9. Canyon Lake:

- Beneficial Uses: MUN, AGR, GWR, REC1, REC2, WARM, WILD
- Hydrologic Unit: 802.11
- Total Water Body Size: 600 acres

242

- Size Impaired: 52 acres
- Extent of Impairment: Unknown at this time
- Data Analyses: Independent study on East Bay indicates bottom depth rising rapidly due to sedimentation
- Potential Sources: urban runoff, non point source, agricultural runoff
- Recommendation: List East Bay of Canyon Lake on 303(d) list as impaired for REC 1, REC 2 and WARM beneficial uses
- TMDL Priority: Medium
- TMDL Start Date: 2008
- TMDL End Date: 2011

FROM : CANYON LAKE POA OPERATIONS PHONE NO. : 000 244 3197

Steven C. Suitt and Associates

Consulting Engineering, Mining and Environmental Geologists, Hydrogeologists and Earth Science Professionals

Fax to
909-781-6288

8CL145
February 17, 1998

Mr. Paul Johnson
Director of Operations
Canyon Lake Property Owners Association
22200 Canyon Club Drive
Canyon Lake, Ca. 92587

Subject: Memorandum, Calculation of Historic and Current Sediment Depths in the East Bay Portion of Canyon Lake Riverside County, California

Dear Paul:

As per your request, Steven C. Suitt and Associates (SCS) has performed calculations with regard to the apparent thickness of lake bottom sediments or alluvial deposits at five Canyon Lake-East Bay locations (Figure 1). These calculations are based on approximate water depth measurements performed by others at the request of the Canyon Lake Property Owners Association (CLPOA) Operations Department during the Fall of 1986 and 1997. Persons, firms or agencies responsible for conducting the depth to water or other measurements utilized for the SCS East Bay "sediment depth" calculations are as follows:

1) Water depths and thickness of sediment measurements were performed in the East Bay by Action Geotechnical on December 18, 1986 (Figures 2 and 3);

2) Water depths were reportedly measured with a "fish finder" at the approximate Action Geotechnical East Bay ocations by a member of the Canyon Lake Property Owners Association Lake-Marina Committee on September 26, 1997 (Figure 4); and,

3) Canyon Lake surface water elevations were provided by Mr. John Rossi of the Elsinore Valley Municipal Water District (EVMWD) for both of the above dates (Figure 5).

Calculations

Based on the above December 18, 1986 water depths and apparent sediment thicknesses, the September 26, 1997 water depth, and the surface water elevations as recorded by the EVMWD in Canyon Lake SCS has prepared three Tables that depict the historic and current subsurface and water depth conditions in the East Bay area of Canyon Lake. Table 1 presents the apparent water depth at "minimum pool elevation" for the Fall of 1986 and 1997. Table 2 depicts the apparent increase in alluvial sediment deposited in the East Bay from December 1986 to September 1997. Table 3 shows the apparent overall thickness of alluvial sediments in the East Bay area since the re-construction of Canyon Lake in 1968.

30020 Windward Drive, Canyon Lake, CA. 92587 · (909) 244-6447 · Fax (909) 244-6047

Memorandum, Calculation of Historic and Current Sediment Depths
Mr. Paul Johnson, CLPOA Director of Operations
February 17, 1998

TABLE 1: Lake Bottom Elevations and Apparent Water Depth at Minimum Lake (Pool) Elevations (1371.50 feet) on December 18, 1986 and September 26, 1997 at East Bay - Action Geotechnical Measurement Locations, Canyon Lake, California.

Survey Date	East Bay Survey Location (1)	Water Depth (1,3)	Lake Surface Water Elevation (2)	Lake Bottom Elevation	Apparent Water Depth at Minimum Lake Elevation (1371.5 feet)
12-18-86	1	4.8 feet(1)	1373.18 feet	1368.38 feet	3.12 feet
12-18-86	2	4.8 feet(1)	1373.18 feet	1368.38 feet	3.12 feet
12-18-86	3	5.0 feet(1)	1373.18 feet	1368.18 feet	3.32 feet
12-18-86	4	5.5 feet(1)	1373.18 feet	1367.68 feet	3.82 feet
12-18-86	5	6.0 feet(1)	1373.18 feet	1367.18 feet	4.32 feet
09-26-97	1	5.5 feet(3)	1376.52 feet	1371.02 feet	0.48 feet
09-26-97	2	6.0 feet(3)	1376.52 feet	1370.52 feet	0.98 feet
09-26-97	3	6.5 feet(3)	1376.52 feet	1370.02 feet	1.48 feet
09-26-97	4	7.0 feet(3)	1376.52 feet	1369.52 feet	1.98 feet
09-26-97	5	7.0 feet(3)	1376.52 feet	1369.52 feet	1.98 feet

Notes: (1) Action Geotechnical Report dated December 19, 1986, Limited Geotechnical Investigation For Canyon Lake Siltation, Canyon Lake, California. (2) Elsinore Valley Municipal Water District Measurement. (3) CLPOA Lake-Marina Committee Member "Fish-Finder" Measurement.

Based on the Table 1 calculations, the apparent water depth at the five East Bay measurement stations during a "low water event" could have ranged from 3.12 to 4.32 feet in December of 1986. In September of 1997, the water depths during a "low water event" could have varied from 0.48 to 1.98 feet in the East Bay.

TABLE 2: Sediment Increase from December 18, 1986 to September 26, 1997 at the East Bay - Action Geotechnical Measurement Locations, Canyon Lake, California.

East Bay Survey Location(1)	Lake Bottom Elevation on December 18, 1986	Lake Bottom Elevation on September 26, 1997	Change in Elevation or Sediment Increase During 11 Year Period
1	1368.38 feet	1371.02 feet	+2.64 feet
2	1368.38 feet	1370.52 feet	+2.14 feet
3	1368.18 feet	1370.02 feet	+1.84 feet
4	1367.68 feet	1369.52 feet	+1.84 feet
5	1367.18 feet	1369.52 feet	+2.34 feet

Notes: (1) Action Geotechnical Report dated December 19, 1986, Limited Geotechnical Investigation For Canyon Lake Siltation, Canyon Lake, California.

As depicted in Table 2, the elevation of the lake bottom at the five East Bay locations has increased from 1.84 to 2.64 feet. In other words, the East Bay has experienced an apparent 1.84 to 2.64-foot increase in sediment during the last 11 years, or an average of 2 to 3 inches of sedimentation per year.

Memorandum, Calculation of Historic and Current Sediment Depths
Mr. Paul Johnson, CLPOA Director of Operations
February 17, 1998

TABLE 3: Approximate Total Thickness of Alluvial Sediments Deposited at the East Bay - Action Geotechnical Measurement Locations, Canyon Lake, California.

East Bay Survey Location[1]	Approximate Thickness of Organic Clay, Sand and Gravel Deposits on December 18, 1986[1]	Sediment Increase from December 18, 1986 to September 26, 1997	Approximate Total Thickness of Alluvial Sediment Deposits at Survey Point
1	6.5 feet	+2.64 feet	9.14 feet
2	2.2 feet	+2.14 feet	4.34 feet
3	2.7 feet	+1.84 feet	4.54 feet
4	1.4 feet	+1.84 feet	3.24 feet
5	1.2 feet	+2.34 feet	3.54 feet

Notes: (1) Action Geotechnical Report dated December 19, 1986, Limited Geotechnical Investigation For Canyon Lake Siltation, Canyon Lake, California. Lake bottom was inferred to occur where the sampling equipment refusal, bedrock or the clay liner was encountered.

Based on the data available to date, the total thickness of alluvial deposits consisting of organic clay, sand and gravel sediments in the East Bay from Indian Beach to the East Port Boat Launch ranges from 3.24 feet to 9.14 feet.

Findings and Discussion

Alluvial sediment thicknesses range from approximately 9 feet (Point 1) near the East Port Boat Launch to 3 to 3.5 feet (Points 4 and 5) near the Indian Beach sampling points. The largest East Bay alluvial deposit thicknesses appear to be related to sedimentation from the Salt Creek watershed, with decreasing sedimentation toward Indian Beach. However, based on a slight increase in sedimentation from Point 4 to Point 5, some sedimentation might be related to deposits originating from the drainage adjacent to Indian Beach. In summary, it appears that up to 9 feet of alluvial sediments have been deposited in the East Bay since the apparent re-construction of Canyon Lake in 1968.

The minimum pool or surface water elevation of Canyon Lake has apparently been established at 1371.5 feet above Mean Sea Level. Table 1 indicates that there will be approximately 0.5 to 2.0 feet (6 to 24 inches) of water in the East Bay during a low surface water elevation event due to accumulated sedimentation. Considering that the East Bay has apparently experienced an average increase of 2 to 3 inches of sedimentation a year over the last eleven years, it appears that portions of the East Bay could be dry or elevated should a low water event occur within the next three to five years.

Memorandum, Calculation of Historic and Current Sediment Depths
Mr. Paul Johnson, CLPOA Director of Operations
February 17, 1998

Recommendation

The calculations presented herein are based on information supplied by others. Additionally, some of the information furnished to the CLPOA Operations Department may not be reliable, such as, measurements or recordings performed with a "fish finder". Hence, it is recommended that subsurface studies or surveys be conducted to verify the thicknesses of sediments in the East Bay area of Canyon Lake. The results of these studies could be used to prepare quantity estimates for the total or partial removal of these accumulated sediments to alleviate any concerns of "dry docks or dry boat launches" during a Canyon Lake "low or minimum pool" surface water event.

Closure and Limitations

This memorandum was prepared based on standard engineering geologic principles and practices, practicing in this locality. No warranty, expressed or implied, in fact or by law, whether of merchantability, fitness for any particular purpose, or otherwise, is given concerning any of the materials or "services" furnished to the client. This memorandum provides engineering geologic calculations and opinions only, based on surface and subsurface data collected by others. No subsurface exploration or testing was performed by SCS to determine or evaluate existing subsurface geologic conditions.

Therefore, no warranty is given or liability accepted for unknown geologic conditions that may underlie the site, changes in existing conditions, or future performance of the property due to any potential changes in the geologic conditions.

This opportunity to be of service is sincerely appreciated. If you should have any questions, please contact the undersigned.

Respectfully submitted,
Steven C. Suitt and Associates

Steven C. Suitt, CEG 1453
Engineering Geologist

REGISTERED GEOLOGIST
STEVEN C. SUITT
NO. EG1453
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Figure 1: Action Geotechnical East Bay Sampling Point Map
Figure 2 and 3: Action Geotechnical East Bay Sampling Point Soil Logs
Figure 4: September 26, 1997 East Bay Water depths Measured by a Member of the Lake-Marina Committee
Figure 5: Canyon Lake Surface Water Elevations Provided by the Elsinore Valley Municipal Water District

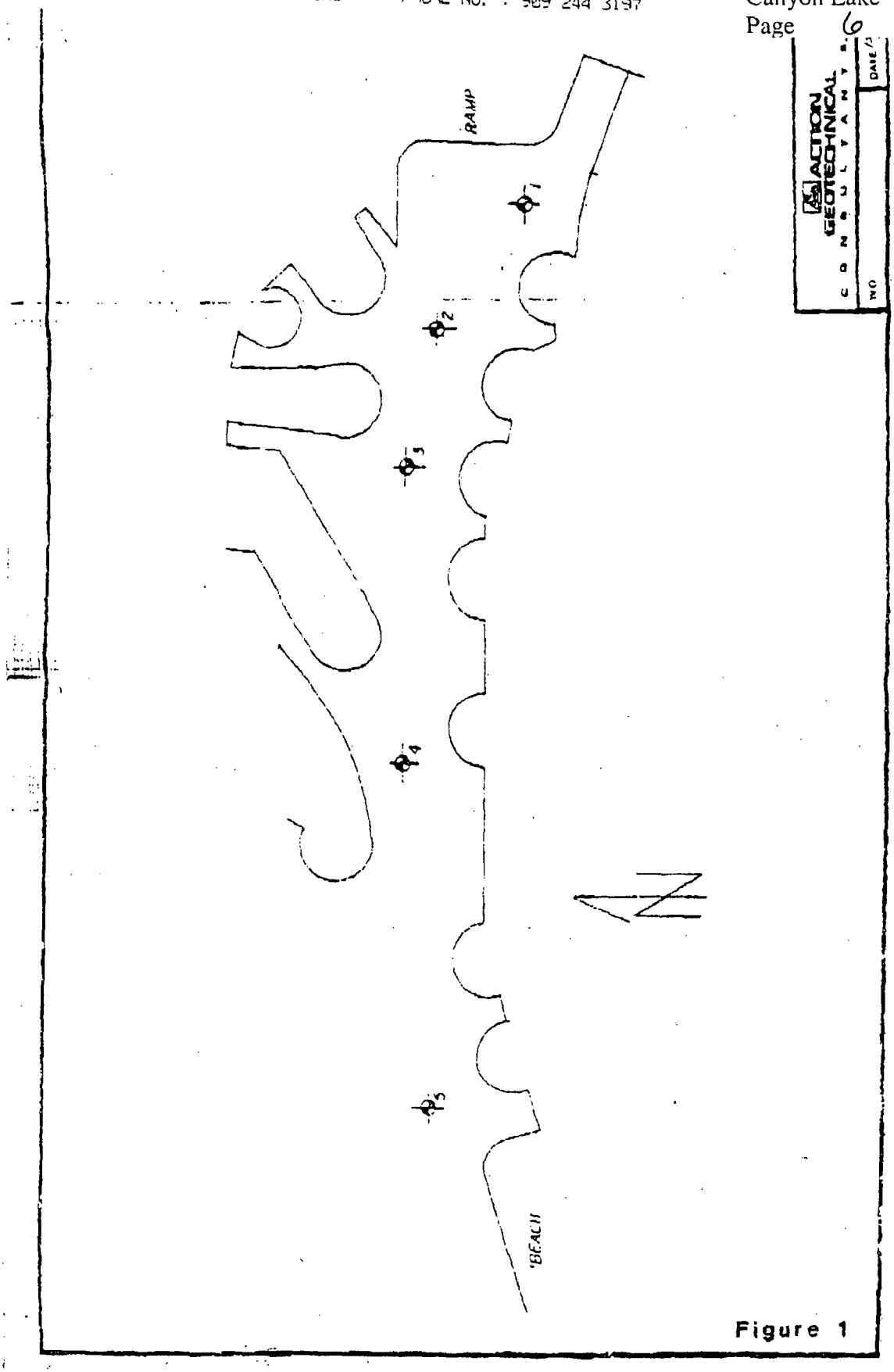
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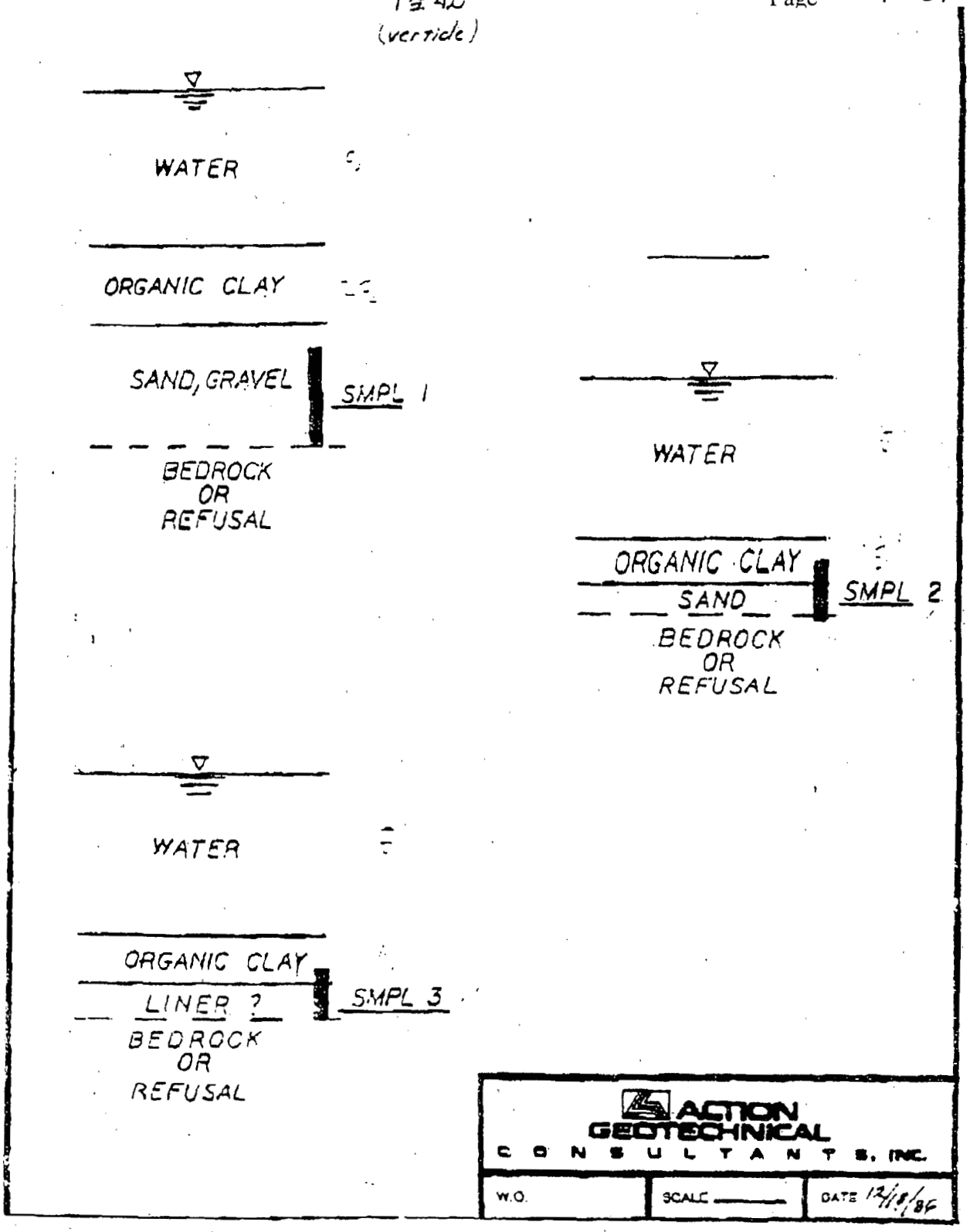
Figure 1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(verride)
WATER
ORGANIC CLAY
SAND, GRAVEL
SMPL 1
BEDROCK
OR
REFUSAL
WATER
ORGANIC CLAY
SAND
SMPL 2
BEDROCK
OR
REFUSAL
WATER
ORGANIC CLAY
LINER ?
SMPL 3
BEDROCK
OR
REFUSAL
ACTION
GEOTECHNICAL
CONSULTANTS, INC.
W.O.
SCALE
DATE 12/18/86

Figure 2

1" = 4'
(vertical)

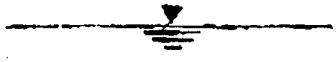
WATER

ORGANIC CLAY

LINER ?

REFUSAL

SMPL 4



WATER

ORGANIC CLAY

LINER ?

REFUSAL

SMPL 5

ACTION GEOTECHNICAL
CONSULTANTS, INC.

W.O.	SCALE	DATE

Figure 3

...ter Depth	East Bay Location				
AT	1	2	3	4	5
Sept. 26, 1997	5.5	6.0	6.5	7.0	7.0
Spillway level (1382)	10.5	11.0	11.5	12.0	12.0
Minimum Pool (1371.5)	~~0~~	~~0.5~~	1.0	1.5	1.5

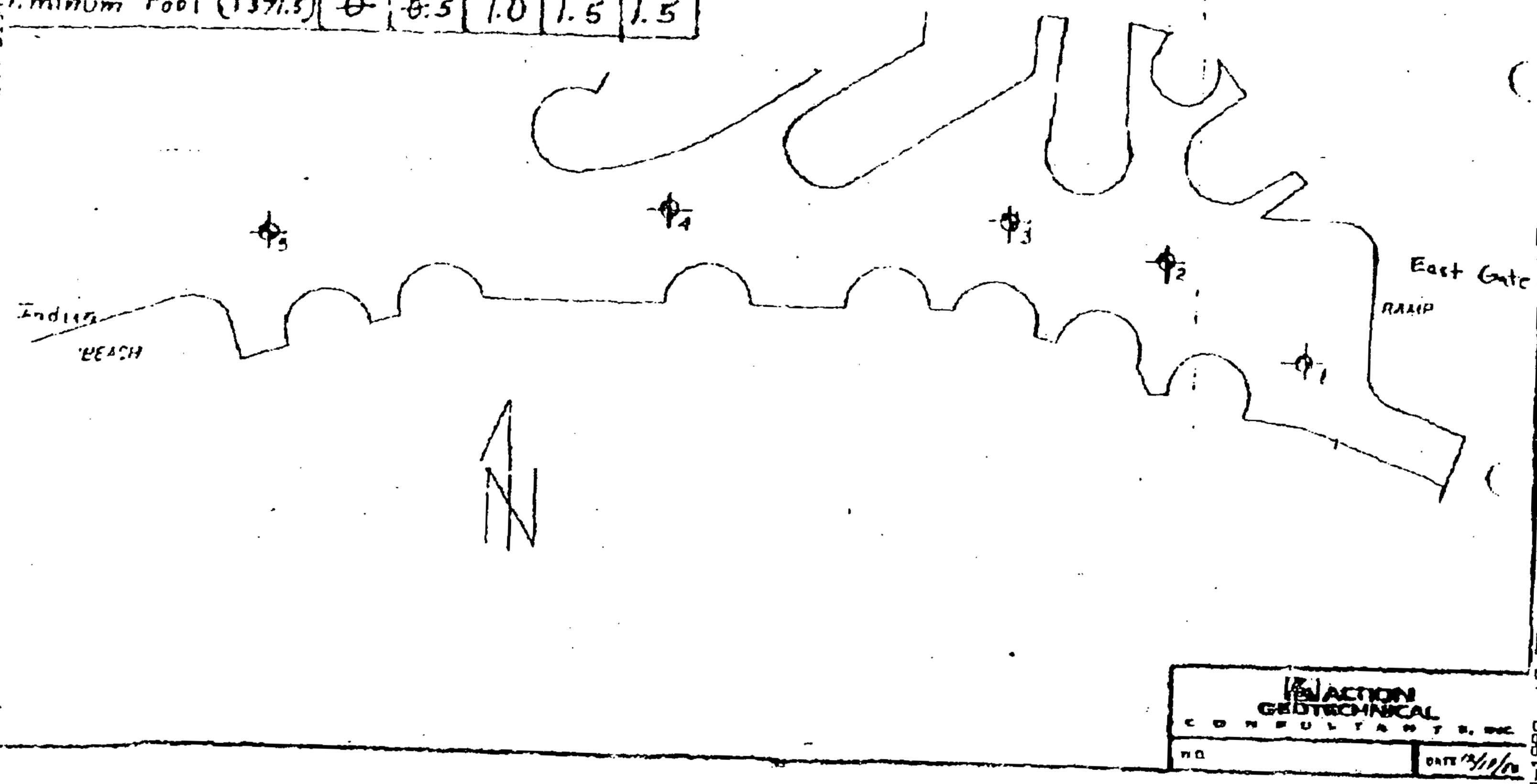


Figure 4

RESTORATION OF CANYON LAKE AND BENEFITS TO LAKE ELSINORE DOWNSTREAM

Prepared for: Lake Elsinore & San Jacinto Watersheds Authority
Administered by: Santa Ana Watershed Project Authority

By

Alex J. Horne

31 January 2001
Revised June 6 2001

Alex Horne Associates, AHA: 867 Bates Avenue, El Cerrito, California 94530.
Phone, 510-525-4433 (FAX 510-527-1085). ahorneassoc@aol.com

1.0. SUMMARY

Canyon Lake is a small reservoir (A = 383 acres) situated on the main inflow to the much larger natural Lake Elsinore (A = 3,000 acres). Due to its upstream position and the dam, Canyon Lake is estimated to intercept 45 tons/year (range 3-103) bioavailable phosphorus that would otherwise pass to Lake Elsinore. The 3-103 tons be compared other sources (17-30 tons from internal loading in summer; 19-37 tons projected from recycled makeup water, and an unknown but probably larger amount from the San Jacinto drainage). Depending on the bioavailability of phosphorus in each of the sources, the P-trapping function of Canyon Lake could be a potentially important contributor in the internal and possibly the external P-budget of Lake Elsinore. Other than the Five-Point Plan to restore Lake Elsinore using Proposition 13 funds, there is no likely action to reduce phosphorus in large amounts from any other sources in the next quinquenium. Since several management actions in the Five-Point Plan require reduction in nutrients within two years, the current existence of a P-trapping mechanism should be considered as much a major benefit to Lake Elsinore as the sediment that carries the phosphorus is a hindrance to Canyon Lake.

Canyon Lake can be classified as a morphometrically mesotrophic lake but most indicators show aspects of eutrophy (nuisance algae blooms, hypolimnion anoxia, high soluble ammonia and phosphate in the summer hypolimnion, soluble iron and manganese, Secchi depth < 2 m, Chlorophyll *a* > 35 ug/L). Because the nutrient loading to the lake is high the lake produces abundant algae that sink to the bottom, decay and use up all the dissolved oxygen in the deep water. The depth of the water in the main lake allows permanent summer thermal stratification and makes the deeper water costly to treat as a drinking water supply for Elsinore Valley Municipal Water District. Typical water quality problems for drinking water from Canyon Lake are the presence of soluble iron and manganese, high pH, high turbidity, taste and odor and possible blue-green algal toxicity. In terms of recreation, low water clarity and nuisance algae are most important in the deeper lake and sediment accumulation interfering with boating, hydrogen sulfide odor and occasional submerged weed growth are most important in the extensive shallow East Bay. Algae in Canyon Lake, like Lake Elsinore, is currently likely to be growth-limited by both P and N depending on season and time of year. However, if biomanipulation and other restoration of L. Elsinore is successful, it will revert to strong N-limitation. In practice therefore, both N and P should always be removed.

Restoration of Canyon Lake is possible and would allow it to continue to reduce eutrophication and P-loading to Lake Elsinore. Watershed protection from erosion and external nutrient loading is the ideal solution and should be pursued within the Santa Ana Regional Water Quality Control Board's ongoing TMDL process. However, it will take a long time for any TMDL to be fully effective over such a vast watershed. Thus some in-lake solutions are needed for at least the next 15-30 years. Two main and three minor in-lake solutions are proposed. The two major solutions are deep water or hypolimnion oxygenation and inlet zone dredging. The three minor solutions are spring and fall mixing, local wetland filtration, and biomanipulation. Dredging to balance the current astonishingly high rate of sedimentation (2 to 3 inches per year, over 60 times the rate for

a normal lake) will improve use of the lake and will allow future storage space for phosphorus-containing sediments to be stored and kept out of Lake Elsinore. It should be possible to sell some sediment. A pilot program should be undertaken along with some monitoring of the sediment nutrient bioavailability (N & P). Protection of the public drinking water supply in Canyon Lake can be achieved by reducing the amount of algae in the lake, primarily by limiting internal nutrient loading in summer and fall. The installation of a hypolimnetic oxygenation system will reduce the current internal concentration of highly bioavailable soluble phosphate (~ 0.6 mg/L) that is currently exported to Lake Elsinore each winter when releases are made. It is estimated that this loading is about 2 tons/y to Lake Elsinore. If an oxygenation system is installed in Lake Elsinore to suppress internal P-loading, this addition of 2 tons of bioavailable-P will become more important. Hypolimnetic oxygenation in Canyon Lake will have substantial benefits to use of the lake as a drinking water source since DOC and other undesirable algal products (DOC and THMP, turbidity, neuro- and hepato-toxins) and algae-induced chemicals (iron and manganese, sulfide) will be substantially reduced by oxygenation. Removal of sediment in the East Bay of Canyon Lake will also reduce phosphorus-driven eutrophication in the reservoir by reducing P-loading and shallow water nutrient recycling. Spring and fall mixing to enhance natural bottom oxygenation can make use of existing compressors and would run for a month before and after oxygenation. Local wetland filtration of surface water will remove surface algae but depends on the existence or creation of local wetlands. Wetlands have multiple purposes and could even be use to generate mitigation bank credits as well as increase property values away from the lakeshore. Biomanipulation, with its increase in natural zooplankton to filter lake algae, will occur anyway with the provision of deep oxygenated water refuge for large *Daphnia*. Removal of excess small fish throughout the lake and of carp in the shallow regions will enhance biomanipulation. As the lake water clarity improves, it is likely that submerged weeds will become more common. These weeds will provide refuge for *Daphnia* in the shallow East Bay and can be managed by harvesting.

Costs for dredging reflect the high sediment influx and 30 years of Canyon Lake's existence as particulate trap for Lake Elsinore. To remove the estimated half million cubic yards of sediment trapped by the lake over 30 years would be very costly ($2-5 million, unless sale of sand was possible) but a phased approach removing smaller amounts equal to the annual sediment loading (~ 17,000 cu yd.) would also work. Annual cost would be $60,000 to $170,000, depending on dredging cost. It is recommended that a pilot project to remove about 20,000 cubic yards be implemented at once to determine overall feasibility of the full-scale cleanup. If the pilot is successful, it is recommended that at least five years worth of sediment and attached phosphorus be removed. Sediment bioavailable-P removal is of interest to The Joint Powers Agency and other agencies interested in the cleanup of the San Jacinto watershed. A sinking fund would then be needed to maintain the new status quo. An efficient hypolimnetic oxygenation is estimated to be in the $250,000 to $500,000 range for construction with low operational costs ($20,000-$50,000/y). The minor solutions spring and fall mixing local wetland filtration, and biomanipulation can be expected to be in the $10,000-$25,000 range excluding any capital cost for land),

2.0 RECOMMENDATIONS

Three immediate actions are recommended for Canyon Lake:

1. Chemical and soils testing of the recently accumulated sediment in the East Bay. Needed will be a particle size analysis, measurements of heavy metals (17 can be measured simultaneously with plasma methods, and mercury can be tested separately), and estimation of the quantity and bioavailability of the sediment phosphorus and nitrogen.

2. Begin a pilot dredging program to remove about 20,000 cubic yards (one year's worth of sediments) to get a realistic idea of the costs of removal of the entire 30 years of sediment and the feasibility of using the East Basin as a long-term sedimentation and removal basin for the upstream regions.

3. Design and install a hypolimnetic oxygenation device. This methodology will offer the best return to improve water quality in Canyon Lake.

Over the next rainy period the following action is recommended:

4. Watershed nutrient & sediment budgets. The City of Canyon Lake support the efforts of others, including the Regional Board, to determine a P and N budget for the lake and its watershed.

Over the next two years the following is recommended:

5. Estimate utility of use of submerged propellers for spring and fall mixing when the hypolimnetic oxygenation device is off
6. Estimate utility of off-line wetlands for temporary summer algae filtration.
7. Estimate feasibility of biomanipulation for long-term sustained algae control.

TABLE OF CONTENTS

LIST OF FIGURES & TABLES

Acknowledgments

This report was written by Dr. Alex Horne based on data supplied by The City of Canyon Lake, Dr. Cindy Li of the The Santa Ana Regional Water Quality Control Board, The Elsinore Valley Municipal Water District, and the open literature. The author thanks the various reviewers of the draft report for their helpful critiques.

3.0. INTRODUCTION

Canyon Lake is a reservoir constructed in 1927 as a railroad canyon dam since train track and trestles covered the now flooded narrow valley bottom. About 1,300 residents enjoy the lake amenities along 15 miles of shoreline with about 1,000 homes built on the waterfront. Main activities are boating, fishing, and water-skiing. Thus the water quality of the lake is of paramount interest to the lake users. In addition the lake is a water source for Elsinore Valley Municipal Water District that also has a strong interest in high water quality. Although both main classes of lake users need high quality water, there specific needs differ. For example the dissolved organic carbon content (DOC) of the water is regulated for drinking water purposes at levels that are unimportant for typical recreational uses. In contrast, certain parts of the lake have become silted in by the storm runoff cause problems for boating but lie above the water elevation used for drinking water storage. Both groups, and the public in general, however, have an interest in the overall health of the lake since shallow water, for example can increase nutrient recycling. In turn, increased nutrients can degrade water quality.

The limnological situation at Canyon Lake can thus be summarized in the following way. The main lake is quite deep and steep sided and would be expected to be mesotrophic or oligotrophic on a morphometric basis. Over time the lake has probably become more eutrophic with more nuisance algae. The cause of eutrophication is excess nutrients from the drainage basin and internal recycling (internal loading). Excess nutrients and sediments from external sources can only be reduced with in the long term via the TMDL process. In the meantime some in-lake restoration is required. Internal sources can be reduced by other in-lake procedures.

Because Canyon Lake is a small reservoir situated at the terminus of a semi-arid drainage the influx of sediment can be large. Areas of low rainfall such as the San Jacinto River generally have large areas of barren or lightly vegetated ground and are susceptible to erosion during the occasional severe storms. Thus the natural watershed contribution to Canyon Lake drainage can be expected to consist of infrequent but large amounts of sediments. The sediment contribution following development in the watershed in the past few decades will have increased substantially over the natural rates. Because phosphorus is strongly bound to sediments in soils, eroded sediment is the major pathway of phosphorus to lakes. However, the Canyon Lake watershed is also developed with dairy farms, some other agriculture and housing. These land uses tend to increase the yield of soluble matter including soluble phosphate and nitrate. The result is that Canyon Lake receives large amounts of sediments in both wet and flood years.

4.0 THE CURRENT STATUS OF CANYON LAKE

4.1 CANYON LAKE AS A STORM DETENTION BASIN: SEDIMENT AND TOTAL PHOSPHORUS RETAINED

Canyon Lake (A = 283 acres) is situated on the San Jacinto River and is a minor volumetric contributor (~7%) to the much larger natural Lake Elsinore (A = 3,000 acres). Lake Elsinore also suffers from eutrophication and considerable efforts are being made to reduce the inflow of nutrients including phosphorus to Lake Elsinore. Although not its original purpose, Canyon Lake dam acts as a storm retention basin for sediments bound for Lake Elsinore. Because of the density of the sediments and the design of Canyon Lake, the majority of sediments build up in the delta of the main inflow and are not distributed over the entire lake or passed downstream of the dam.

A survey was made of the sediment depth in the upper reaches of Canyon Lake in 1986 and again in 1997 (Suitt & Assoc., 1998). The difference between the two dates indicates an average annual accumulation of 2 to 3 inches of sediment over an area of 52 acres. Using an annual average value of 2.4 inches, the accumulation is equivalent to an annual sediment load to Canyon Lake of approximately 17,000 cubic yards. Using a density of 1.6 g/cc (2.3 tons/cubic yard) the annual weight of sediment deposited is 38,000 tons.

Three assuming were made in converting the sediment into total phosphorus (TP) and then into bioavailable phosphate:

1. TP in sediments was 0.1 % (The world average for P in the earth's crust)
2. TP in sediments was 0.1% (a low value, perhaps typical if the sediment was high in sandy matter)
3. TP in sediments was 0.43% (measured amount in Canyon Lake deep sediments, likely to overestimate value for the presumably coarser delta sediments in keys).
4. It was assumed that only 80% of the TP in the sediments was bioavailable [this is a reasonable assumption for many types of sediment, but if the sediment-P is dominated by apatite (calcium phosphate), the assumption will be too high since much of the TP will be biologically unavailable].

Based on the above assumptions, the annual amount of bioavailable phosphate deposited in the in the sediments of Canyon was estimated as between 3 and 103 tons (assumptions in same order as above):

1. 30.4 tons
2. 3.0 tons
3. 103 tons

The average of these three values is approximately 45 tons that will be used as a figure for discussion until further data is gathered to refine the number.

Thus In the absence of the Canyon Lake dam the 45 tons of total phosphorus would pass directly to Lake Elsinore and increase its eutrophic state. Recently, the Elsinore Valley Municipal Water District has estimated that Canyon Lake intercepts about half of the annual total P-load to Lake Elsinore. The most important contributors of phosphorus were considered to be dairy farms.

The 43 tons of total phosphorus (range 3-103) the settles in Canyon Lake annually is thus prevented from entering Lake Elsinore. In terms of Lake Ellsinore's phosphorus budget, the 3-103 tons held in Canyon Lake can be compared with the 17-30 tons that enters Lake Elsinore from the sediments during internal loading in summer, the 19-39 tons that would enter Lake Elsinore from recycled water during normal and dry years. The amount of bioavailable-P entering from the San Jacinto River the main inflow to Lake Elsinore is not known but could be much larger than all the above sources combined. However, there are various sites along the river where sediment could be stored. The complete P-budget of Lake Elsinore is not know but other sources, wind-blown dust, fish stocking, local septic tank leachate, local small sources of storm erosion, and summer nuisance runoff from irrigation are likely to be small relative to the large items just discussed.

The P-trapping function of Canyon Lake thus appears important in compared with the internal p-budget of Lake Elsinore and may be important in the external loading budget. It is vital that better data be collected for the San Jacinto River, although the recent dry years have handicapped any collections. Thus the P-trapping in Canyon Lake should be considered as much a benefit to Lake Elsinore as the sediment containing the phosphorus is a hindrance to Canyon Lake. In terms of constructing sediment detention ponds upstream the P-trapping function of Canyon Lake saves a considerable amount of construction and maintenance upstream. It is also not clear at what time in the future actual storm water detention ponds would be constructed since there is no fixed implementation schedule for most TMDL construction projects at present.

4.2. Water Quality Problems at Canyon Lake

Deeper, thermally stratified part of the lake. The main water quality problems at Canyon Lake are related to the large annual influx of sediments and other nutrients that enter the lake. Canyon Lake has two main sections a shallow upstream area and a deeper section that extends back from the dam where water depth reaches about 50 feet.

The main deeper water section of Canyon Lake could be expected to have moderate to good water quality based on its shape. Normally, deep steep-sided lakes have good water quality since the nutrients entering in the summer are trapped in the deeper water. So only a spring algae bloom occurs with relatively good water quality for the remainder of the year. The magnitude of the spring bloom depends on the amount of nutrients carried in each winter together with nutrients mixed in from the deeper water. It is important to note that flushing of nutrients from lakes by winter storms or summer releases has generally little effect on the lake's trophic state.

The main problems in the deeper water of Canyon Lake are due to algae, which in turn are fed by excessive nutrients (Table 1). The winter supply of nutrients and sediments that contain nutrients is one cause. The second cause is that nutrients are regenerated in the sediments in deep water in the summer. Sediment nutrient generation or internal loading is primarily caused by a lack of oxygen in summer in the deep-water hypolimnion.

Table 1. Examples of water quality problems in the deeper water section of Canyon Lake in 1995-2000 (Data from Dr. Cindy Li, Santa Ana Regional Water Quality Control Board).

Parameter	Measured value	Depth/date	Desirable value
Dissolved oxygen	0.2 mg/L	42 feet/Sept.	2-7 mg/L
Soluble phosphate	1.3 mg/L	Hypolimnion/Aug	20-50 ug/L
Ammonia	4.3 mg/L	Hypolimnion/Aug	20-100 ug/L
Chlorophyll a	37 ug/L	Surface water	10-20 ug/L
Iron	1.4 mg/L	Hypolimnion, summer	0.05 mg/L
Manganese	0.35 mg/L	Hypolimnion, summer	0.05 mgL
Blue-green algae	Surface blooms	Fall	No visible blooms

The upper shallow keys section of the lake. The main problems for the shallow area of the lake are that they are becoming shallower more rapidly. Shallow water in some parts of the lake can degrade the entire lake by increased nutrient recycling and by allowing the growth of macrophytes (waterweeds). Submerged aquatic plants can produce odors that are undesirable in a drinking water supply both directly and by providing a site for attached blue-green algae. Submerged weeds, if extensive are also a nuisance for swimmers and boaters, especially if the propulsion unit becomes entangled in long stringy weeds. An outbreak of submerged weed did occur about 10 years ago but so far weeds have not been a nuisance. It is not clear why this is so but shallow waters usually become dominated with weed when the water is shallow. As the water becomes clearer if other cleanup measures such as hypolimnetic oxygenation are put into operation, then increase submerged macrophyte growth is probably inevitable.

The increase in sediment in Canyon Lake is very large indeed, especially in the 15% of the East Bay and inlet regions. A survey of the lake bathymetry was made in 1986 and 1997 at five stations in the East Bay section (Table 2).

Table 2. Thickness and increase in sediment over 11 years in the East Bay section of Canyon Lake.

Site location	Thickness of deposited organic clay, sand and gravel, Dec 1986 (feet)	Sediment increase in 11 years to Sept. 1997 (Feet)	Total thickness of alluvial sediments
1	6.5	+2.6	9.1
2	2.2	+2.1	4.3
3	2.7	+1.8	4.5
4	1.4	+1.8	3.2
5	1.2	+2.3	3.5

The bottom elevation was found to have increase from 1.8 to 2.6 feet over the eleven years, a rate of 2-3 inches/year (4.6-6.9 cm/y; Suitt & Assoc. Feb 17 1999). Total sedimentation in the East Bay over the 30 years life of the reservoir was estimated at 3.2 to 9.1 feet or 1.3 to 3.6 inches per year (3 to 8.4 cm/y (Table 2).

The amount of sediment retained in upper East Bay Canyon Lake can be compared with the values found elsewhere. A range of sediment values is shown in Table 3. The values found in the East Bay of Canyon Lake are astoundingly high and are about 65 times more than would occur in a normal lake. Even if the influx of sediment had been spread over the entire lake the rate is eight times the normal rate. Such very high sedimentation rates have been approached in Mountain Lake in the Presidio in San Francisco only because a road was constructed through the lake. The sand deposited to form the roadbed spread over the lake, filling it in several feet in a few years. Only deliberate sediment traps such as the Daguerre Dam on the Yuba River in northern California show higher deposition rates than the East Bay of Canyon Lake (Table 3). However, there are some other reservoirs in highly erosive conditions (e.g. Lake Pillsbury on the Eel River) that have experienced severe filling of side arms.

Table 3. Rate of sedimentation in the East Bay section of Canyon Lake compared with other sites. Values based on surveys. It was assumed that the East Bay section covered 52 acres or 14% of the entire lake.

Rate of sedimentation	Inches/ year	cm/yr	Comments
Based on East Bay			
Based on last 11 years	2-3	5-7.5	Based on survey of 52 acres in E. Bay
Based on 30 years	1.3-3.6	3.2-9	As above
Averaged over entire lake			
Based on last 11 years	0.27-0.41	0.68-1.0	Assumes E. Bay sediment spread through the lake
Based on 30 years	0.18-0.49	0.44-1.2	As above
Values elsewhere			
Typical lake		0.1	Mostly winter silt and dead summer algae
Strumpshaw Broad, UK		0.5	Heavy agricultural loading
Small Michigan lake		0.6	Very eutrophic lake
Mountain Lake, SF, recent years		1.9	Result of a road built through the lake
Daguerre sediment dam	30	75	Built to trap hydraulic mining debris in early 1990s. Was filled in six years.

4.3. ALGAL GROWTH LIMITING NUTRIENT IN CANYON LAKE AND LAKE ELSINORE

The most successful method to improve water quality in almost all drinking water and recreational lakes and reservoirs is to reduce the amount of algae (Cooke et al., 1999). In turn, in deeper lakes such as Canyon Lake, direct reduction of nutrients such as nitrate or phosphate has been shown to be effective in reducing algae (Horne & Goldman, 1994).

The situation in shallow lakes is complicated by the need to ensure reduction in sediment recycling which is probably best ensured by biomanipulation combined with strong initial nutrient reduction.

Algae in Canyon Lake, like Lake Elsinore, are currently likely to be growth-limited by both P and N depending on season and time of year. However, if biomanipulation and other restoration of L. Elsinore is successful, it will revert to strong N-limitation. In practice therefore, both N and P should always be removed in future projects. The combination of wetlands and settling basins provides methods for N and P removal, respectively. Thus the P removal capacity of Canyon Lake (sedimentation) will always be needed to assist Lake Elsinore but should be combined with N-removal, by oxygenation for example.

5.0 SOLUTIONS TO CANYON LAKE'S WATER QUALITY PROBLEMS

5.1. SELECTION OF THE METHODS FOR ENHANCEMENT OF CANYON LAKE

The problems that can be addressed by watershed and lake management for Canyon Lake are shown in Table 4. The chief problems are too much sediment and nutrients from the watershed and too much internal loading in summer in the lake itself.

Table 4. Current problems in Canyon Lake and their probable causes.

Problem to be addressed	Probable cause	Other possible causes
Eutrophication	High nutrients from runoff & high internal loading of nutrients	
Algae	Excessive nutrients from watershed & anoxic lake bed	Sedimentation in East Bay enhances nutrient fluxes from shallow sediments
High internal nutrient loading	Anoxia on lake bed & hypolimnion	
DOC/THMs*	Algae extra-cellular products	
Iron & manganese	Anoxia on lake bed	
Sulfides & odors	Anoxia on lake bed	
Silting in of lake	Sediment from watershed	

*Dissolved organic carbon (DOC) can produce Trihalomethanes (THMs) when if DOC is high (> ~ 4-6 mg/L) when the water is chlorinated for disinfection during drinking water treatment. THMs have been linked with human health problems including birth problems and possibly cancer.

Eutrophication and sedimentation in lakes and reservoirs can be reversed by two methods:

1. Watershed actions – Five methods of reduction of nutrients and sediment in the inflows
2. In-Lake actions – 17 lake management techniques and technologies

5.2. WATERSHED ACTION TO REDUCE EUTROPHICATION AND SEDIMENTATION IN CANYON LAKE

There are five general methods of watershed action that can be taken. These are:

Treat sewage
Divert non-point sewage (move from septic tanks to sewers)
Decrease landscape/agricultural fertilizer input
Block entry of storm runoff & sediment out particles
Use of wetlands as "biological filters"

Applicability of five watershed treatment methods for the Canyon Lake drainage basin

Treat sewage. Secondary treatment is currently provided for the residents and shoreline homeowners in Canyon Lake. No sewage treatment plant effluent is discharged directly into Canyon Lake. There is thus little room for improvement in the local region. However, treated sewage and animal wastes form part of the flow of the San Jacinto River that flows into Canyon Lake from its vast watershed of over 500,000 acres.

Divert non-point sewage. Most homes outside cities are permitted to use septic tanks for sewage disposal so long as the land area and soil types are adequate. Septic tanks contribute nutrients and can cause eutrophication downstream. In addition, agriculture of both row crops and livestock contribute nutrients downstream that can also cause eutrophication. Non-points of diffuse sources of nutrients are generally septic tanks or farms and ranches. Septic tanks are adequate methods of treatment for the reduced oxygen-demanding components of sewage and if they are sited on large plots. However, septic systems are ineffective for nutrient removal of all waste components even if there are sufficient trees in the leach line to remove soluble nitrate. In the winter trees do not take up water from the ground allowing soluble nutrients to flow to the local groundwater and eventually the lake. One method to reduce diffuse septic tank pollution is to connect the septic tanks to sewers.

Decrease landscape/agricultural fertilizer input. The other main diffuse source of nutrients in most drainages is "nuisance flows" from landscaping irrigation and runoff from farms. Reduction or elimination of row crop fertilizer runoff or groundwater seepage and livestock wastes can be accomplished with retention/treatment ponds and nutrient removal wetlands. Unfortunately, these actions are difficult in a large watershed. However, there is hope that the TMDL process will eventually reduce upstream diffuse pollution. Until that time some other, probably in-lake methods will be needed.

In the dry climate of Canyon Lake, runoff from agriculture is likely to occur only in winter following storms. However, although occasional, such flow can contain enormous amounts of nutrient and pathogen waste. There are several dairies and other agricultural operations in the vast watershed. It is recommended that control of

agricultural and other diffuse nutrient sources be mainly directed through the ongoing Santa Ana Regional Water Quality Control Board's TMDL process.

Block entry of storm runoff & sediment out particles. Soil particles are bathed in soil water, which contains nutrients at much higher concentrations than even eutrophic lake waters. An exception is the summer anoxic waters of Canyon Lake where ammonia and soluble phosphate probably exceed the amounts sorbed to the sediments. The removal of storm flow particles is important since they contain sorbed nutrients that are released when the particle meets the lower nutrient milieu of the lake. In addition, once in the lake, sediments particles are decomposed by bacteria releasing nutrients in summer and adding to the lake's internal nutrient loading.

Best Management Practices (BMPs) are used to control sediment losses. Contour plowing, better road cutting, and enforcement of house construction are examples of BMPs commonly used. Constructed detention ponds and wetlands to hold urban and agricultural runoff are examples of structural BMPs. It is recommended that BMPs be also considered in the TMDL process not directly dealt with in the management of Lake Elsinore.

Use of wetlands as "biological filters". Wetlands in wet or dry conditions have proven effective at removing particles and soluble nutrients as well as heavy metals, organics, pesticides and pathogens. However, a detention time of one to four weeks is needed for soluble nutrient removal. Only a few hours is needed to sediment particles in wetlands.

In conjunction with the TMDL process it is recommended that wetlands be employed in the drainage basin where possible. It is unlikely that riparian wetlands will contribute much in terms of nutrient removal in storm flows. However, flat vegetation-filled wetlands upstream of Canyon Lake would assist in the reduction of eutrophication in the lake. Wetlands do consume water (~ 3-5 feet per acre per year in this region) so the water quality improvements must be balanced against water losses.

5.3. In-Lake Treatments

There are 17 commonly accepted methods for the reduction of eutrophication in lakes using know technologies and management strategies. Some methods are well known while others are just beginning to be used for most lakes and reservoirs. The methods are shown immediately below and their possible application to Canyon Lake are show in Table 5.

A. Physical methods

Common and widely applicable methods

1. Dredging
2. Water level draw down & water level fluctuation
3. Destratification & lake mixing
4. Macrophyte (water weed) harvesting
5. Wetland algae filters (off-line wetlands)

Minor or restricted methods

6. Algae (phytoplankton) harvesting
7. Selective withdrawal of hypolimnion water
8. Dilution/flushing
9. Sediment sealing (fabric liners, barriers)

B. Chemical methods

10. Herbicides (for algae or macrophytes)
11. Oxygenation or aeration
12. Shading (dyes)
13. Sediment sealing (chemical; alum, phosloc for PO_4 binding)

C. Biological methods

Direct

14. Pathogens of algae or macrophytes (virus, bacteriophages, bacteria)
15. Grazers on algae of macrophytes (, grass carp, Talapia, beetles)
16. Nutrient harvesting (fish, minor method, unlikely to work)

Indirect

17. Biomanipulation (top down controls to favor algae-filtering *Daphnia*). Includes harvesting excess small fish and bottom-grubbing carp.

The 17 methods were listed above and the utility for Canyon Lake are summarized in Table 5.

Table 5. Review of the applicability of the in-lake methods for Canyon Lake, southern California.

Method	Applicability for Canyon	Use?
Dredging	Use in East Bay to remove up to 9 feet of sediment. Carry out in stages? Will remove main source of P to Canyon Lake (& Lake Elsinore). Cost is high for complete removal	Yes
Water level draw down & water level fluctuation	East Bay already too shallow for draw down, no weed problems (yet). Most of shoreline is bulkhead with no weed potential	No
Summer destratification & lake mixing	Will likely increase algae, possibility of odors. Climate too warm to make this method energy efficient. Replace with hypolimnetic oxygenation.	No
Spring & fall short term destratification & lake mixing	Will reduce blue-green algae in spring and fall by extending natural winter mixing when mixing is energetically feasible.	Yes
Macrophyte (water weed) harvesting	No weeds at present, possible need in future	Maybe
Wetland algae filters (off-line wetlands)	Not feasible due to pumping costs? Need to explore possible sites and other values of wetland	Maybe
Algae (phytoplankton) harvesting	Cost is high and effectiveness low for small Canyon Lake. Algae must accumulate predictably	No
Selective withdrawal of hypolimnion water	No spare water to lose, water is withdrawn at present from hypolimnion. Water quality problems and smells with summer releases.	No
Dilution/flushing	Possible flushing with Colorado River since volume of Canyon Lake is small. Water not always available and would be required most years in absence of other methods.	Maybe
Sediment sealing (fabric liners, barriers)	No weed problems at present. Could be used if weeds grow alongside docks & swim areas	No
Herbicides (for algae or macrophytes)	Most cannot be used in a drinking water supply. Copper sulfate or similar are used but should be kept for emergencies	Limited
Oxygenation or aeration	Main in-lake method to reverse eutrophication by reducing internal nutrient loading	Yes
Shading (dyes)	Lake too large for this method, lasts only few months.	No
Sediment sealing (alum, phosloc)	High cost, would be ineffective following first storm. Lake is N limited not P-limited so effect not as good as in some other sites.	No
Pathogens of algae or macrophytes	Ineffective for blue-green algae due to resistance buildup. None known for macrophytes	No
Grazers on algae or macrophytes	Not applicable except within concept of biomanipulation (see below)	No
Nutrient harvesting from fish or other biota	N and P removal very small compared to other nutrient sources. Fish stocking may balance harvesting.	No
Biomanipulation	Successful in shallow lakes, less so in deeper lakes. Needs hypolimnetic oxygenation for a refuge from fish predation for the algae grazing zooplankton.	Yes

6.0 RECOMMENDED METHODS OF WATERSHED AND IN-LAKE TREATMENT FOR CANYON LAKE

Two main approaches are recommended. These are:

- Installation of a hypolimnetic oxygenation system (Speece Cone-type submerged oxygen-water mixing system or similar device)
- Phased dredging of the shallow East Bay sediments

Three minor approaches are recommended. These are:

- Extended winter mixing in early spring and late fall using compressed air
- Examination of local regions for algae-filtering wetlands
- Biomanipulation: Small fish stock reduction and carp removal

6.1 Installation of a submerged hypolimnetic oxygenation system

The installation of a hypolimnetic oxygenation system is the most cost-effective way to improve the drinking water quality of Canyon Lake while also improving the water quality for recreational uses. The Speece Cone is one example that has been used for eight years and there are other less efficient systems that use Venturi or oxygen bubbles to achieve similar results. The Speece Cone is not a proprietary device but is the general name for a submersible oxygen-water mixing system originally devised by Professor Richard Speece at Vanderbilt University in Tennessee. Various forms of the device and other similar systems have been used in the Tennessee Valley Authorities Reservoirs, in Camanche Reservoir on the Mokelumne River (East Bay Municipal Water District, Oakland, CA) and in Washington State. At this time the exact size and oxygen demand of the reservoir is not known so the sizing is based on similar sized systems elsewhere. In particular the large Speece Cone operating in Camanche Reservoir since 1993 has been used for operation and maintenance estimates and the design of several yet to be built cones for smaller reservoirs has been used for capital costs and installation. The actual system for Canyon Lake should be specifically designed for the lake's own shape and depth. Because there are new innovations in hypolimnetic oxygenation devices Professor Speece (Department of Civil & Environmental Engineering, Vanderbilt University, Tennessee) or some other expert (e.g. Mark Mobely, private consultant formerly at TVA), Dr. Marc Beutel, (my former doctoral student now at EWAG, Switzerland), Bill Faisst, (consultant, Brown & Caldwell, Walnut Creek CA) or similar oxygenation experts) should be requested to assist with the design. It is vital to note that aeration and oxygenation expertise is not the same and persons with experience at oxygenation are more useful than those familiar with the more common aeration methods.

The basic principle of a Speece Cone-type system is that water is pumped from the very deepest part of the reservoir into the top of a small steel cone (~ 10 feet high for Canyon Lake) that has been dropped to the bottom of the lake on a concrete base. The anoxic

water flows down the cone and is met by a stream of bubbles of pure oxygen that, since they are buoyant, are floating towards the top of the cone. The countercurrent thus established is a very efficient way to dissolve all of the oxygen with no waste and no bubbles escaping. The water, now fully saturated with oxygen at the high pressure of the lakebed, is forced out of a manifold set just above the lakebed. The high oxygen water meets with lower oxygen water and entrains about 10 times its own volume within a few feet of the manifold. The manifold jets are set horizontally since it is the lakebed that is most important in eutrophication reduction using oxygen. A new innovation is that the manifold size can be considerably reduced in size making the entire system very compact.

Hypolimnetic oxygenation device system in Canyon Lake. There are several possible devices for this purpose including a Speece Cone or other devices that achieve the same result. A system should be installed near the dam in the deepest section of the lake to take advantage of the reduction in power required. In deep water the pressure of the water increases the amount of oxygen dissolved, reducing the amount of water to be pumped to the cone. Oxygen is pumped from the lakeshore either as evaporated liquid oxygen that is stored in a tank at the lakeshore or gaseous oxygen that is made by PSV compressors on the lakeshore. The location of the oxygen station, electrical controls for the pump and the evaporator for the liquid oxygen is not critical and can be set in a convenient spot away from the public view.

Costs of a hypolimnetic oxygenation device. The size of the system is not known at this time. It is anticipated, by analogy with other reservoirs, that between 0.25 and 2 tonnes of oxygen per day will be needed. Overall estimated cost will also depend on the mix of capital options (for example the PSV on site oxygen generator) versus bi-weekly liquid oxygen deliveries. Other yet to be decided costs are the length and cost of the electrical supply to the underwater pump. The location of the underwater entry is critical to reducing costs. Overall a preliminary estimate of $250,000 to $500,000 can be made

6.2. Phased dredging for Canyon Lake

Dredging of the East Bay of Canyon Lake is the only feasible way to restore that section of the lake to recreational use. In addition, the removal of large amounts of phosphorus that will recycle in the shallow water would benefit drinking water quality in the lake. For example areas that were nine feet deep at low water a decade ago are now about a foot deep. The environmental geologists who recently surveyed the site state that "...portions of the East Bay could be dry or elevated should a low water event occur within the next three to five years." (Suitt & Assoc. 1998).

The water depth cannot be raised without flooding the lakeside homes, so the only option for these shallow water lakeside homes is to remove some of the accumulated sediments. The erosion upstream that created the shallow water is not the fault of the Canyon Lake residents and some redress from upstream actions that have accelerated the erosion seems fair. In addition, the action of Canyon Lake in trapping sediment and especially about 45

tons per year of bioavailable phosphorus has a beneficial effect on Lake Elsinore downstream.

The ideal solution would be construct sediment traps and storm water detention basins upstream and relieve Canyon Lake of the sediment and phosphorus load. However, such detention basins have not even been proposed and may be part of a future TMDL. In the next decade or two it might be appropriate for the residents and users of the entire upstream region to use the East Bay of Canyon Lake as an already constructed sedimentation basin. In this way some of the large costs for dredging could be shared for the public benefit and for Lake Ellsinore's protection as well as assisting the residents of Canyon Lake.

Sediment removal and cost of removal. The total amount of sediment that has entered Canyon Lake since its construction about 30 years ago is not known. However, the amount of heavier sediment that has settled near the inflow in the East Bay section has been estimated to be in excess of 500,000 cubic yards (17,000 cubic yards annually over 30 years). This is a very large amount of sediment to have accumulated in such a short time as was noted above. Typical current costs for sediment removal range from $3.50 to $10 per cubic yard giving a cost range for dredging of $2 to $5 million. These costs assume that the sediments do not contain any toxicants such a heavy metal (copper, zinc, lead etc.) and that disposal sites can be found locally. The costs also do not include any profit that could be made from the sale of some dredged material such as sand.

Phased approach. Given the high cost of removing the entire sediment accumulation, a phased approach may be most appropriate. The initial sediment removal project should target those areas that are most likely to go dry in the next five years. There is no doubt that some of the burden of cost should be born by the Canyon Lake dwellers, perhaps in proportion to the amount of sediment that would have arrived at the lake under natural undisturbed conditions. The sediment TMDL for the watershed will determine this amount.

Two immediate actions are recommended:

- **Chemical and soils testing of the recently accumulated sediment** in the East Bay. Needed will be a particle size analysis, measurements of heavy metals (17 can be measured simultaneously with plasma methods, and mercury can be tested separately), and estimation of the quantity and bioavailability of the sediment phosphorus and nitrogen.
- Beginning a pilot program to remove about one year's worth of sediments to get a realistic idea of the costs of removal of the entire 30 years of sediment and the feasibility of using the East Basin as a long-term sedimentation and removal basin for the upstream regions.

Over the next rainy period the following action is recommended:

- The City of Canyon Lake support the efforts of others, including the Regional Board, to determine a P and N budget for the lake and its watershed.

The 45 tons of phosphorus contained in the sediments and withheld from Lake Elsinore is a valuable contribution to making Lake Elsinore less eutrophic than it otherwise would be. In addition, the projects proposed using State Proposition 13 funds, which will be used to restore Lake Elsinore, would be much less successful if the 45 tons of additional phosphorus was not held back by Canyon Lake Dam.

Following the results of the pilot dredging program, a regular program of dredging the East Bay of Canyon Lake may be implemented as the best long-term solution for both lakes and their eroding watersheds. The Canyon Lake group should begin to consider setting up a sinking fund to provide matching funds for other grants that will fund the dredging of the lake.

6.3. Spring and fall extended winter lake mixing for Canyon Lake

Lakes in Mediterranean climates tend to mix top-to-bottom (holomixis) for only two or three winter months. The time that atmospheric oxygen is stirred naturally by the wind over the anoxic sediments is thus short. In more northern climates holomixis may last for up to six months. In addition, Canyon Lake is quite sheltered from winds and is deep for its surface area. It is not possible to stir lakes in Mediterranean or tropical climates in summer using compressed air or similar devices. The sun is simply too strong and sets up too large a temperature gradient for mechanical mixing to be efficient. However, in spring and fall the sun is lower and the thermal gradient is easier to overcome using mechanical means. Assuming that the lake is in good condition due to installation of the Speece Cone hypolimnetic oxygenation system, additional mixing for a month in early spring and late fall using the existing air compressor would befit the water quality of the lake.

During the warm summer stratified period the stratification is used to the lake users benefit and maintained. In the March-April and November months, the Speece Cone system should not operated but will be replaced with the holomixis device. The results from tests of operating the reservoir in holomixis mode in early spring and late fall should be evaluated using chlorophyll a, Secchi depth, bottom oxygen levels, and blue-green algae as one set of indicators.

Cost of spring and fall holomixis. A large compressor is already installed in Canyon Lake. Previous attempts to use compressed air bubbles to destratify the lake, without first oxygenating the hypolimnion, produced less than ideal results. In addition, it is working against nature to destratify such a strongly stratified lake. Working against the sun is inefficient when one can work with it (hypolimnetic oxygenation makes use of the stratified layer). Cost for operating the current system for two months per year is estimated in the $5,000 range.

6.4. Local wetlands as algae filters in summer at Canyon Lake

One sure method to reduce nuisance algae growths is to filter them out directly using a wetland with a few days retention time. It is not clear that there is any land available, but considering the large benefits gained in property values situated near wetlands, sites may be available away from the water's edge but close enough that pumping costs are minimized. Various solar and wind devices are available for the pumping to be at least partially renewable energy. Up to 95% of the algae can be removed. The method has been employed in large Lake Apopka in Florida and is proposed for Lake Elsinore.

Cost of local wetlands filtration. The main cost in wetlands construction is the purchase of the land. In the case of Canyon Lake 20-50 acres would be needed. This land could be away from the lake and the wetland, which can also be designed to look like a lake with islands, could be the focus of a housing development. The cost of the land is thus variable and could even be free if a wetland mitigation bank were set up. The other cost for the lake filtration would be pumping the lake surface water up to the lake. Obviously the elevation and distance of the lake to the wetlands would decide the pumping costs. The amount of water to be pumped is equivalent to about 10% of the lake epilimnion.

6.5. Biomanipulation

Wetlands filtration is an effective method to filter out algae that requires energy. Biomanipulation can serve a similar function but is essentially self-sustaining, once in place. The method uses the filtering ability of small animals in the water, the zooplankton to remove algae. These zooplankton, particularly the large individuals of the genus *Daphnia*, are already present in the lake. The essence of the lake manipulations needed is to make large Daphnia more abundant by providing better conditions for them. If the method is successful, large *Daphnia* can filter the upper lake water layer in about a week. Large *Daphnia* are more desirable in biomanipulation because they can filter a lot more water and algae than smaller forms.

The main requirement for the lake manager is to adjust the reservoir habitat to favor large *Daphnia*. A single factor controls the survival and abundance of these highly useful small animals; a safe refuge from small fish predation during daylight hours. If large zooplankton are present in open water when it is light enough for small fish to see them, they will be eaten.

Hypolimnetic oxygenation. One component needed for *Daphnia* survival will be provided if a Speece Cone oxygenation system is installed. Daphnia will be able to migrate down the water column into healthy but dark hypolimnion water during the day. At present the hypolimnion of Canyon Lake has no oxygen so the zooplankton cannot take refuge there. For example, even at 18 feet down there was only 0.2 mg/L dissolved oxygen at station 7 near the dam in September 2000. Zooplankton can survive, probably uncomfortably at about 2 mg/L oxygen but fish cannot. Thus the conversion of the hypolimnion to about 5 mg/L dissolved oxygen will provide a zooplankton refuge.

Fish population balancing. Even with an oxygenated hypolimnion, fish grazing pressure at dawn and dusk can decimate zooplankton when they are migrating from deep to shallow water. Severe reductions in useful zooplankton occur when there are too many small fish and too few large ones. Such a situation with an excess of stunted small fish often occurs in reservoirs and is frequently managed to improve fishing. In Canyon Lake the removal of excess small fish by summer netting is the major active lake management action required. It is not necessary to remove all the small fish, just sufficient to balance the lake to a more natural ratio. Also always useful for biomanipulation is to reduce or eliminate introduced carp. The adult carp stirs nutrients from the lakebed, especially in the shallows and increases eutrophication. Netting or fishing out any large carp is almost always beneficial to the lake.

Biomanipulation in the shallow East Bay. The East Bay is too shallow, even if dredged back to its original depth, to be permanently stratified. Water quality is poor at present with less than three feet of water clarity. The East Bay must be cleaned up if the entire lake is to become much less eutrophic so water transparency will improve with oxygenation. However, there is the problem of how to provide a refuge for *Daphnia* if the water is clear to the sediments.

Under clear water conditions aquatic macrophytes are likely to grow. Although submerged weeds can be a nuisance if they interfere with boating, aquatic vegetation in the right place provide a daytime refuge for *Daphnia* and also improve the fishing. It may be necessary to control submerged weeds as the lake water quality improves from dredging and oxygenation. There are several methods for control but mechanical weed harvesting may be the most appropriate action in a drinking water reservoir where use of chemical is problematic.

Costs of biomanipulation. The costs of biomanipulation are small, that is one of the most attractive features of the technique. The costs of fish populations balancing, primarily small fish removal, is estimated at $15,000 for the first year will smaller amounts in following years. Not all years will require fish population balancing and cooperation with the local California Fish and Game Department is good. In addition, local schools and colleges may wish to use the project as part of class or research exercises. For example, the fish population in the lake could be measured before and after manipulation using experimental gill nets with various sized openings.

7.0. REFERENCES

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Horne, A. J. & C. R. Goldman. 1994. *Limnology* (2nd Ed.). McGraw-Hill. NY. 576 pp.

Suitt & Associates, 1998. Calculation of historic and current sediment depths in the East Bay portion of Canyon Lake, Riverside County, California. Rept to City of Canyon Lake. 17 February 1998

CA N8.31

Date:

WATER BODY FACT SHEET

REGION: 8

TYPE OF RESOURCE: lake
RESOURCE VALUE:

W A T E R B O D Y
NAME: Canyon Lake (Railroad Canyon Reservoir) 1/

DAM NAME IF DIFFERENT: Railroad Cyn 818-000 2/

USGS QUADRANGLE: Elsinore, Romoland COUNTY Riverside

OWNER: Temescal Water Co. OPERATOR IF DIFFERENT:

PUBLIC ACCESS/FEES: private (open to homeowners)

SURFACE AREA (in acres): ~~583~~ 525 VOLUME (in acre-feet): 11837

MEAN DEPTH (in feet): MAXIMUM DEPTH (in feet):

PRINCIPAL INFLOW(S):

San Jacinto River

PRINCIPAL OUTFLOW(S):

San Jacinto River

DISCHARGERS WITHIN 25 RIVERMILES:

Permit No.	Agency Name	Facility Name	Discharge Q

1/ In BP, not in WQA 2/ DWR 17-88

BENEFICIAL USES:

~~REC-1, REC-2, WARM~~

~~MUN, AGR, GWR,~~ REC1, REC2, WARM, WILD

DESCRIPTION OF AVAILABLE DATA:

Elsinore Valley Muni WD 8/11/86

RB 9/22/86, 9/26/86, 10/3/86, 7/6/87; 6/23/88

Temescal Water Co 4/29/88, 5/16/88, 7/13/88, 8/25/88, 10/18/88

DESCRIPTION OF WATER QUALITY:

DO extremely low below thermocline (~20-25'),
Total phosphates-P exceeded EPA guideline of 25 ug/l at all stations (range from 60 - 160 ug/l).
8 out of 10 stations exceeded Cl ion obj. in B.P.

WATER QUALITY PROBLEM(S):

low DO at depth before turnover; excessive nutrients (phosphates); excessive chlorides

DESCRIPTION OF PROBLEM:

BENEFICIAL USE(S) AFFECTED:

WARM, AG, REC-2

PROBABLE SOURCE(S):

Upstream camping & ORVs in area upstream of N Cyn Lake causeway; evap of source water; ~~[illegible]~~ low qual GW

CURRENT ACTIONS:

EMWD planning for live discharge of 3o effl to San J. River fr several area plants; reuse in basin with remainder going to SJ River

PROGRAM(S) DIRECTLY INVOLVED IN CURRENT ACTIONS:

ADDITIONAL ACTIONS:

PROGRAMS DIRECTLY AFFECTED BY STATE AND REGIONAL BOARD ADDITIONAL ACTIONS:

COSTS PER YEAR, CONTRACT ($):________ PY:_____ DURATION:_____

California Regional Water Quality Control Board
Santa Ana River

Date
1/1

LAKE INVENTORY

LAKE NAME Canyon Lake
DAM NAME
COUNTY Riverside
LAKE OR RES. Reservoir
OWNER Temescal Water Co. and Canyon Lake Homeowner's Association.

OPERATOR Canyon Lake Homeowner's Association
ACCESS Closed except open to homeowners
SURFACE AREA (acres) 383
VOLUME (acre-feet)
DEPTH MEAN: MAX:
USGS QUADRANGLE Elsinore, Romoland

PRINCIPAL INFLOW AND SOURCES
San Jacinto River

PRINCIPAL OUTFLOW San Jacinto River

USES OF LAKE Fishing
RECREATIONAL USE(S) Restricted and non-restricted recreational use

ANALYST(S)
REPORTS TO

9/19/89

Analysis of 6/23/88
Canyon Lake Data

Sta	ammon N mg/l	Temp	pH	WARM crit. c	WARM crit. a
2	.2	25°	8.5	"	"
3	.2	26°	8.5	"	"
4	.2	26°	8.6	"	
5	.2	26°	8.6	"	
6	.3	24°	8.6	"	
7	.3	26°	8.6	"	
9	.2	26°	8.7	"	
10	.3	26°	9.0	.37	1.01
~~11~~	~~.3~~	~~27°~~	~~8.4~~		

∴ all measures are below chronic limit for WARM

Sta	ammon N	NO_3 N	NO_2 N	TIN	TP
Sta1	.2	<.1	<.1	.2+	.16
2	.2	<.1	<.1	.2+	~~.16~~ .07
3	.2	<.1	<.1	.2+	.07
4	.2	<.1	<.1	.2+	.06
5	.2	<.1	<.1	.2+	.06
6	.3	<.1	<.1	.2+	.06
7	.3	<.1	<.1	.3+	.06
9	.2	<.1	<.1	.2+	.14
10	.3	<.1	<.1	.3+	.15

∴ all stas exceed EPA criterion of ~~25~~ ug/l total P
No sta exceeds BP obj for TIN of 8 mg/l

Briefing Paper for meeting 5/6/88 Canyon Lake 8-54

MEMORANDUM

SUBJECT: Removal of the Municipal and Domestic Supply (MUN) Beneficial Use Designation for Canyon Lake

FROM: Mary Butterwick
California Section
Water Quality Planning and Standards Branch

TO: Catherine Kuhlman, Chief
Water Quality Planning and Standards Branch

The Santa Ana Regional Water Quality Control Board (Regional Board 8) will be updating their Water Quality Control Plan (Basin Plan) for the San Jacinto River Basin this year. One of the anticipated water quality standards (WQS) revisions is the removal of the Municipal and Domestic Supply (MUN) beneficial use designation for Canyon Lake, also known as Railroad Canyon Reservoir, which is a reservoir in the San Jacinto River Basin.

The objective of this memo is to help develop Branch policy necessary to provide guidance to the Region Board regarding this WQS revision that is consistent with the requirements of the Clean Water Act (§303(c)(2)).

EPA needs to determine whether or not the removal of MUN, an existing designated use, is an approvable WQS revision. Ultimately, the Regional Administrator will be required to review and approve or disapprove the WQS revisions adopted by this Regional Board and approved by the State Board.

This paper provides background information on this issue, a review of the State and Federal requirements, and develops options and recommendations for management's consideration.

The Problem

The Eastern Municipal Water District (EMWD) proposes to implement the San Jacinto Water Reclamation Program. This water reclamation program, as proposed, may necessitate the removal of the MUN use from Canyon Lake to allow five wastewater treatment facilities to discharge treated sewage effluent into the San Jacinto River which is tributary to

Canyon Lake. The Basin Plan prohibits the discharge of treated wastewater to lakes or reservoirs or streams flowing into or out of lakes or reservoirs which are used for domestic water supplies. California Department of Health Services (CDHS) guidelines also prohibit the discharge of wastewater into lakes and reservoirs.

Removing the MUN use to accommodate the proposed water reclamation program will transform Canyon Lake into an effluent dominated water body and is expected to degrade the water quality in the San Jacinto River and in Canyon Lake. EPA approval of such a WQS revision would be setting a precedent for allowing the removal of a designated use that is an existing use and would be inconsistent with Federal regulations (40 CFR 131(h)(1)).

In December 1987 EPA received a notice of preparation of a draft Environmental Impact Report on the San Jacinto Water Reclamation Program. Our January 1988 comment letter expressed concerns regarding compliance with applicable WQS and cited the existing use requirements of 40 CFR 131.10(h). In a subsequent conversation with the Regional Board's Executive Officer, EPA suggested that the designation on municipal supply may be removed if the water quality criteria/objectives in the Basin Plan remain high enough to protect the water quality at its current level. This suggestion is one of the options examined in this paper.

Background

During the 1920's the Temascal Water Company constructed a dam across the San Jacinto River, forming Canyon Lake. At that time the water was used primarily for agricultural purposes. In the early 1960's residential development along the shores of Canyon Lake led to the formation of the Canyon Lake Property Owner's Association (CLPOA). The CLPOA leased surface water rights from Temascal Water Company to use the lake for body contact recreation and fishing (REC I) and as a source of domestic supply (MUN). The Elsinore Valley Municipal Water District (EVMWD) provides the water treatment for this public water supply. Treatment includes flocculation, sedimentation, filtration, and chlorination.

The lake level is currently maintained by seasonal flows from the San Jacinto River and imported water from the Municipal Water District. EVMWD has a storage agreement with Temascal Water Company to store 3000 acre feet of water in Canyon Lake. When the lake levels fall below this quantity EVMWD is required to purchase additional water to make up the difference.

The EMWD is currently in the process of purchasing Canyon Lake from the Temascal Water Company. The CLPOA leased surface water rights will not be affected by the transfer in ownership.

San Jacinto Water Reclamation Program

The EMWD presently operates four regional wastewater treatment and disposal facilities in the San Jacinto River drainage basin. These four plants are: 1) Sunnymead Regional Water Reclamation Facility, 2) Hemet-San Jacinto Regional Water Reclamation Facility, 3) Perris Valley Regional Water Reclamation Facility, and 4) Sun City Regional Water Reclamation Facility (Map 1). Current wastewater flows at these facilities total 15.8 mgd. Wastewater treated at these facilities is disposed of by spray irrigation and percolation. To accommodate future growth in this portion of Riverside County, EMWD anticipates a need to increase the capacity of the above mentioned treatment facilities and to construct an entirely new facility at Winchester. The projected total flows will be 155.0 mgd.

The EMWD does not consider it feasible to use land treatment as a means of disposing of this volume of wastewater. The EMWD proposes to construct advanced wastewater treatment facilities at each site to provide a source of reclaimed water that would be discharged into the San Jacinto River. The quality of the reclaimed water would meet applicable WQS to protect the MUN use but would not be potable.

Once the water reclamation program is operational, Reaches 3 and 4 of the San Jacinto River would have a constant flow of between 25 cubic feet per second (cfs) and 241 cfs. The

CLPOA would benefit from this project because Canyon Lake could be maintained at its maximum water level to enhance recreational opportunities. EMWD would supply the CLPOA with an alternative source of drinking water that is of comparable water quality. The increased flows would also relieve the EVMWD of the need to purchase water to comply with its water storage agreement.

The EMWD has contracted with K. S. Dunbar and Associates to prepare an environmental impact report (EIR) on this reclamation program. Until the draft EIR is completed many of the specifics on the project will not be available. The document is currently scheduled to come out in July, 1988.

Water Quality

In Reaches 3 and 4 the San Jacinto River is an ephemeral stream and, therefore, little water quality data is available for this water body. Attachment 1 is a summary of water quality data collected by the Riverside County Flood Control and Water Conservation District in 1956, 1966, and 1969. These data are not sufficient to characterize the existing water quality in this portion of the San Jacinto River.

Water quality in Canyon Lake is monitored on a yearly basis by the EVMWD. The EVMWD provided data from samples taken in June or July for the years 1979-1981 and 1983-1987. The samples have been analyzed for a variety of parameters, nine of which are water quality objectives in the Basin Plan. Attachment 2 lists the available data for these water quality objectives. The water quality objectives have been exceeded for chloride in 1985-1987 and for copper in 1981 and 1984. Other applicable water quality objectives such as filtered BOD and COD, boron, phenolics, and the narrative toxicity objective have not been monitored. The EVMWD considers Canyon Lake to be of suitable water quality for a public water supply.

The alternate water supply provided by EMWD is expected to be of comparable water quality. The CLPOA will not be receiving an improved drinking water supply as a result of this water reclamation program.

The notice of preparation of the draft Environmental Impact Report for this project briefly discusses impacts to water quality. Discharges of reclaimed water from the wastewater treatment facilities is expected to change the quality of the flow in Reaches 3 and 4 of the San Jacinto River substantially particularly in terms of sodium, chloride, sulfate, boron, and total hardness. Discharges of reclaimed water into the reservoir would also have a deleterious effect with respect to total filterable residue, sodium, and chloride.

However, in recent discussions, Dunbar stated that the water quality impacts in Canyon Lake would not be significant because the increased quantity of water flowing though the reservoir would prevent stagnant conditions from developing and would offset any impacts of pollutant loadings.

Regional Board staff have mentioned that beneficial uses in Reaches 3 and 4 of the San Jacinto River may be enhanced because the perennial water flow could support REC-1 and WARM uses. These uses are not currently designated for these stretches of the river.

Additional water quality concerns, not addressed in the notice, are the effects the increased nutrient loadings to Canyon Lake would have on BOD and COD levels and the eutrophic condition in this water body. At this point in time the EMWD plans to construct advanced wastewater treatment facilities that will include dechlorination, removal of total nitrogen to the 1.5 mg/l level, and removal of phosphorus to the 0.5 mg/l level. Even so, discharges of reclaimed water will increase the levels of nitrogen and phosphorus entering the reservoir. The burden of proof will be on EMWD to demonstrate that the anticipated pollutent loadings to Canyon Lake will not lower water quality or adversely affect beneficial uses.

At the request of the EMWD, Regional Board staff has issued tentative discharge requirements for disposal of treated wastewater by EMWD (Attachment 3). Effluent limits for those parameters considered most critical for planning purposes (i.e. BOD5, Suspended Solids, Total Nitrogen, Total Phosphorus, Total Dissolved Solids) are specified under three discharge scenarios:

1. Direct discharge to Canyon Lake
2. Direct discharge to Lake Elsinore
3. Direct discharge to Temescal Canyon Creek.

The tentative limits for discharges to Canyon Lake are more stringent than the applicable water quality objectives for this water body.

State Policy

The CDHS recently (February 1987) issued guidelines for wastewater disinfection for health protection. The guidelines recommend that no discharge of sewage effluent be allowed to a lake or reservoir used for domestic supply. The prohibition is based on the 1967 State Board of Public Health (SBPH) policy to protect the beneficial uses of mountain streams, lakes and reservoirs (Attachment 4). In adopting this policy the SBPH recognized the importance of maintaining high water quality in lakes and reservoirs and protecting these sources from degradation.

A stated goal of the policy is that direct discharge of waste waters of sewage origin into these waters is not necessary and none should be permitted. An assumption is that since impounded waters are more subject to water quality problems resulting from the accumulation of organics and toxics, the protection of these water sources requires more stringent prohibitions. The CDHS has found little justification for changing its prohibition, as evidenced by the 1987 guidelines.

Regional Board 8 has expanded on this policy by prohibiting not only the discharge of sewage to lakes and reservoirs designated MUN, but also the discharge of sewage to streams flowing into or out of such lakes or reservoirs.

Notwithstanding this state policy, CDHS in a letter regarding the subject project stated that "the proposed treatment provides adequate public health protection for the intended use of the reclaimed water" (Attachment 5). In order to prevent any possibility of misunderstanding that Canyon Lake could still be used as a source of domestic water

supply after the introduction of reclaimed water, CDHS recommended that Eastern's water supply to EVMWD be referred to as a "replacement" source of supply. The CDHS did not express any concern over the discharge of treated wastewater into Canyon Lake.

On May 4, 1988 the SWRCB will be considering adoption of the "sources of drinking water" policy (Attachment 6). The policy specifically requires the Regional Boards to assure "that any changes in beneficial use designations for waters of the State are consistent with all applicable regulations adopted by the Environmental Protection Agency".

Federal Requirements

The Federal regulations contain certain existing use requirements that are pertinent to the issue of removing the MUN use designation for Canyon Lake. The following assumptions address the applicable portions of 40 CFR 131.3 and 131.10.

A. The Canyon Lake MUN use is an "existing" use as defined in the Federal regulation.

   Existing uses are defined as those uses actually attained in the water body on or after November 28, 1975 (40 CFR 131.3(e)). For several years the CLPOA has used Canyon Lake as a public water supply and continues to do so. The Canyon Lake MUN use clearly qualifies as an "existing" use.

   There is a question as to whether the Canyon Lake MUN use would continue to be an "existing" use should the CLPOA decide to use an alternate public water supply. The Federal regulations do not identify the conditions under which an "existing" use may be terminated, perhaps because of the emphasis placed on the protection and maintenence of "existing" uses.

   The EPA guidance document, Questions & Answers on: Antidegradation, includes this interpretation of the term "an existing use".

> An existing use can be established by demonstrating that fishing, swimming, or other uses have actually occurred since November 28, 1975 or that the water quality is suitable to allow such uses to occur.

It follows from this interpretation that if Canyon Lake has the water quality to support the MUN use then that use would continue to be an "existing" use whether the CLPOA was using Canyon as a public water supply or not

B. The Canyon Lake MUN use is a designated use as defined in the Federal regulation.

Designated uses are defined as those uses specified in water quality standards for each water body (40 CFR 131.3(f)). The approved WQS for Canyon Lake include MUN as a designated beneficial use.

C. The existing use requirements of 40 CFR 131.10(h)(1) apply to all beneficial uses not just the instream uses listed in §101 (a)(2) of the CWA.

One of the purposes of adopting WQS is to protect public health and welfare (§303(c)(2)(A) of the CWA, 40 CFR 130.3). Therefore, when establishing WQS, the State is required to consider the use and value of such standards for public water supplies as well as for propogation of fish and wildlife, recreational purposes, and other purposes.

The California State Water Resources Control Board has adopted 21 standard beneficial uses that apply to the uses listed in §303 of the CWA and in Section 13050 of the California Porter-Cologne Water Quality Act. In California, the public water supply use is covered in the Municipal and Domestic Supply (MUN) beneficial use.

Portions of the Federal regulations that deal with use attainability requirements (40 CFR 131.10 (g) & (j)) apply only to that subset of uses specified in §101(a)(2) of the CWA (i.e., the instream water uses). However, the existing use requirements of 40 CFR 131.10(h)(1) use the term "designated uses", which in California include all the standard beneficial uses that have been adopted for a particular water body.

According to 40 CFR 131.10(h)(1), States are prohibited from removing designated uses if they are existing uses as defined in 40 CFR 131.3, unless a use requiring more stringent criteria is added. Relatively sensitive uses such as WARM and REC I have already been designated for Canyon Lake. It is unlikely that another use requiring more stringent criteria could be added. Therefore, compliance with 40 CFR 131.10(h)(1) would preclude the removal of MUN as a beneficial use designation for Canyon Lake.

EPA has been fairly consistent in protecting existing uses. EPA approved the deletion of drinking water as a beneficial use for a water body in Vermont. However, in this case, the State added aquatic life and body contact recreation uses and, therefore, satisfied the federal requirement to add uses requiring more stringent criteria.

Discussions with Standards Branch staff in HQ indicate that Region 9 approval of the deletion of MUN from Canyon Lake would be setting a precedent within the agency and would be inconsistent with Federal regulations. In a HQ memorandum dated April 22, 1988, Standards Branch again stated that existing uses cannot be removed (Attachment 7).

Options

The four options presented here assume that Regional Board 8 has not made a final decision to pursue the deletion of MUN as a beneficial use for Canyon Lake and wants to adopt WQS revisions that will be approvable by the State Board and EPA.

A. EPA could recommend that the MUN designation for Canyon Lake not be removed and provide guidance to the Regional Board as to why the use should not be removed and ultimately why such a WQS revision would not be approveable.

Advantages

1. The option is consistent with Federal regulations (40 CFR 131.10(h)(1));

2. with §303(c)(2) of the CWA which requires EPA to assure that WQS revisions enhance water quality;

3. with SBPH policy on protecting lakes and reservoirs from degradation;

4. and with CDHS wastewater disinfection guidelines and Basin Plan prohibitions to protect lakes and reservoirs which are used for domestic water supply from discharges of sewage.

5. Existing water quality in Canyon Lake would be maintained.

6. Water reclamation and future growth in the area would still be possible.

Disadvantages

1. EMWD would not be able to discharge reclaimed water into the San Jacinto River upstream of Canyon Lake.

2. EMWD would have to develop alternate means of disposing of the waste water (i.e., enlarged land disposal facilities, piping effluent downstream of Canyon Lake). $53,000,000 ← don't type
400,000 people, 200,000 households

don't type
$132/person
$265/household

3. EMWD and other publics may view the EPA position as overly protective and unnecessarily preventing future growth.

4. Local interest may pursue specific legislation to exempt the San Jacinto Water Reclamation Program from the federal regulation requirement to maintain existing uses.

5. EPA may be under considerable pressure from local and state agencies to support the removal of the MUN designation for Canyon Lake.

6. Recreational opportunities for CLPOA would not be enhanced by maintaining a stable lake level.

B. EPA could recommend that Regional Board 8 amend the Basin Plan to provide a site specific requirement that allows the discharge of treated wastewater to Canyon Lake and to adopt sufficient objectives that to protect water quality at its current level.

Advantages

1. By removing the Basin Plan prohibition EMWD would be able to discharge reclaimed wastewater into the San Jacinto River upstream of Canyon Lake.

2. Existing water quality in Canyon Lake would be maintained.

3. The MUN use would be maintained so compliance with 40 CFR 131.10(h)(1) would not be an issue.

4. Recreational opportunities for CLPOA could be enhanced by maintaining a stable lake level in Canyon Lake.

5. EVMWD would not have to purchase water to comply with its Canyon Lake water storage agreement with Temascal Water Company.

6. CDHS has not opposed the discharge of treated wastewater into Canyon Lake.

Disadvantages

1. The EIR notice states that the reclamation program, as proposed, is expected to impact water quality in the San Jacinto River and Canyon Lake.

2. The Regional Board may need to adopt more stringent water quality objectives to ensure that the effluent dominated water source will not degrade the existing water quality in Canyon Lake.

3. The level of protection needed to prevent degradation may be beyond the technical capabilities of EMWD.

4. This Basin Plan amendment would not follow current CDHS guidelines and is counter to the spirit of the SBPH policy.

5. This Basin Plan amendment may not be approved by the SWRCB.

C. EPA could approve the removal of the MUN designation on the condition that the water quality objectives in the Basin Plan remain high enough to protect water quality at its current level.

Advantages

1. Advantages 1,2,4,5 listed under Option B apply here.

2. Existing water quality would be protected from degradation.

Disadvantages

don't type
Residents Controlling Growth
S. CA. Coalition for Responsible Growth
Controlled

1. EPA would be subject to a lawsuit. EPA approval of the removal of the MUN designation is inconsistent with Federal regulations (40 CFR 131.10(h)(1)) and would be indefensible in court. EPA may be more vulnerable to litigation now because proponents of 'slow growth' in southern California have recently become organized and are challenging proposed developments in this area. This public is expected to closely scrutinize agency decisions affecting future growth in Riverside, San Bernardino, Orange, San Diego, and Los Angeles counties.

2. EPA would be setting a precedent for approving the removal of an existing designated use. Option C is counter to EPA's longstanding policy of protecting and

maintaining existing uses and assuring that WQS reflect uses being attained. Option C would significantly weaken the Agency's ability to disapprove future WQS submittals involving the removal of existing designated uses.

3. This Basin Plan amendment may not be approved by the SWRCB. It is inconsistent with the SWRCB draft policy entitled "Sources of Drinking Water".

4. Data are not adequate to describe the current level of water quality in Canyon Lake.

5. Disadvantages 1-3 listed under Option B apply here.

6. The option is not consistent with the SBPH policy to protect lakes and reservoirs from discharge of waste water of sewage origin.

7. The option is not consistent with CDHS guidelines and Basin Plan prohibitions adopted to protect drinking water supplies in lakes and reservoirs.

8. EPA approval of this WQS revision may not be consistent with provisions of §303(c)(2) of the CWA which states that WQS shall protect the public health and welfare, enhance the quality of water, and serve the purposes of the CWA. Removing the MUN designation will allow Canyon Lake to be converted from an existing public water supply to an effluent dominated water body and can hardly be seen as enhancing water quality.

D. EPA could decide not to provide Regional Board 8 with additional guidance in regards to the subject WQS revision.

Advantages

1. None.

Disadvantages

1. The 'no action' alternative is not a tenable option. EPA has a specific mandate under §303(c) of the CWA to review and to approve or disapprove State adopted

WQS. We have a responsibility to clearly articulate to the State the criteria EPA uses in reviewing WQS submittals.

2. Thus far EPA has expressed to Regional Board 8 two different views regarding the deletion of the MUN use from Canyon Lake. EPA needs to resolve these inconsistencies and to present Regional Board 8 with clear guidance on the issue of deleting existing designated uses. The 'no action' alternative would not accomplish this.

Recommendations

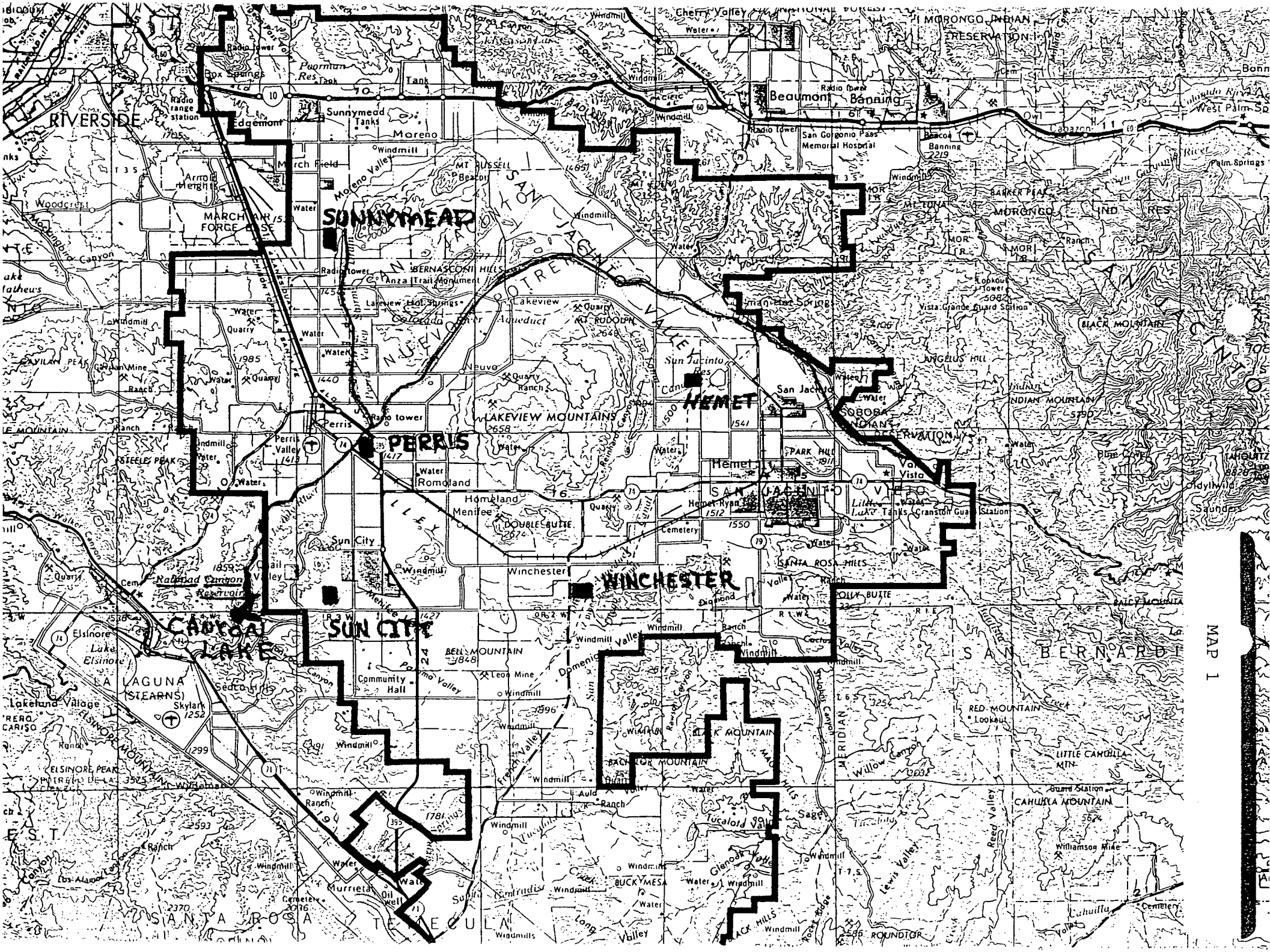
A. Option A is the preferred action because it is the only alternative that is clearly consistent with State policy to protect beneficial uses of lakes and reservoirs, the requirements of the CWA, and Federal regulations.

Option A is the only alternative in which the water quality in Canyon Lake will not be affected by discharges of waste water from treatment plants. Notwithstanding the advanced level of treatment proposed by EMWD, impacts to water quality are expected.

B. Option B is a viable alternative in that it is consistent with Federal regulations and accommodates the reclamation project as proposed by EMWD. Since CDHS does not oppose the project, State approval of such a Basin Plan revision may by possible. The impacts to water quality would need to be thoroughly evaluated and levels of treatment necessary to prevent degradation determined.

C. In the event that EPA decides to support the removal of the MUN designation, a Regional policy is needed in regards to future WQS submittals involving the removal of existing designated uses.

The policy should address the following questions:
1. Is Canyon Lake a unique situation and if so, what specific conditions make it so?
2. What is the basis for EPA exempting Regional Board 8 from the federal requirement of 40 CFR 131.10(h)(1)?
3. What criteria will EPA use in reviewing future WQS submittals that involve the removal of existing designated uses?


RIVERSIDE
SUNNYMEAD
PERRIS
HEMET
WINCHESTER
CANYON LAKE
SUN CITY
MORENO
BEAUMONT
BANNING
MORONGO INDIAN RESERVATION
SOBOBA INDIAN RESERVATION
SAN JACINTO VALLEY
SAN JACINTO MTS
SAN BERNARDINO MTS
SANTA ROSA MTS
LAKEVIEW MOUNTAINS
MAP 1

Only limited chemical analyses of the San Jacinto River are available due to its seasonal flow and lack of beneficial uses. Results were obtained, however, for analyses at Goetz Road on December 7, 1966 and at the Highway 395 (now State HIghway 215) bridge on January 26, 1956 and January 22, 1969. These data collected by the Riverside County Flood Control and Water Conservation District are presented below:

Chemical Analyses
San Jacinto River at Goetz Road
December 7, 1966

pH, units	7.3
Specific Conductance, umhos/cm	252
Calcium, ppm	24
Magnesium, ppm	6
Sodium, ppm	15
Potassium, ppm	6
Carbonate, ppm	0.0
Bicarbonate, ppm	99
Sulfate, ppm	33
Chloride, ppm	13
Nitrate, ppm	3
Fluoride, ppm	0.0
Boron, ppm	0.12
Total hardness, ppm	84

Chemical Analyses
San Jacinto River near Perris at Highway 395 Bridge

	1/26/56	1/22/69
pH, units	8.0	7.3
Specific Conductance, umhos	435	262
Calcium, ppm	18	23
Magnesium, ppm	4	3
Sodium, ppm	71	25
Potassium, ppm	1.5	7
Carbonate, ppm	0	0
Bicarbonate, ppm	165	93
Sulfate, ppm	47	16
Chloride, ppm	28	22
Nitrate, ppm	1.2	8.7
Fluoride, ppm	1.2	0.6
Boron, ppm	0.28	0.13
Total hardness, ppm		70

Attachment 2

Canyon Lake Water Quality Data
Provided by
Elsinore Valley Municipal Water District

Parameter**	1987	1986	1985	1984	1983	1981	1980	1979
Total Hardness as CaCO3	249	213	203	182	105	325	115	170
Sodium	85	73	65	55	26	85	40	54
Sulfate	147	91	74	72	40	180	45	94
Chloride	100*	99*	107*	71	27	108	46	59
Nitrate	1	1	1	1	1	1	1	0
MBAs	0.1	0.1		0.1	0.1	0.1	0.1	0
Zinc	0.01	0.01		0.01	0.01	0.01	0.03	0.01
Total Filterable Residue	500	430	420	365	235	600	295	370
Copper	0.01	0.01		0.07*	0.02*	0.09	0.02	0.01

* levels not meeting applicable WQS
** expressed in mg/l

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SANTA ANA REGION
6809 INDIANA AVENUE, SUITE 200
RIVERSIDE, CALIFORNIA 92506
PHONE: (714) 782-4130

April 1, 1988

Mr. Keith Dunbar, P.E.
K. S. Dunbar & Associates
7009 Pescado Circle
Rancho Murieta, CA 95689

TENTATIVE DISCHARGE REQUIREMENTS: EASTERN MUNICIPAL WATER DISTRICT'S SAN JACINTO WATER RECLAMATION PROGRAM DEIR

Dear Mr. Dunbar:

Per your request we are providing the following tentative discharge requirements for disposal of treated wastewater by Eastern Municipal Water District.

Three discharge scenarios are considered. These are:

1. Direct discharge of treated sewage effluent to Canyon Lake (either by pipe to Lake or discharge to Reach 3 of San Jacinto River when continuous flow to Lake occurs).

2. Direct discharge of treated sewage effluent to Lake Elsinore

   a) Discharge to Lake by pipe

   b) Discharge to Lake via discharge to Reach 1 of San Jacinto River.

3. Direct discharge of treated sewage effluent to Temescal Canyon Creek (Alberhill Creek) downstream of Lake Elsinore. This is considered a discharge to Reach 3 of the Santa Ana River and is subject to Santa Ana River Waste Load Allocations.

Please note that we have specified tentative requirements only for those parameters which we consider most critical for planning purposes; additional discharge limitations and monitoring and reporting requirements will be specified in the final permit.

Tentative Waste Discharge Requirements

1. Direct discharge of treated sewage effluent to Canyon Lake

   The principal constraints on the implementation of this scenario are that the 1983 Basin Plan specifies a MUN (municipal) beneficial use for Canyon Lake and that the Plan includes a prohibition against the discharge of treated wastewater (p. 4-26, c.2.) to waters so designated. Therefore, in order to implement such a discharge, the MUN designation or the discharge prohibition must be removed.

Because of federal water quality standards regulations [(40 CFR 131.10(h)(1)], it is unlikely that the MUN designation for the Lake can be removed. The prohibition statement may be slightly revised in the updated plan, but it is unlikely that the prohibition of direct discharge to Lakes or reservoir with designated municipal beneficial use will be changed. However, if such changes are made and effluent discharge is permitted the probable requirements are given below:

i) The effluent must comply with Title 22 of California Admisistrative Code (tertiary treatment).

ii)

Constituent	Concentration Limit
BOD_5	20 mg/l
Suspended Solids	20 mg/l
Total Nitrogen (Inorganic)	1.5 (1)
Total Phosphorus	0.5 (1)
Total Dissolved Solids (TFR)	600 (2)(3)(4)

2. Direct discharge to Lake Elsinore

a. Discharge to Lake by pipe into Lake below elevation 1250 feet. (No recharge of effluent to Elsinore Ground Water Basin)

i) The effluent must comply with Title 22 of California Administrative Code (tertiary treatment).

ii)

Constituent	Concentration Limit
BOD_5	20 mg/l
Suspended Solids	20 mg/l
Total Nitrogen	1.5 mg/l (1)
Total Phosphorus	0.5 mg/l (1)

b. Discharge to Lake Elsinore via discharge to Reach 1 of San Jacinto River

i) The effluent must comply with Title 22 of California Administrative Code (tertiary treatment).

ii)

Constituent	Concentration Limit
BOD_5	20 mg/l
Suspended Solids	20 mg/l
Total Nitrogen (Inorganic)	1.5 mg/l (1)
Total Phosphorus	0.5 mg/l (1)
Total Dissolved Solids (TFR)	600 mg/l (2)

Please let me know if I can provide clarification or additional information relative to these requirements.

Sincerely,

Michael J. Adacakapara, Chief
Regulations Section

Attachment: Letter to Ron Campbell, Elsinore Valley Municipal Water District - dated June 27, 1983

cc: Eastern Municipal Water District

RRN:ww

Footnotes (1) See attached letter to EVMWD dated 6/27/83

(2) TDS limited because of potential recharge to the small Elsinore ground water basin, with probable limited assimilative capacity (450 + 150 = 600)

(3) TDS limited because of Lee Lake Ground Water Basin & Santa Ana River Reach 3.
Lee Lake is a small ground water basin with limited ability to assimilate wastewater. Santa Ana River, Reach 3, 1988 Waste Load Allocation may limit discharges to 600 mg/l

(4) TDS limited to 600 mg/l because of existing quality of Canyon Lake.

Attachment 4

CALIFORNIA STATE BOARD OF PUBLIC HEALTH POLICY ON WATER QUALITY OF MOUNTAIN STREAMS, LAKES, AND RESERVOIRS

Adopted on December 1, 1967, the California State Board of Public Health established policy on water quality of mountain streams, lakes, and reservoirs. The Board urges other agencies with water quality regulatory responsibilities to adopt similar standards to insure high water quality.

WHEREAS, California's topography, climate, and population distribution provide a valued resource in the multiple beneficial uses for domestic water supplies, recreation — including water-contact sports — fish and wildlife propagation, aesthetic values, and water for irrigation provided by the mountain streams, lakes and reservoirs; and

WHEREAS, these values have been recognized by many official agencies and interested citizens with whom this Board joins for the continuing protection of the present high water quality; and

WHEREAS, present and projected increasing land use on and near these streams, lakes, and reservoirs threaten this high water quality, and vigilance is necessary if degradation is to be prevented; and

WHEREAS, at present poorly planned developments and improperly controlled sewage effluents in areas adjacent to these streams represent serious threats to a presently high quality water and will change the ecology of the receiving waters leading to the loss of beneficial uses now enjoyed; and

WHEREAS, the California Conference of Local Health Officers and the California Conference of Directors of Sanitation in 1967 adopted the following Position Statement:

> "that such mountain waters as yet unsullied by sewage waste discharges be protected from degradation by direct sewage discharges and that in such areas sewage disposal be confined entirely to land disposal; and that the State Department of Public Health, with local health departments, accept this as a principal guide in their recommendations to Water Quality Control Boards."

NOW THEREFORE BE IT

RESOLVED, it is the policy of this Board to protect the beneficial uses of mountain streams, lakes, and reservoirs of this State within the authority, promotional powers and responsiblities conferred upon it.

Specifically, the Board sets as goals for action by appropriate public and private entities in California the following:

1. No direct discharge of waste waters of sewage origin into mountain streams, lakes and reservoirs is necessary, and none should be permitted.

2. Land use planning in areas adjacent to these mountain waters should be used to control developments within the limits of adjacent areas to receive and properly handle sewage wastes and should include plans for adequate and reliable sewage treatment and land disposal capable of meeting all future demands.

3. All responsible agencies should act to assure continuous safe and satisfactory operation of sewage treatment facilities constructed adjacent to or in any way threatening the quality of mountain waters.

It is recommended by this Board that all official agencies with water quality regulatory responsibilities adopt similar policies with regard to the mountain streams, lakes, and reservoirs, and continually review their regulatory authority in keeping with changes that require new approaches to these problems.

Copies of this policy statement shall be transmitted to the Regional Water Quality Control Boards, the State Water Resources Control Board, County Boards of Supervisors, County Planning Agencies, local health departments, the Resources Agency and the State Departments of Fish and Game, Water Resources, Conservation and Agriculture.

Adopted: December 1, 1967

STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY GEORGE DEUKMEJIAN, Governor

DEPARTMENT OF HEALTH SERVICES
PUBLIC WATER SUPPLY BRANCH
350 Front Street, Room 2050
San Diego, California 92101
Telephone: (619) 237-7391

February 24, 1988

Mr. Keith S. Dunbar, P.E.
K. S. Dunbar & Associates
7009 Pescado Circle
Rancho Murieta, CA 95683

Subject: NOP - San Jacinto Water Reclamation Program

We have reviewed the subject NOP, the Project Description, and the Initial Study prepared by the Eastern Municipal Water District.

The proposed treatment provides adequate public health protection for the intended use of the reclaimed water. On Page 2 of the Project Description and Page 12 of the Initial Study, the water to be supplied to the Elsinore Valley Municipal Water District is referred to as an "alternate" source of supply for water currently withdrawn from Canyon Lake. In order to prevent any possibility of misunderstanding that Canyon Lake could still be used as a source of domestic water supply after the introduction of reclaimed water, we recommend that Eastern's supply to Elsinore Valley M.W.D. be referred to as a "replacement" source of supply.

If you have any questions or need further information, please contact me at the above address.

Kirkham W. Campbell, P.E.
District Engineer

KWC:PFM:rr

cc Office of Planning and Research
Environmental Health Division
State Clearinghouse
Eastern MWD (W.E. Plummer)
Elsinore Valley MWD (A.R. Bullock)
Riverside Co. Dept. of Health (Bill Leuer)

AT CHMENT 6

APR 20 1988

STATE WATER RESOURCES CONTROL BOARD
WORKSHOP-- DIVISION OF WATER QUALITY
MAY 4, 1988

ITEM: 10

SUBJECT: CONSIDERATION OF ADOPTION OF POLICY ENTITLED "SOURCES OF DRINKING WATER".

DISCUSSION: A State Policy for Water Quality Control defining the phrase "sources of drinking water" is needed to more clearly identify waters of the State which should be designated municipal/domestic water supply (MUN) in basin plans. The proposed policy will apply where Regional Boards have not completely identified the potential beneficial uses of a body of water. The proposed policy defines surface waters and ground waters of the State as potential sources of drinking water with criteria for determining certain exceptions for MUN designations.

POLICY ISSUE: How should the State Board define "sources of drinking water"?

FISCAL IMPACT: The recommended policy is compatible with the resource allocations for this task in the Governor's FY 1988-89 budget.

REGIONAL BOARD IMPACT: Yes. All Regional Boards.

STAFF RECOMMENDATION: The State Board adopt the "sources of drinking water" policy in the attached resolution.

Policy Review _____

Fiscal Review _____

Legal Review _____

APR 26 1988

STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 88-

ADOPTION OF POLICY ENTITLED
"SOURCES OF DRINKING WATER"

WHEREAS:

1. California Water Code Section 13140 provides that the State Board shall formulate and adopt State Policy for Water Quality Control; and,

2. California Water Code Section 13240 provides that Water Quality Control Plans "shall conform" to any State Policy for Water Quality Control; and,

3. The Regional Boards can conform the Water Quality Control Plans to this policy by amending the plans to incorporate the policy; and,

4. The State Board must approve any conforming amendments pursuant to Water Code Section 13245; and,

5. "Sources of drinking water" shall be defined in Water Quality Control Plans as those water bodies with beneficial uses designated as suitable, or potentially suitable, for municipal or domestic water supply (MUN); and,

6. The Water Quality Control Plans do not provide sufficient detail in the description of water bodies designated MUN to judge clearly what is, or is not, a source of drinking water for various purposes.

THEREFORE BE IT RESOLVED:

All surface and ground waters of the State are considered to be suitable, or potentially suitable, for municipal or domestic water supply and should be so designated by the Regional Boards[1] with the exception of:

1. Surface and ground waters where:

   a. The total dissolved solids (TDS) exceed 3,000 mg/L (5,000 uS/cm, electrical conductivity) and it is not reasonably expected by Regional Boards to supply a public water system, or

b. There is contamination, either by natural processes or by human activity (unrelated to a specific pollution incident), that cannot reasonably be treated for domestic use using either Best Management Practices or best economically achievable treatment practices, or

c. The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.

2. Surface waters where:

a. The water is in systems designed or modified to collect or treat municipal or industrial wastewaters, process waters, mining wastewaters, or storm water runoff, provided that the discharge from such systems is monitored to assure compliance with all receiving water quality objectives set by the Regional Boards for all beneficial uses; or,

b. The water is in systems designed or modified for the primary purpose of conveying or holding agricultural drainage waters, provided that the discharge from such systems is monitored to assure compliance with all receiving water quality objectives set by the Regional Boards for all beneficial uses.

3. Ground water where:

The aquifer is geothermal energy producing as administered by the EPA or has been exempted pursuant to 40 Code of Federal Regulations, Section 146.4 as administered by the EPA and by the Department of Conservation Division of Oil and Gas for the purpose of underground injection of fluids associated with the production of hydrocarbon or geothermal energy, provided that these fluids do not constitute a hazardous waste under 40 CFR, Section 261.3.

4. Regional Board Authority to Amend Use Designations:

Any body of water which has a current specific designation previously assigned to it by a Regional Board in Water Quality Control Plans may retain that designation at the Regional Board's discretion. Where a body of water is not currently designated as MUN but, in the opinion of a Regional Board, is presently or potentially suitable for MUN, the Regional Board shall include MUN in the beneficial use designation.

The Regional Boards shall also assure that the beneficial uses of municipal and domestic supply are designated for protection wherever those uses are presently being attained, and assure that any changes in beneficial use designations for waters of the State are consistent with all applicable regulations adopted by the Environmental Protection Agency.

The Regional Boards shall review and revise the Water Quality Control Plans to incorporate this policy.

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1 This policy does not affect any determination of what is a potential source of drinking water for the limited purposes of maintaining a surface impoundments after June 30, 1988, pursuant to Section 25208.4 of the Health and Safety Code.

CERTIFICATION

The undersigned, Administrative Assistant to the Board, does hereby certify that the foregoing is a full, true, and correct copy of a policy duly and regularly adopted at a meeting of the State Water Resources Control Board held on May 19, 1988.

Maureen Marche'
Administrative Assistant to the Board

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR 22 1988

OFFICE OF
WATER

MEMORANDUM

Subject: Removal of the Municipal ~~and~~ Domestic Supply (MUN) Beneficial ~~Use Designation~~ for Canyon Lake

From: David K. Sabock, Chief
Standards Branch, CSD, OWRS (WH 585)

To: Catherine Kuhlman, Chief
Water Quality Planning and Standards Branch (W-3)
Region 9

We have reviewed the transmitted issue paper which discusses removal of the Public Water Supply use for Canyon Lake. In terms of the analysis provided, the public water supply use is an existing use as defined in 40 CFR 131, and therefore cannot be removed. Thus, Option A is the only action EPA can take consistent with the Water Quality Standards Regulation.

A copy of a draft memorandum prepared by the Office of General Counsel addressing the possibility of removing the public water supply use designation supports this position. This memorandum has been previously transmitted to Phil Woods of the Region 9 staff. While the OGC memorandum has never been finalized, we believe its analysis is essentially correct.

OPTION A

EPA could recommend that the MUN designation for Canyon Lake not be removed and provide guidance to the Regional Board as to why the use should not be removed and ultimately why such a WQS revision would not be approveable.

Advantages

1. The option is consistent with Federal regulations (40 CFR 131.10(h)(1));

2. with §303(c)(2) of the CWA which requires EPA to assure that WQS revisions enhance water quality;

3. with SBPH policy on protecting lakes and reservoirs from degradation;

4. and with CDHS wastewater disinfection guidelines and Basin Plan prohibitions to protect lakes and reservoirs which are used for domestic water supply from discharges of sewage.

5. Existing water quality in Canyon Lake would be maintained.

6. Water reclamation and future growth in the area would still be possible.

Disadvantages

1. EMWD would not be able to discharge reclaimed water into the San Jacinto River upstream of Canyon Lake.

2. EMWD would have to develop alternate means of disposing of the waste water (i.e., enlarged land disposal facilities, piping effluent downstream of Canyon Lake).

3. EMWD and other publics may view the EPA position as overly protective and unnecessarily preventing future growth.

4. Local interest may pursue specific legislation to exempt the San Jacinto Water Reclamation Program from the federal regulation requirement to maintain existing uses.

5. EPA may be under considerable pressure from local and state agencies to support the removal of the MUN designation for Canyon Lake.

6. Recreational opportunities for CLPOA would not be enhanced.

OPTION B

EPA could recommend that Regional Board 8 amend the Basin Plan to provide a site specific requirement that allows the discharge of treated wastewater to Canyon Lake and to adopt sufficient objectives to protect water quality at its current level.

Advantages

1. By removing the Basin Plan prohibition EMWD would be able to discharge reclaimed wastewater into the San Jacinto River upstream of Canyon Lake.

2. Existing water quality in Canyon Lake would be maintained.

3. The MUN use would be maintained so compliance with 40 CFR 131.10(h)(1) would not be an issue.

4. Recreational opportunities for CLPOA could be enhanced by maintaining a stable lake level in Canyon Lake.

5. EVMWD would not have to purchase water to comply with its Canyon Lake water storage agreement with Temascal Water Company.

6. CDHS has not opposed the discharge of treated wastewater into Canyon Lake.

Disadvantages

1. The EIR notice states that the reclamation program, as proposed, is expected to impact water quality in the San Jacinto River and Canyon Lake.

2. The Regional Board may need to adopt more stringent water quality objectives to ensure that the effluent dominated water source will not degrade the existing water quality in Canyon Lake.

3. The level of protection needed to prevent degradation may be beyond the technical capabilities of EMWD.

4. This Basin Plan amendment would not follow current CDHS guidelines and is counter to the spirit of the SBPH policy.

5. This Basin Plan amendment may not be approved by the SWRCB.

OPTION C

EPA could approve the removal of the MUN designation on the condition that the water quality objectives in the Basin Plan remain high enough to protect water quality at its current level.

Advantages

1. Advantages 1,2,4,5 listed under Option B apply here.

2. Existing water quality would be protected from degradation.

Disadvantages

1. EPA would be subject to a lawsuit. EPA approval of the removal of the MUN designation is inconsistent with Federal regulations (40 CFR 131.10(h)(1)) and would be indefensible in court. EPA may be more vulnerable to litigation now because proponents of 'slow growth' in southern California have recently become organized and are challenging proposed developments in this area. This public is expected to closely scrutinize agency decisions affecting future growth in Riverside, San Bernardino, Orange, San Diego, and Los Angeles counties.

2. EPA would be setting a precedent for approving the removal of an existing designated use. Option C is counter to EPA's longstanding policy of protecting and maintaining existing uses and assuring that WQS reflect uses being attained. Option C would significantly weaken the Agency's ability to disapprove future WQS submittals involving the removal of existing designated uses.

3. This Basin Plan amendment may not be approved by the SWRCB. It is inconsistent with the SWRCB draft policy entitled "Sources of Drinking Water".

4. Data are not adequate to describe the current level of water quality in Canyon Lake.

5. Disadvantages 1-3 listed under Option B apply here.

6. The option is not consistent with the SBPH policy to protect lakes and reservoirs from discharge of waste water of sewage origin.

7. The option is not consistent with CDHS guidelines and Basin Plan prohibitions adopted to protect drinking water supplies in lakes and reservoirs.

8. EPA approval of this WQS revision may not be consistent with provisions of §303(c)(2) of the CWA which states that WQS shall protect the public health and welfare, enhance the quality of water, and serve the purposes of the CWA. Removing the MUN designation will allow Canyon Lake to be converted from an existing public water supply to an effluent dominated water body and can hardly be seen as enhancing water quality.

OPTION D

EPA could decide not to provide Regional Board 8 with additional guidance in regards to the subject WQS revision.

Advantages

1. None.

Disadvantages

1. The 'no action' alternative is not a tenable option. EPA has a specific mandate under §303(c) of the CWA to review and to approve or disapprove State adopted WQS. We have a responsibility to clearly articulate to the State the criteria EPA uses in reviewing WQS submittals.

2. Thus far EPA has expressed to Regional Board 8 two different views regarding the deletion of the MUN use from Canyon Lake. EPA needs to resolve these inconsistencies and to present Regional Board 8 with clear guidance on the issue of deleting existing designated uses. The 'no action' alternative would not accomplish this.

K. S. DUNBAR & ASSOCIATES

June 22, 1988

Ms. Joanne E. Schneider
Environmental Specialist IV
California Regional Water Quality Control Board, Santa Ana Region
6809 Indiana Avenue, Suite 200
Riverside, California 92506

~~Basin Plan Amendment~~
Waste Discharge Prohibition: Canyon Lake

Dear Joanne:

Enclosed for your review and comments are the suggested Notice of Public Hearing, Staff Report, Environmental Checklist (with explanations of all yes and maybe answers), and Resolution regarding the proposed Basin Plan Amendment concerning the waste discharge prohibition to streams flowing into or out of lakes and reservoirs used for domestic water supplies.

As we discussed previously, we believe that the suggested Basin Plan amendment is critical to the success of Eastern Municipal Water District's San Jacinto Water Reclamation Program. As you are well aware, the 1983 Basin Plan includes a "MUN" beneficial use designation for Canyon Lake waters which cannot be removed by the State of California due to the provisions of Section 131.10(h) of Title 40 of the Code of Federal Regulations. Therefore, should Eastern purchase Canyon Lake and provide Elsinore Valley Municipal Water District with a replacement water supply, there would still be the possibility in the future that some Board might construe that the discharge prohibition applied to Canyon Lake because of the beneficial use designation. As you will note upon review, we are suggesting that the waste discharge prohibition be amended by excluding Canyon Lake. This will still give your Board the needed protection of the mountain streams, which I believe to be the original intent of the prohibition, and allow Eastern to proceed with its reclamation program.

We look forward to meeting with you on June 29th at 10:00 a.m. in your office to discuss this matter in more detail. In the meantime, if you have any questions concerning the enclosed materials, please do not hesitate to call me.

Sincerely,

K.S. Dunbar

Keith S. Dunbar, P.E.

cc: William E. Plummer (w/enclosures)

California Regional Water Quality Control Board
Santa Ana Region
6809 Indiana Avenue, Suite 200
Riverside, California 92506
(714) 782-4130

NOTICE OF PUBLIC HEARING

The California Regional Water Quality Control Board, Santa Ana Region, will hold a public hearing to receive testimony regarding the waste discharge prohibition to streams flowing into or out of lakes and reservoirs used for domestic water supplies.

DATE: September 9, 1988

TIME:

PLACE:

ISSUE: Should the Regional Board amend the waste discharge prohibition to streams flowing into or out of lakes and reservoirs used for domestic water supplies by excluding Canyon Lake from the prohibition?

DISCUSSION: At the present time, Canyon Lake is used as a domestic water supply source by the Elsinore Valley Municipal Water District. However, Eastern Municipal Water District is anticipating the purchase of Canyon Lake from the Temescal Water Company. Should the District purchase the lake, it would also construct an intertie from its water distribution system to the Elsinore Valley Municipal Water District's water treatment plant which draws water from Canyon Lake. Therefore, once the purchase was complete and the intertie constructed, Canyon Lake would no longer be utilized for domestic water supplies.

Although it would appear that the prohibition would not apply to streams flowing into or out of Canyon Lake once the intertie system were constructed and the actual use of lake waters for domestic supplies were abandoned, Eastern Municipal Water District has requested that the prohibition be amended to exclude Canyon Lake. The main reason for this request is due to the fact that the 1983 Basin Plan designated municipal and domestic water supplies as a beneficial use of Canyon Lake waters and Section 131.10(h) of Title 40 of the Code of Federal Regulations does not allow States to remove beneficial use designations if they are for existing uses (i.e., those actually attained in the water body on or after November 28, 1975).

Eastern Municipal Water District is in the final stages of completing an update to its 1977 Areawide Facilities Plan. Based on that update, Eastern now anticipates a two-fold water reclamation program in the San Jacinto Basin. First, the maximum amount of reclaimed water would continue to be utilized for agricultural purposes. Second, the excess reclaimed water would be subjected

to additional treatment (i.e., coagulation, filtration, and nutrient removal) to meet Title 22 standards for unrestricted recreational use. The excess reclaimed water would be utilized to create "live streams" in the San Jacinto River, Perris Valley Storm Drain, and Salt Creek. As presently written, however, the waste discharge prohibition to streams flowing into or out of lakes and reservoirs used for domestic supplies would preclude the implementation of this reclamation program.

The Regional Board staff is preparing a staff report regarding this matter. Copies of this report will be distributed to interested persons on July 27, 1988. Additional copies will be provided on request by calling the Regional Board office at (714) 782-4130.

HEARING PROCEDURES: Persons wishing to make statements regarding these matters are urged to attend the hearing and provide written copies of their comments. Written comments will also be accepted at the Regional Board office prior to the hearing.

JAMES R. BENNETT
Executive Officer

Dated: _____

California Regional Water Quality Control Board
Santa Ana Region

September 9, 1988

ITEM:

SUBJECT: Waste Discharge Prohibition For Streams Flowing Into Or Out Of Lakes Or Reservoirs Which Are Used For Domestic Water Supplies

DISCUSSION:

The 1983 Water Quality Control Plan for the Santa Ana River Basin (8) adopted by the Regional Board contains the following waste discharge prohibition:

> The discharge of sewage to lakes or reservoirs, or streams flowing into or out of lakes or reservoirs, which are used for domestic water supplies, is prohibited.

At the present time, Canyon Lake is used as a domestic water supply source by the Elsinore Valley Municipal Water District. The existing use is about 3.0 mgd (3,360 acre-feet per year) of which approximately 2,000 acre-feet per year is purchased from The Metropolitan Water District of Southern California. The purchased water is released to the San Jacinto River immediately upstream of Canyon Lake. The main purpose of the purchased water is to maintain the level in Canyon Lake at approximately 1,372 feet (7,966 acre-feet capacity) to enhance the recreational uses by the Canyon Lake Property Owners Association.

However, Eastern Municipal Water District is now anticipating the purchase of Canyon Lake from the Temescal Water Company. Should the District purchase the lake, it would also construct an intertie from its water distribution system to the Elsinore Valley Municipal Water District's water treatment plant which presently withdraws water from Canyon Lake. Lake ownership combined with the replacement water supply for Elsinore Valley Water District's water treatment plant would allow the District to control the beneficial use of Canyon Lake waters. However, it is understood that the Canyon Lake Property Owners Association has the exclusive right to use the lake for boating, fishing, water sports, and other rights specifically mentioned in its lease agreement with the Temescal Water Company. Those rights do not include municipal and domestic uses, however. Therefore, once the purchase was complete and the intertie constructed, Canyon Lake would no longer be utilized for domestic water supplies.

Although it would appear that the above prohibition would not apply to streams flowing into or out of Canyon Lake once the intertie system were constructed and the actual use of lake waters for domestic supplies were abandoned, Eastern Municipal Water District has requested that the prohibition be amended to exclude

Canyon Lake due to the fact that the 1983 Basin Plan designated municipal and domestic water supplies as a beneficial use of Canyon Lake waters and Section 131.10(h) of Title 40 of the Code of Federal Regulations does not allow States to remove beneficial use designations if they are for existing uses (i.e., those actually attained in the water body on or after November 28, 1975).

The main reason for Eastern Municipal Water District's request is that it is in the final stages of completing an update to its 1977 Areawide Facilities Plan. The 1977 Plan anticipated the operation of five regional water reclamation facilities within the San Jacinto River Basin. These were: Hemet-San Jacinto, Winchester, Sun City, Perris Valley, and Sunnymead. Four of these facilities have been operating for several years. The fifth facility (i.e., Winchester), which is presently in the final stages of planning, is scheduled to go on line prior to 1995.

The 1977 Areawide Facilities Plan also anticipated that all wastewater handled by these five facilities would be utilized for agricultural purposes, percolated to land, or evaporated. The 1977 Areawide Facilities Plan was based on population projections through the year 2000. Those projections for the entire San Jacinto Basin were as follows:

1975	90,368
1980	109,582
1985	127,210
1990	144,839
1995	156,794
2000	168,747

Based on those population projections, it was anticipated that the wastewater flows in the basin would be as follows:

1975	4.93 mgd
1980	6.55 mgd
1985	9.62 mgd
1990	10.48 mgd
1995	12.12 mgd
2000	13.80 mgd

As can be seen by the above projections, in 1977, it was anticipated that the population in the San Jacinto Basin would grow to about 134,000 by the year 1987 and that corresponding wastewater flows would be about 10 mgd. According to present estimates, however, the 1987 population actually soared to about 191,000 with a corresponding wastewater flow of 14.3 mgd. Therefore, the areawide facilities plan has been reevaluated to insure its validity.

Based on that evaluation, it has been concluded that the location of treatment facilities (i.e., Hemet-San Jacinto, Winchester, Sun

City, Perris Valley, and Sunnymead) is appropriate and that the type of treatment (i.e., activated sludge) is appropriate. However, the method of disposal (i.e., agricultural use, percolation to land, or evaporation) by itself is not appropriate at this time due to the unexpected increases in flow and the diminishing availability of agricultural land plus the lack of storage facilities.

Therefore, the Eastern Municipal Water District now anticipates a two-fold water reclamation program in the San Jacinto Basin. First, the maximum amount of reclaimed water would continue to be utilized for agricultural purposes. Second, the excess reclaimed water would be subjected to additional treatment (i.e., coagulation, filtration, and nutrient removal) to meet Title 22 standards for unrestricted recreational use. The effluent from this system would be utilized to create "live streams" in the San Jacinto River, Perris Valley Storm Drain, and Salt Creek. The Hemet-San Jacinto and Perris Valley facilities would release reclaimed water to the San Jacinto River, the Winchester and Sun City facilities would release reclaimed water to Salt Creek, and the Sunnymead facility would release reclaimed water to the Perris Valley Storm Drain.

Implementation of this program would create permanent live streams in the Perris Valley Storm Drain downstream of the Sunnymead facility (i.e., Oleander Street), in the San Jacinto River downstream of its confluence with the Perris Valley Storm Drain (i.e., Highway 215 crossing), and in Salt Creek downstream of Murrietta Road. A complete discussion of the quantity and quality of these live streams is provided in Section III of the attached "Environmental Checklist".

As part of the Areawide Facilities Plan Update, Eastern Municipal Water District prepared an Evaluation of Reclaimed Water Use Alternatives. Alternatives considered in that report included:

1. Agricultural use with storage during the non-irrigation season.

2. Flow augmentation in local streams adjacent to the five regional water reclamation facilities.

3. Flow augmentation in the San Jacinto River below Canyon Lake.

4. Flow augmentation in Temescal Wash downstream of Lake Elsinore.

5. Flow augmentation in Temescal Wash downstream of Lake Mathews.

6. Flow augmentation in the Santa Ana River at Riverside.

7. Flow augmentation in the Whitewater River at Cabazon.

8. No Project.

Cost estimates for the above mentioned alternatives were also developed during the evaluation of alternatives. Those costs are summarized below:

Reclaimed Water Use Alternatives
Construction and Annual Cost Summary
San Jacinto Water Reclamation Program

Alternative	Construction Cost	Annual Cost[1]
Agricultural use with non-irrigation season storage	$254,900,000[2]	$26,844,000
Flow Augmentation		
Local streams	51,250,000[3]	5,397,000
San Jacinto R. d/s of Canyon L.	109,856,000[4]	16,371,000
Temescal Wash d/s of L. Elsinore	119,212,000[4]	17,356,000
Temescal Wash d/s of L. Mathews	156,210,000[4]	28,524,000
Santa Ana R. @ Riverside	148,403,000[4]	26,996,000
Whitewater R. @ Cabazon	222,503,000[4]	51,029,000

1. Annual costs based on a bond issue of 30 years at 10% interest and power costs of $0.12 per kilowatt hour. Operation and maintenance costs are not included in annual costs.

2. Construction costs include estimated costs of storage facilities including the cost of land acquisition.

3. Includes cost of tertiary treatment facilities at the five regional water reclamation facilities.

4. Includes cost of tertiary treatment facilities at the five regional water reclamation facilities as well as the pump stations and pipelines required to transport the reclaimed water to the area of use.

The initial screening process eliminated alternatives 1, 5, 6, 7, and 8 from further consideration. A more detailed analysis of alternatives 2, 3, and 4 plus alternatives 2, 3, and 4 combined with the continued agricultural use of reclaimed water was con-

tained in the "Evaluation of Reclaimed Water Use Alternatives". Based on that analysis, the best apparent alternative was selected. The best apparent alternative is the continued agricultural use of reclaimed water combined with streamflow augmentation at each of the five regional water reclamation facilities.

In selecting the best apparent alternative, Eastern Municipal Water District's consultant suggested that Eastern assist the Regional Board in amending the 1983 Basin Plan to exclude Canyon Lake from the waste discharge prohibition for streams flowing into or out of lakes and reservoirs which are used for domestic supplies. Consequently, the request for the Basin Plan amendment was made by Eastern Municipal Water District.

ALTERNATIVES

The 1983 Basin Plan includes a municipal and domestic supply beneficial use designation for Canyon Lake. In accordance with the provisions of Section 131.10(h) of Title 40 of the Code of Federal Regulations, that beneficial use designation can not be removed from the Basin Plan irregardless of the appropriateness of the designation in the future. Consequently, even if Eastern Municipal Water District purchases Canyon Lake from Temescal Water Company and provides a replacement supply for the Elsinore Valley Municipal Water District, it could be construed in the future that Canyon Lake waters were being used for domestic water supplies due to the "MUN" designation in the Basin Plan and, therefore, the waste discharge prohibition would apply to streams flowing into or out of Canyon Lake. Therefore, the Regional Board may consider the following with respect to the requested Basin Plan amendment:

1. Make no amendments to the waste discharge prohibition.

2. Entirely remove the waste discharge prohibition from the Basin Plan.

3. Exclude Canyon Lake in the waste discharge prohibition.

DISCUSSION OF ALTERNATIVES

Alternative 1

Leaving the waste discharge prohibition unchanged would seriously affect Eastern Municipal Water District's ability to implement its San Jacinto Water Reclamation Program. Therefore, Eastern would be forced to implement the alternative of continued agricultural use of reclaimed waters combined with streamflow augmentation in Temescal Wash downstream of Lake Elsinore (i.e., at Nichols Road). Implementation of this alternative would require the expenditure of $119,212,000 for the construction of

the required facilities. The added annual cost associated with implementing this alternative would be $17,356,000 which represents an average increase in the annual cost of wastewater service of $52.60 per equivalent dwelling unit (an increase of 58 percent over current rates). Implementation of this alternative would also eliminate the environmental benefits of creating "live streams" in the San Jacinto River, Perris Valley Storm Drain, and Salt Creek.

Alternative 2

Complete removal of the waste discharge prohibition would allow the implementation of Eastern Municipal Water District's San Jacinto Water Reclamation Program. However, it would not provide the necessary protection for the mountain streams in the Santa Ana Basin which was the original intent of the waste discharge prohibition. Should the Regional Board entirely remove the waste discharge prohibition from the Basin Plan, it could still control waste discharges to the mountain streams; however, it would have to be done by individual NPDES requirements which would greatly increase the work load of its staff.

Alternative 3

The exclusion of Canyon Lake from the waste discharge prohibition would also allow the implementation of Eastern Municipal Water District's San Jacinto Water Reclamation Program while at the same time providing the necessary protection to the mountain streams within the Santa Ana Basin and not creating an additional work load on its staff.

ENVIRONMENTAL IMPACTS:

The basin planning process, which includes the changes to the waste discharge prohibition to streams flowing into or out of lakes and reservoirs used for domestic supplies being considered, is exempt from the conventional requirements of the California Environmental Quality Act of 1970 (CEQA) (Public Resources Code Section 21080.5). Instead of the usual EIR process, the Regional Board is required to prepare an Environmental Checklist and a report which contains a brief description of the proposed activity, reasonable alternatives to that activitiy, and mitigation measures which minimize any significant adverse impacts of the proposed activity. The Environmental Checklist is attached. This staff report describes the proposed activity, as required. Alternatives and mitigation measures are discussed below. A Notice of Filing was submitted to the Secretary for Resources' office and mailed to interested persons and other agencies. A Notice of Decision will be filed after the Board acts on this matter.

ALTERNATIVES AND MITIGATION MEASURES:

Three alternative courses of action regarding the waste discharge prohibition amendment are described and discussed earlier in this report. Two alternatives are described as having adverse impacts if selected by the Regional Board. No reasonable mitigation measures are known by staff which could be implemented if either of these two alternatives were adopted by the Regional Board.

RECOMMENDATION:

Adopt Resolution No. 88-___, which amends the Water Quality Control Plan for the Santa Ana River Basin (8), excluding Canyon Lake from the waste discharge prohibition to streams flowing into or out of lakes and reservoirs used for domestic water supplies (Alternative 3).

ENVIRONMENTAL CHECKLIST

I. Background

1. Name of Proponent: California Regional Water Quality Control Board, Santa Ana Region

2. Address and Phone Number of Proponent: 6809 Indiana Avenue, Suite 200 Riverside, California 92506-4298 (714) 482-7130

3. Date Checklist Submitted:

4. Agency Requiring Checklist: N/A

5. Name of Proposal, if applicable: Amend 1983 Basin Plan by excluding Canyon Lake from Prohibition C.2.

II. Environmental Impacts

(Explanation of all "yes" and "maybe" answers are provided on the attached sheets.)

	Yes	Maybe	No
1. Earth. Will the proposal result in:			
a. Unstable earth conditions or in changes in geological substructures?	___	___	X
b. Disruptions, displacements, compaction or uncovering of the soil?	___	___	X
c. Change in topography or ground surface relief features?	___	___	X
d. The destruction, covering or modification of any unique geologic or physical features?	___	___	X
e. Any increase in wind or water erosion of soils, either on or off the site?	___	___	X

	Yes	Maybe	No
f. Changes in deposition or erosion of beach sands, or changes in siltation, deposition or erosion which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet or lake?	___	___	X
g. Exposure of people or property to geologic hazards such as earthquakes, landslides, mudslides, ground failure, or similar hazards?	___	___	X
2. Air. Will the proposal result in:			
a. Substantial air emissions or deterioration of ambient air quality?	___	___	X
b. The creation of objectionable odors?	___	___	X
c. Alteration of air movement, moisture, or temperature, or any change in climate, either locally or regionally?	___	___	X
3. Water. Will the proposal result in:			
a. Changes in currents, or the course of direction of water movements, in either marine or fresh waters?	X	___	___
b. Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?	X	___	___
c. Alteration to the course or flow of flood waters?	___	___	X
d. Change in the amount of surface water in any body of water?	X	___	___
e. Discharge into surface waters, or in any alteration of surface water quality, including but not limited to temperature, dissolved oxygen or turbidity?	X	___	___
f. Alteration of the direction or rate of flow of groundwaters?	___	X	___
g. Change in the quantity of groundwaters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?	___	X	___

	Yes	Maybe	No
h. Substantial reduction in the amount of water otherwise available for public water supplies?	___	___	X
i. Exposure of people or property to water related hazards such as flooding or tidal waves?	___	___	X
4. Plant Life. Will the proposal result in:			
a. Change in diversity of species, or number of any species of plants (including trees, shrubs, grass, crops, and aquatic plants?	X	___	___
b. Reduction of the numbers of any unique, rare or endangered species of plants?	___	___	X
c. Introduction of new species of plants into an area, or in a barrier to the normal replenishment of existing species?	___	X	___
d. Reduction in acreage of any agricultural crop?	___	___	X
5. Animal Life. Will the proposal result in:			
a. Change in the diversity of species, or numbers of any species of animals (birds, land animals including reptiles, fish and shellfish, benthic organisms or insects)?	___	X	___
b. Reduction of the numbers or any unique, rare or endangered species of animals?	___	___	X
c. Introduction of new species of animals into an area, or result in a barrier to the migration or movement of animals?	___	___	X
d. Deterioration to existing fish or wildlife habitat?	___	___	X
6. Noise. Will the proposal result in:			
a. Increases in existing noise levels?	___	___	X
b. Exposure of people to severe noise levels?	___	___	X

	Yes	Maybe	No
7. **Light and Glare.** Will the proposal produce light or glare?	___	___	X
8. **Land Use.** Will the proposal result in a substantial alteration of the present or planned land use of an area?	___	___	X
9. **Natural Resources.** Will the proposal result in:			
a. Increase in the rate of use of any natural resources?	___	___	X
10. **Risk of Upset.** Will the proposal involve:			
a. A risk of an explosion or the release of hazardous substances (including, but not limited to, oil, pesticides, chemicals or radiation) in the event of an accident or upset conditions?	___	___	X
b. Possible interference with an emergency response plan or an emergency evacuation plan?	___	___	X
11. **Population.** Will the proposal alter the location, distribution, density, or growth rate of the human population of an area?	___	___	X
12. **Housing.** Will the proposal affect existing housing, or create a demand for additional housing?	___	___	X
13. **Transportation/Circulation.** Will the proposal result in:			
a. Generation of substantial additional vehicular movement?	___	___	X
b. Effects on existing parking facilities, or demand for new parking?	___	___	X
c. Substantial impact upon existing transportation systems?	___	___	X
d. Alterations to present patterns of circulation or movement of people and/or goods?	___	___	X
e. Alterations to waterborne, rail or air traffic?	___	___	X

	Yes	Maybe	No
f. Increase in traffic hazards to motor vehicles, bicyclists or pedestrians?	___	___	X
14. Public Services. Will the proposal have an effect upon, or result in a need for new or altered governmental services in any of the following areas:			
a. Fire protection?	___	___	X
b. Police protection?	___	___	X
c. Schools?	___	___	X
d. Parks or other recreational facilities?	___	___	X
e. Maintenance of public facilities, including roads?	___	___	X
f. Other governmental services?	___	___	X
15. Energy. Will the proposal result in:			
a. Use of substantial amounts of fuel or energy?	___	___	X
b. Substantial increase in demand upon existing sources of energy, or require the development of new sources of energy?	___	___	X
16. Utilities. Will the proposal result in a need for new systems, or substantial alterations to the following utilities:			
a. Power or natural gas?	___	___	X
b. Communications systems?	___	___	X
c. Water?	___	___	X
d. Sewer or septic tanks?	___	___	X
e. Storm water drainage?	___	___	X
f. Solid waste and disposal?	___	___	X

	Yes	Maybe	No
17. Human Health. Will the proposal result in:			
a. Creation of any health hazard or potential health hazard (excluding mental health)?	___	___	X
b. Exposure of people to potential health hazards?	___	___	X
18. Aesthetics. Will the proposal result in the obstruction of any scenic vista or view open to the public, or will the proposal result in the creation of an aesthetically offensive site open to public view?	___	___	X
19. Recreation. Will the proposal result in an impact upon the quality or quantity of existing recreational opportunities?	X	___	___
20. Cultural Resources.			
a. Will the proposal result in the alteration of or the destruction of a prehistoric or historic archaeological site?	___	___	X
b. Will the proposal result in adverse physical or aesthetic effects to a prehistoric or historic building, structure, or object?	___	___	X
c. Does the proposal have the potential to cause a physical change which would affect unique ethnic cultural values?	___	___	X
d. Will the proposal restrict existing religious or sacred uses with the potential impact area?	___	___	X
21. Mandatory Findings of Significance.			
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal			

	Yes	Maybe	No
or eliminate important examples of California history or prehistory?	___	___	X
b. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time while long-term impacts will endure well into the future.)	___	___	X
c. Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environment is significant.)	___	___	X
d. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	___	___	X

III. Discussion of Environmental Evaluation
(Narrative description of environmental impacts.)

3. Water

At the present time, the San Jacinto River is essentially a dry streambed during the majority of the time. This fact is substantiated by the continuous measurement of flows at the Railroad Canyon weir (immediately upstream of Railroad Canyon Reservoir) by the Riverside County Flood Control and Water Conservation District since 1951. Recorded data include the total monthly flow in acre-feet and the maximum instantaneous discharge in cubic feet per second per year. These data are summarized below:

Mean Monthly Flows
San Jacinto River at Railroad Canyon Weir
Water Years 1951-52 through 1985-86
(cubic feet per second)

October	<0.1
November	1.9
December	3.1
January	13.6

February	64.5
March	64.6
April	18.8
May	1.1
June	<0.1
July	0.2
August	0.1
September	0.6
Annual Mean	14.0

If the discharge prohibition were amended to exclude Canyon Lake, Eastern Municipal Water District could implement its proposed San Jacinto Water Reclamation Program. That program includes the continued agricultural use of reclaimed water plus streamflow augmentation at each of the regional water reclamation facilities. Once this program was implemented reclaimed water would be released to the San Jacinto River near Sanderson Avenue from the Hemet-San Jacinto Regional Water Reclamation Facility, to the Perris Valley Storm Drain from the Sunnymead Regional Water Reclamation Facility (the Perris Valley Storm Drain is tributary to the San Jacinto River just upstream of the Highway 215 crossing) and to the San Jacinto River near Murrietta Road from the Perris Valley Regional Water Reclamation Facility. Projected streamflows from the release of reclaimed water at these three locations are shown below:

Projected Streamflows in San Jacinto River*
Downstream of Sanderson Avenue
(cubic feet per second)

Month	1995	2000	2005	2010
October	0.0	0.0	0.0	0.0
November	0.0	0.0	0.0	0.0
December	4.0	8.9	12.8	17.3
January	4.0	8.9	12.8	17.3
February	2.8	7.6	11.6	16.0
March	0.0	1.4	5.3	9.8
April	0.0	0.0	0.0	0.0
May	0.0	0.0	0.0	0.0
June	0.0	0.0	0.0	0.0
July	0.0	0.0	0.0	0.0
August	0.0	0.0	0.0	0.0
September	0.0	0.0	0.0	0.0
Annual Mean	0.9	2.2	3.5	5.0

*Due to the release of reclaimed water only.

Projected Streamflows in San Jacinto River*
Downstream of Highway 215 Crossing
(cubic feet per second)

Month	1995	2000	2005	2010
October	10.6	19.5	27.7	37.8
November	10.3	19.2	27.3	37.6
December	20.3	34.1	46.1	61.0
January	20.3	34.1	46.1	61.8
February	18.7	32.4	44.5	59.2
March	14.0	24.3	36.4	51.2
April	10.3	19.2	27.3	37.6
May	8.3	17.2	25.4	35.7
June	5.6	14.5	22.6	32.9
July	3.8	12.7	20.8	31.2
August	2.6	11.5	19.7	30.0
September	6.7	15.6	23.8	34.1
Annual Mean	11.0	21.2	30.6	42.4

*Due to the release of reclaimed water only.

Projected Streamflows in San Jacinto River*
Downstream of Murrietta Road
(cubic feet per second)

Month	1995	2000	2005	2010
October	15.6	28.7	45.6	69.7
November	15.2	28.2	44.1	68.3
December	27.7	45.7	60.0	77.3
January	27.7	45.7	60.0	77.3
February	25.9	43.8	58.2	75.9
March	20.5	34.9	49.4	67.2
April	15.2	28.2	44.1	68.3
May	12.4	25.4	36.0	59.0
June	8.5	21.5	32.0	46.1
July	6.0	19.0	29.5	43.9
August	4.3	17.3	27.9	41.2
September	10.1	23.1	33.7	51.7
Annual Mean	15.8	30.1	43.4	62.2

*Due to the release of reclaimed water only.

As can be seen by the above tabulations of mean monthly streamflows, implementation of the San Jacinto Water Reclamation Program would create a sustained flow in the San Jacinto River downstream of the Highway 215 crossing, mainly

due to the release of reclaimed water from the Sunnymead facility. Therefore, there would also be a sustained flow in the Perris Valley Storm Drain. No flow records exist for the Perris Valley Storm Drain; however, it is mainly a dry streambed which flows during heavy rainfall periods. The sustained flow would also increase at Murrietta Road due to the release of reclaimed water from the Perris Valley facility.

The reclaimed water released by the Sunnymead and Perris Valley facilities would eventually reach the Railroad Canyon Weir. A comparison of the existing streamflows at Railroad Canyon Weir compared with those that would exist once the San Jacinto Water Reclamation Program is implemented is provided below:

Streamflows in the San Jacinto River
Railroad Canyon Weir
(cubic feet per second)

Month	Existing	1995	2000	2005	2010
October	<0.1	15.6	28.7	45.6	69.7
November	1.9	17.1	30.1	46.0	70.2
December	3.1	30.8	48.8	63.1	80.4
January	13.6	41.3	59.3	73.6	90.9
February	64.5	90.4	108.3	122.7	140.4
March	64.6	85.1	99.5	114.0	131.8
April	18.8	34.0	47.0	62.9	87.1
May	1.1	13.5	26.5	37.1	60.1
June	<0.1	8.5	21.5	32.0	46.1
July	0.2	6.2	19.2	29.7	44.1
August	0.1	4.4	17.4	28.0	41.3
September	0.6	10.7	23.7	34.3	52.3
Annual Mean	14.0	29.8	44.2	57.4	76.2

As can be seen by the above comparison, implementation of the San Jacinto Water Reclamation Program would create a live stream in the San Jacinto River. In fact, during 1995 the annual average sustained flow at the Railroad Canyon Weir would increase from the existing 14.0 cfs to 29.8 cfs. This flow would steadily increase as follows: 44.2 cfs in 2000, 57.4 cfs in 2005, and 76.2 cfs in 2010.

The flows in Salt Creek would also be affected by the San Jacinto Water Reclamation Program. The proposed Winchester Regional Water Reclamation Facility would release reclaimed water into Salt Creek at Winchester Road. Those projected releases are shown below:

Projected Streamflows in Salt Creek*
Downstream of Winchester Road
(cubic feet per second)

Month	1995	2000	2005	2010
October	0.0	0.0	0.0	0.0
November	0.0	0.0	0.0	0.0
December	0.7	1.9	3.0	4.1
January	0.7	1.9	3.0	4.1
February	0.4	1.6	2.6	3.7
March	0.0	0.0	0.8	2.2
April	0.0	0.0	0.0	0.0
May	0.0	0.0	0.0	0.0
June	0.0	0.0	0.0	0.0
July	0.0	0.0	0.0	0.0
August	0.0	0.0	0.0	0.0
September	0.0	0.0	0.0	0.0
Annual Mean	0.2	0.4	0.6	1.2

*Due to projected releases of reclaimed water only.

These flows would substantially increase downstream of Murrietta Road, however, due to the release of reclaimed water from the Sun City Regional Water Reclamation Facility. The projected flows at this location due to reclaimed water releases would be as follows:

Projected Streamflows in Salt Creek*
Downstream of Murrietta Road
(cubic feet per second)

Month	1995	2000	2005	2010
October	9.2	15.9	17.6	19.6
November	9.0	15.7	17.3	19.3
December	14.0	21.9	24.6	27.8
January	14.0	21.9	24.6	27.8
February	13.4	21.3	23.9	27.1
March	11.7	18.4	20.8	24.3
April	9.0	15.7	17.3	19.3
May	7.6	14.3	15.9	18.0
June	5.6	12.3	13.9	16.0
July	4.3	11.1	12.7	14.7
August	3.5	10.2	11.9	13.9
September	6.5	13.2	14.8	16.8
Annual Mean	9.0	16.0	17.9	20.4

*Due to projected releases of reclaimed water only.

Existing flow data for Salt Creek are rather limited. However, the Riverside County Flood Control and Water Conservation District has maintained a gauge at Murrietta Road during recent years. A comparison of these data for the 1982-83 through 1984-85 water years with the projected streamflows in 1995, 2000, 2005 and 2010 is shown below:

Streamflow Data for Salt Creek Downstream of Murrietta Road (cubic feet per second)

Month	Existing	1995	2000	2005	2010
October	1.0	10.2	16.9	18.6	20.6
November	0.4	9.4	16.1	17.7	19.7
December	5.6	19.6	27.5	30.2	33.4
January	0.1	14.1	22.0	24.7	27.9
February	0.5	13.9	21.8	24.4	27.6
March	21.5*	16.0	22.7	25.1	28.6
April	0.3	9.3	16.0	17.6	19.6
May	0.0	7.6	14.3	15.9	18.0
June	0.0	5.6	12.3	13.9	16.0
July	0.1	4.4	11.2	12.8	14.8
August	0.6	4.1	10.8	12.5	14.5
September	0.1	6.6	13.3	14.9	16.9
Annual Mean	1.1	10.1	17.1	19.0	21.5

*Major storm during March 1-4, 1983 skewed the data, the average flow during March disregarding this storm would have been 4.3 cfs. That value was used in the projections.

As can be seen by comparing the above streamflow data, implementation of the San Jacinto Water Reclamation Program would create a live stream in Salt Creek downstream of Murrietta Road. In addition, the live stream would have sustained flows significantly higher than presently exists in this stream during runoff periods. The mean annual flows would increase from the existing 1.1 cfs to 10.1 cfs in 1995, 17.1 cfs in 2000, 19.0 cfs in 2005, and 21.5 cfs in 2010.

The San Jacinto River and Salt Creek both flow into Canyon Lake. As shown above, the existing flows in these two streams are very low and normally flow only after an intense rainfall. A comparison of the existing flows with those projected once the San Jacinto Water Reclamation Program is implemented is shown below:

Inlows to Canyon Lake
(cubic feet per second)

Month	Existing	1995	2000	2005	2010
October	1.0	25.8	45.6	64.2	90.3
November	2.3	26.5	46.2	63.7	89.9
December	8.7	50.4	76.3	93.3	113.8
January	13.7	55.4	81.3	98.3	118.8
February	64.9	104.3	130.1	147.1	168.0
March	68.9	101.1	122.2	139.1	160.4
April	19.1	43.3	63.0	80.5	106.7
May	1.1	21.1	40.8	53.0	78.1
June	<0.1	14.1	33.8	45.9	62.1
July	0.3	10.6	30.4	42.5	58.9
August	0.7	8.5	28.2	40.5	55.8
September	0.7	17.3	37.0	49.2	69.2
Annual Mean	15.1	39.9	61.2	76.4	97.7

As can be seen by the above tabulation, the average annual inflow to Canyon Lake would increase from the existing flow of 15.1 cfs to 39.9 cfs in 1995, 61.2 cfs in 2000, 76.4 cfs in 2005, and 97.7 cfs in 2010. These increases are significant and should provide a benefit in that at the present time, the Elsinore Valley Muncipal Water District purchases approximately 2,000 acre-feet of water annually from The Metropolitan Water District of Southern California to maintain the level in Canyon Lake at 1,372 feet (capacity of 7,966 acre-feet) which is necessary to protect the existing recreational uses of the lake by the Canyon Lake Property Owners Association. Once the San Jacinto Water Reclamation Program is implemented, there would not be a need to purchase this water to maintain the lake level due to the increased inflow caused by the release of reclaimed water.

As pointed out above, implementation of the San Jacinto Water Reclamation Program would cause a significant increase in flow in the San Jacinto River, Perris Valley Storm Drain, and Salt Creek. Therefore, implementation of this program will cause a change in currents as well as the rate and amount of surface runoff in the San Jacinto River, Perris Valley Storm Drain, and Salt Creek.

The release of reclaimed water into these streams is not expected to have any affect on the flood flows. The estimated 100-year flood flow in the San Jacinto River in the vicinity of Perris is 42,750 cfs and the estimated 100-year flood flow in Salt Creek is 9,200 cfs.. Therefore, the 77.3 cfs flow from the reclaimed water in the San Jacinto River would be considered insignificant (0.2 percent) and the 27.8 cfs

flow in Salt Creek from the reclaimed water would be considered insignificant (0.3 percent).

Implementation of the San Jacinto Water Reclamation Program would require the construction of advanced wastewater treatment facilities at each of the five regional reclamation facilities. Previous studies by Eastern Municipal Water District have shown that construction of these facilities is feasible at all five sites.

In order to meet the water quality objectives contained in the 1983 Basin Plan as well as Title 22 standards (reclamation criteria) and the tentative waste discharge requirements suggested by the Regional Board staff, the reclaimed water would have to be adequately disinfected, oxidized, coagulated, clarified, and filtered. It would also have to have undergone nutrient removal (i.e., nitrogen and phosphorus). Based on this high level of treatment, it is anticipated that the reclaimed water would meet the quality criteria shown below:

Anticipated Reclaimed Water Quality
(mg/l unless otherwise noted)

Constituent	Hemet-San Jacinto	Win-chester	Sun City	Perris Valley	Sunny-mead
BOD	20	20	20	20	20
Suspended Solids	20	20	20	20	20
Total Inorganic Nitrogen	1.5	1.5	1.5	1.5	1.5
Total Phosphorus	0.5	0.5	0.5	0.5	0.5
Total Filtrable Residue	600	600	550	550	550
Sodium	120	120	120	130	130
Chloride	100	100	150	150	150
Sulfate	120	120	75	90	75
Fluoride	0.5	0.5	0.3	0.3	0.3
Boron	0.6	0.6	0.6	0.6	0.6
Hardness	200	200	125	130	130
Turbidity, NTU	<2	<2	<2	<2	<2
Coliform, MPN/100ml	2.2	2.2	2.2	2.2	2.2

As shown above, the anticipated quality of the reclaimed water is excellent and suitable for most beneficial uses.

Only limited chemical analyses of the San Jacinto River and Salt Creek are available due to their seasonal flow and lack of beneficial uses. Results were obtained, however, for the

San Jacinto River at Goetz Road on December 7, 1966 and at the Highway 395 (now State Highway 215) bridge on January 26, 1956 and January 22, 1969. These data collected by the Riverside County Flood Control and Water Conservation District are presented below:

Chemical Analyses
San Jacinto River at Goetz Road
December 7, 1966

pH, units	7.3
Specific Conductance, umhos/cm	252
Calcium, ppm	24
Magnesium, ppm	6
Sodium, ppm	15
Potassium, ppm	6
Carbonate, ppm	0.0
Bicarbonate, ppm	99
Sulfate, ppm	33
Chloride, ppm	13
Nitrate, ppm	3
Fluoride, ppm	0.0
Boron, ppm	0.12
Total hardness, ppm	84

Chemical Analyses
San Jacinto River near Perris at Highway 395 Bridge

	1/26/56	1/22/69
pH, units	8.0	7.3
Specific Conductance, umhos	435	262
Calcium, ppm	18	23
Magnesium, ppm	4	3
Sodium, ppm	71	25
Potassium, ppm	1.5	7
Carbonate, ppm	0	0
Bicarbonate, ppm	165	93
Sulfate, ppm	47	16
Chloride, ppm	28	22
Nitrate, ppm	1.2	8.7
Fluoride, ppm	1.2	0.6
Boron, ppm	0.28	0.13
Total hardness, ppm		70
Total dissolved solids, ppm	311	221

Although it seldom flows, water quality in the San Jacinto River is excellent as shown above. Consequently, based on the anticipated quality of the reclaimed water, a release of reclaimed water into the San Jacinto River would change the quality of the flow substantially.

As previously stated, Salt Creek water quality data are very limited. In fact, during the last 20 years only two samples have been collected and analyzed. The results of those two sampling events are shown below:

Chemical Analyses
Salt Creek at Hope Ranch Road

Constituent	1/14/69	5/09/77
pH, units	7.1	7.8
Specific Conductance, umhos/cm	192	181
Calcium, mg/l	17	22
Magnesium, mg/l	4	4.5
Sodium, mg/l	11	6
Potassium, mg/l	5	3
Carbonate, mg/l		0
Bicarbonate, mg/l	39	45
Sulfate, mg/l	35	36
Chloride, mg/l	10	7
Nitrate, mg/l	4	2
Fluoride, mg/l	0.2	0.1
Boron, mg/l		0.07
Total Dissolved Solids, mg/l	156	138
Percent Sodium, %	27	14
Total Hardness, mg/l	58	74

Source: RCFC&WCD

As shown above, the water quality of Salt Creek is excellent during periods of runoff; therefore, a discharge of reclaimed water into Salt Creek would substantially change the quality of the runoff.

Water quality data for Canyon Lake are also quite limited. However, the Elsinore Valley Municipal Water District does sample the lake once per year for general water quality parameters as well as heavy metals. The results of these samplings since 1979 are shown on the following page.

As shown on the following page, the water quality in Canyon Lake is very good; however, there has been a steady increase in the mineral content of the waters as evidenced by the specific conductance increasing from 350 umhos/cm in 1983 to 860 umhos/cm in 1987. During this same time, the total filtrable residue increased from 235 mg/l to 500 mg/l. Again, a release of reclaimed water into Canyon Lake would increase the total filtrable residue slightly to approximately 575 mg/l. However, it is believed that the continued release of reclaimed water to Canyon Lake would help stabilize the quality at the levels shown previously for the anticipated quality of the reclaimed water.

A continual discharge of reclaimed water into Canyon Lake will also have a beneficial impact on the lake in that it could be managed to always be at its maximum water level. Maintaining the reservoir at its maximum water level would enhance the recreational opportunities of that reservoir.

A continual discharge into the San Jacinto River and Salt Creek could also have a beneficial impact on the amount of groundwater recharge in those basins.

At the present time, Canyon Lake is used as a source of domestic supply. Once the San Jacinto Water Reclamation Program is implemented, this beneficial use would no longer occur due to the introduction of reclaimed water into the system. Therefore, the Eastern Municipal Water District intends to construct a pipeline from its existing system to the water treatment plant located immediately downstream of the Reservoir; thus providing a replacement source of supply.

4. Plant Life

A continual flow in the San Jacinto River and Salt Creek could establish a riparian habitat that does not presently exist. This is thought to be a beneficial impact.

5. Animal Life

A continual flow combined with a riparian habitat could establish a warm water fishery in the San Jacinto River and Salt Creek which does not presently exist. It would also become a more suitable habitat for aquatic birds.

IV. Determination

On the basis on this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment. X

I find that the proposed project may have a significant adverse impact on the environment. However, there are feasible alternatives and/or mitigation measures available which would substantially lessen any significant adverse impact. These alternatives and mitigation measures are discussed in the attached written report. ___

I find that the proposed project MAY have a significant effect on the environment. There are no feasible alternatives and/or feasible mitigation measures available

which would substantially lessen any significant adverse impacts. See the attached written report for a discussion of this determination.

Date	Signature

California Regional Water Quality Control Board
Santa Ana Region

RESOLUTION NO. 88-

Resolution Amending the Water Quality Control Plan
for the Santa Ana River Basin (8)

WHEREAS, the California Regional Water Quality Control Board, Santa Ana Region (hereinafter Regional Board), finds:

1. The amended Basin Plan for the Santa Ana Region was adopted by Resolution No. 83-88 on May 13, 1983, and approved by the State Water Resources Control Board on October 23, 1983.

2. The Basin Plan contains a waste discharge prohibition to streams flowing into or out of lakes and reservoirs which are used for domestic water supplies in Chapter 4, page 4-26.

3. At the present time, Canyon Lake waters are used as a source of domestic water supply by the Elsinore Valley Municipal Water District; therefore, the waste discharge prohibition would apply to Salt Creek upstream of Canyon Lake and to the San Jacinto River both upstream and downstream of Canyon Lake.

4. Eastern Municipal Water District anticipates the purchase of Canyon Lake from the Temescal Water Company. Should the sale materialize, Eastern Municipal Water District would construct an intertie between its water distribution system and Elsinore Valley Municipal Water District's water treatment plant which now draws water from Canyon Lake thereby eliminating the actual domestic use of Canyon Lake waters.

5. The 1983 Basin Plan includes a "MUN" (municipal and domestic water supply) beneficial use designation for Canyon Lake waters.

6. Section 131.10(h) of Title 40 of the Code of Federal Regulations does not allow States to remove beneficial use designations if they are for existing uses (i.e., those actually attained in the water body on or after November 28, 1975).

7. Eastern Municipal Water District is desirous of implementing its San Jacinto Water Reclamation Program which would create permanent "live streams" in the San Jacinto River downstream of the Perris Valley Storm Drain (i.e., Highway 215 crossing), in the Perris Valley Storm Drain, and in Salt Creek downstream of Murrietta Road.

8. Due to the "MUN" beneficial use designation of Canyon Lake waters, the existing waste discharge prohibition to streams flowing into or out of lakes and reservoirs used for domestic supplies could be construed to apply to Salt Creek which flows into Canyon Lake and the San Jacinto River which flows into and out of Canyon Lake even though the use is no longer occurring.

9. Should the existing waste discharge prohibition to streams flowing into or out of lakes and reservoirs used for domestic supplies be construed to apply to Salt Creek and the San Jacinto River, Eastern Municipal Water District could not implement its San Jacinto Water Reclamation Program.

10. An environmental assessment was made in July 1983 of the impacts of excluding Canyon Lake from the waste discharge prohibition and no unmitigated adverse impacts were identified.

11. The Regional Board conducted a public hearing on September 9, 1988, regarding the effect of excluding Canyon Lake from the waste discharge prohibition. Notice of the public hearing was given to all interested persons and published in accordance with Water Code Section 13244.

12. The Regional Board considered all testimony and evidence at the public hearing and good cause was found to modify the waste discharge prohibition.

NOW THEREFORE BE IT RESOLVED that:

1. The California Regional Water Quality Control Board, Santa Ana Region, adopts the environmental assessment of the impacts of excluding Canyon Lake from the waste discharge prohibition to streams flowing into or out of lakes and reservoirs used for domestic water supplies.

2. The California Regional Water Quality Control Board, Santa Ana Region, adopts the following amendment to the Water Quality Control Plan, revising the waste discharge prohibition to streams flowing into or out of lakes and reservoirs used for domestic water supplies (Chapter 4, Section C, Subsection 2, page 4-26:

   > The discharge of sewage to lakes or reservoirs, or streams flowing into or out of lakes or reservoirs, which are used for domestic water supplies, excluding Canyon Lake, is prohibited.

3. The Executive Officer is directed to forward copies of this resolution to the State Water Resources Control Board in

fulfillment of the requirement of Section 13245 of the Water Code.

I, James R. Bennett, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of a resolution adopted by the California Regional Water Quality Control Board, Santa Ana Region, on September 9, 1988.

JAMES R. BENNETT
Executive Officer

D R A F T

DRAFT

MEMORANDUM

SUBJECT: Deleting Public Water Supply use designations

FROM: Winer, OGC HQ

TO: Sabock (cc. Ballentine, Shippen)

You have asked for my views on the circumstances under which the WQS regulations allow a state to delete a public water supply (pws) use designation for particular segment(s).

This question has apparently arisen because some states who earlier assigned a pws use across the board, whether or not the use had been attained or was expected to occur, are now questioning the desirability of treating to meet the criteria for that use where it does not in fact exist, given the possibility of generating trihalomethanes from chlorination and given the simple expense. (For purposes of the following discussion, I assume that the pws and its criteria relate to raw, not finished drinking water.

The simplest way to start is to outline when such a deletion is not permitted under our regulation, and then to identify what is left. The key restraints applicable to such an action are section 131.10 (use attainabilty requirements and existing use requirements) and 131.12 (antidegradation).

First, if pws is an "existing" use as defined in the regulation, it cannot be deleted, period. Assuming for purposes of discussion that pws is not an existing use on the candidate segment, the next question is whether a use attainability analysis is required, and if so what the outcome is.* One is required unless uses with equal or more stringent criteria are added (or are already included

*/ If the state is able to show that the use is unattainable, then downgrading is permissible as long as any antidegradation requirements are met, see below.

and remain on the books) or unless pws is deemed to be a "higher" use than the goals of the Act (i.e., fishable/ swimmable water).

Whether either of those is the case will depend on the facts of the particular segment, the criteria the state has for pws, and the other uses assigned to the segment and their criteria. However, the first situation (where uses with higher criteria would remain) is unlikely be of much practical help to the state, since there would be little to be gained from dropping the pws use if all its criteria had to be met anyways. The other situation ("higher" than fishable/swimmable) shows more potential promise, although a little reading between the lines of the regulation is required.** The key would, of course, be to show that the pws criteria of concern to the state were more stringent than needed for fishable/swimmable water. (Presumably, if other pws criteria were less stringent than the f/s criteria, that wouldn't matter, as long as the f/s criteria remained on the book.) If the pws use had a numerical criterion for a parameter while the f/s counterpart was a narrative, it would be advisable to adopt a numerical criterion for the f/s use before trying to remove the pws use.

A final consideration is the antidegradation policy. In tier one waters, the only constraint applicable to removing

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**/ Section 131.10(j) says a use attainability analysis is required when removing a use ~~use~~ specified in 101(a) or adopting subcategories of such uses with less stringent criteria; 131.10(k) says no use attainability analysis is required when designating uses which include those in 101(a). By inference, no use attainability analysis is required when removing a use "above" the 101(a) ones, as long as the 101(a) ones remain.

the pws use is making sure that it is not an existing use and that the criteria for the remaining uses are stringent enough to in fact protect those uses. In high quality waters, the only additional requirement is that the state make the required showings (following the public participation requirements, of course). To the extent that remaining uses have criteria more stringent than pws, antidegradation should pose no problem; on the other hand, to the extent that there would be a relaxation of criteria, tier two and three could be hurdles.

8-33

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY
PHONE 684-1881
AREA CODE 714
LABORATORIES
3215 CHICAGO AVENUE

ESTABLISHED 1906

EDWARD S. BABCOCK & SONS, INC.

P. O. BOX 432
RIVERSIDE, CALIFORNIA 92502

JUN 27 1988

TO 137
REGIONAL WATER QUALITY CONTROL BOARD #8
6809 INDIANA AVE, Suite 200
RIVERSIDE, CA 92506

Lab No. 880623-B451
Invoice No. 164169

	Submitted	Sampled
By	Pat	PLB
Date	6/23	6/23
Time	1610	

Time Started

782-4130
Agreemtnt #_____

Sample Mark	Standard Plate Count	Coliform Bacteria: ml Planted	Presumptive	Confirmed	Tubes +	MPN/100 ml	Fecal	Tubes +	MPN/1
1) #1 North of causeway off Dock		1	24 + − + − +	24 + − − − +	5	300	24 − − − − −	0	<2
			48 + + +	48 + + +					
		0.1	24 − − − + −	24 − − − + −	1		24 − − − − −	0	
			48 + + + +	48 − − − −					
		0.01	24 − + − − −	24 −	0		24 −	0	
			48 − − − −	48 −					
			24	24			24		
			48	48					
2) #2 Center North End		1	24 − − + + −	24 − − − + −	2	40	24 − − − − −	0	<2
			48 + + +	48 − − + −					
		0.1	24 − − − − −	24 − − − −	0		24 − − − − −	0	
			48 + + + + −	48 − − − −					
		0.01	24 − − − − −	24	0		24	0	
			48 − − − − −	48					
			24	24			24		
			48	48					
			24	24			24		
			48	48					
3) #3 Bass Cove		1	24 − − + + +	24 − − + + +	3	110	24 − − − − −	0	<2
			48 + +	48 − −					
		0.1	24 − − − + −	24 − − − + −	1		24 − − − − −	0	
			48 + + + +	48 − − − −					
		0.01	24 − − − − −	24 − − − −	0		24 − − − − −	0	
			48 + − + + +	48 − − − −					

SAWPA DES
001004601

CALLED_____

EDWARD S. BABCOCK & SONS, INC.

Allison Mackenzie

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY
PHONE 684-1881
AREA CODE 714
LABORATORIES
3215 CHICAGO AVENUE

ESTABLISHED 1906

EDWARD S. BABCOCK & SONS, INC.

P. O. BOX 432
RIVERSIDE, CALIFORNIA 92502

JUN 27 1988

TO 137
REGIONAL WATER QUALITY CONTROL BOARD #8
6809 INDIANA AVE, Suite 200
RIVERSIDE, CA 92506

Lab No. 880623-B45
Invoice No. 164169

	Submitted	Sampled
By	Pat	PLB
Date	6/23	6/23
Time	1610	
	Time Started	

782-4130
Agreemtnt #_____

Sample Mark	Standard Plate Count	Coliform Bacteria: ml Planted	Presumptive	Confirmed	Tubes +	MPN/100 ml	Fecal	Tubes +	MPN/
1) #4 north of Treasure Is		1	24 – – – – –	24 – – – – –			24 – – – – –		
			48 + + + + +	48 – – + – –	1	40		0	<2
		0.1	24 – – – – –	24 – – + – –			24 – – – – –		
			48 + + + + +	48 – – – – –	1			0	
		0.01	24 – – – – –	24			24		
			48 – – – – –	48	0			0	
			24	24			24		
			48	48					
5) #5 Catfish Cove		1	24 – – – + –	24 – – – + –			24 – – – – –		
			48 + + + +	48 – + – –	2	40		0	<2
		0.1	24 – – – – –	24 – – – – –			24 – – – – –		
			48 + + + + +	48 – – – – –	0			0	
		0.01	24 – – – – –	24 – – –			24 · – – –		
			48 – + – – +	48 – – –	0			0	
			24	24			24		
			48	48					
			24	24			24		
			48	48					
6) #6 at Dam		1	24 – – + – –	24 – – + – –			24 – – + – –		
			48 + + + +	48 – – – +	2	40		1	0
		0.1	24 – – – – –	24 – – – – –			24 – – – – –		
			48 + – + + +	48 – – – – –	0			0	
		0.01	24 – – – – –	24			24		
			48 – – – – –	48	0			0	

SAWPA DES
001004602

_____CALLED_____

EDWARD S. BABCOCK & SONS, INC.

Allison Mackenzie

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY
PHONE 684-1881
AREA CODE 714
LABORATORIES
3215 CHICAGO AVENUE

ESTABLISHED 1906

EDWARD S. BABCOCK & SONS, INC.

P. O. BOX 432
RIVERSIDE, CALIFORNIA 92502

JUN 27 1988

TO 137
REGIONAL WATER QUALITY CONTROL BOARD #8
6809 INDIANA AVE, Suite 200
RIVERSIDE, CA 92506

Lab No. 880623-B45
Invoice No. 164169

	Submitted	Sampled
By	Pat	PLB
Date	6/23	6/23
Time	1010	

Time Started

782-4130
Agreemtnt #_____

Sample Mark	Standard Plate Count	Coliform Bacteria: ml Planted	Presumptive	Confirmed	Tubes +	MPN/100 ml	Fecal	Tubes +	MPN/1
7) #7		1	24 – + + – – / 48 + + –	24 – + + – – / 48 – –	2	70	24 – – – – –	0	<2
		0.1	24 – – + – – / 48 + + –	24 – – – – / 48 – – + –	1		24 – – – –	0	
		0.01	24 – – – – – / 48 – – – – –	24 / 48	0		24	0	
			24 / 48	24 / 48			24		
8) #8 Mouth of Holiday Cove		1	24 – – – – – / 48 + + + + +	24 – – – – – / 48 – – + – –	1	20	24 – – – – –	0	<2
		0.1	24 – – – – – / 48 + + + + +	24 – – – – – / 48 – – – – –	0		24 – – – – –	0	
		0.01	24 – – – – – / 48 – – – – –	24 / 48	0		24	0	
			24 / 48	24 / 48			24		
			24 / 48	24 / 48			24		
9) #9		1	24 – + – – – / 48 + + + + +	24 – + – – – / 48 + + + +	5	500	24 – – – – –	0	<2
		0.1	24 – – + – + / 48 + + +	24 – – – – + / 48 – – – –	1		24 – – – – –	0	
		0.01	24 – – – – – / 48 + + + + +	24 – – – – – / 48 – – + – –	1		24 – – – – –	0	

SAWPA DES
001004603

CALLED_____

EDWARD S. BABCOCK & SONS, INC.

Allison Mackenzie

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ESTABLISHED 1906

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P. O. BOX 432
RIVERSIDE, CALIFORNIA 92502

JUN 27 1988

TO 137
REGIONAL WATER QUALITY CONTROL BOARD #8
6809 INDIANA AVE, Suite 200
RIVERSIDE, CA 92506

782-4130
Agreemtnt #_____

Lab No. 880623-B45
Invoice No. 164169

	Submitted	Sampled
By	Pat	PLB
Date	6/23	6/23
Time	1010	

Time Started

Sample Mark	Standard Plate Count	Coliform Bacteria: ml Planted	Presumptive (24 / 48)	Confirmed (24 / 48)	Tubes +	MPN/100 ml	Fecal (24)	Tubes +	MPN/1
#10 East End of Holiday Bay		1	24: − − − − − / 48: + + + + +	24: − + − − − / 48: − + − +	3	80	24: − − − − −		<2
		0.1	24: − − − − − / 48: + + + + +	24: − − − − − / 48: − − − −	0		24: − − − − −		
		0.01	24: − − − − − / 48: + + + + +	24: − − − − − / 48: − − − −	0		24: − − − − −		
			24 / 48	24 / 48			24		
		1	24 / 48	24 / 48			24		
		0.1	24 / 48	24 / 48			24		
		0.01	24 / 48	24 / 48			24		
			24 / 48	24 / 48			24		
			24 / 48	24 / 48			24		
		1	24 / 48	24 / 48			24		
		0.1	24 / 48	24 / 48			24		
		0.01	24 / 48	24 / 48			24		

SAWPA DES
001004604

CALLED_____

EDWARD S. BABCOCK & SONS, INC.

Allison Mackenzie

file 8-33

August 16,1988

CANYON LAKE SAMPLING

DATE SAMPLED: June 23, 1988

PURPOSE: This purpose of this sampling was to determine current water quality conditions in Canyon Lake.

STAFF:

1. Patricia Blodgett - Santa Ana Regional Water Quality Control Board, 6809 Indiana Avenue, Ste. 200, Riverside, CA 92506
   Phone (714) 782-4275

2. Ray Brewer, Canyon Lake Homeowner's Ass'n Marine Patrol, P.O. Box 5A, Canyon Lake, CA 92380
   Phone (714) 244-6841

3. Charles Crider, Eastern Municipal Water District, P.O. Box 858, Hemet, CA 92343
   Phone (714) 925-7676

4. Charles Smith, Temescal Water District, P. O. Box 669, Corona, CA 91718
   Phone (714) 737-6700

GENERAL CONDITIONS:

Air temperature was approximately 85-90 degrees F; slight wind from south to southeast; clear with high clouds. Water color ranged from black-green to brown-green.

STATION DESCRIPTIONS:

(See attached map for approximate station locations.)

Station 1. North of raised causeway at northernmost end of lake, off dock approximately mid-stream, at surface. No temperature or dissolved oxygen measurements were taken at this station.

Sta. 2. Approximately 250 feet south of raised causeway at northernmost end of lake, mid-stream, at surface. Temperature and dissolved oxygen data at varying depths.

Sta. 3. Middle of Bass Cove, at surface. Temperature and dissolved oxygen data at varying depths.

Sta. 4. Approximately 200 feet north of Treasure Island, mid-channel (from under bridge), at surface. Temperature and dissolved oxygen data at varying depths.

Sta. 5. Catfish Cove, mid-channel, at surface. Temperature and dissolved oxygen data at varying depths.

Sta. 6. At southern end of lake, near dam, mid-channel between floating barriers and dam, at surface. Temperature and dissolved oxygen data at varying depths.

Sta. 7. At mouth of Holiday Bay, mid-channel, at surface. Temperature and dissolved oxygen data at varying depths.

Sta. 8. At mouth of Holiday Bay, mid-channel, at 18 feet depth (same location as Sta. 7).

Sta. 9. At Round Horse Circle in Holiday Cove, mid-channel, at surface.

Sta. 10. Approximately 50 feet from entrance of Salt Creek into east end of Holiday Cove, mid-channel, at surface.

Sta. 11. Approximately .8 road miles upstream from fire gate (located behind fire station at north causeway) on San Jacinto River. Taken at surface from streambank. Substrate appeared to be broken shale, with noticeably more attached algal growth than at station 1. Boating and water skiing was observed along this reach. No dissolved oxygen measurements were taken here, nor were any samples taken for coliform analysis.

MEASUREMENTS/ANALYSES:

Temperature and Dissolved Oxygen measurements were made in the field, using a YSI Model 51B Probe, calibrated to the approximate lake elevation (1400 feet).

Depth samples of water were collected using a Van Dorn sampler.

Collected samples were kept on ice and delivered to Babcock Laboratory in Riverside by 4:15pm. They were analyzed for total and fecal coliform, standard minerals, and nutrient series. Water samples taken for nutrient analyses were taken in marked bottles prepared at the Laboratory indicating that they contained sufficient sulfuric acid to preserve the samples.

FIELD MEASUREMENTS: June 23, 1988

STATION	DEPTH (feet)	TEMPERATURE (degrees C.)	DISSOLVED OXYGEN (mg/l)
2	0	25	9.2
	3	27	9.9
	10	25	8.8
	3	26	9.6
	11.7	25	9.0
	11	25	7.2
3	0	26	10.0
	4	26	10.2
4	0	25.5	10.0
	15	24	7.0
	19	22	1.4
	27	17.4	.06
	34	15	.02
5	0	26	9.5
	20	22	1.4
6	0	24	9.8
	12	25	10.2
	16	23	2.5
	24	17	6.1
7	0	26	9.9
8	13	24	5.0
	15	23	2.6
	20	19.5	.06
9	0	26	13.4
10	0	26	11.3
11	0	27	----

OTHER NOTES OF INTEREST:

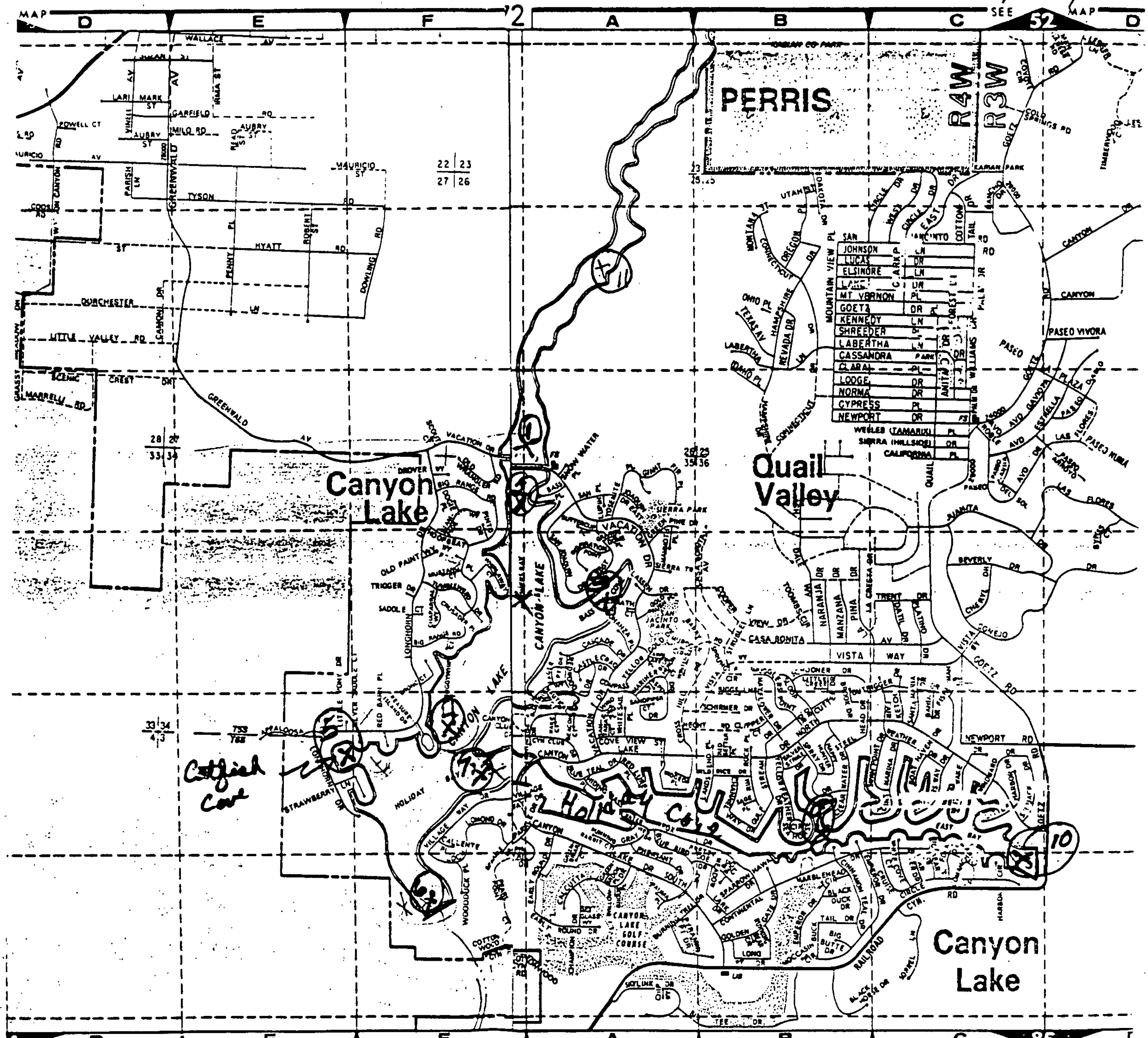
Ray indicated that the lake turns over in the spring and fall. He noted that the spring turnover was late this year, due to unusually cold spring weather. He expects nuisance conditions, such as algal scum in Holiday Cove and other coves in about 1 month. He indicated that the Lake is stocked with 18-24" channel catfish, 9" Florida bass; it also has crappie, bluegill, and sunfish.

We observed fishing, boating, water skiing, and at an area called Indian Beach, swimming. There is a private campground NW of the dam which had more than a dozen tents and RVs. Ray indicated that this area had sewer, electrical, and water hookups.

Tamarisks along the shoreline NE of the dam harbored numerous grey herons, kingfishers, and white egrets. According to Ray, the deepest part of the lake (about 80 feet) was in front of the dam.

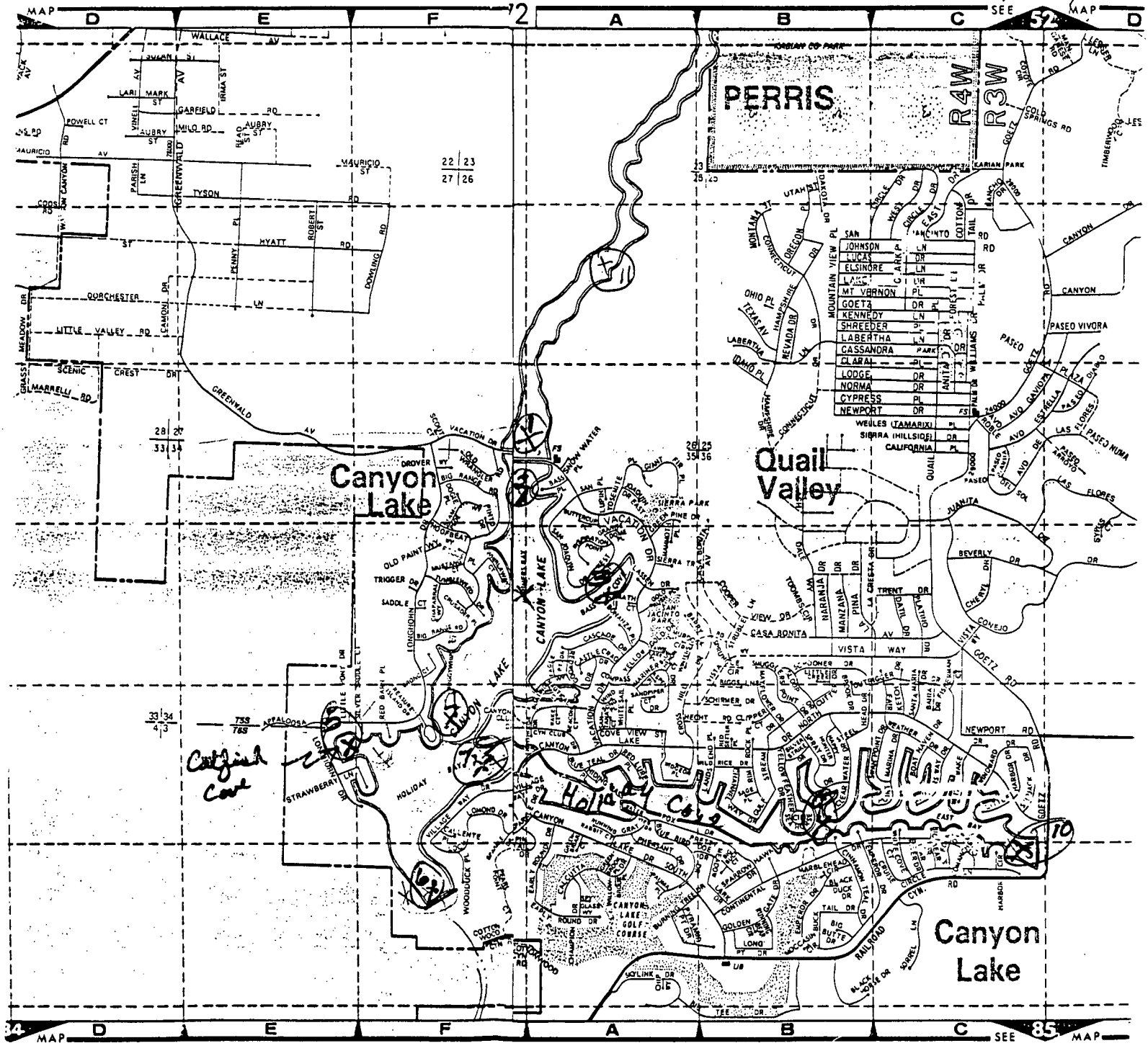
Rocks along the shoreline of the causeway that formed the northern end of Canyon Lake had little visible algal growth. Rocks along the bank at Station 11 (.87 miles by road upstream on the east shoreline from the causeway) had 1/4-1/2" algal covering. No campers or other users were seen on either shore north of the causeway, but there were numerous well-used ATV tracks.

6/23/88
RWQCB Sampling ST



6/23/88

RWQCB Sampling ST



STATE OF CALIFORNIA

GEORGE DEUKMEJIAN, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SANTA ANA REGION
6809 INDIANA AVENUE, SUITE 200
RIVERSIDE, CALIFORNIA 92506
PHONE: (714) 782-4130

June 20,1988

Captain Ray Brewer 244-6841
Post Office Box 5A
Canyon Lake, CA. 92380

SUBJECT: WATER QUALITY SAMPLING OF CANYON LAKE RESERVOIR

Dear Captain Brewer:

This letter confirms our request to do a water quality sampling program at Canyon Lake Reservoir. We have scheduled this program on June 23, 1988 at 08:00 at Canyon Lake. The person sampling from the Regional Board will be Mrs. Patricia Blodgett. There will be possibly two other individuals attending this program. Your assistance in carrying out this program is appreciated.

Sincerely,

Roger W. Turner

Roger W. Turner

cc: P. Blodgett

rwt: rwt

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SANTA ANA REGION
6809 INDIANA AVENUE, SUITE 200
RIVERSIDE, CALIFORNIA 92506
PHONE: (714) 782-4130

August 19, 1988

Mr. Charles Crider
Eastern Municipal Water District
P.O. Box 858
Hemet, CA 92343

DATA FROM CANYON LAKE SAMPLING, JUNE 23, 1988

Dear Mr. Crider:

Enclosed you will find copies of my field report and of the water quality analyses which were made on the samples collected around the Lake on June 23. If you have any questions, please feel free to contact me at (714)782-4275.

Thanks again for your time and assistance.

Sincerely,

Patricia L. Blodgett

Patricia L. Blodgett
Senior Environmental Specialist

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SANTA ANA REGION
6809 INDIANA AVENUE, SUITE 200
RIVERSIDE, CALIFORNIA 92506
PHONE: (714) 782-4130

August 19, 1988

Mr. Charles Smith
Temescal Water District
P.O. Box 669
Corona, CA 91718

DATA FROM CANYON LAKE SAMPLING, JUNE 23, 1988

Dear Mr. Smith:

Enclosed you will find copies of my field report and of the water quality analyses which were made on the samples collected around the Lake on June 23. If you have any questions, please feel free to contact me at (714)782-4275.

Thanks again for your time and assistance.

Sincerely,

Patricia L. Blodgett

Patricia L. Blodgett
Senior Environmental Specialist

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, *Governor*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SANTA ANA REGION
6809 INDIANA AVENUE, SUITE 200
RIVERSIDE, CALIFORNIA 92506
PHONE: (714) 782-4130

August 19, 1988

Mr. Ray Brewer
Canyon Lake Homeowner's Association
Marine Patrol
P.O. Box 5A
Canyon Lake, CA 92380

DATA FROM CANYON LAKE SAMPLING, JUNE 23, 1988

Dear Mr. Brewer:

Enclosed you will find copies of my field report and of the water quality analyses which were made on the samples collected around the Lake on June 23. If you have any questions, please feel free to contact me at (714)782-4275.

Thanks again for your time and the use of a boat for the sample collection effort.

Sincerely,

Patricia L. Blodgett

Patricia L. Blodgett
Senior Environmental Specialist

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HAZARDOUS WASTE TESTING
CALIF. DHS CERTIFIED
PHONE (714) 684-1881
LABORATORIES
3215 CHICAGO AVE.

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P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-181
Invoice No. 91696

	Submitted	Sampled
Sample Marked: #1 N of Causeway off dock Water	By Pat	PLB
	Date 6/23/88	6/23/88
	Time 16:10	

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	190	mg/L	Specific Conductance	640	umho/cm
Calcium (Ca)	46	mg/L	pH	8.1	
Magnesium (Mg)	18	mg/L	Total Filterable Residue	355	mg/L
Sodium (Na)	60	mg/L	Fluoride (F)	0.4	mg/L
Potassium (K)	6	mg/L	Kjeldahl Nitrogen	0.9	mg/L
Ammonium Nitrogen	0.2	mg/L	Total Nitrogen	0.9	mg/L
Total Cations	6.56	me/L	Total Phosphorus	0.16	mg/L
Total Alkalinity as $CaCO_3$	120	mg/L	Phosphate Phosphorus	0.09	mg/L
			Nitrite Nitrogen	<0.1	mg/L
Hydroxide (OH)	none	mg/L	Boron (B)	0.1	mg/L
Carbonate (CO_3)	none	mg/L	Iron (Fe)	0.28	mg/L
Bicarbonate (HCO_3)	146	mg/L			
Sulfate (SO_4)	86	mg/L			
Chloride (Cl)	72	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	6.22	me/L			

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-191
Invoice No. 91696

Sample Marked: #11 Water

	Submitted	Sampled
By	Pat	PLB
Date	6/23/88	6/23/88
Time	16:10	

PARAMETER	RESULT	
Total Hardness as $CaCO_3$	193	mg/L
Calcium (Ca)	47	mg/L
Magnesium (Mg)	18	mg/L
Sodium (Na)	61	mg/L
Potassium (K)	6	mg/L
Ammonium Nitrogen	0.3	mg/L
Total Cations	6.67	me/L
Total Alkalinity as $CaCO_3$	123	mg/L
Hydroxide (OH)	none	mg/L
Carbonate (CO_3)	none	mg/L
Bicarbonate (HCO_3)	149	mg/L
Sulfate (SO_4)	94	mg/L
Chloride (Cl)	68	mg/L
Nitrate Nitrogen	<0.1	mg/L
Total Anions	6.33	me/L

PARAMETER	RESULT	
Specific Conductance	640	umho/cm
pH	8.4	
Total Filterable Residue	385	mg/L
Fluoride (F)	0.3	mg/L
Kjeldahl Nitrogen	0.5	mg/L
Total Nitrogen	0.5	mg/L
Total Phosphorus	0.21	mg/L
Phosphate Phosphorus	0.13	mg/L
Nitrite Nitrogen	<0.1	mg/L
Boron (B)	0.2	mg/L
Iron (Fe)	0.49	mg/L

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-190
Invoice No. 91696

	Submitted	Sampled
Sample Marked: #10 E end of Holiday Bay Water	By Pat	PLB
	Date 6/23/88	6/23/88
	Time 16:10	

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	238	mg/L	Specific Conductance	870	umho/cm
Calcium (Ca)	55	mg/L	pH	9.0	
Magnesium (Mg)	24	mg/L	Total Filterable Residue	520	mg/L
Sodium (Na)	86	mg/L	Fluoride (F)	0.4	mg/L
Potassium (K)	7	mg/L	Kjeldahl Nitrogen	1.6	mg/L
Ammonium Nitrogen	0.3	mg/L	Total Nitrogen	1.6	mg/L
Total Cations	8.69	me/L	Total Phosphorus	0.15	mg/L
Total Alkalinity as $CaCO_3$	113	mg/L	Phosphate Phosphorus	0.06	mg/L
Hydroxide (OH)	none	mg/L	Nitrite Nitrogen	<0.1	mg/L
Carbonate (CO_3)	39	mg/L	Boron (B)	0.1	mg/L
Bicarbonate (HCO_3)	58	mg/L	Iron (Fe)	0.25	mg/L
Sulfate (SO_4)	156	mg/L			
Chloride (Cl)	108	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	8.54	me/L			

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-189
Invoice No. 91696

Sample Marked: #9 Mid Holiday Bay Water

	Submitted	Sampled
By	Pat	PLB
Date	6/23/88	6/23/88
Time	16:10	

PARAMETER	RESULT	
Total Hardness as $CaCO_3$	220	mg/L
Calcium (Ca)	48	mg/L
Magnesium (Mg)	22	mg/L
Sodium (Na)	85	mg/L
Potassium (K)	6	mg/L
Ammonium Nitrogen	0.2	mg/L
Total Cations	8.09	me/L
Total Alkalinity as $CaCO_3$	93	mg/L
Hydroxide (OH)	none	mg/L
Carbonate (CO_3)	45	mg/L
Bicarbonate (HCO_3)	21	mg/L
Sulfate (SO_4)	156	mg/L
Chloride (Cl)	103	mg/L
Nitrate Nitrogen	<0.1	mg/L
Total Anions	8.00	me/L

PARAMETER	RESULT	
Specific Conductance	810	umho/cm
pH	8.7	
Total Filterable Residue	515	mg/L
Fluoride (F)	0.3	mg/L
Kjeldahl Nitrogen	0.4	mg/L
Total Nitrogen	0.4	mg/L
Total Phosphorus	0.14	mg/L
Phosphate Phosphorus	0.02	mg/L
Nitrite Nitrogen	<0.1	mg/L
Boron (B)	<0.1	mg/L
Iron (Fe)	0.07	mg/L

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-188
Invoice No. 91696

	Submitted	Sampled
Sample Marked: #8 18ft D Mouth of Holiday Cve Water	By Pat	PLB
	Date 6/23/88	6/23/88
	Time 16:10	

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	229	mg/L	Specific Conductance	830	umho/cm
Calcium (Ca)	53	mg/L	pH	7.9	
Magnesium (Mg)	23	mg/L	Total Filterable Residue	475	mg/L
Sodium (Na)	82	mg/L	Fluoride (F)	0.4	mg/L
Potassium (K)	7	mg/L	Kjeldahl Nitrogen	1.2	mg/L
Ammonium Nitrogen	0.2	mg/L	Total Nitrogen	1.2	mg/L
Total Cations	8.33	me/L	Total Phosphorus	0.10	mg/L
Total Alkalinity as $CaCO_3$	125	mg/L	Phosphate Phosphorus	0.02	mg/L
Hydroxide (OH)	none	mg/L	Nitrite Nitrogen	<0.01	mg/L
Carbonate (CO_3)	none	mg/L	Boron (B)	0.1	mg/L
Bicarbonate (HCO_3)	153	mg/L	Iron (Fe)	0.14	mg/L
Sulfate (SO_4)	150	mg/L			
Chloride (Cl)	95	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	8.31	me/L			

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7/19/88

To: Regional Water Quality Control Board #8
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Riverside, CA 92506

Lab No. 880623-187
Invoice No. 91696

	Submitted	Sampled
Sample Marked: #7 Mouth of Holiday Cove Water	By Pat	PLB
	Date 6/23/88	6/23/88
	Time 16:10	

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	219	mg/L	Specific Conductance	810	umho/cm
Calcium (Ca)	51	mg/L	pH	8.6	
Magnesium (Mg)	22	mg/L	Total Filterable Residue	435	mg/L
Sodium (Na)	83	mg/L	Fluoride (F)	0.1	mg/L
Potassium (K)	6	mg/L	Kjeldahl Nitrogen	0.2	mg/L
Ammonium Nitrogen	0.3	mg/L	Total Nitrogen	0.2	mg/L
Total Cations	8.16	me/L	Total Phosphorus	0.06	mg/L
Total Alkalinity as $CaCO_3$	113	mg/L	Phosphate Phosphorus	<0.01	mg/L
			Nitrite Nitrogen	<0.1	mg/L
Hydroxide (OH)	none	mg/L	Boron (B)	0.1	mg/L
Carbonate (CO_3)	30	mg/L	Iron (Fe)	0.07	mg/L
Bicarbonate (HCO_3)	76	mg/L			
Sulfate (SO_4)	159	mg/L			
Chloride (Cl)	96	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	8.26	me/L			

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-186
Invoice No. 91696

Sample Marked: #6 at Dam Water

	Submitted	Sampled
By	Pat	PLB
Date	6/23/88	6/23/88
Time	16:10	

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	213	mg/L	Specific Conductance	810	umho/cm
Calcium (Ca)	50	mg/L	pH	8.6	
Magnesium (Mg)	21	mg/L	Total Filterable Residue	470	mg/L
Sodium (Na)	83	mg/L	Fluoride (F)	0.3	mg/L
Potassium (K)	6	mg/L	Kjeldahl Nitrogen	1.3	mg/L
Ammonium Nitrogen	0.3	mg/L	Total Nitrogen	1.3	mg/L
Total Cations	8.03	me/L	Total Phosphorus	0.06	mg/L
Total Alkalinity as $CaCO_3$	115	mg/L	Phosphate Phosphorus	<0.01	mg/L
Hydroxide (OH)	none	mg/L	Nitrite Nitrogen	<0.1	mg/L
Carbonate (CO_3)	12	mg/L	Boron (B)	0.1	mg/L
Bicarbonate (HCO_3)	116	mg/L	Iron (Fe)	0.06	mg/L
Sulfate (SO_4)	145	mg/L			
Chloride (Cl)	90	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	7.86	me/L			

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-185
Invoice No. 91696

Sample Marked: #5 Catfish Cove Water

	Submitted	Sampled
By	Pat	PLB
Date	6/23/88	6/23/88
Time	16:10	

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	213	mg/L	Specific Conductance	810	umho/cm
Calcium (Ca)	50	mg/L	pH	8.6	
Magnesium (Mg)	21	mg/L	Total Filterable Residue	485	mg/L
Sodium (Na)	84	mg/L	Fluoride (F)	0.5	mg/L
Potassium (K)	6	mg/L	Kjeldahl Nitrogen	0.2	mg/L
Ammonium Nitrogen	0.2	mg/L	Total Nitrogen	0.2	mg/L
Total Cations	8.06	me/L	Total Phosphorus	0.06	mg/L
Total Alkalinity as $CaCO_3$	93	mg/L	Phosphate Phosphorus	0.01	mg/L
Hydroxide (OH)	none	mg/L	Nitrite Nitrogen	<0.1	mg/L
Carbonate (CO_3)	33	mg/L	Boron (B)	0.1	mg/L
Bicarbonate (HCO_3)	46	mg/L	Iron (Fe)	0.03	mg/L
Sulfate (SO_4)	144	mg/L			
Chloride (Cl)	94	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	7.95	me/L			

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7/20/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-184
Invoice No. 91696

Sample Marked: #4 N of Treasure Isle Water

	Submitted	Sampled
By	Pat	PLB
Date	6/23/88	6/23/88
Time	16:10	

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	213	mg/L	Specific Conductance	810	umho/cm
Calcium (Ca)	50	mg/L	pH	8.6	
Magnesium (Mg)	21	mg/L	Total Filterable Residue	475	mg/L
Sodium (Na)	83	mg/L	Fluoride (F)	0.4	mg/L
Potassium (K)	6	mg/L	Kjeldahl Nitrogen	1.3	mg/L
Ammonium Nitrogen	0.2	mg/L	Total Nitrogen	1.3	mg/L
Total Cations	8.02	me/L	Total Phosphorus	0.06	mg/L
Total Alkalinity as $CaCO_3$	110	mg/L	Phosphate Phosphorus	0.02	mg/L
Hydroxide (OH)	none	mg/L	Nitrite Nitrogen	<0.1	mg/L
Carbonate (CO_3)	21	mg/L	Boron (B)	<0.1	mg/L
Bicarbonate (HCO_3)	92	mg/L	Iron (Fe)	0.06	mg/L
Sulfate (SO_4)	146	mg/L			
Chloride (Cl)	95	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	7.92	me/L			

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-183
Invoice No. 91696

Sample Marked: #3 Bass Core Water

	Submitted	Sampled
By	Pat	PLB
Date	6/23/88	6/23/88
Time	16:10	

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	221	mg/L	Specific Conductance	810	umho/cm
Calcium (Ca)	50	mg/L	pH	8.5	
Magnesium (Mg)	23	mg/L	Total Filterable Residue	440	mg/L
Sodium (Na)	83	mg/L	Fluoride (F)	0.5	mg/L
Potassium (K)	6	mg/L	Kjeldahl Nitrogen	1.6	mg/L
Ammonium Nitrogen	0.2	mg/L	Total Nitrogen	1.6	mg/L
Total Cations	8.19	me/L	Total Phosphorus	0.07	mg/L
Total Alkalinity as $CaCO_3$	115	mg/L	Phosphate Phosphorus	0.01	mg/L
Hydroxide (OH)	none	mg/L	Nitrite Nitrogen	<0.1	mg/L
Carbonate (CO_3)	21	mg/L	Boron (B)	0.1	mg/L
Bicarbonate (HCO_3)	98	mg/L	Iron (Fe)	0.06	mg/L
Sulfate (SO_4)	145	mg/L			
Chloride (Cl)	95	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	8.00	me/L			

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-182
Invoice No. 91696

Sample Marked: #2 Center N end Water

	Submitted	Sampled
By	Pat	PLB
Date	6/23/88	6/23/88
Time	16:10	

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	219	mg/L	Specific Conductance	810	umho/cm
Calcium (Ca)	51	mg/L	pH	8.5	
Magnesium (Mg)	22	mg/L	Total Filterable Residue	450	mg/L
Sodium (Na)	83	mg/L	Fluoride (F)	0.5	mg/L
Potassium (K)	6	mg/L	Kjeldahl Nitrogen	1.9	mg/L
Ammonium Nitrogen	0.2	mg/L	Total Nitrogen	1.9	mg/L
Total Cations	8.14	me/L	Total Phosphorus	0.07	mg/L
Total Alkalinity as $CaCO_3$	115	mg/L	Phosphate Phosphorus	0.01	mg/L
Hydroxide (OH)	none	mg/L	Nitrite Nitrogen	<0.1	mg/L
Carbonate (CO_3)	18	mg/L	Boron (B)	0.2	mg/L
Bicarbonate (HCO_3)	104	mg/L	Iron (Fe)	0.06	mg/L
Sulfate (SO_4)	145	mg/L			
Chloride (Cl)	95	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	8.00	me/L			

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-181
Invoice No. 91696

	Submitted	Sampled
Sample Marked: #1 N of Causeway off dock Water	By Pat	PLB
	Date 6/23/88	6/23/88
	Time 16:10	

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	190	mg/L	Specific Conductance	640	umho/cm
Calcium (Ca)	46	mg/L	pH	8.1	
Magnesium (Mg)	18	mg/L	Total Filterable Residue	355	mg/L
Sodium (Na)	60	mg/L	Fluoride (F)	0.4	mg/L
Potassium (K)	6	mg/L	Kjeldahl Nitrogen	0.9	mg/L
Ammonium Nitrogen	0.2	mg/L	Total Nitrogen	0.9	mg/L
Total Cations	6.56	me/L	Total Phosphorus	0.16	mg/L
Total Alkalinity as $CaCO_3$	120	mg/L	Phosphate Phosphorus	0.09	mg/L
			Nitrite Nitrogen	<0.1	mg/L
Hydroxide (OH)	none	mg/L	Boron (B)	0.1	mg/L
Carbonate (CO_3)	none	mg/L	Iron (Fe)	0.28	mg/L
Bicarbonate (HCO_3)	146	mg/L			
Sulfate (SO_4)	86	mg/L			
Chloride (Cl)	72	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	6.22	me/L			

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-182
Invoice No. 91696

Sample Marked: #2 Center N end
Water

	Submitted	Sampled
By	Pat	PLB
Date	6/23/88	6/23/88
Time	16:10	

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	219	mg/L	Specific Conductance	810	umho/cm
Calcium (Ca)	51	mg/L	pH	8.5	
Magnesium (Mg)	22	mg/L	Total Filterable Residue	450	mg/L
Sodium (Na)	83	mg/L	Fluoride (F)	0.5	mg/L
Potassium (K)	6	mg/L	Kjeldahl Nitrogen	1.9	mg/L
Ammonium Nitrogen	0.2	mg/L	Total Nitrogen	1.9	mg/L
Total Cations	8.14	me/L	Total Phosphorus	0.07	mg/L
Total Alkalinity as $CaCO_3$	115	mg/L	Phosphate Phosphorus	0.01	mg/L
Hydroxide (OH)	none	mg/L	Nitrite Nitrogen	<0.1	mg/L
Carbonate (CO_3)	18	mg/L	Boron (B)	0.2	mg/L
Bicarbonate (HCO_3)	104	mg/L	Iron (Fe)	0.06	mg/L
Sulfate (SO_4)	145	mg/L			
Chloride (Cl)	95	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	8.00	me/L			

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P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-183
Invoice No. 91696

	Submitted	Sampled
By	Pat	PLB
Date	6/23/88	6/23/88
Time	16:10	

Sample Marked: #3 Bass Core
Water

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	221	mg/L	Specific Conductance	810	umho/cm
Calcium (Ca)	50	mg/L	pH	8.5	
Magnesium (Mg)	23	mg/L	Total Filterable Residue	440	mg/L
Sodium (Na)	83	mg/L	Fluoride (F)	0.5	mg/L
Potassium (K)	6	mg/L	Kjeldahl Nitrogen	1.6	mg/L
Ammonium Nitrogen	0.2	mg/L	Total Nitrogen	1.6	mg/L
Total Cations	8.19	me/L	Total Phosphorus	0.07	mg/L
Total Alkalinity as $CaCO_3$	115	mg/L	Phosphate Phosphorus	0.01	mg/L
Hydroxide (OH)	none	mg/L	Nitrite Nitrogen	<0.1	mg/L
Carbonate (CO_3)	21	mg/L	Boron (B)	0.1	mg/L
Bicarbonate (HCO_3)	98	mg/L	Iron (Fe)	0.06	mg/L
Sulfate (SO_4)	145	mg/L			
Chloride (Cl)	95	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	8.00	me/L			

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7/20/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-184
Invoice No. 91696

	Submitted	Sampled
Sample Marked: #4 N of Treasure Isle Water	By Pat	PLB
	Date 6/23/88	6/23/88
	Time 16:10	

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	213	mg/L	Specific Conductance	310	umho/cm
Calcium (Ca)	50	mg/L	pH	8.6	
Magnesium (Mg)	21	mg/L	Total Filterable Residue	475	mg/L
Sodium (Na)	83	mg/L	Fluoride (F)	0.4	mg/L
Potassium (K)	6	mg/L	Kjeldahl Nitrogen	1.3	mg/L
Ammonium Nitrogen	0.2	mg/L	Total Nitrogen	1.3	mg/L
Total Cations	8.02	me/L	Total Phosphorus	0.06	mg/L
Total Alkalinity as $CaCO_3$	110	mg/L	Phosphate Phosphorus	0.02	mg/L
Hydroxide (OH)	none	mg/L	Nitrite Nitrogen	<0.1	mg/L
Carbonate (CO_3)	21	mg/L	Boron (B)	<0.1	mg/L
Bicarbonate (HCO_3)	92	mg/L	Iron (Fe)	0.06	mg/L
Sulfate (SO_4)	146	mg/L			
Chloride (Cl)	95	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	7.92	me/L			

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-185
Invoice No. 91696

Sample Marked: #5 Catfish Cove Water

	Submitted	Sampled
By	Pat	PLB
Date	6/23/88	6/23/88
Time	16:10	

PARAMETER	RESULT	
Total Hardness as $CaCO_3$	213	mg/L
Calcium (Ca)	50	mg/L
Magnesium (Mg)	21	mg/L
Sodium (Na)	84	mg/L
Potassium (K)	6	mg/L
Ammonium Nitrogen	0.2	mg/L
Total Cations	8.06	me/L
Total Alkalinity as $CaCO_3$	93	mg/L
Hydroxide (OH)	none	mg/L
Carbonate (CO_3)	33	mg/L
Bicarbonate (HCO_3)	46	mg/L
Sulfate (SO_4)	144	mg/L
Chloride (Cl)	94	mg/L
Nitrate Nitrogen	<0.1	mg/L
Total Anions	7.95	me/L

PARAMETER	RESULT	
Specific Conductance	810	umho/cm
pH	8.6	
Total Filterable Residue	485	mg/L
Fluoride (F)	0.5	mg/L
Kjeldahl Nitrogen	0.2	mg/L
Total Nitrogen	0.2	mg/L
Total Phosphorus	0.06	mg/L
Phosphate Phosphorus	0.01	mg/L
Nitrite Nitrogen	<0.1	mg/L
Boron (B)	0.1	mg/L
Iron (Fe)	0.03	mg/L

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-186
Invoice No. 91696

	Submitted	Sampled
Sample Marked: #6 at Dam Water	By Pat	PLB
	Date 6/23/88	6/23/88
	Time 16:10	

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	213	mg/L	Specific Conductance	810	umho/cm
Calcium (Ca)	50	mg/L	pH	8.6	
Magnesium (Mg)	21	mg/L	Total Filterable Residue	470	mg/L
Sodium (Na)	83	mg/L	Fluoride (F)	0.3	mg/L
Potassium (K)	6	mg/L	Kjeldahl Nitrogen	1.3	mg/L
Ammonium Nitrogen	0.3	mg/L	Total Nitrogen	1.3	mg/L
Total Cations	8.03	me/L	Total Phosphorus	0.06	mg/L
Total Alkalinity as $CaCO_3$	115	mg/L	Phosphate Phosphorus	<0.01	mg/L
Hydroxide (OH)	none	mg/L	Nitrite Nitrogen	<0.1	mg/L
Carbonate (CO_3)	12	mg/L	Boron (B)	0.1	mg/L
Bicarbonate (HCO_3)	116	mg/L	Iron (Fe)	0.06	mg/L
Sulfate (SO_4)	145	mg/L			
Chloride (Cl)	90	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	7.86	me/L			

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-187
Invoice No. 91696

	Submitted	Sampled
Sample Marked: #7 Mouth of Holiday Cove Water	By Pat	PLB
	Date 6/23/88	6/23/88
	Time 16:10	

PARAMETER	RESULT	
Total Hardness as $CaCO_3$	219	mg/L
Calcium (Ca)	51	mg/L
Magnesium (Mg)	22	mg/L
Sodium (Na)	83	mg/L
Potassium (K)	6	mg/L
Ammonium Nitrogen	0.3	mg/L
Total Cations	8.16	me/L
Total Alkalinity as $CaCO_3$	113	mg/L
Hydroxide (OH)	none	mg/L
Carbonate (CO_3)	30	mg/L
Bicarbonate (HCO_3)	76	mg/L
Sulfate (SO_4)	159	mg/L
Chloride (Cl)	96	mg/L
Nitrate Nitrogen	<0.1	mg/L
Total Anions	8.26	me/L

PARAMETER	RESULT	
Specific Conductance	810	umho/cm
pH	8.6	
Total Filterable Residue	435	mg/L
Fluoride (F)	0.1	mg/L
Kjeldahl Nitrogen	0.2	mg/L
Total Nitrogen	0.2	mg/L
Total Phosphorus	0.06	mg/L
Phosphate Phosphorus	<0.01	mg/L
Nitrite Nitrogen	<0.1	mg/L
Boron (B)	0.1	mg/L
Iron (Fe)	0.07	mg/L

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-188
Invoice No. 91696

Sample Marked: #8 18ft D Mouth of Holiday Cve Water

	Submitted	Sampled
By	Pat	PLB
Date	6/23/88	6/23/88
Time	16:10	

PARAMETER	RESULT	
Total Hardness as $CaCO_3$	229	mg/L
Calcium (Ca)	53	mg/L
Magnesium (Mg,	23	mg/L
Sodium (Na)	82	mg/L
Potassium (K)	7	mg/L
Ammonium Nitrogen	0.2	mg/L
Total Cations	8.33	me/L
Total Alkalinity as $CaCO_3$	125	mg/L
Hydroxide (OH)	none	mg/L
Carbonate (CO_3)	none	mg/L
Bicarbonate (HCO_3)	153	mg/L
Sulfate (SO_4)	150	mg/L
Chloride (Cl)	95	mg/L
Nitrate Nitrogen	<0.1	mg/L
Total Anions	8.31	me/L

PARAMETER	RESULT	
Specific Conductance	830	umho/cm
pH	7.9	
Total Filterable Residue	475	mg/l
Fluoride (F)	0.4	mg/L
Kjeldahl Nitrogen	1.2	mg/L
Total Nitrogen	1.2	mg/L
Total Phosphorus	0.10	mg/L
Phosphate Phosphorus	0.02	mg/L
Nitrite Nitrogen	<0.01	mg/L
Boron (B)	0.1	mg/L
Iron (Fe)	0.14	mg/L

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-189
Invoice No. 91696

Sample Marked: #9 Mid Holiday Bay Water

	Submitted	Sampled
By	Pat	PLB
Date	6/23/88	6/23/88
Time	16:10	

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	220	mg/L	Specific Conductance	810	umho/cm
Calcium (Ca)	48	mg/L	pH	8.7	
Magnesium (Mg)	22	mg/L	Total Filterable Residue	515	mg/L
Sodium (Na)	85	mg/L	Fluoride (F)	0.3	mg/L
Potassium (K)	6	mg/L	Kjeldahl Nitrogen	0.4	mg/L
Ammonium Nitrogen	0.2	mg/L	Total Nitrogen	0.4	mg/L
Total Cations	8.09	me/L	Total Phosphorus	0.14	mg/L
Total Alkalinity as $CaCO_3$	93	mg/L	Phosphate Phosphorus	0.02	mg/L
Hydroxide (OH)	none	mg/L	Nitrite Nitrogen	<0.1	mg/L
Carbonate (CO_3)	45	mg/L	Boron (B)	<0.1	mg/L
Bicarbonate (HCO_3)	21	mg/L	Iron (Fe)	0.07	mg/L
Sulfate (SO_4)	156	mg/L			
Chloride (Cl)	103	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	8.00	me/L			

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-190
Invoice No. 91696

	Submitted	Sampled
Sample Marked: #10 E end of Holiday Bay Water	By Pat	PLB
	Date 6/23/88	6/23/88
	Time 16:10	

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	238	mg/L	Specific Conductance	870	umho/cm
Calcium (Ca)	55	mg/L	pH	9.0	
Magnesium (Mg)	24	mg/L	Total Filterable Residue	520	mg/L
Sodium (Na)	86	mg/L	Fluoride (F)	0.4	mg/L
Potassium (K)	7	mg/L	Kjeldahl Nitrogen	1.6	mg/L
Ammonium Nitrogen	0.3	mg/L	Total Nitrogen	1.6	mg/L
Total Cations	8.69	me/L	Total Phosphorus	0.15	mg/L
Total Alkalinity as $CaCO_3$	113	mg/L	Phosphate Phosphorus	0.06	mg/L
Hydroxide (OH)	none	mg/L	Nitrite Nitrogen	<0.1	mg/L
Carbonate (CO_3)	39	mg/L	Boron (B)	0.1	mg/L
Bicarbonate (HCO_3)	58	mg/L	Iron (Fe)	0.25	mg/L
Sulfate (SO_4)	156	mg/L			
Chloride (Cl)	108	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	8.54	me/L			

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7/19/88

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 880623-191
Invoice No. 91696

Sample Marked: #11 Water

	Submitted	Sampled
By	Pat	PLB
Date	6/23/88	6/23/88
Time	16:10	

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	193	mg/L	Specific Conductance	640	umho/c
Calcium (Ca)	47	mg/L	pH	8.4	
Magnesium (Mg)	18	mg/L	Total Filterable Residue	385	mg/L
Sodium (Na)	61	mg/L	Fluoride (F)	0.3	mg/L
Potassium (K)	6	mg/L	Kjeldahl Nitrogen	0.5	mg/L
Ammonium Nitrogen	0.3	mg/L	Total Nitrogen	0.5	mg/L
Total Cations	6.67	me/L	Total Phosphorus	0.21	mg/L
Total Alkalinity as $CaCO_3$	123	mg/L	Phosphate Phosphorus	0.13	mg/L
Hydroxide (OH)	none	mg/L	Nitrite Nitrogen	<0.1	mg/L
Carbonate (CO_3)	none	mg/L	Boron (B)	0.2	mg/L
Bicarbonate (HCO_3)	149	mg/L	Iron (Fe)	0.49	mg/L
Sulfate (SO_4)	94	mg/L			
Chloride (Cl)	68	mg/L			
Nitrate Nitrogen	<0.1	mg/L			
Total Anions	6.33	me/L			

EDWARD S. BABCOCK & SONS, INC.

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this should be s[illegible]d with JES then Jerry & JRB before being sent to Temescal & EMWD.

good work

[illegible] — RWT 8/17

August 16.1988

CANYON LAKE SAMPLING

DATE SAMPLED: June 23. 1986

PURPOSE: The purpose of this sampling was to determine current water quality conditions in Canyon Lake.

STAFF:

1. Patricia Blodgett - Santa Ana Regional Water Quality Control Board. 6809 Indiana Avenue. Ste. 200. Riverside. CA 92506
   Phone (714) 782-4275

2. Ray Brewer, Canyon Lake Homeowner's Ass'n Marine Patrol. P.O. Box 5A. Canyon Lake. CA 92380
   Phone (714) 244-6841

3. Charles Crider, Eastern Municipal Water District. P.O. Box 858. Hemet. CA 92343
   Phone (714) 925-7676

4. Charles Smith. Temescal Water District. P. O. Box 669. Corona. CA 91718
   Phone (714) 737-6700

GENERAL CONDITIONS:

Air temperature was approximately 85-90 degrees F: slight wind from south to southeast; clear with high clouds. Water color ranged from black-green to brown-green.

STATION DESCRIPTIONS:

(See attached map for approximate station locations.)

Station 1. North of raised causeway at northernmost end of lake, off dock approximately mid-stream. at surface. No temperature or dissolved oxygen measurements were taken at this station.

Sta. 2. Approximately 250 feet south of raised causeway at the northernmost end of lake. mid-stream. at surface. Temperature and dissolved oxygen data at varying depths.

Sta. 3. Middle of Bass Cove. at surface. Temperature and dissolved oxygen data at varying depths.

Sta. 4. Approximately 200 feet north of Treasure Island. mid-channel (from under bridge). at surface. Temperature and dissolved oxygen data at varying depths.

Sta. 5. Catfish Cove, mid-channel, at surface. Temperature and dissolved oxygen data at varying depths.

Sta. 6. At southern end of lake, near dam, mid-channel between floating barriers and dam, at surface. Temperature and dissolved oxygen data at varying depths.

Sta. 7. At mouth of Holiday Bay, mid-channel, at surface. Temperature and dissolved oxygen data at varying depths.

Sta. 8. At mouth of Holiday Bay, mid-channel, at 18 feet depth (same location as Sta. 7).

Sta. 9. At Round Horse Circle in Holiday Cove, mid-channel, at surface.

Sta. 10. Approximately 50 feet from entrance of Salt Creek into east end of Holiday Cove, mid-channel, at surface.

Sta. 11. Approximately .8 road miles upstream from fire gate (located behind fire station at north causeway) on San Jacinto River. Taken at surface from streambank. Substrate appeared to be broken shale, with noticeably more attached algal growth than at station 1. Boating and water skiing was observed along this reach. No dissolved oxygen measurements were taken here, nor were any samples taken for coliform analysis.

MEASUREMENTS/ANALYSES:

Temperature and Dissolved Oxygen measurements were made in the field, using a YSI Model 51B Probe, calibrated to the approximate lake elevation (1400 feet).

Depth samples of water were collected using a Van Dorn sampler.

Collected samples were kept on ice and delivered to Babcock Laboratory in Riverside by 4:15pm. They were analyzed for total and fecal coliform, standard minerals, and nutrient series. Water samples taken for nutrient analyses were taken in marked bottles prepared at the Laboratory indicating that they contained sufficient sulfuric acid to preserve the samples.

FIELD MEASUREMENTS: June 23, 1988

STATION	DEPTH (feet)	TEMPERATURE (degrees C.)	DISSOLVED OXYGEN (mg/l)
2	0	25	9.2
	3	27	9.9
	10	25	8.8
	3	26	9.6
	11.7	25	9.0
	11	25	7.2
3	0	26	10.0
	4	26	10.2
4	0	25.5	10.0
	15	24	7.0
	19	22	1.4
	27	17.4	.06
	34	15	.02
5	0	26	9.5
	20	22	1.4
6	0	24	9.8
	12	25	10.2
	16	23	2.5
	24	17	6.1
7	0	26	9.9
8	13	24	5.0
	15	23	2.6
	20	19.5	.06
9	0	26	13.4
10	0	26	11.3
11	0	27	———

OTHER NOTES OF INTEREST:

Ray indicated that the lake turns over in the spring and fall. He noted that the spring turnover was late this year, due to unusually cold spring weather. He expects nuisance conditions, such as algal scum in Holiday Cove and other coves in about 1 month. He indicated that the Lake is stocked with 18-24" channel catfish, 9" Florida bass; it also has crappie, bluegill, and sunfish.

We observed fishing, boating, water skiing, and at an area called Indian Beach, swimming. There is a private campground NW of the dam which had more than a dozen tents and RVs. Ray indicated that this area had sewer, electrical, and water hookups.

Tamarisks along the shoreline NE of the dam harbored numerous grey herons, kingfishers, and white egrets. According to Ray, the deepest part of the lake (about 80 feet) was in front of the dam.

Rocks along the shoreline of the causeway that formed the northern end of Canyon Lake had little visible algal growth. Rocks along the bank at Station 11 (.87 miles by road upstream on the east shoreline from the causeway) had 1/4-1/2" algal covering. No campers or other users were seen on either shore north of the causeway, but there were numerous well-used & defined ATV tracks.

This looks good. A map would be a nice touch. Data wrt total & fecal coliform, standard minerals and nutrient constituent would be good. Can this be done on one table under each station # or ? Also, if a standard for water quality could be presented it would give the reader a definitive position regarding field measurements & acceptable water quality standards.

Kut

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P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

5/19/88

To: Temescal Water Company
P.O. Box 669
Corona, CA. 91718
737-6700

Lab No. 880429-301
Invoice No. 90271

Sample Marked: Canyon Lake water

	Submitted	Sampled
By	Bob	Bob
Date	4/29	4/29
Time	16:40	2:30

PARAMETER	RESULT	
Total Hardness as $CaCO_3$	250	mg/L
Calcium (Ca)	60	mg/L
Magnesium (Mg)	24	mg/L
Sodium (Na)	82	mg/L
Potassium (K)	6	mg/L
Total Alkalinity as $CaCO_3$	138	mg/L
Hydroxide (OH)	none	mg/L
Carbonate (CO_3)	42	mg/L
Bicarbonate (HCO_3)	82	mg/L
Sulfate (SO_4)	135	mg/L
Chloride (Cl)	88	mg/L

PARAMETER	RESULT	
Specific Conductance	820	umho/cm
pH	7.8	
Total Filterable Residue	480	mg/L
Boron (B)	0.1	mg/L
Copper (Cu)	<0.01	mg/L
Iron (Fe)	0.06	mg/L
Manganese (Mn)	0.02	mg/L
MBAS	<0.02	mg/L
Zinc (Zn)	0.01	mg/L

Pcclm ? 450

RECEIVED MAY 20 1988

? R.C Res Elev
1379.06

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EDWARD S. BABCOCK & SONS, INC.
Allison Mackenzie

Canyon Lake

1987

pac 8-4-87

CANYON LAKE SAMPLING

JULY 6, 1987:

SITE	CONSTITUENTS				
	Fecal Coliform (MPN/100 ml.)	Total Coliform (MPN/100 ml.)	Ammonium - Nitrogen (mg/l)	MBAS (mg/l)	Total Phosphorus (mg/l)
Ski Dock Ski Area West side of Causeway	<2	240	1.8	<0.1	<0.03
Ski Dock Ski Area East side of Causeway	2	50	1.5	<0.1	0.03

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY

PHONE 684-1881
AREA CODE 714

LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906

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P.O. BOX 432
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07/21/87

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 870706-261
Invoice No. 83817

Legal Location: T5S, R4W, Sec. 35C

Sample Marked: #2 Ski Dock Ski Area
(Vacation Dr.) Eastside

	Submitted	Sampled
By	NAO	NAO
Date	7/06	7/06
Time	1453	

PARAMETER	RESULT
Ammonium Nitrogen	1.5 mg/L
MBAS	<0.1 mg/L
Total Phosphorus	0.03 mg/L

Water Temp. = 25.5°C

EDWARD S. BABCOCK & SONS, INC.

Allison Mackenzie

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY

PHONE 684-1881
AREA CODE 714

LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906

EDWARD S. BABCOCK & SONS, INC.

P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

07/21/87

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 870706-260
Invoice No. 83817

Legal Location: T5S, R4W, sec. 35C
Sample Marked: #1 Ski Dock Ski Area Westside

	Submitted	Sampled
By	NAO	NAO
Date	7/06	7/06
Time	1453	1220

PARAMETER	RESULT
Ammonium Nitrogen	1.8 mg/L
MBAS	<0.1 mg/L
Total Phosphorus	<0.03 mg/L

Water Temp. = 82°F / 27.7°C

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RIVERSIDE, CALIFORNIA 92502

JUL 09 1987

TO 137
REGIONAL WATER QUALITY CONTROL BOARD #8
6809 INDIANA AVE, Suite 200
RIVERSIDE, CA 92506

Lab No. 8707106-B106
Invoice No. 11426

	Submitted	Sampled
By	NAD	
Date	7/6	
Time	1453	

Time Started 4:00

782-4130
Agreemtnt #_____

Sample Mark	Standard Plate Count	Coliform Bacteria: ml Planted	Presumptive	Confirmed	Tubes +	MPN/100ml	Fecal	Tubes +	MPN/10
#1 Ski Dock Ski Area (Vacation Dr.) West Side		10	24: + + + + + / 48:	24: − − − − − / 48: + + + + +	5	240	24: − − − − −	0	<2
Legal Location:		1	24: + + + + + / 48:	24: − − − − − / 48: + + + + +	5		24: − − − − −	0	
35, R4W, Sec. 35C		0.1	24: − − − − − / 48: − − − − −	24: / 48:	0		24: − − − − −	0	
			24: / 48:	24: / 48:			24:		
2.5 Ski Dock Ski Area (Vacation Dr.) East		10	24: + + + + + / 48:	24: − − − + + / 48: + + +	5	50	24: − − − + −	1	2
Legal Location		1	24: + + + + + / 48:	24: − − − − − / 48: − + − + −	2		24: − − − − −	0	
5S, R4W, Sec. 35C		0.1	24: − − − − − / 48: − − − − −	24: / 48:	0		24:	0	
			24: / 48:	24: / 48:			24:		
			24: / 48:	24: / 48:			24:		
			24: / 48:	24: / 48:			24:		
			24: / 48:	24: / 48:			24:		
			24: / 48:	24: / 48:			24:		

EDWARD S. BABCOCK & SONS, INC.
Eleanor Babcock

_____CALLED_____

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LABORATORIES
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P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

RAV 7-31-87

EVMWD 7-31-87

07/30/87

To: Temescal Water Company
P.O. Box 669
Corona, CA. 91718
737-6700

Lab No. 870713-170
Invoice No. 83994

Sample Marked: Railroad Dam Weir Box

	Submitted	Sampled
By	Bob	Bob
Date	7/13	7/13
Time	1635	3:00

PARAMETER	RESULT	
Total Hardness as $CaCO_3$	289	mg/L
Calcium (Ca)	74	mg/L
Magnesium (Mg)	25	mg/L
Sodium (Na)	86	mg/L
Potassium (K)	7	mg/L
Total Alkalinity as $CaCO_3$	168	mg/L
Hydroxide (OH)	none	mg/L
Carbonate (CO_3)	none	mg/L
Bicarbonate (HCO_3)	204	mg/L
Sulfate (SO_4)	120	mg/L
Chloride (Cl)	104	mg/L

PARAMETER	RESULT	
Specific Conductance	900	umho/cm
Total Filterable Residue	540	mg/L
pH	7.4	
Copper (Cu)	<0.01	mg/L
Iron (Fe)	0.12	mg/L
Manganese (Mn)	1.1	mg/L
MBAS	<0.1	mg/L
Zinc (Zn)	<0.01	mg/L

JUL 3 1 1987

RECEIVED JUL 3 1 1987

R.C. Res. E/CV
374.25

SAWPA DES
001004606

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Allison Mackinnon

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CHEMISTS
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AREA CODE 714

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EDWARD S. BABCOCK & SONS, INC.

P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

6/7/85 / 6-9-87 per EUMWD

To: Temescal Water Company
P.O. Box 669
Corona, CA. 91720
737-6700

Lab No. 850516-34
Invoice No. 42423

	Submitted	Sampled
By	Bob	Smith
Date	5/16	5/16
Time	4:30	9:30

Sample Marked: Railroad Canyon

PARAMETER	RESULT		6-9-87
Total Hardness as $CaCO_3$	209	mg/L	209
Calcium (Ca)	55	mg/L	63
Magnesium (Mg)	17	mg/L	22
Sodium (Na)	66	mg/L	85
Potassium (K)	6	mg/L	7
Total Cations	7.19	me/L	5.86
Total Alkalinity as $CaCO_3$	143	mg/L	148
Hydroxide (OH)	None	mg/L	none
Carbonate (CO_3)	9	mg/L	none
Bicarbonate (HCO_3)	156	mg/L	180
Sulfate (SO_4)	76	mg/L	147
Chloride (Cl)	103	mg/L	100
Nitrate (NO_3)	<1	mg/L	< 1
Total Anions	7.33	me/L	8.53

PARAMETER	RESULT		6-9-87
Specific Conductance	720	umho/cm	860
pH	8.6		8.3
Total Filterable Residue	435	mg/L	500
Copper (Cu)	<0.01	mg/L	0.01
Iron (Fe)	0.10	mg/L	0.03
Manganese (Mn)	0.02	mg/L	0.04
MBAS	<0.1	mg/L	< 0.1
Zinc (Zn)	<0.01	mg/L	< 0.01

P.C. Rs. Elev.
377.86

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CHEMISTS
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LABORATORIES
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EDWARD S. BABCOCK & SONS, INC.
P O BOX 432
RIVERSIDE, CALIFORNIA 92502

10/25/84

To: Temescal Water Company
P.O. Box 669
Corona, CA. 91720
737-6700

Lab No. 841008-262
Invoice No. 36710

Sample Marked: Railroad Canyon ~~Drive~~ DAM

	Submitted	Sampled
By	Bob	B.Hughes
Date	10/8	10/8
Time	4:15	2:35

PARAMETER	RESULT	
Total Hardness as $CaCO_3$	195	mg/L
Calcium (Ca)	52	mg/L
Magnesium (Mg)	15	mg/L
Sodium (Na) 2.70 me/L	62	mg/L — 40.24 %
Potassium (K)	6	mg/L
Total Cations	6.70	me/L
Total Alkalinity as $CaCO_3$	153	mg/L
Hydroxide (OH)	none	mg/L
Carbonate (CO_3)	none	mg/L
Bicarbonate (HCO_3)	186	mg/L
Sulfate (SO_4)	66	mg/L
Chloride (Cl)	82	mg/L
Nitrate (NO_3)	<1	mg/L
Total Anions	6.72	me/L
Manganese (Mn)	0.91	mg/L
Mercury (Hg)	<0.001	mg/L
MBAS	<0.1	mg/L
Selenium (Se)	<0.005	mg/L
Silver (Ag)	<0.01	mg/L
Zinc (Zn)	0.04	mg/L

PARAMETER	RESULT	
Specific Conductance	700	umho/cm
pH	7.3	
Total Filterable Residue	415	mg/L
Color	10	
Odor	4	TON
Turbidity	2.0	NTU
Arsenic (As)	0.01	mg/L
Barium (Ba)	<0.5	mg/L
Boron (B)	0.1	mg/L
Cadmium (Cd)	<0.005	mg/L
Chromium, total (Cr)	<0.01	mg/L
Copper (Cu)	0.02	mg/L
Fluoride (F)	0.4	mg/L
Iron (Fe)	0.26	mg/L
Lead (Pb)	0.02	mg/L

RECEIVED

'cc R.P.C. Res.
374.07

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001004608

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Laurence J. Chrystal

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EDWARD S. BABCOCK & SONS, INC.

P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

9/9/83

To: Temescal Water Company
P.O. Box 669
Corona, CA. 91720
737-6700

Lab No. 830826-739
Invoice No. 26314

Sample Marked: RR Cyn Reserv.

	Submitted	Sampled
By	Bob	Ed
Date	8/26	8/25
Time	12:05	5:30

PARAMETER	RESULT		PARAMETER	RESULT	
Total Hardness as $CaCO_3$	129	mg/L	pH	7.5	
			Specific Conductance	400	umho/cm
Calcium (Ca)	38	mg/L	Total Filterable Residue @ 180 C	225	mg/L
Magnesium (Mg)	8	mg/L			
33.26% Sodium (Na)	31	mg/L / 1.35 me/L	Boron (B)	0.1	mg/L
Potassium (K)	5	mg/L			
Total Cations	4.05	me/L	Copper (Cu)	0.17	mg/L
			Iron (Fe)	0.33	mg/L
Total Alkalinity as $CaCO_3$	113	mg/L	Manganese (Mn)	0.27	mg/L
Hydroxide (OH)	None	mg/L	MBAS	<0.1	mg/L
Carbonate (CO_3)	None	mg/L	Zinc (Zn)	<0.01	mg/L
Bicarbonate	137	mg/L			
Sulfate (SO_4)	33	mg/L			
Chloride (Cl)	34	mg/L			
Total Anions	3.89	me/L			

R.R.C. Res Elev
@ 1378.66

SAWPA DES
001004609

EDWARD S. BABCOCK & SONS, INC.

Norman Babcock

STATE OF CALIFORNIA

OFFICE MEMO
STD. 100 (REV. 12/85)
86 38867

DA 8-6-87

TO:

File

ROOM NUMBER

FROM:

YAD

PHONE NUMBER

SUBJECT: Results

Copies of the July 6, 1987 sampling results were sent to the following:

1. Benny Rodriguez, Chief Operator Canyon LK. Water Filtration Plant

2. Ray Brewer (boat patrol) Canyon LK. Home Owners Assn. / Admin.

Put your thoughts to work. Submit a **MERIT AWARD SUGGESTION.**

Canyon Lake Sampling

Purpose: This sampling was a continuation of the sampling done in September and October in order to determine if camping upstream (BLM land) will increase total and fecal coliform counts. Camping was observed upstream of the causeway during the weekend of July 4th (per conversation with Canyon Lake residents and marine patrol staff).

We were unable to sample two sites that were sampled last year: (1) Camping Area #1 Ski Area; and (2) North End Ski Area. This land, according to Ray Brewer, Marine Patrol, is in court to determine ownership (Temescal Water Company, BLM and other groups). Due to this dispute, Canyon Lake boats are not insured. Canyon Lake does not have any four-wheel drive vehicles so we were unable to monitor by land.

Date Sampled: July 6, 1987

Staff:

1. Nancy Olson - Regional Board
2. Malcolm (?) - Marine Patrol

Sites / Field Measurements: (see attached map)

1. East of causeway (Vacation Drive) Sampled at the end of the south dock.
   Time: 1220 hours
   Water Temperature: 82°F / 27.7°C

   NOTE: water enters through a tunnel under the causeway which leads into Canyon Lake.

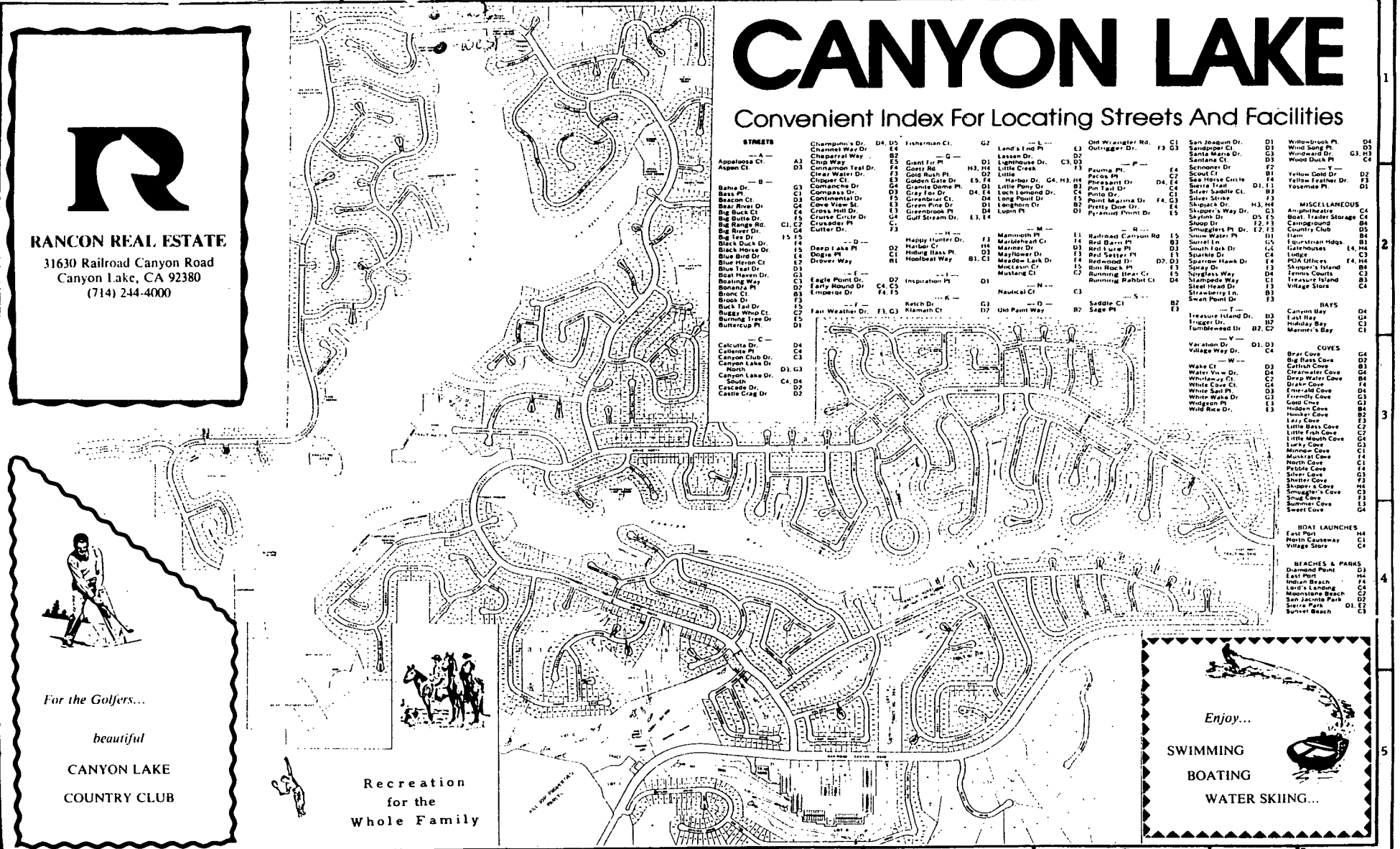
2. West of causeway (near Vacation Drive). Sampled by boat near mouth of tunnel.
   Time: 1230 hours
   Water Temperature: 78°F / 25.5°C

Analyses: (same constituents sampled in 1986)

1. Total / Fecal Coliform
2. MBAS
3. Total phosphate
4. Ammonia - Nitrate

CANYON LAKE

Convenient Index For Locating Streets And Facilities



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Canyon Lake, CA 92380
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Whole Family

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SWIMMING

BOATING

WATER SKIING...

STREETS

— A —
Appaloosa Ct. A3
Aspen Ct D3

— B —
Bahia Dr. G3
Bass Pl C1
Beacon Ct D3
Bear River Dr G4
Big Buck Ct E4
Big Buttle Dr. F5
Big Range Rd. C1, C2
Big River Dr. G4
Big Tex Dr F5, F6
Black Duck Dr. F4
Black Horse Dr. F5
Blue Bird Dr. E4
Blue Heron Ct F2
Blue Teal Dr. D3
Boat Haven Dr. G3
Boating Way C3
Bonanza Pl D2
Bronc Ct B3
Brook Dr F3
Buck Tail Dr. F5
Buggs Whip Ct. C2
Burning Tree Dr F5
Buttercup Pl. D1

— C —
Calcutta Dr. D4
Cafiette Pl C4
Canyon Club Dr. C3
Canyon Lake Dr. North D3, G3
Canyon Lake Dr. South C4, D4
Cascade Dr. D2
Castle Crag Dr D2
Champion's Dr. D4, D5
Channel Way Dr E4
Chaparral Way B2
Chap Way E5
Cinnamon Teal Dr. F4
Clear Water Dr. F3
Clipper Ct E3
Comanche Dr G4
Compass Dr. D3
Continental Dr F5
Cove View St. E3
Cross Hill Dr. E3
Cruise Circle Dr G4
Crusader Pl C1
Cutter Dr. F3

— D —
Deep Lake Pl D2
Dogie Pl C1
Drover Way B1

— E —
Eagle Point Dr. D2
Early Round Dr C4, C5
Emperor Dr F4, F5

— F —
Fair Weather Dr. F3, G3
Fisherman Ct. G2

— G —
Giant Fir Pl D1
Goetz Rd H3, H4
Gold Rush Pl D2
Golden Gate Dr. E5, F4
Granite Dome Pl. D1
Gray Fox Dr D4, E4
Greenbriar Ct. D4
Green Pine Dr D1
Greenbrook Pl D4
Gulf Stream Dr. E3, E4

— H —
Happy Hunter Dr. F3
Harbor Ct H4
Hiding Bass Pl. D3
Hoofbeat Way B1, C1

— I —
Inspiration Pl D1

— K —
Ketch D. G3
Klamath Ct D2

— L —
Land's End Pl E3
Lassen Dr. D2
Lighthouse Dr. C3, D3
Little Creek F3
Little Harbor Dr. G4, H3, H4
Little Pony Dr B3
Loch Lomond Dr. C4
Long Point Dr E5
Longhorn Dr B2
Lupin Pl D1

— M —
Mammoth Pl E1
Marbleheart Cr F4
Mariner Dr D3
Mayflower Dr E3
Meadow Lark Dr. F4
Moccasin Cr F5
Mustang Ct C2

— N —
Nautical Ct C3

— O —
Old Paint Way B2
Old Wrangler Rd. C1
Outrigger Dr. F3, G3

— P —
Paiuma Pl. F4
Pecos Pl C2
Pheasant Dr D4, E4
Pin Tail Dr C4
Pinto Dr. C1
Point Marina Dr. F4, G3
Pretty Doe Dr. F4
Pyramid Point Dr. E5

— R —
Railroad Canyon Rd E5
Red Barrn Pl B3
Red Lure Pl D3
Red Setter Pl E3
Redwood Dr. D2, D3
Rim Rock Pl F3
Running Bear Cr. E5
Running Rabbit Ct D4

— S —
Saddle Ct B2
Sage Pl E3
San Joaquin Dr. D1
Sandpiper Ct. D3
Santa Maria Dr. G3
Santana Ct. D3
Schooner Dr F2
Scout Ct B1
Sea Horse Circle F4
Sierra Trail D1, E1
Silver Saddle Ct. B3
Silver Strike F3
Skipjack Dr. H3, H4
Skipper's Way Dr. G3
Skylink Dr. D5, E5
Sloop Dr. F2, F3
Smugglers Pt. Dr. E2, F3
Snow Water Pl D1
Sorrel Ln G5
South Fork Dr. G4
Sparkle Dr C4
Sparrow Hawk Dr. E4
Spray Dr. F3
Stagglers Way D4
Stampede Way C1
Steat Head Dr F3
Strawberry Ln. B3
Swan Point Dr. F3

— T —
Treasure Island Dr. B3
Trigger Dr. B2
Tumbleweed Dr. B2, C2

— V —
Vacation Dr. D1, D2
Village Way Dr. C4

— W —
Wake Ct D3
Water Vis e Dr. D4
Whirlaway Ct. C2
White Cove Ct. G5
White Sail Pl. D3
White Wake Dr G3
Widgeon Pl E3
Wild Rice Dr. E3
Willow Brook Pl. D4
Wind Song Pl. D3
Windward Dr. G3, H3
Wood Duck Pl C4

— Y —
Yellow Gold Dr D2
Yellow Feather Dr. F3
Yosemite Pl D1

MISCELLANEOUS

Amphitheatre C4
Boat Trailer Storage C4
Campground B4
Country Club D5
Dam B4
Equestrian Hdqs. B1
Gatehouses E4, H4
Lodge C3
POA Offices E4, H4
Skipper's Island B4
Tennis Courts C3
Treasure Island B3
Village Store C4

BAYS

Canyon Bay D4
East Bay G4
Holiday Bay C3
Mariner's Bay C1

COVES

Bear Cove G4
Big Bass Cove D2
Catfish Cove B3
Clearwater Cove B4
Deep Water Cove B4
Drake Cove F4
Emerald Cove F4
Friendly Cove G3
Gold Cove G3
Hidden Cove B4
Hunker Cove B2
Lazy Cove F3
Little Bass Cove C2
Little Fish Cove C2
Little Mouth Cove C4
Lucky Cove G3
Minnow Cove C1
Muskrat Cove F4
North Cove C1
Pebble Cove F4
Silver Cove G3
Shelter Cove F3
Skipper's Cove H4
Smuggler's Cove D3
Snug Cove F3
Summer Cove E3
Sweet Cove G4

BOAT LAUNCHES

East Port H4
North Causeway C1
Village Store C4

BEACHES & PARKS

Diamond Point D3
East Port H4
Indian Beach F4
Lord's Landing C4
Moonstone Beach C2
San Jacinto Park D2
Sierra Park D1, E2
Sunset Beach C3

Canyon Lake Sampling

Elsinore Valley Municipal Water District collected total / fecal coliform samples from Canyon Lake on July 25, 26, 27, 28 and August 1, 2, 3 and 4. Three sites had high values; 900 / 100 ml., 240 / 100 ml., and 500 / 100 ml. (Camping Area #1 SKi Area, North End SKi Area and SKi Dock SKi Area, respectively).

These results were presented at Supervisor Younglove's office. Concern was expressed regarding possible water quality impacts associated with camping in the area of Canyon Lake, particularly around the north end of the lake. Jack H. Devers contacted HAB regarding this meeting and public concern. It was decided that Regional Board staff sample Canyon Lake on five separate occasions to compare results.

I collected samples on September 22nd and 26th and October 3rd. Fecal coliform values were < 16 MPN / 100 ml. Steve and Mike from Marine Patrol suggested that

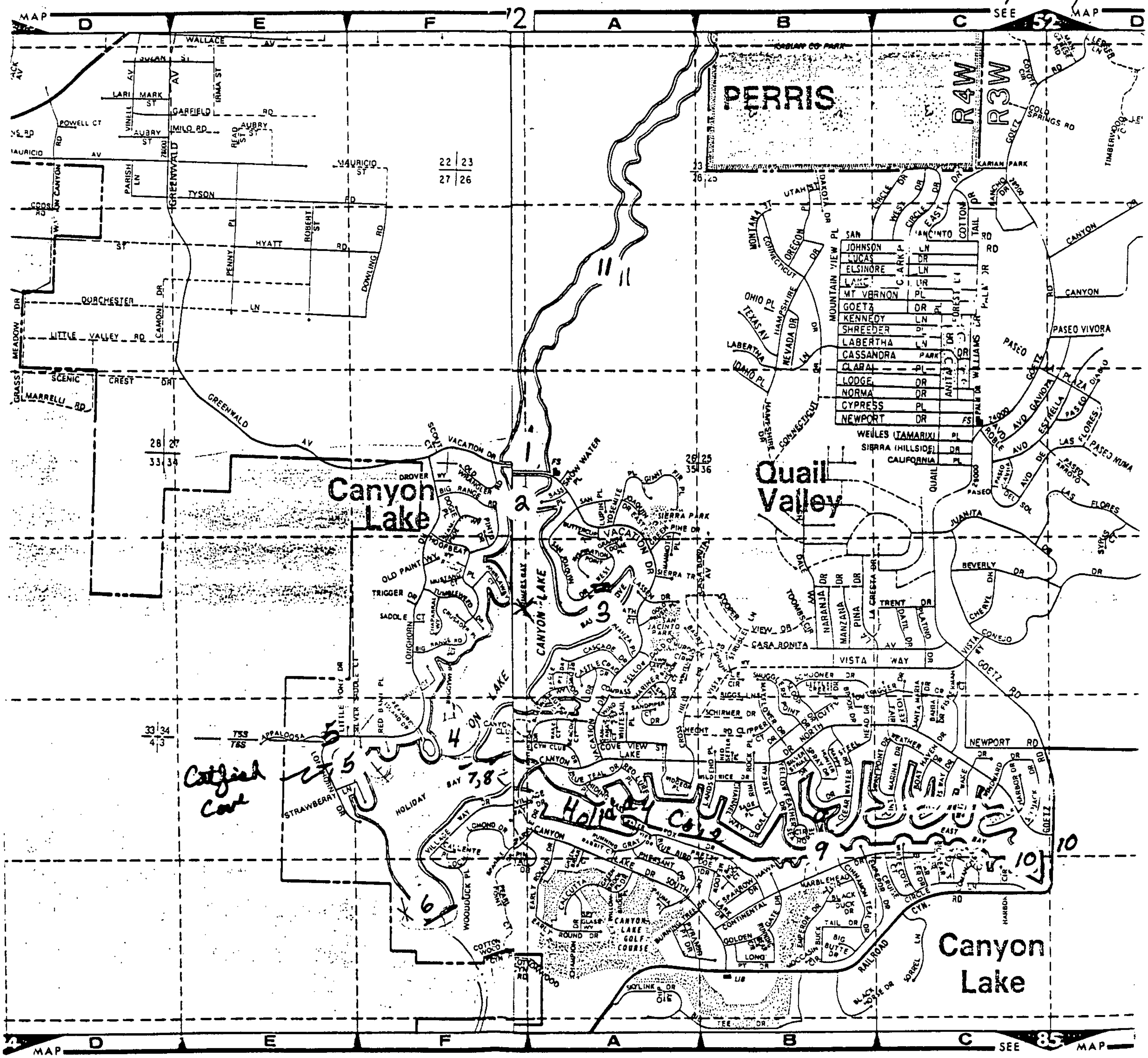
these values were low because of the time of year; that virtually no camping occurs at this time. After speaking to JES and HAB, it was decided that sampling should be discontinued until summer to see what influence camping would have on the fecal coliform values. I spoke to Ray Brewer (#244-6841) of Marine Patrol about our decision; he agreed. Ray also suggested that sampling during a heavy rain might show something? He believes that feces are buried around the north end (no restroom facilities) and severe erosion problems exist in this area, thus fecal coliform values should be fairly significant.

Please see attached field notes/analyses.

Sampling Locations / Constituents

6/23/88

RWQCB Sampling ST



NAO 10-8-86

Canyon Lake Sampling

Dates : September 22, 26 and October 3.

Stations (via Marine Patrol boat):

1. SKi Dock SKi Area (off of Vacation Drive) - T5S, R4W, sec. 35C

2. Camping Area #1 SKi Area (access by boat or four-wheel drive vehicle) T5S, R4W, sec. 26L

3. North End SKi Area (access by boat or four-wheel drive vehicle) T5S, R4W, sec. 26F

Constituents :

1. Total / Fecal Coliform
2. MBAS
3. Total Phosphate
4. Ammonia - Nitrate

Sampled by: NAO

Laboratory : Babcock Lab.

NAO 10-8-86

Canyon Lake Sampling

Date: October 3, 1986

Sampled By: NAO

General Field Conditions:

1. Weather - warm and partly cloudy
2. Air temp. - ~80°F
3. Water appearance - greenish/brown

Sites:

1. SKi Dock SKi Area - 1316 hours
   water temp. - 74°F (23°C)

2. Camping SKi Area #1 - 1330 hours
   water temp. - 78°F (26°C)

3. North End SKi Area - 1335 hours
   water temp. - 76°F (24°C)

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY

PHONE 684-1881
AREA CODE 714

LABORATORIES
3215 CHICAGO AVE.

Copies sent to STOLET on 10-28-86

ESTABLISHED 1906

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P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

OCT 16 '86

10/15/86

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 861003-156
Invoice No. 75676

Legal Location: T5S, R4W, sec. 35C

Sample Marked: #1 Canyon Lake
Ski Dock Ski Area

	Submitted	Sampled
By	Nancy	NAO
Date	10/3	10/3
Time	3:15	1316

PARAMETER	RESULT
Ammonium Nitrogen	0.5 mg/L
MBAS	<0.1 mg/L
Total Phosphorus	0.08 mg/L

x 3 = 0.24 for total phosphate

Water Temp - 23°C

Fecal Coliform = 2.2 MPN/100 ml

Total Coliform = >16 MPN/100 ml

SAWPA DES
001004614

EDWARD S. BABCOCK & SONS, INC.

Allison Mackenzie

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY

PHONE 684-1881
AREA CODE 714

LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906

EDWARD S. BABCOCK & SONS, INC.

P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

OCT 16 [illegible]

10/15/86

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 861003-157
Invoice No. 75676

Legal Location: T5S, R4W, Sec. 26 L

	Submitted	Sampled
Sample Marked: #2 Canyon Lake Camping Area #1 Ski Area	By Nancy	NAO
	Date 10/3	10/3
	Time 3:15	1330

PARAMETER	RESULT
Ammonium Nitrogen	0.5 mg/L
MBAS	<0.1 mg/L
Total Phosphorus	0.1 mg/L

x 3 = 0.3 for total phosphate

Water Temp. = 26°C
Fecal Coliform = < 2.2 MPN/100 ml.
Total Coliform = 716 " " "

EDWARD S. BABCOCK & SONS, INC.

Allison Mackenzie

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY

PHONE 684-1881
AREA CODE 714

LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906

EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

OCT 16

10/15/86

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 861003-158
Invoice No. 75676

	Submitted	Sampled
Sample Marked: #3 Canyon Lake North End Ski Area	By Nancy	NAO
	Date 10/3	10/3
	Time 3:15	1335

Legal Location: T5S, R4E, Sec. 26 F

PARAMETER	RESULT
Ammonium Nitrogen	0.5 mg/L
MBAS	<0.1 mg/L
Total Phosphorus	0.03 mg/L

X 3 = 0.09 for total phosphate

Water Temp. = 24°C

Fecal Coliform = 16 MPN/100 ml.
Total " = 716 " " "

SAWPA DES
001004616

EDWARD S. BABCOCK & SONS, INC.

Allison Mackenzie

NAO 10-8-86

Canyon Lake Sampling

Date: 9-26-86

Sampled By: NAO

General Field Conditions:

1. Weather - partly cloudy
2. Air temp. - ~72°F
3. Water appearance - brownish & turbid

Sites:

1. SKi Dock SKi Area - 1443 hours
   Water temp. - 77°F (25°C)

2. Camping SKi Area #1 - 1449 hours
   water temp. - 80°F (27°C)

3. North End SKi Area - 1456 hours
   water temp. - 80°F (27°C)

Copies sent to STORET on 10-28-86

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY

PHONE 684-1881
AREA CODE 714

LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906

EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

OCT 10 1986

10/08/86

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 860926-295
Invoice No. 75447

Legal Location; T5S, R4W, Sec. 35C

	Submitted	Sampled
By	Nancy	NAO
Date	9/26/86	9/26
Time	4:20	14:43

Sample Marked: #1 Ski Dock Ski Area
Canyon Lake

PARAMETER	RESULT
Ammonium Nitrogen	0.6 mg/L
MBAS	<0.1 mg/L
Total Phosphorus	0.2 mg/L

Total Phosphate = 0.6 mg/l
Fecal Coliform = 2.2 MPN/100 ml.
Total Coliform = >16 " " "
Water Temp. = 25°C

SAWPA DES

001004618

EDWARD S. BABCOCK & SONS, INC.

Sherman Babcock

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY

PHONE 684-1881
AREA CODE 714

LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906

EDWARD S. BABCOCK & SONS, INC.

P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

OCT 10 1986

10/08/86

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 860926-296
Invoice No. 75447

Legal Location: T5S, R4W, Sec. 26 L

Sample Marked: #2 Camping Area #1 Ski Area
Canyon Lake

	Submitted	Sampled
By	Nancy	NAO
Date	9/26/86	9/26
Time	4:20	14:49

PARAMETER	RESULT
Ammonium Nitrogen	0.6 mg/L
MBAS	<0.1 mg/L
Total Phosphorus	0.2 mg/L

Total Phosphate = 0.6 mg/l.
Fecal Coliform = 2.2 MPN/100 ml.
Total Coliform = >16 " " "
Water Temp. = 27°C

SAWPA DES
001004619

EDWARD S. BABCOCK & SONS, INC.

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY

PHONE 684-1881
AREA CODE 714

LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906

EDWARD S. BABCOCK & SONS, INC.

P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

0 986

10/08/86

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 860926-297
Invoice No. 75447

Legal Location: T5S, R4W, Sec. 26F

Sample Marked: #3 North End Ski Area
Canyon Lake

	Submitted	Sampled
By	Nancy	NAO
Date	9/26/86	9/26
Time	4:20	14:56

PARAMETER	RESULT
Ammonium Nitrogen	0.6 mg/L
MBAS	<0.1 mg/L
Total Phosphorus	0.2 mg/L

Total Phosphate = 0.6 mg/l
Total Coliform = >16 MPN / 100 ml.
Fecal Coliform = 2.2 " " "
Water Temp. = 27°C

SAWPA DES
001004620

EDWARD S. BABCOCK & SONS, INC.

Herman Babcock

NAO 10-8-86

Canyon Lake

Date: 9-22-86

General Field Conditions:

1. Weather - partly cloudy & cool
2. Air Temp. - ~75°F
3. Water Appearance - brownish-yellow and turbid.

Sites:

1. SKi Dock SKi Area - 1318 hours
   Water Temp. - 75°F (24°C)

2. Camping Area #1 SKi Area - 1325 hours
   Water temp. - 80°C (27°C)

3. North End SKi Area - 1333 hours
   Water temp. - 76°F (24°C)

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY

PHONE 684-1881
AREA CODE 714

LABORATORIES
3215 CHICAGO AVE.

Copies sent to ST & 10/28/86

ESTABLISHED 1906

EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

OCT -

10/06/86

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 860922-81
Invoice No. 75253

Legal Location: T5S, R4W, Sec. 35C

	Submitted	Sampled
Sample Marked: Canyon Lake / #1 Ski Dock Ski Area	By Nancy	NAO
	Date 9/22/86	9/22
	Time 2:40	13:18

PARAMETER	RESULT	
MBAS	0.1	mg/L
Total Phosphorus	0.08	mg/L
Ammonium Nitrogen	0.6	mg/L

Total Phosphate = 0.24 mg/l
Total Coliform = >16 MPN/100 ml.
Fecal Coliform = >16 MPN/100 ml.
Water Temperature = 24°C

SAWPA DES
001004622

EDWARD S. BABCOCK & SONS, INC.

Allison Mackenzie

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY

PHONE 684-1881
AREA CODE 714

LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906

EDWARD S. BABCOCK & SONS, INC.
P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

OCT

10/06/86

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 860922-82
Invoice No. 75253

Legal Location: T5S, R4W, sec. 26 L

Sample Marked: Canyon Lake / #2 Camping Area #1 Ski Area

	Submitted	Sampled
By	Nancy	NAO
Date	9/22/86	9/22
Time	2:40	13:25

PARAMETER	RESULT
MBAS	0.1 mg/L
Total Phosphorus	2.1 mg/L
Ammonium Nitrogen	0.5 mg/L

Total Phosphate = 6.3 mg/l
Fecal Coliform = > 16 MPN/100 ml.
Total Coliform = > 16 " " "
Water Temperature = 27°C

EDWARD S. BABCOCK & SONS, INC.

Allison Mackenzie

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY

PHONE 684-1881
AREA CODE 714

LABORATORIES
3215 CHICAGO AVE.

ESTABLISHED 1906

EDWARD S. BABCOCK & SONS, INC.

P.O. BOX 432
RIVERSIDE, CALIFORNIA 92502

OCT - 7

10/06/86

To: Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

Lab No. 860922-83
Invoice No. 75253

Legal Location: T5S, R4W, sec. 26F

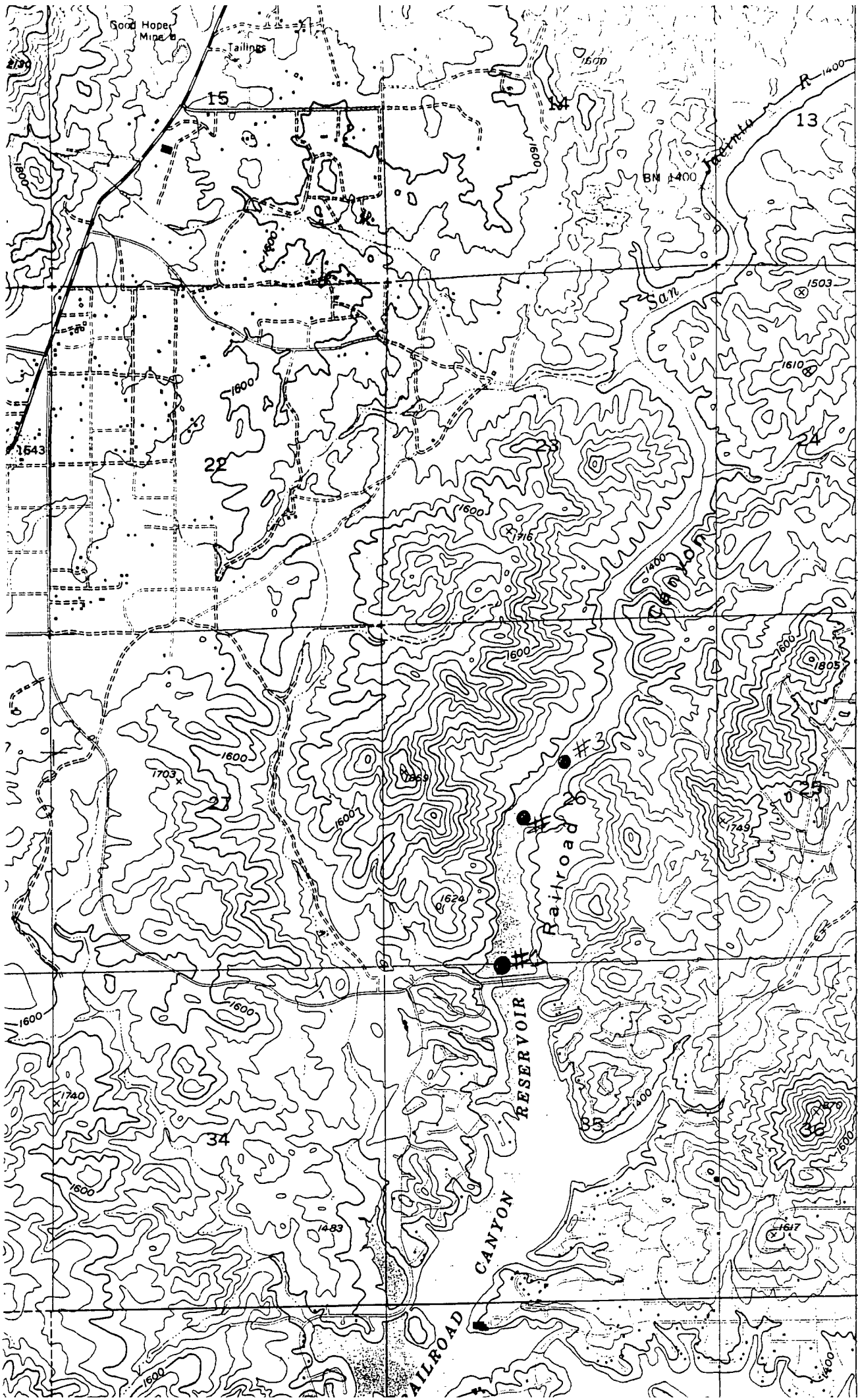
	Submitted	Sampled
Sample Marked: Canyon Lake #3 North End Ski Area		
By	Nancy	NAO
Date	9/22/86	9/22
Time	2:40	13:30

PARAMETER	RESULT
MBAS	0.1 mg/L
Total Phosphorus	0.2 mg/L
Ammonium Nitrogen	0.6 mg/L

Total Phosphate = 0.6 mg/l.
Fecal Coliform = >16 MPN/100 ml.
Total Coliform = >16 " " "
Water Temp. = 24°C

EDWARD S. BABCOCK & SONS, INC.

Allison Mackenzie



Topo Map:
Elsinore

Canyon
Lake Samplin
Locations:

#1: S.C. Doc
SCI Area

#2: Camping
SCI Area
#1

#3: North
End SCI
Area

Note: can
not go
further b
boat -
too shall

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY
PHONE 684-1881
AREA CODE 714
LABORATORIES
3215 CHICAGO AVENUE

ESTABLISHED 1906

EDWARD S. BABCOCK & SONS, INC.

P. O. BOX 432
RIVERSIDE, CALIFORNIA 92502

OCT 6 1986

OCT - 7 1986

TO Regional Water Quality Control Board
6809 Indiana Ave. Suite 200
Riverside, Ca. 92506

Lab No. B861003-B861
Invoice No. 75675

	Submitted	Sampled
By	NANCY	NAD
Date	10/3	10/3
Time	3:15	

Time Started 3:20 CK-RE

Canyon Lake

Sample Mark	Standard Plate Count	Coliform Bacteria: ml Planted	Presumptive (24 / 48)	Confirmed (24 / 48)	Tubes +	MPN/100 ml	Fecal (24)	Tubes +	MPN
#1 Ski Dock Ski Area	20	10	24: + + + + + / 48:	24: + + + + + / 48:	5	>16	24: + − − − −	1	2
#2 Camping Area #1 Ski Area	220	10	24: + + + + + / 48:	24: + + + + + / 48:	5	>16	24: − − − − −	0	<2
#3 North End - Ski Dock	180	10	24: + + + + + / 48:	24: + + + + + / 48:	5	>16	24: + + + + −	4	16
			24: / 48:	24: / 48:			24:		
			24: / 48:	24: / 48:			24:		
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CALLED

SAWPA DES
001004617

EDWARD S. BABCOCK & SONS, INC.

Norman Babcock

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY

PHONE 684-1881
AREA CODE 714

LABORATORIES
3215 CHICAGO AVENUE

ESTABLISHED 1906

EDWARD S. BABCOCK & SONS, INC.

P. O. BOX 432
RIVERSIDE, CALIFORNIA 92502

OCT 1 1986

OCT - 2 1986

TO Regional Water Quality Control Board
6809 Indiana Ave. Suite 200
Riverside, Ca. 92506

Lab No. 860926-B446

Invoice No. 75436

	Submitted	Sampled
By	Nancy	NAO
Date	9/26	9/26
Time	4:20	

Time Started 4:40 CK

Canyon Lake as listed

Sample Mark	Standard Plate Count	ml Planted	Presumptive						Confirmed						Tubes +	MPN /100ml	Fecal						Tubes +	MPN/
1443 hrs			24	−	−	−	−	−	24	+	+	+	+	+			24	−	−	−	+	−		
Ski Dock Ski Area	790	10	48	+	+	+	+	+	48						5	716							1	2.
#1 Ski Area 1449 hrs			24	+	+	+	+	+	24	+	+	+	+	+			24	−	−	−	−	+		
Camping Area	910	10	48						48						5	>16							1	2.
1456 hrs			24	−	−	−	−	−	24	+	+	+	+	+			24	−	−	+	−	−		
North End Ski Area	960	10	48	+	+	+	+	+	48						5	716							1	2.
			24						24								24							
			48						48															
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EDWARD S. BABCOCK & SONS, INC.

Sherman Babcock

CALLED

AGRICULTURAL CONSULTANTS
CHEMISTS
APPROVED WATER LABORATORY
PHONE 684-1881
AREA CODE 714
LABORATORIES
3215 CHICAGO AVENUE

ESTABLISHED 1906

EDWARD S. BABCOCK & SONS, INC.

P. O. BOX 432
RIVERSIDE, CALIFORNIA 92502

TO Regional Water Quality Control Board #8
6809 Indiana Avenue, Suite 200
Riverside, CA 92506

CED 25 1986

Lab No. 8609 22-5359
Invoice No. 75246

	Submitted	Sampled
By	Nancy	Nancy
Date	4-22-86	4-22-86
Time	2:40	

Time Started 3:34 CKm

Sample Mark	Standard Plate Count	Coliform Bacteria: ml Planted	Presumptive						Confirmed						Tubes +	MPN/100 ml	Fecal						Tubes +	MPN
			24						24								24							
			48						48															
Canyon Lake @ #1 Ski Dock-Ski Area	430	10	+	+	+	+	+	-	+	+	+	+	+	-	5	>11	+	+	+	+	+		5	>1
Canyon Lake @ #2 Camping Area 13:45 Hrs	590	10	+	-	+	+	-	-	+	+	+	+	+	+	5	>11	+	+	+	+	+		5	>1
Canyon Lake @ #3 Mid End Ski Area 13:33 Hrs	1400	10	+	+	+	+	+	+	+	+	+	+	+	+	5	>11	+	+	+	+	+		5	>1

SAWPA DES
001004624

CALLED

EDWARD S. BABCOCK & SONS, INC.

JES - 81
See me
on this one.

ELSINORE VALLEY MUNICIPAL WATER DISTRICT

TELEPHONE
AREA CODE 714
674-3146

33751 MISSION TRAIL, P.O. BOX 3000, ELSINORE, CALIFORNIA 92330

JAB
8-11-86

August 11, 1986

AUG 13 1986

California Regional Water Quality Control Board
Santa Ana Region
6809 Indiana Ave., Suite 200
Riverside, CA 92506

Attn: Mr. Hisam A. Baqai P.E.
Senior WRC Engineer

RE: Sampling of Canyon Lake

Dear Hisam,

I am sending you the results of samples taken by the Elsinore Valley Municipal Water District from Canyon Lake. These samples were taken July 25,26,27,28, 1986 and August 1,2,3,&4, 1986 at four locations as noted. This was the results of the meeting held in Supervisor Younglove's office concerning the outside camping in the area of Canyon Lake. You requested copies of the samples.

Hisam I would like to know from you, if you see any kind of heavy pollution within the lake. Personnally I don't, but I don't know all the standards for lakes that have body contact.

I look forward to your response and if you have questions please feel free to call me.

Sincerely,

Jack H. Devers
General Manager

JHD:bk

ENCLS:

contains only bacteriological data @ the following locations.
1. Ski Dock Ski area
2. Camping area #1 Ski area
3. Camping area #2 Ski area
4. North End Ski area

	Date Sampled	Time Sampled	Address	Presumptive No. Tubes Pos 24 Hrs.	Presumptive No. Tubes Pos 48 Hrs.	Confirmed No. Tubes Pos 24 Hrs.	Confirmed No. Tubes Pos 48 Hrs	
529	7-23-86	10:55 R.S.	The Farm	0	0			<2.2/100mL
530	7-23-86	11:10 R.S.	Daily #2	0	0			<2.2/100mL
531	7-23-86	11:20 R.S.	Dunes Casino	0	0			<2.2/100mL
532	7-23-86	11:35 R.S.	Skylink Dr.	0	0			<2.2/100mL
533	7-23-86	11:45 R.S.	Canyon Lake Dr. So.	0	0			<2.2/100mL
534	7-25-86	10:10 J.E.	~~Ski Dock~~ Ski Area	5-1-0	0-2-1	5-2-0	0-0-0	50/100mL
535	7-25-86	10:20 J.E.	Camping Area #1 Ski Area	5-5-3	0-0-0	5-5-3	0-0-0	900/100mL
536	7-25-86	10:23 J.E.	Camping Area #2 Ski Area	5-1-1	0-3-0	5-3-0	0-0-0	80/100mL
537	7-25-86	10:26 J.E.	North End Ski Area	5-2-0	0-1-1	5-3-0	0-0-0	80/100mL
538	7-25-86	12:00 B.R.	Stewart's Well #1	0	1	1		2.2/100mL
539	7-26-86	10:00 J.E.	~~Ski Dock~~ Ski Area	5-2-0	0-2-0	5-4-0	0-0-0	130/100mL
540	7-26-86	10:10 J.E.	Camping Area #1 Ski Area	5-2-0	0-2-0	5-2-0	0-0-0	50/100mL
541	7-26-86	10:12 J.E.	Camping Area #2 Ski Area	5-1-0	0-1-0	5-1-0	0-0-0	3/100mL
542	7-26-86	10:15 JE	North End Ski Area	5-5-0	0-0-0	5-5-0	0-0-0	240/100mL
543	7-27-86	10:15 RS.	Camping Area #1 Ski Area	5-4-0	0-1-1	5-2-1	0-0-0	70/100mL
544	7-27-86	10:20 RS.	Camping Area #2 Ski Area.	5-0-0	0-2-1	5-0-1	0-1-0	50/100mL

	Date Sampled	Time Sampled	Address	Presumptive No. Tubes Pos 24 Hrs.	Presumptive No. Tubes Pos 48 Hrs.	Confirmed No. Tubes Pos 24 Hrs.	Confirmed No. Tubes Pos 48 Hrs	
45	7-27-86	10:25 RS.	North End Ski Area	5-4-0	0-0-2	5-3-1	0-1-0	170/100ml
40	7-27-86	10:35 RS.	~~Ski Dock~~ ~~Ski Area~~	5-4-0	0-0-2	5-4-0	0-0-0	130/100ml
45	7-28-86	10:15 R.S.	Camp Area #1 Ski Area	5-1-0	0-1-0	5-0-0	0-0-0	23/100ml
40	7-28-86	10:20 RS.	Camp Area #2 Ski Area	5-4-0	0-0-0	5-2-0	0-0-0	50/100ml
40	7-28-86	10:25 RS.	North End Ski Area	5-1-0	0-3-0	5-1-0	0-1-0	50/100ml
30	7-28-86	10:35 RS.	~~Ski Dock~~ ~~Ski Area~~	5-1-0	0-1-0	5-0-0	0-1-1	50/100ml
1	7-29-86	9:00 R.S.	River Rd.	0	0			<2.2/100ml
1	7-29-86	9:15 R.S.	26900 Hwy 74	0	0			<2.2/100ml
10	7-29-86	9:30 R.S.	EL Toro	0	0			<2.2/100ml
1	7-29-86	9:45 R.S.	335 Ave. 5	0	0			<2.2/100ml
10	7-29-86	9:55 R.S.	Elsinore jr. High	0	0			<2.2/100ml
10	7-29-86	10:15 R.S.	208 woodlake	0	0			<2.2/100ml
1	7-29-86	10:25 R.S.	machado School	0	0			<2.2/100ml
10	7-29-86	10:35 R.S.	32900 Riverside dr.	0	0			<2.2/100ml
10	7-29-86	10:45 R.S.	morris pump station	0	0			<2.2/100ml
30	7-29-86	11:05 R.S.	Tomlins	0	0			<2.2/100ml

	Date Sampled	Time Sampled	Address	Presumptive No. Tubes Pos 24 Hrs.	Presumptive No. Tubes Pos 48 Hrs.	Confirmed No. Tubes Pos 24 Hrs.	Confirmed No. Tubes Pos 48 Hrs	MPN
61	7-29-86	11:15 R.S.	EL CAMINO	0	0			<2.2/100mL
62	7-29-86	11:30 R.S.	upper Los Pinos	0	0			<2.2/100mL
63	7-29-86	12:00 R.S.	Skymeadows clubhouse	0	0			<2.2/100mL
64	7-29-86	12:50 R.S.	Skylark dr.	0	0			<2.2/100mL
65	7-29-86	1:05 R.S.	21220 Walnut St.	0	0			<2.2/100mL
66	8-1-86	10:00 J.E.	Ski Dock Ski Area	3-0-0	2-2-0	5-0-0	0-0-0	23/100mL
67	8-1-86	10:05 J.E.	Camping Area #1 Ski Area 0	1-0-0	4-3-1	5-0-0	0-0-0	23/100mL
68	8-1-86	10:07 J.E.	Camping Area #2 Ski Area	1-0-0	4-3-1	5-1-0	0-0-0	30/100mL
69	8-1-86	10:10 J.E.	North End Ski Area	2-0-0	3-3-1	5-3-1		110/100mL
70	8-2-86	10:00 J.E.	Ski Dock Ski Area	5-1-0	0-2-1	5-3-1		110/100mL
71	8-2-86	10:10 J.E.	Camping Area #1 0 Ski Area	5-0-0	0-1-0	5-1-0		30/100mL
72	8-2-86	10:12 J.E.	Camping Area #2 Ski Area	2-0-0	3-0-0	5-0-0		23/100mL
73	8-2-86	10:15 J.E.	North End Ski Area	4-1-0	1-3-0	5-4-0		130/100mL
74	8-3-86	10:10 R.S.	North End Ski Area	5-3-0	0-0-0	5-3-0		80/100mL
75	8-3-86	10:15 R.S.	Camping Area #2 Ski Area	4-3-0	1-1-0	5-4-0		130/100mL
76	8-3-86	10:18 RS	Camping Area #1 0 Ski Area	5-1-0	0-3-0	5-4-0		130/100mL

	Date Sampled	Time Sampled	Address	Presumptive No. Tubes Pos 24 Hrs.	Presumptive No. Tubes Pos 48 Hrs.	Confirmed No. Tubes Pos 24 Hrs.	Confirmed No. Tubes Pos 48 Hrs	MPN
77	8-3-86	10:25 R.S.	Ski Dock Ski Area	5-4-2	0-1-0	5-5-2		500/100mL
78	8-4-86	10:15 R.S.	North End Ski Area	3-1-0	2-1-0	5-2-0		50/100mL
79	8-4-86	10:18 R.S.	Camping Area #2 Ski Area	0-0-0	5-2-0	5-2-0		50/100mL
80	8-4-86	10:21 R.S.	Camping Area #1 Ski Area	5-2-0	0-2-1	5-4-1		170/100mL
81	8-4-86	10:30 R.S.	Ski Dock Ski Area	5-0-0	0-4-1	5-4-1		170/100mL
82	8-6-86	1:30 S.H.	Grand Avenue Apts. (new const)					
83								
84								
85								
86								
87								
88								
89								
90								
91								
92								

AUG 13 1986