

Keywords: Beach Lake,
mercury,
fish monitoring

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Loc.
51.13



Beach Lake photo taken by SRCSD staff, 12/30/97.

Sacramento Regional County
Sanitation District
(author)

Beach Lake Monitoring Report

January 1998

Sacramento Regional County
Sanitation District

**BEACH LAKE
MONITORING REPORT**

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Sacramento Regional County Sanitation District BEACH LAKE MONITORING REPORT

Purpose

The purpose of this report is to document and present the findings of water quality and fish tissue monitoring of Beach Lake implemented by the Sacramento Regional County Sanitation District (SRCSD). All sampling was performed through the voluntary On-Site Monitoring Program (OSMP) of SRCSD. This report provides information beneficial to evaluating the Beach Lake listing on the 1998 Clean Water Act Section 303(d) List and TMDL Priority for the Central Valley Regional Water Quality Control Board (Regional Board).

History

The SRCSD operates the Sacramento Regional Wastewater Treatment Plant (SRWTP) which is located on 900 acres of a 3400-acre site between Interstate 5 and Franklin Boulevard in Elk Grove, CA. The remaining 2500 acres serve as a buffer between the Plant and nearby residential areas. The bufferlands contain valuable wildlife habitat, including the 550-acre Upper Beach Lake Wildlife Area. The Upper Beach Lake Wildlife Area contains lakes (Black Crown Lake, Meadowlark Lake), portions of creeks (Morrison Creek, Laguna Creek), more than 10,000 trees and shrubs, and enhanced levees that provide habitat for waterfowl and shorebirds.

In the early and mid-eighties, water quality and fish tissue sampling was performed in areas of Beach Lake. The Army Corps of Engineers conducted limited water quality analyses of the Morrison Creek stream group from 1982 to 1984 that resulted in cadmium, copper, lead, and mercury exceedances of EPA acute or chronic toxicity criteria (USFWS Environmental Contaminants Program On-Refuge Investigations Sub-Activity, CA-Investigation of Waterbird Deformities Recently Observed at North Stone Lakes, July 5, 1996). During 1985-87, the California Department of Fish and Game and State Water Resources Control Board collected largemouth bass from Meadowlark Lake as part of their Toxic Substances Monitoring Program. Tissue sample results indicated elevated levels of mercury, copper, and chlorinated organic compounds (USFWS Environmental Contaminants Program On-Refuge Investigations Sub-Activity, CA-Investigation of Waterbird Deformities Recently Observed at North Stone Lakes, July 5, 1996). These two events prompted the Bay Protection and Toxic Cleanup Program (BPTCP) to recognize Beach Lake as a potential toxic hot spot in the early 1990's. Subsequently, in 1994, the Clean Water Act Section 303(d) List and TMDL Priority for the Central Valley Regional Water Quality Control Board listed Beach Lake.

*As attached memo,
this should read
"Black
Crown
Lake"*

The voluntary OSMP was conceived in 1983 and routine monitoring was implemented on creeks within the boundaries of SRWTP. Detection levels, in the eighties, were high and virtually all samples resulted in non-detections. As analytical detection limits decreased and clean sampling techniques improved the quality of sampling data in the nineties, the OSMP sampling schedule was expanded to include additional waterbodies and additional constituents. In 1994, some of the additions included low level mercury analysis and Class A Pesticides (Class A as defined by National Academy of Sciences) at various locations and frequencies.

Beach Lake remained on the Clean Water Act Section 303(d) List and TMDL Priority for the Central Valley Regional Water Quality Control Board for the 1996 update.

The specifics of the current Beach Lake Section 303(D) listing are as follows:

- Size: 295 Acres
 - Impaired: 295 Acres
 - Pollutants: Hg, Pesticides (Copper & Zinc are recommended to be deleted from the pollutant list)
 - Source Hg: Urban runoff/Storm Sewer and Resource Extraction
 - Source Pesticides: Urban runoff/Storm Sewer and Industrial Point Sources
- Schedule: 3 (Targeted for a TMDL over the next 5-13 years)

In late November of 1997, the 'solicitation for information' memo was received by SRCSD staff (11/17/97 memo by Jerry Bruns, Solicitation of Information for the Development of the 1998 Section 303(D) List and TMDL Priority for the Central Valley Regional Board). This solicitation prompted discussions between the SRCSD and the Regional Board to generate additional monitoring data and to present a report on recent Beach Lake monitoring. During the discussions, the Regional Board consulted with both the Department of Fish and Game and the State Board. The Regional Board and SRCSD developed a specific sampling plan in addition to the clean sampling protocol to be employed. The additional monitoring included Bass and Carp sampling of Black Crown Lake for analysis of Mercury and Pesticides and would be subject to National Academy of Sciences whole fish wet weight objectives (12/11/97 memo to Sue Yee of the Regional Board from Mark Perry of SRCSD, Summary of communications (over 12/4/97 – 12/11/97) between Sue Yee and Mark Perry on the 1998 Section 303(d) List).

Summary of Beach Lake Monitoring Data

In December of 1997, five Bass samples and five Carp samples were taken by SRCSD staff from Black Crown Lake using EPA clean sampling techniques. The Bass samples ranged in size from approximately 8 inches to 18 inches, and ranged in whole weight from approximately 0.13 kg to 1.5 kg (see Figure 1, Beach Lake Fish Sample Characteristics – 12/97). The Carp ranged in size from approximately 12 inches to 29 inches, and ranged in whole weight from approximately 0.6 kg to 3.5 kg. The analytical results of the Bass samples for Total Mercury ranged from 0.04 ppm to 0.27 ppm

(see Figure 2, Beach Lake Fish Tissue Data 1997). The analytical results of the Carp samples for all Class A Pesticides were 'non-detects'.

Water Quality sampling has been performed by SRCSD in Beach Lake from 1994 to present. Sampling has been performed in Black Crown Lake, Morrison Creek at I-5, and Meadowlark Lake. The Class A Pesticides were sampled and analyzed in all three locations on a quarterly basis in 1994, each time results were below the laboratory detectable limits (see Figure 3, Beach Lake Water Quality Data 1994 – 1997). Mercury has been analyzed periodically since 1994. Five samples were taken from Morrison Creek at I-5 between 1994 and 1995 and were found to have undetectable levels of Mercury. In 1997, three samples were taken from Morrison Creek at I-5 and resulted in an average of 8.5 ng/L (see Figure 3, note the lower detection limit).

Summary and Conclusions

Beach Lake monitoring data has been performed intermittently by various entities since the early eighties. Over the past fifteen years, laboratory analytical techniques have improved to reduce detection limits and clean sampling techniques have improved to reduce potential sample contamination. These improvements have enabled the scientific community to greatly improve the integrity and overall quality of data generated by monitoring programs. Additionally, the evolution of the SRCSD bufferlands department has resulted in extensive improvements in habitat enhancements and management.

The recent, high quality data presented in this report has shown that levels of Class A Pesticides and Mercury in the Beach Lake water column and fish tissue are less than previously suspected and are in fact at levels conducive to a healthy ecosystem. Both Mercury and Class A Pesticide levels in Beach Lake fish tissue are in compliance with National Academy of Sciences Guidelines and Action Levels for Toxic Chemicals in Fish.

Recommendations

The SRCSD requests that Beach Lake be delisted from the 1998 update of the Clean Water Act Section 303(d) List and TMDL Priority for the Central Valley Regional Water Quality Control Board. The SRCSD requests that Beach Lake no longer be identified as a potential toxic hot spot and removed from any such listing.

If Beach Lake is removed from the Section 303(d) List, the SRCSD agrees to conduct follow-up monitoring of fish tissue and water quality in accordance with existing protocol over the period of 1998 – 1999.

Figure 1

Beach Lake Fish Sample Characteristics - 12/97

Sample (No.)	Sampling Date	Species	Length (in)	Weight (whole)
1	12/11/97	bass	16	1.32 kg*
2	12/11/97	bass	7.5	0.13 kg
3	12/11/97	bass	17.5	1.45 kg
4	12/12/97	bass	15	1.1 kg
5	12/12/97	bass	15.5	1.2 kg
6	12/9/97	carp	26	3.48 kg*
7	12/11/97	carp	12	0.55 kg*
8	12/11/97	carp	18	1.1 kg
9	12/12/97	carp	24	2.35 kg
10	12/15/97	carp	28.5	2.9 kg

* The sample portion analyzed by the laboratory was of less weight than the whole fish.

Figure 2

Beach Lake Fish Tissue Data 1997

	NAS Guideline (Whole Fish) (wet weight) (ppm)	Detection Limit (ppm)	Fish Tissue Samples									
			Bass #1 (ppm)	Bass #2 (ppm)	Bass #3 (ppm)	Bass #4 (ppm)	Bass #5 (ppm)	Carp #1 (ppm)	Carp #2 (ppm)	Carp #3 (ppm)	Carp #4 (ppm)	Carp #5 (ppm)
Mercury	0.5	0.01	0.26	0.04	0.27	0.12	0.20	-	-	-	-	-
Class A Pesticides												
γ-DDT (total)	1.0	0.05	-	-	-	-	-	ND	ND	ND	ND	ND
PCB (total)	0.5	0.5	-	-	-	-	-	ND	ND	ND	ND	ND
aldrin	0.1	0.05	-	-	-	-	-	ND	ND	ND	ND	ND
dieldrin	0.1	0.05	-	-	-	-	-	ND	ND	ND	ND	ND
endrin	0.1	0.05	-	-	-	-	-	ND	ND	ND	ND	ND
heptachlor	0.1	0.05	-	-	-	-	-	ND	ND	ND	ND	ND
heptachlor epoxide	0.1	0.05	-	-	-	-	-	ND	ND	ND	ND	ND
γ-chlordane (total)	0.1	0.1	-	-	-	-	-	ND	ND	ND	ND	ND
lindane	0.1	0.05	-	-	-	-	-	ND	ND	ND	ND	ND
hexachlorocyclohexane (total)	0.1	0.05	-	-	-	-	-	ND	ND	ND	ND	ND
endosulfan (total)	0.1	0.05	-	-	-	-	-	ND	ND	ND	ND	ND
toxaphene	0.1	1	-	-	-	-	-	ND	ND	ND	ND	ND

ND - Not Detected

Figure 3

Beach Lake Water Quality Data 1994 - 1997

	DL (µg/L)	1994				1995		1996		1997	
		BC (Avg)	ME (Avg)	ML (Avg)	No. of samples	ME (Avg)	No. of samples	ME (Avg)	No. of samples	ME (Avg)	No. of samples
Mercury	0.2	-	ND	-	4	ND	1	-	-	8.5	5
Class A Pesticides											
DDT (total)	0.01	ND	ND	ND	4	-	-	-	-	-	-
PCB (total)	0.20	ND	ND	ND	4	-	-	-	-	-	-
aldrin	0.006	ND	ND	ND	4	-	-	-	-	-	-
dieldrin	0.007	ND	ND	ND	4	-	-	-	-	-	-
endrin	0.01	ND	ND	ND	4	-	-	-	-	-	-
heptachlor	0.007	ND	ND	ND	4	-	-	-	-	-	-
heptachlor epoxide	0.007	ND	ND	ND	4	-	-	-	-	-	-
chlordane (total)	0.01	ND	ND	ND	4	-	-	-	-	-	-
lindane	0.01	ND	ND	ND	4	-	-	-	-	-	-
hexachlorocyclohexane (total)	0.006	ND	ND	ND	4	-	-	-	-	-	-
endosulfan (total)	0.01	ND	ND	ND	4	-	-	-	-	-	-
toxaphene	0.50	ND	ND	ND	4	-	-	-	-	-	-

ND - Not Detected

DL - Detection Limit

BC - Black Crown Lake

ME - Morrison Creek Exit

ML - Meadowlark Lake

Acknowledgements

This Beach Lake Monitoring Report was developed by Mark Perry, Project Engineer for SRCSD. The report would not be possible without the collaboration and efforts of the following SRCSD staff: Bufferlands Department, specifically Bryan Young, Roger Jones, Shannon Brown, and Jennifer Albright; Chad Schwartz, Engineering Intern; Lucy Boehm, Laboratory Supervisor. Additional support and review was provided by Larry Walker, Larry Walker Associates.

APPENDIX

SACRAMENTO REGIONAL WASTEWATER TREATMENT PLANT

COUNTY OF SACRAMENTO - PUBLIC WORKS AGENCY

WATER QUALITY DIVISION

8521 Laguna Station Road

Elk Grove, CA 95758

Mail Code: 99-003

Phone: (916) 875-9000

FAX: (916) 875-9049

MEMORANDUM

TO: Sue Yee
CVRWQCB

DATE: December 11, 1997

FROM: Mark Perry *MP*
SRCSD

FILE: OSM-93-5.1

SUBJECT: Summary of communications (over 12/4/97 – 12/11/97) between Sue Yee and Mark Perry on the 1998 Section 303(D) List

Background

The Regional Board is soliciting information for use in updating the Section 303(D) list. The list is scheduled for consideration at a public hearing in *January, 1998* (11/17/97 memo by Jerry Bruns, Solicitation of Information for the Development of the 1998 Section 303(D) List and TMDL Priority for the Central Valley Regional Board). The Sacramento Regional County Sanitation District (SRCSD) expressed an interest in performing an immediate study to accurately depict current conditions in Beach Lake, leading to the potential delisting of Beach Lake from the Section 303(D) list. Sue Yee and Mark Perry held several phone conversations between December 4 and December 11, 1997 on this effort.

Support from the Regional Board

The SRCSD proposed an immediate study to analyze fish tissue in Beach Lake in an effort to have Beach Lake delisted from the Section 303(D) list. The Regional Board consulted with both the Department of Fish and Game and the State Board. The Regional Board expressed support for performing the study. The Regional Board indicated that a bid for delisting Beach Lake is encouraged, but should be accompanied with an agreement that follow up monitoring, in accordance with the immediate study, will be performed over the next couple of years to cover a three year period overall. The Regional Board indicated that the study in progress should be included in a memo to the Regional Board by the December 22, 1997 information submittal deadline.

Initial studies performed on Beach Lake The initial studies, (which resulted in the 303(D) listing of Beach Lake), were performed by Cal Fish and Game in the mid-eighties in Black Crown Lake. The Ca Fish and Game study was documented as performed in Meadowlark Lake, however the areas of Beach Lake are often mistakenly identified. A set of longitude and latitude coordinates (provided by the Regional Board), documented with that study, proved that the work was actually performed in Black Crown Lake.

Fish tissue sampling study outline The sampling study to be performed is outlined below:

Twelve fish will be sampled from Black Crown Lake using clean sampling techniques: six Carp, and six Large-Mouth Bass.

Each of the Carp will be analyzed for Class A Pesticides, and DDT. Class A Pesticides include: aldrin, dieldrin, chlordane, endrin, heptachlor, heptachlor epoxide, hexachlorocyclohexane (including lindane), endosulfan, and toxaphene.

Each of the Large-Mouth Bass will be analyzed for total Hg.

The whole fish samples will be analyzed.

A contract laboratory will analyze fish tissue samples (rough estimate of \$3500 overall cost). The sampling will be performed the week of December 8, 1997. The field sampling will be performed by SRCSD staff.

Results will be subject to NAS standards for Human Health Objectives.

Impending deadlines The first deadline is December 22, 1997 for submission of a memo to the Regional Board which describes the scope of the SRCSD work plan and notifies the Regional Board of the potential request for revision of the updated Section 303(D) list.

The second deadline is January 14, 1998 for submission of a final report, which includes analysis of both the current fish tissue data, and available water quality data from the OSMP, and an agreement for follow up monitoring in 1998 and 1999 to cover a 3 year period.

The public hearing on the updated Section 303(D) list at the Regional Board will be held in January, 1998.

Questions? If you have any questions, please call at (916) 875-9114.

Field Notes

Beach Lake Fish Tissue Sampling - 12/97

Black Crown Lake

LIMS ID	Date	Species	Sample (No.)	Length (in)	Weight (sample)	Weight (head+tail)	Weight (whole)	Capture	Notes
97-030824	12/9/97	carp	1	26	2.5 kg	0.98 kg	3.48 kg	100' net	head/tail cut
97-030826	12/11/97	carp	2	12	0.44 kg	0.11 kg	0.55 kg	cast net	head/tail cut - female
97-030836	12/11/97	bass	3	16	0.96 kg	0.36 kg	1.32 kg	cast net	head/tail cut
97-030838	12/11/97	bass	4	7.5			0.13 kg	10' net	
97-030840	12/11/97	bass	5	17.5			1.45 kg	cast net	
97-030828	12/11/97	carp	6	18			1.1 kg	cast net	
97-030842	12/12/97	bass	7	15			1.1 kg	cast net	
97-030844	12/12/97	bass	8	15.5			1.2 kg	cast net	
97-030830	12/12/97	carp	9	24			2.35 kg	cast net	
97-030832	12/15/97	carp	10	28.5			2.9 kg	cast net	

Due to high water levels producing unsafe conditions resulting from recent storms, the first five samples of each species were used as the sample set.

The first three samples were supplied to the laboratory with the head and tail removed. These samples were processed using EPA sampling techniques for fillet analysis. After the SRCSD and Regional Board agreed upon whole fish sampling, the remaining samples were processed as whole fish.

TABLE 3

Guidelines and Action Levels for Toxic Chemicals in Fish
(wet weight)

Chemical	NAS ^a Recommended Guideline		FDA ^b Action Level	
	(Whole Fish)		(Edible Portion)	
	ug/g (ppm)	ng/g (ppb)	ug/g (ppm)	ng/g (ppb)
Mercury	0.5	500	1.0 ^d	1,000
DDT (total)	1.0	1,000	5.0	5,000
PCB (total)	0.5	500	2.0 ^e	2,000
aldrin	0.1 ^c	100	0.3	300
dieldrin	0.1 ^c	100	0.3	300
endrin	0.1 ^c	100	0.3	300
heptachlor	0.1 ^c	100	0.3	300
heptachlor epoxide	0.1 ^c	100	0.3	300
chlordane (total)	0.1 ^c	100	0.3	300
lindane	0.1	100	-	-
hexachlorocyclo- hexane (total)	0.1 ^c	100	-	-
endosulfan (total)	0.1 ^c	100	-	-
toxaphene	0.1 ^c	100	5.0	5,000

a National Academy of Sciences-National Academy of Engineering, 1973. Water Quality Criteria, 1972 (Blue Book). U.S. Environmental Protection Agency, Ecological Research Series.

b U. S. Food and Drug Administration. 1984. Shellfish Sanitation Interpretation: Action Levels for Chemical and Poisonous Substances, June 27, 1984. U.S.F.D.A., Shellfish Sanitation Branch, Washington, D.C.

c Individually or in combination. Chemicals in this group under NAS Guidelines are referred to as Chemical Group A in this report.

d As methyl mercury.

e A tolerance, rather than an action level, has been established for PCBs (21CFR 109, published May 29, 1984). An action level is revoked when a regulation establishes a tolerance for the same substance and use.

California Regional Water Quality Control Board Central Valley Region

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Sacramento, CA 95827-3098
FAX: (916) 255-3015



FAX TRANSMITTAL PAGE

Date: 12/11/97

To: Mark Perry

From: Eric Lee

Sender's Phone: (916) 255- 3098 Or CALNET 8-494- _____

Number of Pages
(including cover): 2

☐ Original will follow by U.S. Mail

Subject: NAS Recommended Guidelines

Comments: I'll read the memo & get back to
you with comments. Thanks
Eric

If any problems occur in receiving, please call one of the numbers listed above.

BEACH LAKE
MAP

MOF

MEADOWLARK
LAKE

BERM

SRWTP

Morrison Creek
at I-5
↓

TSM

BLACK CROWN LAKE

MORRISON CREEK EXIT

NICHOLAS POND