

ATTACHMENT D

WATER QUALITY ORDER NO. 2005-XXX-DWQ NPDES NO. CA0103209

MONITORING AND REPORTING PROGRAM

CALIFORNIA DEPARTMENT OF FISH AND GAME SILVER KING CREEK ROTENONE PROJECT ALPINE COUNTY

I. MONITORING PROGRAM GOALS

- A. To ensure compliance with receiving water limits established in this Order.
- B. To establish the nature and duration of rotenone treatment impacts to benthic macroinvertebrate populations, and verify that those populations and beneficial uses have been restored following treatment.
- C. To detect, capture, and relocate out of the project area any threatened, endangered, sensitive, candidate or rare amphibians prior to rotenone treatment.

II. DETERMINATION OF PROJECT BOUNDARIES

The project boundaries for rotenone projects are defined, pursuant to the Regional Water Quality Control Board, Lahontan Region's (Regional Water Board) *Water Quality Control Plan* (Basin Plan), as encompassing the treatment area, the detoxification area, and the area downstream of the detoxification station up to a thirty-minute in-stream travel time.

The California Department of Fish and Game (DFG), hereinafter Discharger, shall estimate the distance from the detoxification station to the downstream thirty-minute travel time endpoint, based on measurements of stream flow and/or average velocities, prior to commencement of rotenone application. This endpoint will define the downstream extremity of the project boundaries. The approximate location of the project boundaries shall be identified and recorded, along with any calculations and measurements used in making the determination.

III. SURFACE WATER MONITORING

A. Temperature

Water temperature shall be measured and recorded whenever samples are collected for chemical analysis (according to the schedule described below) at the corresponding monitoring station and at the same time as sample collection.

B. Color

The Discharger shall visually inspect the stream water downstream of project boundaries at least three times a day during daylight operations, to ascertain whether discoloration due

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to potassium permanganate is discernible more than two miles downstream of project boundaries, and shall keep records of the observations.

C. Sample Location

Samples will be collected at the following locations, depicted in Attachment 1:

<u>Station Code</u>	<u>Location Description</u>
MSKC1	Silver King Creek, at project boundaries
MSKC2	Silver King Creek, immediately upstream of detoxification station
MSKC3	Silver King Creek, Lower Fish Valley
MSKC5	Silver King Creek, Long Valley
MSKC7	Silver King Creek Canyon
MTC1	Tamarack Creek, trail crossing
MTC2	Tamarack Creek
MTL1	Tamarack Lake, mid-lake, 1 foot below surface
MTL2	Tamarack Lake, mid-lake, mid-depth
MTL3	Tamarack Lake, mid-lake, 1 foot above bottom
MTLC	Tamarack Lake Creek

D. Sampling Methods, Analyses, and Analytical Methods

Sampling protocols shall conform to the July 2, 2004 Monitoring Plan submitted by the Discharger and incorporated herein by reference. Samples will be analyzed by laboratories certified by the California Department of Health Services. Constituents shall be sampled and results reported according to the following table:

<u>Constituent</u>	<u>Analytical Methods</u>	<u>Units</u>	<u>Sample Type</u>
Rotenone	Dawson et. al ¹	µg/L	Grab
Rotenolone	Dawson et. al ¹	µg/L	Grab
Volatile Organic Compounds (VOCs)	USEPA 8260	µg/L	Grab
Semi-Volatile Organic Compounds (SVOCs)	USEPA 8270	µg/L	Grab
Di(ethylene glycol) ethyl ether (DEE)	modified USEPA 8015	µg/L	Grab
1-methyl-2-pyrrolidone (MP)	modified USEPA 8015	µg/L	Grab

¹ Method: Dawson, V., P. Harmon, D. Schultz, and J. Allen. 1983. Rapid method for measuring rotenone in water at piscicidal concentrations. *Trans. Amer. Fish. Soc.* 112:725-728

E. Detection Limits

Detection limits shall conform to limits established in the specified analytical methods. Where detection limits are not specified within the method, detection limits shall be the

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lowest achievable using state-of-the-art analytical laboratory equipment and methodologies.

F. Sampling Schedule

Samples shall be collected for analysis according to the schedule indicated in the following table. Pre-treatment samples shall be collected not more than 24 hours prior to application of rotenone.

Analysis	Site	Pre-Treatment	During Treatment	Day After Treatment	Weekly Post-Treatment	
Rotenone & Rotenolone	MSKC1	X	every two hours	X	X ²	
	MSKC2	X	every two hours	X		
	MSKC3		Twice			
	MSKC5		Twice			
	MSKC7		Twice			
	MTLC1		Twice			
	MTC1		Twice			
	MTC2		Twice			
	MTL1	X			X	X
	MTL2	X			X	X
MTL3	X			X	X	
VOC/semiVOC	MSKC1	X	Twice		X ²	
	MSKC2	X	Twice			
DEE/MP	MSCK1	X	Twice	X	X ²	
	MTC1	X	Twice			
	MTC2	X	Twice			
	MTL1	X		X	X	
	MTL2	X		X	X	
	MTL3	X		X	X	

² If any chemical treatment residues are detected at MSCK1 (project-boundaries) on the day following treatment, samples shall be collected at that station and analyzed on a weekly basis until no residues are detected.

IV. TOXICITY

Caged fish shall be used to determine whether detoxification is effective and ascertain whether rotenone toxicity has escaped beyond project boundaries. Caged fish will be positioned at the

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project boundaries 30 minutes travel time downstream of the detoxification station prior to the discharge of rotenone formulation. The caged fish shall be maintained and observed for stress at least twice per day during treatment and detoxification operations, and observations shall be recorded.

V. BENTHIC MACROINVERTEBRATE MONITORING

A. Methods and Analysis

- 1 The Discharger shall conduct benthic macroinvertebrate monitoring and analysis as described in the Aquatic Macroinvertebrate Study Proposal, dated June 15, 2003, incorporated into this permit as Attachment 2, which is made a part of this Monitoring and Reporting Program. The Discharger shall adhere to the revised sample collection schedule in section V.B below.
2. Taxonomic resolution for macroinvertebrate analysis shall conform to the table contained in Appendix 1 to Attachment 2, with the following exception: midges (Chironomidae) and mites (Hydracarina), or a statistically representative portion of organisms from each of those groups, shall be keyed to the genus level in order to allow detection of significant changes in community similarity following treatment.
3. The Discharger submitted a revised Aquatic Invertebrate Monitoring Sample Site map on August 13, 2004. The revised sample site map, incorporated herein as Attachment 5, supersedes the sampling site map included as Figure 1 in the June 15, 2003 Aquatic Macroinvertebrate Study Proposal.

B. Macroinvertebrate Sampling Schedule

In anticipation of treatment, pre-project sampling was completed in August 2003 and August 2004. Rotenone treatments are planned for September 2005 and August/September 2006. Post-project sampling will be conducted in August 2007 and August 2008 or alternatively in August 2008 and August 2009 if a third year of rotenone treatment is required in 2007.

VI. AMPHIBIAN SURVEYS

The Discharger will conduct amphibian surveys in each treatment area immediately prior to each treatment, according to protocols described in Attachment 4. Any threatened, endangered, sensitive, candidate or rare amphibians found within the project area shall be captured by net and relocated out of the project area to suitable nearby habitat. The Discharger shall keep records of the amphibians found and relocated, and the points of discovery and release, for subsequent reporting to the Regional Water Board.

VII. REPORTING

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- A. The Discharger shall submit a Project Monitoring Report to the Regional Water Board for each year in which chemical application occurs in accordance with the following schedule:

<u>Monitoring Period</u>	<u>Report Due Date</u>
<u>September 9, 2005 - October 31, 2005</u>	November 15, 2005
<u>November 1, 2005 - October 31, 2006</u>	November 15, 2006
<u>November 1, 2006 - October 31, 2007</u>	November 15, 2007

The Project Monitoring Reports shall include the following:

1. Data and information required by this monitoring and reporting program (except benthic macroinvertebrate monitoring results for which separate reports are required in section VII.E, below);
2. Summary of methods used to determine rotenone formulation delivery rates to achieve target pesticide concentrations, and field data/calculations (including stream flow) used to calibrate drip stations or pumps for delivery of pesticide to streams or lakes.
3. Volume of rotenone product used, by location applied;
4. Amount of potassium permanganate used;
5. Results of amphibian surveys and relocation activities;
6. Summary of project activities, including all treatment dates;
7. Projected plans and schedules for upcoming treatments, if any; and
8. Evaluation of project.

In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with this Order.

- B. The Project Monitoring Report shall include a cover letter containing the information and certification in the Monitoring and Reporting Cover Letter form (Attachment 3), which is hereby made a part of this Monitoring and Reporting Program.
- C. The Discharger shall clearly identify in the Project Monitoring Report any violations of this Order and submit a statement of corrective actions taken or proposed, including a timetable for implementation.
- D. **Within two years of the last treatment date**, a fisheries biologist or related specialist from DFG must assess the restoration of applicable beneficial uses to the treated waters, and certify to the Regional Water Board, in writing, whether all beneficial uses have been restored. A project will be considered complete upon written acceptance by the Regional Water Board's Executive Officer of such certification.
- E. The Discharger shall submit an Aquatic Macroinvertebrate Study Report by **June 1, 2009** if rotenone treatments are conducted only in 2005 and 2006, and by **June 1, 2010** if a third

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year of rotenone treatment is conducted in 2007. The Executive Officer will review the report for completeness and adequacy and may request additional analysis of the data if necessary to fully characterize impacts of rotenone use to invertebrate communities and the duration of those impacts. The Aquatic Macroinvertebrate Study Report shall include:

1. Data from all pre- and post-project macroinvertebrate sampling events in tabular, graphic, and electronic form.
2. Summary of analytical methods, statistical methods, and metrics used.
3. Results.
4. Discussion of results, evaluating nature and duration of impacts to benthic macroinvertebrate communities, and comparison with pre-treatment data.

Where monitoring stations correspond to stations also surveyed in the DFG document *Impacts of Rotenone on Benthic Macroinvertebrate Populations in Silver King Creek, 1990 Through 1996*, the Aquatic Macroinvertebrate Study Report will compare data obtained during that study with pre-project data from the current rotenone treatment, where feasible. The objective of this comparison is to confirm whether invertebrate communities fully recovered following the last rotenone treatment in 1993.

VIII. The Discharger shall implement the above monitoring program immediately upon the commencement of the initial discharge covered by this Order. This Monitoring and Reporting Program may be modified by the Regional Water Board Executive Officer to require increased monitoring as deemed necessary to verify compliance with the requirements of the Order.

- Attachments:
1. Map – Location of monitoring stations
 2. Aquatic Invertebrate Monitoring Study Plan
 3. Monitoring Report Cover Letter form
 4. Amphibian Survey Protocols
 5. Revised Aquatic Invertebrate Monitoring Sample Site Map