

California Department of Fish and Game
Upper Truckee River
Rotenone Monitoring Plan

I. Introduction

Brook trout Salvelinus fontinalis will be eliminated from four to six miles of the headwaters of the Upper Truckee River, Alpine and El Dorado counties. This action is necessary and precedes the reestablishment of the Lahontan cutthroat trout Salmo clarkii henshawi into the project area. This specific reestablishment is part of the interagency fishery management plan for the Lahontan cutthroat trout agreed to by CDFG, Nevada Department of Wildlife, U.S. Fish and Wildlife Service, and U.S. Forest Service (Gerstung 1986).

It is expected that the resultant concentrations of 2.0 mg/L Nusyn-Noxfish will result in a maximum initial rotenone concentration of 50 ug/L. The lakes and ponds will be detoxified with potassium permanganate within 48 hours after application and the Upper Truckee River will be detoxified with potassium permanganate immediately below the application area.

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; iii) insure that toxicity does not leave the project area; and iv) insure the safety of environmentally significant ground waters. The monitoring program has been reviewed by the Regional Water Quality Control Board-Lahontan Region and the El Dorado County Environmental Health Division. This monitoring plan meets the specifications outlined in the CDFG Programmatic EIR, Rotenone for Fisheries Management (CDFG 1985).

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 using methods of Harrington and Finlayson (1988) and California Department of Food and Agriculture (CDFA) will collect ground water samples using methods of Sava (1986). Sediment samples will also be collected from the treatment area after detoxification and analyzed for rotenone and rotenolone residues. CDFG will analyze all samples for rotenone and rotenolone concentrations using methods of Dawson et al. (1983).

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 and rivers. Two, possibly three, wells downstream of the project area in Christmas Valley will be monitored. Sediment samples from the project area will be collected in 1-liter glass jars.
2. Water temperature and dissolved oxygen of surface waters will be recorded at the time of sample collection using a YSI model 57 oxygen meter. Water temperature will be determined at time of sample collection using a hand-held thermometer. Water samples from surface water and well sites for pH and alkalinity determinations will be collected in 500-ml high density polyethylene bottles.
3. All water samples will be stored on ice in portable ice chests and transported 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 replicate water samples will be analyzed. The other sample will serve as insurance against breakage during transit or analytical anomaly.
4. To insure that toxic materials do not leave the project area, one cubic foot cages containing trout will be placed 200 and 400 yards downstream of the detoxification station in the Upper Truckee River. The condition of the fish will be checked hourly during the application.

B. Analysis

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 values for rotenone and rotenolone are 2 ug/L for a 500-ml sample volume. Coefficient of variations from

CDFG studies conducted in 1986 and 1987 using this method ranged from 3 to 20%, and rotenone was relatively stable for six days when stored at 4°C in the absence of light (Harrington and Finlayson 1988). The objective is to have all samples extracted in methanol within 48 hours after collection. Sediment samples will be analyzed using a variation of the method of Dawson et al. (1983).

Quality assurance for rotenone and rotenolone analyses will be conducted by spiking a minimum of two water samples each sampling day at 5 and 25 ug/L rotenone and rotenolone to determine recovery.

C. 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 a 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.

D. Rotenone Sampling Frequency

Samples will be collected from all monitoring sites prior to application to establish background levels of rotenone and rotenolone. Samples will be collected after application:

1. Surface waters - Samples will be collected within 3, 24 and 72 hours after application, and daily thereafter until nondetectable (< 2 ug/L) levels of rotenone and rotenolone are reached.
2. Sediment - Samples will be collected above and below the detoxification station on the Upper Truckee River after the rotenone application.
3. Ground waters - Samples will be collected 2 and 30 days following application. Should rotenone or rotenolone be detected in well water after 30 days, monitoring will proceed at two to four week intervals until rotenone and rotenolone are below detection.

E. Monitoring Locations

The following locations (Appendix B) have been chosen based on discussions with the CDFG Region 2, CDFA, Regional Water Quality Control Board-Lahontan Region, and the El Dorado County Environmental Health Division, and inspection of the application area.

The proposed sampling sites are as follows:

1. Surface water sites are listed in Appendix C.
2. Ground water sites are listed in Appendix D.

III. Information Dissemination

The results of this monitoring plan will be prepared in report form and supplied to the Regional Water Quality Control Board-Lahontan Region, the El Dorado County Environmental Health Division and other interested parties.

IV. Personnel

This study will be conducted jointly by the CDFG Pesticide Investigations Unit, and the CDFA Environmental Hazards Assessment Program, under the overall supervision of Brian Finlayson (CDFG) and Randy Segawa (CDFA). Other key personnel are listed below:

Project Leaders - Jim Harrington (CDFG),
Bonnie Turner (CDFA)
Chemical Analysis - Tom Lew (CDFG)

Brian Finlayson will be the primary contact person for other agencies and the public. All questions should be directed to him at (916) 355-0136.

IV. Required Resources

A. Number of Rotenone Analyses by CDFG

Surface waters	=	32
Ground waters	=	6 (9)
Sediment	=	4
QC & QA	=	<u>8</u>
Total	=	50 (53)

B. Number of 500-ml bottles

Estimate of 110

C. Number of man-days

10 for WPCL (analysis)
6 for PIU (sampling)
3 for CDFA (sampling)

D. Number of COC Forms

Estimate of 110

CHAIN OF CUSTODY RECORD

(Use ball point pen only)

STATE OF CALIFORNIA
DEPARTMENT OF FISH AND GAME

Environmental Services Division
Pesticide Investigations 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: _____

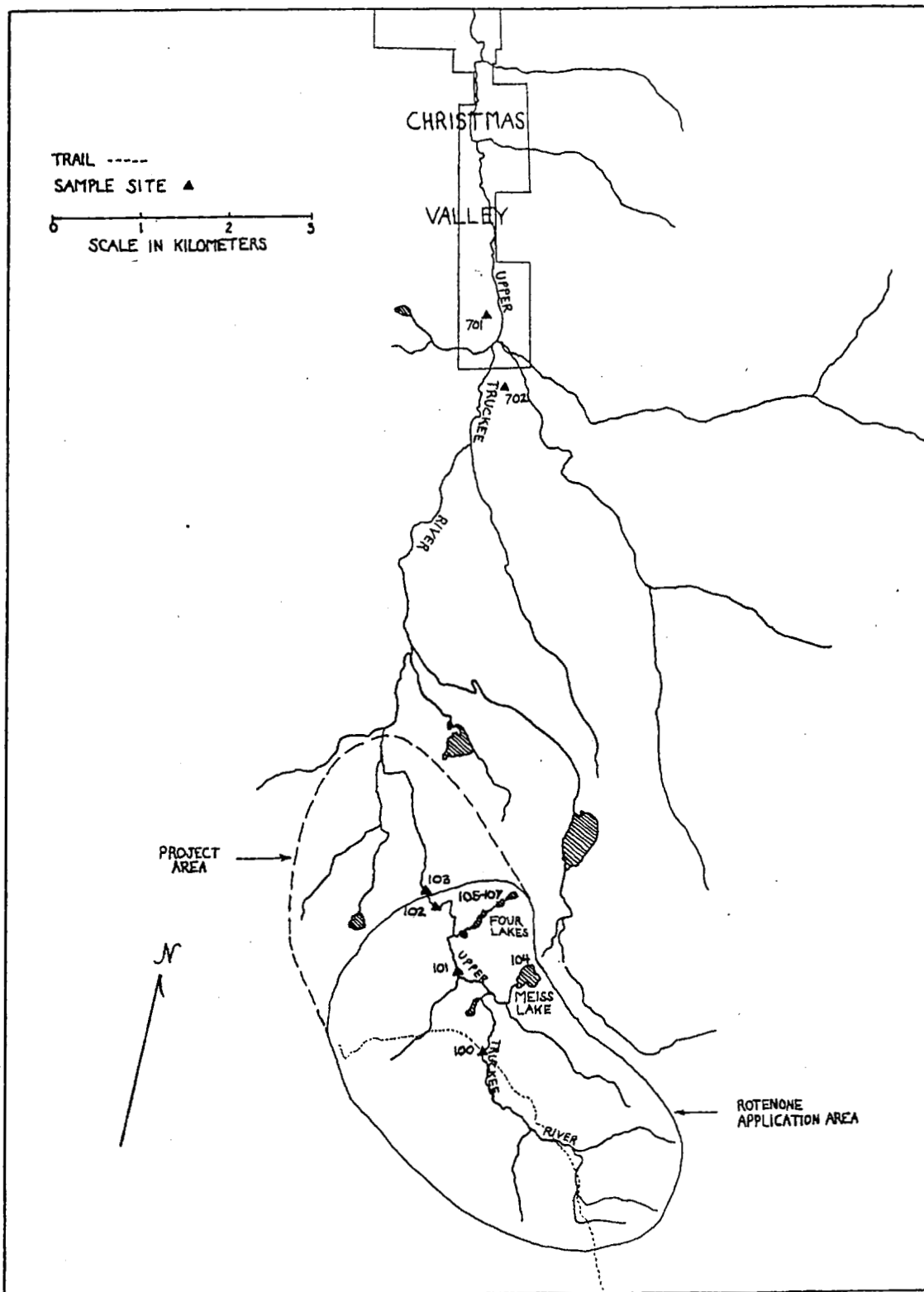
Relinquished by: _____ Date/Time: _____

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.



Appendix B. Rotenone sampling locations, Upper Truckee River Watershed, Alpine and El Dorado counties, California.

Appendix C. Site codes and location description for surface water sites for the Upper Truckee River rotenone project, El Dorado County, California.

<u>Site Code</u>	<u>Location Description</u>
100	Upper Truckee River in Meiss meadow approximately one mile upstream of Meiss Lake.
101	Upper Truckee River approximately one mile downstream of Meiss Lake.
102	Upper Truckee River immediately above detoxification station approximately one-half mile downstream of Four Lakes.
103	Upper Truckee River approximately 200 yards downstream of detoxification station.
104	Meiss Lake near outflow channel.
105-107	Near outflow channel at three of the Four Lakes.

Appendix D. Site codes and location description for ground water sites for the Upper Truckee River rotenone project, El Dorado County, California.

<u>Site Codes</u>	<u>Location Description</u>
701	Devine property Christmas Valley. East side upstream Upper Truckee River (36-451-12).
702	Wysham property Christmas Valley. West side downstream Upper Truckee River (36-290-16).
703	