

WHITE BASS ENVIRONMENTAL IMPACT REPORT
ROTENONE MONITORING PLAN

I. Introduction

White bass Morone chrysops will be eradicated with rotenone from inland waters of Tulare, Kings, and Kern counties during October through November 1987. It is expected that the treatment of 2.0 mg/L Nusyn-Noxfish® will result in a maximum initial rotenone concentration of 50 ug/L (150 ug/L total rotenoids). Under the environmental conditions expected during treatment and excluding dilution, seven to 40 days will be required for rotenone concentrations to reach levels (<4 ug/L) safe for public contact and fish rejuvenation.

The purpose of the monitoring program is three fold: i) insure that effective piscicidal concentrations of rotenone are applied; ii) insure that sufficient degradation of rotenone has occurred in environmentally significant areas prior to resource rejuvenation and resumption of public contact; and iii) insure the safety of environmentally significant ground waters. The monitoring program will have to be approved by the Regional Water Quality Control Board and the Department of Health Services with input from local County Agricultural Commissioners and Health Officers as indicated in the CDFG Programmatic EIR, Rotenone for Fisheries Management (April 1985). Suggestions from these agencies were received on September 14, 1987, and are incorporated in this plan.

Presented below is the proposed monitoring plan which is subject to changes caused by the dynamics of water conditions and associated environmental significance. It is expected that CDFG will collect surface water samples and California Department of Food and Agriculture (CDFA) will collect ground water samples. CDFG will analyze all samples for rotenone and rotenolone concentrations and CDFA will perform quality control for the analyses. CDFG has contracted with a private analytical laboratory for trichloroethene, benzene, ethylbenzene, xylene, and naphthalene analyses.

II. Materials and Methods

A. Overview

1. Water sampling for rotenone and rotenolone will utilize two replicate samples collected in 500-ml amber glass bottles filled to capacity with teflon-lined caps. Grab surface water samples will be taken from shallow ponds, reservoirs, canals, and rivers. Subsurface water samples will also be taken from Kaweah Reservoir. Wells in close proximity to

treatment areas will be monitored. Sampling bottles provided by the contract laboratory will be utilized for the other organic compounds.

2. The water samples will be stored on ice in portable ice chests and flown to the Pesticide Investigations Unit (PIU) for check-in. The samples for rotenone and rotenolone analyses will then be transferred to the Water Pollution Control Laboratory (WPCL) in Rancho Cordova for analysis. Generally, only one of the two replicates will be analyzed unless there is anomaly; the other sample will serve as insurance against breakage during transit. Quality control and assurance for rotenone and rotenolone analyses will be an integral part of the program (see II.C.). Samples for the other organic compound analyses will be transferred to the contract laboratory.

B. Analysis

1. Rotenone and Rotenolone - A 500-ml aliquot of a water sample, buffered to pH 5 is filtered through a preconditioned Sep Pak[®] at a rate not to exceed 40 ml/min using a vacuum pump according to the method of Dawson et al. (1983). The rotenone is extracted from the Sep Pak[®] with methanol and analyzed on a Varian[®] model 500 high-performance liquid chromatograph on a MCH 10 reverse-phase column with methanol:water (75:25) mobile phase and wavelength of 275 nm. The MDL for rotenone is 2 ug/L for a 500-ml sample volume. Coefficient of variations from CDFG studies conducted in 1986 using this method ranged from 4 to 7%, and rotenone was stable for three days when stored at 4° C in the absence of light. The objective is to have all samples extracted in methanol within 48 hours after collection. Rotenone stability under site-specific conditions of San Joaquin Valley will be determined prior to the eradication program (see II.C.1.).
2. Other Organic Compounds - These samples will be analyzed by a State of California certified laboratory using EPA Method 601 (for trichloroethene), EPA Method 602 (for benzene, ethylbenzene, and xylene), and EPA Method 610 (for naphthalene).

C. Quality Control and Assurance for Rotenone and Rotenolone Analyses

1. Rotenone Stability - Rotenone stability under site-specific conditions of the San Joaquin Valley will be determined prior to the eradication program. A 5-gallon water sample will be collected from the scheduled treatment area and spiked with rotenone resultant concentration of 2 mg/L Nusyn-Noxfish[®]. The spiked sample will be split into 10 duplicate samples. Five of the 10 duplicate samples will immediately be filtered and extracted for analysis at WPCL. The remaining five duplicate samples will be stored for five days at 4° C in a refrigerator and then filtered, extracted, and analyzed for rotenone. The two sets of analyses will be evaluated for possible degradation of rotenone and rotenolone during storage.
2. Quality Control - Approximately once per week, surface water from one site will be collected in a 4-L bottle and split in the field into four duplicate samples. One set of two duplicate samples will be analyzed by CDFC and the other set will be analyzed by CDFA for comparative purposes. The samples will be analyzed using similar analytical techniques.
3. Analytical Variability - Approximately once every other week, surface water from one site will be collected in two, 4-L bottles and split in the field into 10 duplicate samples. One set of five duplicate samples will be analyzed as soon as possible and the other set will be analyzed after five days storage at 4° C to establish analytical variability and stability of rotenone.

D. Quality Control for Other Organic Compound Analyses

All analyses for trichloroethene, benzene, ethylbenzene, xylene, and naphthalene done by the contracting laboratory will require second column verification. The Regional Water Quality Control Board will occasionally collect duplicate or replicate samples for quality control of these analyses.

E. Sample Security and Data Handling

Each sample collected will be accompanied by a Chain of Custody form documenting the sequence of transfer from sample generation to final chemical analysis (see Appendix A). The form will

include location codes, sampling dates and times, sample description, and analytical results. Data from the forms will be entered and stored on an IBM AT[®] microcomputer using DBase III+[®] software. The computer files will be generated when the samples are checked-in at the PIU. The files will be edited daily and programming will produce summarized results for dissemination on an as-needed basis.

F. Rotenone Sampling Program

1. Sampling Frequency - Treatment areas will be characterized as Type I, Type II, or Type III using the following criteria: i) Type I - environmentally significant surface waters with high public contact or scheduled fishery resource rejuvenation; ii) Type II - ground waters in close proximity to rotenone treatment areas; and iii) Type III - areas with limited public contact, no fishery rejuvenation, and used for agricultural irrigation or drainage. Samples will be collected from all monitoring sites prior to treatment to establish background levels of rotenone and rotenolone.
 - a. Type I - Samples will be collected within three hours, three days, seven days, and weekly thereafter following treatment until rotenone residues degrade to nondetectable (<2 ug/L) levels.
 - b. Type II - Samples will be collected within seven, 28, and 49 days following treatment. Should rotenone be detected (>4 ug/L) in well water, monitoring will proceed at two to four week intervals until rotenone is below detection.
 - c. Type III - Samples will be collected within three hours after treatment to confirm levels of rotenone. Additionally, samples will be collected at one-half of the locations 21 days following treatment for confirmation of rotenone degradation.
2. Sample Numbers - The number of sampling sites at Type I and III locations will vary from one to three consistent with the size of treatment area: i) bodies of water less than one mile in length or 200 surface acres will have one site; ii) those greater than one and up to 10 miles in length or greater than 200 and up to 640 surface acres will have two sites; and iii) those greater than 10 miles in length or

640 surface acres will have three sites. With the exception of Kaweah Reservoir, only surface water samples will be collected from Type I and III locations. Surface and subsurface (mid-depth and bottom) water samples will be taken in Kaweah Reservoir. The sampling methodology for Type II locations will be at the discretion of CDFA personnel (see Appendix B, draft protocol).

3. Monitoring Locations - The following locations have been chosen based on discussions with the CDFG White Bass Project staff, CDFA, Regional Water Quality Control Board, and local health agencies, and inspection of the treatment areas.
 - a. Type I environmentally significant surface water sites are listed in Appendix C.
 - b. Type II environmentally significant ground water well sites are listed in Appendix D.
 - c. Type III agricultural irrigation or drainage water sites are listed in Appendix E.

G. Other Organic Compound Sampling Programs

1. Sampling Frequency - Samples will be collected from all Type II waters and Lake Kaweah (Location 001) and Bravo Lake (Location 013) prior to treatment to establish background levels of trichloroethene, benzene, ethylbenzene, xylene, and naphthalene.
 - a. Type I - Samples will be collected within three hours and at 21 days following treatment from Lake Kaweah (Location 001) and Bravo Lake (Location 013).
 - b. Type II - Samples will be collected within seven, 28, and 49 days following treatment from Kaweah Lake Corps of Engineers Well (Location 070) and City of Woodlake Well Number 9 (Location 074).
2. Significant and Persistent Residues - The detection of significant and persistent residues in the water samples may require additional sampling dependent on input from the Regional Water Quality Control Board and Department of Health Services.

III. Information Dissemination

Weekly updates of analytical results will be available to the Regional Water Quality Control Board, Department of Health Services, Tulare County Health Department, and Kings County Health Department.

IV. Required Resources

A. Number of Rotenone Analyses by CDFG

Type I = 200
Type II = 36
Type III = 42
QC = 24
QA = 50

Total = 352

B. Number of Rotenone Analyses by CDEA
Estimate of 24

C. Number of 500-ml Bottles
Estimate of 1,000

D. Number of Man-months
3 for WPCL (analysis)
6 for PIU (sampling)
1 to 2 for CDEA (sampling)

E. Number of Treatment Signs
Estimate of 1,000

F. Number of Chain of Custody Forms
Estimate of 1,000

G. Number of EPA Method 601/602/610 Analyses by Private Laboratory
Estimate of 22

H. Budget - CDFG

1. Personnel (9 man-months seasonal)	\$10,800
2. Operating Expense	
Printing	2,000
General Expense	1,000
Vehicle (\$0.205 for 2,400 mi.)	2,500
Bottles (\$2/bottle)	2,000

Chemicals (\$20/sample)	7,000
Air Freight (\$50/shipment for 24)	1,200
Per Diem (\$75/day for 40)	<u>3,000</u>
Total	\$18,700
3. Chemical Analyses Contract	\$9,900
4. Total	\$39,400

CHAIN OF CUSTODY RECORD
(Use ball point pen only)

STATE OF CALIFORNIA
DEPARTMENT OF FISH AND GAME

Environmental Services Division
Pesticide Investigation Unit
1701 Nimbus Road, Suite F
Rancho Cordova, CA 95670

RECDNO _____ (PIU USE ONLY)
SAMPNO _____
DATE _____ 87
TIME _____
TYPE _____
COUNTY _____
LOCID _____
SITEID _____
DEPTH _____
TEMP _____
DO _____
PH _____
ALKAL _____
COLLID _____

Field: _____	WPCL Number: _____
OBSERVATION & REMARKS: _____	LAB RESULTS: _____
_____	ROTENONE: _____
_____	ROTENOLONE: _____
_____	CHEMIST'S NAME: _____ DATE: _____
_____	APPROVED BY: _____ DATE: _____

ROTENE _____ (PIU USE ONLY)

ROLONE _____ (PIU USE ONLY)

DATAID _____ (PIU USE ONLY)

Relinquished by: _____ Date/Time: _____
 Received by: _____ Date/Time: _____
 Relinquished by: _____ Date/Time: _____
 Received by: _____ Date/Time: _____
 Relinquished by: _____ Date/Time: _____
 Received by: _____ Date/Time: _____
 Relinquished by: _____ Date/Time: _____
 Received for Laboratory by: _____ Date/Time: _____

Distribution: White original and blue and pink copies accompanies shipment; Canary copy retained in field. White Original and blue copy to WPCL; pink copy retained by PIU; completed white original returned to PIU; blue copy retained by WPCL.

CHAIN OF CUSTODY RECORD
KEY

SAMPNO = XXX.YY; where XXX is the consecutive number of discrete samples beginning at 001 to 699 for surface water and 700 to 999 for ground water. Duplicates from split samples are given consecutive number YY; 01 to 20. EPA Method 601, 602, and 610 will have number YY of 30, 31, and 32, respectively.

DATE = MMDD87; (m)onth and (d)ay of sampling, respectively.

TIME = HHMM; (h)our and (m)inute in standard military time of sampling.

COUNTY = XX; 01 for Kings, 02 for Tulare, and 03 for Kern.

LOCID = XXX; a number assigned to each monitoring location (see monitoring location/site descriptions).

SITEID = XX; a number assigned to each body of water (see monitoring location/site descriptions)

DEPTH = XX; depth of sample (in meters) from well or subsurface water samples, enter 00 for surface water samples.

TEMP = XX; temperature (in ° C) of water.

DO = XX.X; dissolved oxygen (to nearest 1/10 of mg/L) of water.

PH = XX.X; pH (to nearest 1/10 of unit) of water.

ALKAL = XXX; alkalinity (mg/L CaCO₃) of water.

COLLID = FL; (f)irst and (l)ast name of person collecting sample.

ROTENE = XXX.X; rotenone (to nearest 1/10 ug/L) of water.

ROLONE = XXX.X; rotenolone (to nearest 1/10 ug/L) of water.

DATAID = FL; (f)irst and (l)ast initial of person entering log into computer.

OBSERVATIONS & REMARKS = Include here a short description of any unusual observation and special instructions to laboratory (i.e., when to analyze the duplicate samples).

APPENDIX C

ROTENONE MONITORING
TYPE I WATERS
CONFIDENTIAL

COUNTY	SITEID	LOCID	DESCRIPTION
02	01	001	KAWEAH LAKE, TERMINUS DAM, SURFACE
		002	KAWEAH LAKE, TERMINUS DAM, MID-DEPTH
		003	KAWEAH LAKE, TERMINUS DAM, BOTTOM
		004	KAWEAH LAKE, AUXIL TERMINUS DAM, SURFACE
		005	KAWEAH LAKE, AUXIL TERMINUS DAM, MID-DEPTH
		006	KAWEAH LAKE, AUXIL TERMINUS DAM, BOTTOM
		007	KAWEAH LAKE, LEMON HILL/HORSE CREEK, MIDWAY, SURFACE
		008	KAWEAH LAKE, LEMON HILL/HORSE CREEK, MIDWAY, MID-DEPTH
		009	KAWEAH LAKE, LEMON HILL/HORSE CREEK, MIDWAY, BOTTOM
02		010	KAWEAH RIVER, 1/2 KM D/S TERMINUS DAM AT CONCRETE GAUGING WEIR
		011	KAWEAH RIVER, HWY 216 INTERSECTION
03		013	BRAVO LAKE, WUTCHUMNA DITCH OUTLET
		014	BRAVO LAKE, NORTH SHORE
04		015	TULE RIVER BRANCH, HWY 99 INTERSECTION
		016	TULE RIVER, HWY 43 INTERSECTION
08		021	KAWEAH D.R.P. BASIN #5, W. SHORE
09		023	KAWEAH D.R.P. BASIN #12, W. SHORE
10		025	KAWEAH D.R.P. BASIN #13, W. SHORE
17		037	LONESTAR PIT EAST SIDE POND
		038	LONESTAR PIT SOUTH SIDE POND
		039	LONESTAR PIT WEST SIDE POND

COUNTY	SITEID	LOCID	DESCRIPTION
01	14	033	CORCORAN I.D.P. NW CORNER
		034	CORCORAN I.D.P., SE CORNER

APPENDIX D

ROTENONE MONITORING
TYPE II WATERS
CONFIDENTIALCOUNTY SITEID LOCID DESCRIPTION

02	35	070	KAWEAH LAKE, CORPS OF ENGINEERS WELL, RECREATIONAL AREA
	36	071	ROBERT WALKER, KAWEAH RIVER AT WALKER MINNOW FARM NEAR DRY CREEK ROAD
	37	072	LONESTAR INDUSTRIES DOMESTIC WELL NEAR KAWEAH RIVER
	38	073	DAVID STILLWELL, BOA MINNOW FARM, WELL NEAR WUTCHUMNA DITCH
	39	074	CITY OF WOODLAKE, BRAVO LAKE, MUNICIPAL WELL NO. 9 NEAR WUTCHUMNA DITCH
		075	CITY OF WOODLAKE, ST. JOHNS RIVER, MUNICIPAL WELL NO. 10 NEAR ST. JOHNS RIVER
	40	076	MR. MIKE WELLS, ST. JOHNS RIVER, DOMESTIC WELL NEAR ROAD 220
	42	078	THOMAS PELTZER, KAWEAH D.R.P. BASIN NO. 5 DOMESTIC WELL NEAR ROAD 312

APPENDIX E

ROTENONE MONITORING
TYPE III WATERS
CONFIDENTIAL

COUNTY	SITEID	LOCID	DESCRIPTION
01	20	042	LAKELAND CANAL, 6TH AVENUE, BETWEEN KANSAS & NEVADA AVENUE
	16	045	CROSS CREEK, WHITNEY AVENUE
		046	CROSS CREEK, MIDDLE BRANCH, WHITNEY AVENUE INTERSECTION
	24	047	SWEET CANAL, WHITNEY AVENUE INTERSECTION
	25	048	TULARE LAKE CANAL, 10TH AND PUEBLO AVENUE
		049	TULARE LAKE CANAL, 20TH AVENUE
	26	050	KINGS RIVER, LAUREL AVENUE
		051	KINGS RIVER, LOVELACE LEVEE
	27	052	BLAKELEY CANAL, NEVADA AVENUE
		053	BLAKELEY CANAL, KETTLEMAN CITY
		054	BLAKELEY CANAL, DUDLEY RIDGE
	04	055	TULE RIVER, WILBUR DITCH (WEST OF COUSINS LEVEE)
	28	056	WILBUR DITCH, NORTH (1 MILE SOUTH/TULE RIVER ON COUSINS LEVEE)
	29	058	GATES JONES CANAL, NORTH
02	30	060	HOMELAND CANAL, ALPAUGH

COUNTY SITEID LOCID DESCRIPTION

01	30	061	HOMELAND CANAL, LATERAL B INTERSECTION
03	31	062	KERN RIVER, LONE TREE
		063	KERN RIVER, LOST HILLS