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Agency Secretary

# State Water Resources Control Board

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Arnold Schwarzenegger  
Governor

## WATER QUALITY ORDER NO. 2005-0010-DWQ

### NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT, NO. CA0103209

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

The California State Water Resources Control Board (State Water Board) finds:

1. Discharger

The California Department of Fish and Game (DFG) is responsible for carrying out a variety of fishery management activities. These activities are designed to protect and maintain valuable aquatic ecosystems and sport fisheries. DFG is also responsible under State and federal law for the restoration and protection of threatened and endangered species. For the purposes of this Order, DFG is referred to as the “Discharger.”

2. Project Purpose

The Discharger, in cooperation with the U.S. Department of Agriculture, Humboldt-Toiyabe National Forest (USFS), and the U.S. Fish and Wildlife Service (USFWS), proposes to use rotenone as part of recovery efforts for Paiute Cutthroat Trout, *Oncorhynchus clarki seleniris*, at Silver King Creek. Paiute Cutthroat Trout is the rarest subspecies of trout in North America, indigenous only to the Silver King Creek watershed. Paiute Cutthroat Trout was listed by the USFWS as federally endangered on October 13, 1970 (Federal Register 35:16047) and reclassified as federally threatened on July 16, 1975 (Federal Register 40:29863). Rotenone will be used to eradicate introduced fish species that can out-compete and interbreed with Paiute Cutthroat Trout, from portions of Silver King Creek and associated tributaries, prior to introduction of the native trout.

The Paiute Cutthroat Trout was successfully reintroduced to upper portions of Silver King Creek, above a natural fish barrier (Llewellyn Falls), following rotenone treatments in 1991, 1992, and 1993. The Discharger is concerned that non-native fish from below this barrier could be introduced by humans into the area where the pure population of Paiute Cutthroat Trout has been reestablished, threatening restoration efforts. The current project would help safeguard the restoration of Paiute Cutthroat Trout by introducing the endangered fish to six additional miles of the main-stem Silver King Creek downstream of Llewellyn Falls, and five miles of associated tributary stream.

According to the USFWS document *Draft Revised Recovery Plan for the Paiute Cutthroat Trout* (November 2003), “Four self-sustaining, genetically pure populations of Paiute cutthroat trout are known to occur out-of-basin in the North Fork of Cottonwood Creek [Mono County], Stairway Creek [Madera County], Sharktooth Creek [Fresno County], and Cabin Creek [Mono County] . . .”

3. Rotenone

Rotenone is a naturally occurring pesticide found in the roots of certain plants. It is used for insect control and for fisheries management. Rotenone acts by interfering with oxygen use. It is especially toxic to fish because it is readily absorbed through the gills.

The Department of Pesticide Regulation (DPR) regulates rotenone as a restricted material. Commercial rotenone formulations contain certain “inert” ingredients (solvents, dispersants, emulsifiers, etc.) as well as the active ingredient rotenone.

The active ingredient rotenone and some of the inert ingredients are potentially toxic chemicals. Chemical concentration, duration, and route of exposure must all be considered in determining potential risk to non-target organisms. At the concentrations proposed for the Silver King Creek project, the rotenone formulations will be toxic to gill breathing organisms such as fish and amphibians in aquatic life stages, and aquatic organisms such as invertebrates. There is no evidence of adverse effects to humans or terrestrial wildlife such as deer from incidental contact (for example, through drinking water) with rotenone formulation ingredients applied to surface waters at concentrations typical of fishery management projects.

Under normal field conditions (water temperature greater than 5°C), when applied to water, rotenone breaks down naturally within approximately five days. It can also be detoxified by oxidation with potassium permanganate or chlorine. It binds readily to organic matter in soil. Consequently, it does not persist as a pollutant in groundwater. Inert ingredients are generally volatile compounds that are expected to dissipate within two weeks.

4. Project Location

The Discharger will discharge rotenone formulation and potassium permanganate into Silver King Creek and associated tributaries between Snodgrass Creek (Silver King Canyon) and Llewellyn Falls (see map, Attachment A). Discharges will also be made into Tamarack Lake. The project area is within the East Fork Carson River Hydrologic Unit (Hydrologic Unit #632.00). The project is within the jurisdictional area of the Lahontan Regional Water Quality Control Board (Lahontan Water Board).

5. Basin Plan

In compliance with the Porter-Cologne Water Quality Control Act, the Lahontan Water Board adopted the *Water Quality Control Plan for the Lahontan Region* (Basin Plan) that became effective on March 31, 1995. The Basin Plan incorporates State Water Board plans and policies by reference, contains beneficial use designations and water quality objectives for all waters of the Lahontan Region, and provides a strategy for protecting beneficial uses of surface and ground waters throughout the Lahontan Region. The Basin Plan can be viewed or downloaded on the Internet at [http://www.waterboards.ca.gov/lahontan/BPlan/BPlan\\_Index.htm](http://www.waterboards.ca.gov/lahontan/BPlan/BPlan_Index.htm), reviewed at the Lahontan Water Board office, or purchased at a nominal cost. This permit implements the Basin Plan.

6. Lahontan Water Board Policy for DFG Rotenone Use

The Lahontan Water Board amended the Basin Plan in 1990 to allow conditional use of rotenone by DFG. The Basin Plan rotenone policy allows use of rotenone by DFG for certain specific types of fishery management activities, including restoration or enhancement of threatened or endangered species. Eligibility criteria and conditions are set forth in Chapter 4 of the Basin Plan. For DFG projects meeting the eligibility criteria and conditions, the Basin Plan rotenone policy grants a variance from meeting Basin Plan water quality objectives (such as the pesticides and toxicity objectives) that would otherwise apply. Projects qualifying for the variance are instead subject to specific water quality objectives for DFG rotenone use established in Chapter 3 of the Basin Plan. A Memorandum of Understanding (MOU) between the Lahontan Water Board and DFG was executed in 1990 to implement the policy. In 1993, the Lahontan Water Board adopted additional Basin Plan amendments affecting rotenone use by the DFG.

7. Reason for Action

On March 12, 2001, the Ninth Circuit Court of Appeals held that point-source discharges of pollutants associated with use of aquatic pesticides in waters of the United States require a NPDES permit (Headwaters, Inc. v. Talent Irrigation District<sup>1</sup>). Accordingly, the discharge of pollutants associated with the application of rotenone for the Silver King Creek Project requires an NPDES permit.

8. Project Description

The Discharger proposes to apply rotenone in the summer of 2005. Additional treatments will be scheduled as necessary to ensure complete eradication of non-native fish.

Under this permit, DFG is limited to the use of two commercially available rotenone formulations for this project, specifically Nusyn-Noxfish and CFT Legumine. Use of other formulations is not authorized under this permit.

CFT Legumine is a recently developed “alternative” formulation, which reportedly contains less potentially objectionable “inert” ingredients. The use of CFT Legumine is consistent with Basin Plan rotenone provisions that require DFG to encourage development of and to use alternative formulations.

Nusyn-Noxfish will be applied at a target concentration of 1,000 microgram/L (ug/L) formulation (25 µg/L rotenone) to all flowing streams except Tamarack Creek. CFT Legumine will be applied at a target concentration of 1,000 ug/L formulation (50 µg/L rotenone) to Tamarack Creek, and Tamarack Lake. The discharge will take place over a period of 12-18 hours. Rotenone will be applied to streams using drip stations, with hand spraying in backwater areas as necessary. DFG will apply rotenone to Tamarack Lake from non-motorized rafts using gasoline-powered pumps.

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<sup>1</sup> Headwaters, Inc. v. Talent Irrigation District, (9<sup>th</sup> Cir. 2001) 243 F.3d 526.

DFG will operate a detoxification station downstream of the application, at the confluence of Silver King Creek and Snodgrass Creek. The Discharger will apply potassium permanganate at a rate of approximately 3 mg/L as the detoxifying agent. Under these conditions, potassium permanganate is expected to be quickly reduced to manganese oxide and does not persist for more than a day following the end of detoxification. At these levels, potassium permanganate is not considered a health threat to humans and will not violate water quality objectives. Potassium permanganate will result in a temporary purple or brown discoloration for up to two stream miles downstream of the project boundaries (project boundaries are defined in Finding #9, below).

The Discharger will conduct a fish salvage operation prior to treatment, using electroshock devices to stun and remove as many fish as possible from the treatment area. Salvaged fish will be relocated to other nearby waters as feasible. To the extent feasible, fish killed during the treatment will be removed for burial. A few dead fish may remain and may be consumed by foraging wildlife. DFG evaluated the potential toxicity of these dead fish to foraging wildlife in its Programmatic Environmental Impact Report (EIR), *Rotenone Use for Fisheries Management, July 1994*, and concluded that foraging wildlife will not be adversely affected by consuming these fish.

#### 9. Project Boundaries

The Basin Plan defines the project boundaries for rotenone projects as encompassing the treatment area, the detoxification area, and the area downstream of the detoxification station at Snodgrass Creek, up to a thirty-minute in-stream travel time. The project boundaries are determined in the field based on stream flow measurements immediately prior to treatment.

#### 10. Proposition 65 Considerations

Three inert ingredients present in one or both proposed rotenone formulations (N-methyl-2-pyrrolidone, ethylbenzene, and naphthalene) are on the Proposition 65 list of chemicals known to the State of California to cause cancer or reproductive toxicity. The Proposition 65 statute is contained in California Health and Safety Code sections 25249.9-25249.13. Proposition 65 prohibits the discharge of chemicals known to cause cancer or reproductive toxicity. The State Attorney General's Office is the State agency responsible for enforcing Proposition 65. Section 25249.11(b) specifically exempts State agencies from the statute's provisions. Therefore, as a State agency, DFG is exempt from Proposition 65.

#### 11. Impacts to Non-target Aquatic Life—Benthic Macroinvertebrates

Rotenone treatment is expected to have short-term effects on benthic macroinvertebrate communities (invertebrates are expected to repopulate treated areas following treatment and beneficial uses must be restored within two years of the final treatment). The Discharger conducted benthic macroinvertebrate monitoring studies before, during, and for three consecutive years following rotenone treatments that occurred in portions of the Silver King Creek basin in 1991 through 1993. DFG also conducted a study of rotenone impacts on macroinvertebrates in Silver King Creek (Mono County), which was treated for three years from 1994 to 1996. The previously-cited Negative Declaration for the Silver King Creek project asserts that "the results of the monitoring did not provide any evidence that rotenone use had affected macroinvertebrate abundance . . . [these studies] suggested that rotenone may have short-term impacts to sensitive aquatic invertebrates . . ." Based on those studies

and the metrics evaluated, DFG concluded that the data do not suggest any significant long-term impacts to invertebrates lasting beyond the study periods. There has been significant controversy regarding the adequacy of the design and interpretation of those studies. The State Water Board finds that the existing studies do not necessarily agree with DFG's conclusions and that additional monitoring is necessary to conclusively characterize impacts to invertebrate communities and the duration of those impacts.

The Discharger submitted an Aquatic Macroinvertebrate Study Proposal, dated June 15, 2003, to the Lahontan Water Board, including plans for pre- and post-project macroinvertebrate surveys and statistical analysis, that addresses some of the criticisms leveled at earlier studies. This permit requires the Discharger to implement the Study Proposal as part of the current project.

At this time, no macroinvertebrate species have been identified that are strictly endemic to the Silver King Creek basin. However, neither existing macroinvertebrate surveys nor surveys to be conducted under the Study Proposal are designed to detect endemic species, and they cannot rule out the possibility that endemic species may be present that could be impacted by rotenone use.

#### 12. Impacts to Non-target Aquatic Life – Amphibians

Amphibians in the terrestrial life stage should not be affected by the rotenone treatment. However, gill breathing life stages are susceptible, if present.

Mountain Yellow Legged Frogs (*Rana mucosa*) and Yosemite Toads (*Bufo canorus*) are known to inhabit portions of the Silver King Creek basin. Both species are candidates for listing under the federal Endangered Species Act. The DFG recently completed four years of amphibian surveys within the project area and nearby upstream areas. Although Mountain Yellow Legged Frogs have been found in certain areas upstream of the project area (Upper Fish Valley and Fly Valley Creek), none was observed in the project area. A few Western Toad/Yosemite Toad adult and terrestrial subadult hybrids were observed within the project area. DFG biologists determined that during the August 2004 survey, tadpoles within the project area had already metamorphosed into terrestrial life stages due to an early spring/summer and low water year.

The Discharger will conduct additional amphibian surveys immediately before treatment, according to protocols described in Attachment 4 of the Monitoring and Reporting Program. If adult or tadpole life stages of any threatened, endangered, sensitive, candidate or rare amphibians are found during pre-project surveys, they will be captured by net and relocated out of the project area to suitable nearby habitat.

#### 13. Past DFG Rotenone Projects in the Lahontan Region

The Discharger has completed several rotenone projects in the Lahontan Region since the late 1980s. Those projects included treatments of portions of the Upper Truckee River (Alpine County), Mill Creek (Mono County), Wolf Creek (Mono County), and the 1991-1993 treatments in upper portions of the Silver King Creek drainage for Paiute Cutthroat Trout restoration.

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The Lahontan Water Board waived waste discharge requirements for those projects. Following the 9<sup>th</sup> U.S. Circuit Court's decision in the Headwaters, Inc. v. Talent Irrigation District, NPDES permits are required for the discharge of aquatic pesticides to waters of the United States, and there is therefore no longer any basis to waive waste discharge requirements.

Violations of waiver conditions occurred on several occasions. Violations included: persistence of rotenone or rotenolone in shallow lakes (attributed to standing water and cool temperatures during late-season applications); rotenone escaping past project boundaries (attributed to late detoxification start-up or premature cessation of detoxification); a fish kill (estimated 1,000 fish killed) downstream of project boundaries (attributed to over-application of potassium permanganate detoxifying agent); and naphthalene detected downstream of project boundaries at a concentration exceeding the 25 ug/L limit allowed under the Basin Plan rotenone policy (attributed to low temperature of flowing water). DFG proposed additional control measures for future projects to prevent recurrences of these violations. Staff did not recommend that the Lahontan Water Board take enforcement action for the violations.

This permit establishes waste discharge requirements for the proposed Silver King Creek project, including receiving water limits and Best Management Practices (BMPs), adequate to protect water quality. Violations will be subject to enforcement action pursuant to Lahontan Water Board authorities under the California Water Code.

**14. Project Information Submitted by Discharger Meets Requirements for Variance**

The Discharger has provided project-specific information required by the MOU. The Lahontan Water Board has considered this information and determined that this project meets Basin Plan conditions and eligibility criteria for DFG rotenone projects. On that basis, the project qualifies for the variance, established in the Basin Plan, from meeting water quality objectives that would otherwise apply. The project is subject, however, to specific water quality objectives for rotenone use contained in the Basin Plan and to numeric criteria for priority pollutants contained in the California Toxics Rule.

**15. Consideration of Alternatives to Chemical Treatment**

The Discharger has considered alternatives to chemical treatment, and determined that rotenone treatment is the only feasible, effective option to ensure the complete eradication of non-native fish necessary to reestablish the Paiute Cutthroat Trout for this project. Recent research indicates that gillnetting may be an effective non-chemical alternative to rotenone treatment in eradicating fish from certain shallow mountain lakes. The Discharger considered gillnetting as a possible alternative to using rotenone in Tamarack Lake, a shallow lake that is part of the project area, but determined that Tamarack Lake is deeper than the maximum depth recommended to ensure complete fish eradication by the gillnetting method. Water drawdown (followed by winter freezing) was also considered as a possible alternative to rotenone for Tamarack Lake, but was determined to be impracticable due to the large volume of water that would need to be removed.

16. Beneficial Uses of Silver King Creek

The beneficial uses of Silver King Creek as set forth and defined in the Basin Plan are: Municipal and Domestic Supply, Agricultural Supply; Groundwater Recharge; Water Contact Recreation; Non-contact Recreation; Commercial and Sport Fishing; Cold Freshwater Habitat; Wildlife Habitat; Rare, Threatened or Endangered Species; and Spawning, Reproduction, and Development.

17. Effluent Limitations

NPDES permits for discharges to surface waters must meet all applicable provisions of sections 301 and 402 of the Clean Water Act (CWA). These provisions require controls that use best available technology economically achievable (BAT), best conventional pollutant control technology (BCT), and any more stringent controls necessary to reduce pollutant discharges and meet water quality standards.

Pursuant to section 122.44(k)(3) of Title 40 of the Code of Federal Regulations (CFR), BMPs may be required in NPDES permits in lieu of numeric effluent limits to control or abate the discharge of pollutants when numeric effluent limits are infeasible. Numeric effluent limits for pollutant discharges associated with the application of rotenone formulation and potassium permanganate neutralizing agent are not feasible, because in this case there is no definable "effluent" upon which limits can be placed. Rotenone and potassium permanganate are commercial products of formulated chemical composition, rather than an effluent waste stream from a controllable process or activity.

After being mixed with receiving waters and achieving their intended effect, these materials may be considered pollutants. This permit requires that the Discharger implement BMPs to control or abate pollutants in the receiving water and comply with numeric receiving water limitations. Those BMPs constitute BAT and BCT and will be implemented to minimize the area and duration of impacts caused by the discharge of aquatic pesticides in the treatment area. This approach will allow for restoration of water quality and the long-term protection of beneficial uses of the receiving water following completion of a treatment event.

18. California Toxics Rule

The U.S. Environmental Protection Agency promulgated the California Toxics Rule (CTR), CFR, Title 40, Part 131.38), establishing numeric criteria for priority toxic pollutants for the State of California. The State Water Board adopted the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (SIP), which establishes procedures for implementing water quality standards in NPDES permits. Section 5.3 of the SIP allows the State Water Board/Regional Quality Control Water Boards to grant short-term or seasonal categorical exceptions from meeting the CTR priority pollutant criteria for resource or pest management projects conducted by public entities. In order to qualify for an exception from meeting priority pollutant standards, a public entity must fulfill the requirements listed in section 5.3. Among other requirements, entities seeking an exception to complying with water quality standards for priority pollutants must submit California Environmental Quality Act (CEQA) (CEQA, Public Resources Code Section 21000, et seq.) documents.

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The Discharger prepared a Negative Declaration (see Finding No. 19, below) in compliance with CEQA. The Silver King Creek rotenone project meets the qualifications for an exception from meeting CTR priority pollutant criteria/objectives, and an exception is granted in the provisions of this permit. Therefore, effluent and receiving water monitoring for priority pollutants, as described in the SIP, is not required for this project.

State Water Board staff reviewed confidential proprietary information provided by the manufacturers of the rotenone formulations to be used for this project and found no evidence that the formulations contain ingredients that include priority pollutants.

**19. CEQA Compliance**

The action to adopt an NPDES permit is exempt from the provisions of Chapter 3 of CEQA in accordance with section 13389 of the California Water Code.

While adoption of this NPDES permit by the Lahontan Water Board is exempt from preparation of a CEQA document, public entities receiving exceptions from meeting CTR priority pollutant criteria/objectives, pursuant to section 5.3 of the SIP, are required to prepare a CEQA document. In 1994, the Discharger completed a Programmatic EIR titled *Rotenone Use for Fisheries Management, July 1994*. The Discharger completed an Initial Study and Negative Declaration (State Clearinghouse No. 2002052136) for the Silver King Creek project and filed a CEQA Notice of Determination for the project with the Governor's Office of Planning and Research on April 7, 2003.

**20. Antidegradation**

The Lahontan Water Board has considered antidegradation pursuant to 40 CFR section 131.12 and State Water Board Resolution No. 68-16. Discharges must be consistent with both the State and federal antidegradation policies. The conditions of this permit require compliance with water quality objectives for rotenone projects contained in the Basin Plan. The application of rotenone and potassium permanganate will temporarily degrade waters of exceptional quality. The degradation will be temporary, and it is in the best interest of the people of the State. The Basin Plan states:

*The temporary deterioration of water quality due to the use of rotenone by the DFG is justifiable in certain situations. The Regional Board recognizes that the State and federal Endangered Species Acts require the restoration and preservation of threatened and endangered species . . . These resources are of important economic and social value to the people of the State, and the transitory degradation of water quality and short-term impairment of beneficial uses that would result from rotenone application is therefore justified provided suitable measures are taken to protect water quality within and downstream of the project area.*

Therefore, this permit is consistent with the State nondegradation and federal antidegradation policies.



21. Species Composition Considerations and Antidegradation

The Basin Plan rotenone policy requires that within two years following the last treatment for a specific project, a fisheries biologist or related specialist from DFG must assess the condition of the treated waters and certify in writing whether all applicable beneficial uses have been restored. Pursuant to the MOU, that assessment must consider the condition of fish and invertebrate populations in the affected waters.

The Basin Plan water quality objectives for rotenone include a species composition objective that states:

“Where species composition objectives are established for specific water bodies or hydrologic units, the established objective(s) shall be met for all non-target aquatic organisms within one year following rotenone treatment [or within one year following the final rotenone application for multi-year projects].”

And:

“Threatened or endangered aquatic populations (e.g., invertebrates, amphibians) shall not be adversely affected. The DFG shall conduct pre-project monitoring to prevent rotenone application where threatened or endangered species may be adversely impacted.”

No species composition objective has been established in the Basin Plan specifically for Silver King Creek or for the East Fork Carson River Hydrologic Unit. However, antidegradation requires protecting non-target aquatic organisms so that aquatic species composition is not degraded over the long-term. DFG has included measures to protect threatened and endangered species, in compliance with the Basin Plan requirement. The Discharger will also conduct benthic macroinvertebrate monitoring to evaluate the assertion that rotenone treatment will not adversely affect populations of non-target aquatic organisms and beneficial uses of water over the long-term and to better establish the duration of short-term impacts.

22. Notification of Interested Parties

The State Water Board has notified interested agencies and persons of its intent to adopt an NPDES permit for the discharge and has provided them with an opportunity to submit comments.

23. Consideration of Public Comments

The State Water Board, in a public meeting, heard and considered all comments pertaining to the discharge.

24. NPDES Permit

This Order shall serve as an NPDES permit pursuant to section 402 of the CWA and amendments thereto, and as Waste Discharge Requirements pursuant to California Water Code Section 13263, and shall take effect upon the date of adoption. The Lahontan Water Board shall administer this permit.

**IT IS HEREBY ORDERED** that:

I. DISCHARGE SPECIFICATIONS

A. Receiving Water Limitations

The Discharger shall comply with the following receiving water limitations. The discharge of rotenone formulation and potassium permanganate to surface waters shall not cause or contribute to a violation of the following water quality objectives contained in the Basin Plan rotenone policy:

1. Color

The characteristic purple or brown discoloration resulting from the discharge of potassium permanganate shall not be discernible more than two stream miles downstream of project boundaries at any time. Twenty-four hours after shutdown of the detoxification operation, no color alteration(s) resulting from the discharge of potassium permanganate shall be discernible within or downstream of project boundaries.

2. Pesticides

- a. The concentration of naphthalene outside of project boundaries shall not exceed 25 µg/L at any time.
- b. The concentration of rotenone, rotenolone, trichloroethylene (TCE), xylene, or acetone (or potential trace contaminants such as benzene or ethylbenzene) outside of project boundaries shall not exceed the detection levels<sup>2</sup> for these respective compounds at any time.
- c. After a two-week period has elapsed from the date that rotenone application was completed, no chemical residues resulting from the treatment shall be present at detectable levels within or downstream of project boundaries.
- d. No chemical residues resulting from rotenone treatments shall exceed detection levels in ground water at any time.

3. Toxicity

Chemical residues resulting from rotenone treatment must not exceed the limitations listed above for pesticides.

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<sup>2</sup> "Detection level" is defined as the minimum level that can be reasonably detected using state-of-the-art equipment and methodology.

B. Application Specifications

1. The Discharger shall use only the two rotenone formulations, which it has previously identified and characterized for this project (specifically, Nusyn-Noxfish and CFT Legumine).
2. Rotenone applications shall be made in accordance with label specifications.
3. Applications must be conducted by a licensed applicator in accordance with regulations of the DPR.
4. Applications of rotenone and potassium permanganate must be made in compliance with the MOU, the project Negative Declaration, and the Programmatic EIR.
5. The Discharger shall implement the Spill Contingency plan submitted with the 2002 Rotenone Application received on July 16, 2002.

C. General Requirements

1. As an alternative to numeric effluent limits, the Discharger is required to implement BMPs. Required BMPs include, but are not limited to: applying rotenone in accordance with label instructions by a licensed applicator; using potassium permanganate to detoxify rotenone before it escapes the treatment area; applying the minimum concentration of chemicals determined necessary to achieve an effective rotenone treatment; maintaining and implementing a suitable spill prevention and response plan; applying rotenone only when ambient water temperatures are sufficiently high (greater than 5°C) to promote its rapid post-treatment breakdown; and conducting water quality monitoring inside and outside the treatment area.
2. All project operations shall be conducted consistent with plans and management practices contained in documents submitted by the Discharger prior to the adoption of this permit, including the Discharger's Negative Declaration for the project, the July 2002 project information document submitted pursuant to the MOU (and any submitted updates or revisions thereto).
3. The Discharger shall provide the public with adequate notice of the treatments, and post signs in the project area prior to treatment with appropriate warnings against public contact with water and fish while chemical residues are present, and shall direct wilderness users to alternative potable water sources as appropriate.
4. Mechanical disturbance of soils (for example, to construct earthen spill containment berms) in wetland or riparian habitats is prohibited.
5. The Discharger shall notify the Lahontan Water Board in writing or by phone at least fourteen **(14) days** in advance of each planned treatment event.
6. Prior to chemical application, the Discharger shall capture fish within the treatment area by electroshocking and shall relocate the fish to suitable nearby habitat, to the extent feasible.

II. PROVISIONS

A. Standard Provisions for NPDES Permits

The Discharger shall comply with the “Standard Provisions for NPDES Permits,” (Attachment B), which is made a part of this Order.

B. Monitoring and Reporting

1. Pursuant to California Water Code Section 13383, the Discharger shall comply with Monitoring and Reporting Program, which is made a part of this Order, and with any revisions thereto.
2. The Lahontan Water Board Executive Officer may require additional monitoring pursuant to California Water Code Section 13267, as necessary, to establish the recovery of aquatic macroinvertebrate communities following treatment, or to ensure compliance with other requirements and conditions of this NPDES Permit.

C. General Provisions for Monitoring and Reporting

The Discharger shall comply with the “General Provisions for Monitoring and Reporting,” (Attachment C), which is made a part of this Order.

D. Expiration

This Order expires on July 6, 2010.

III. EXCEPTION FROM PRIORITY POLLUTANT CRITERIA

An exception from meeting priority pollutant criteria is hereby granted subject to the provisions of SIP section 5.3. The Discharger shall comply with all provisions of section 5.3.

IV. ATTACHMENTS

- A. Project Location Map
- B. Standard Provisions for NPDES Permits
- C. General Provisions for Monitoring and Reporting
- D. Monitoring and Reporting Program
- E. Fact Sheet

**CERTIFICATION**

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of an order duly and regularly adopted at a meeting of the State Water Board held on July 6, 2005.

AYE: Authur G. Baggett Jr., Peter S. Silva, Gerald D. Secundy, Tam M. Doduc

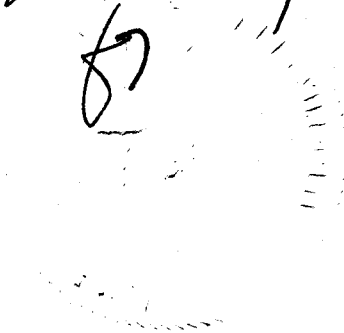
NO: None.

ABSENT: None.

ABSTAIN: None.

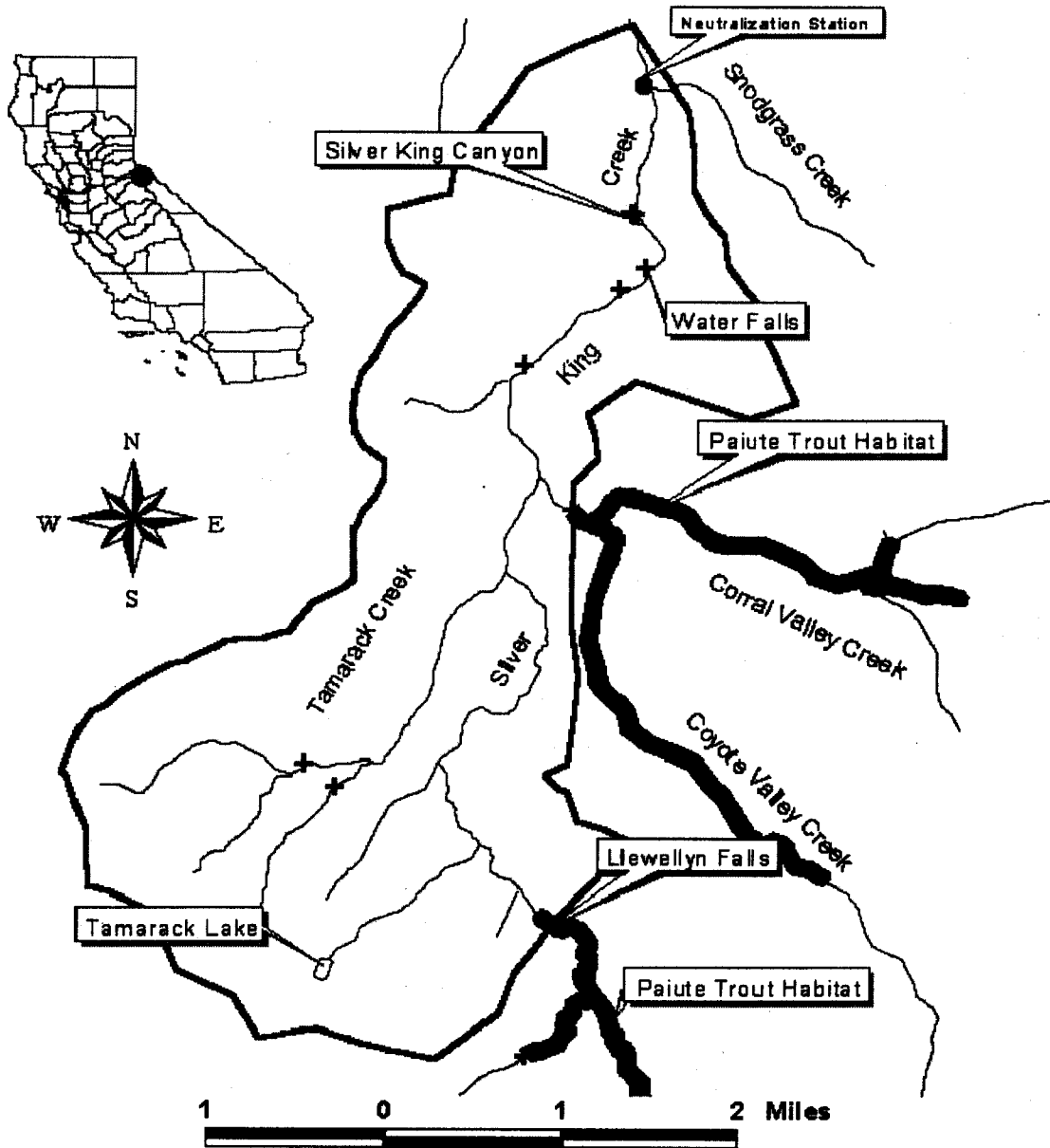


Debbie Irvin  
Clerk to the Board



ATTACHMENT A

PROJECT LOCATION MAP



## ATTACHMENT B

### WATER QUALITY ORDER NO. 2005-0010-DWQ NPDES NO. CA0103209

#### STANDARDS PROVISIONS

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

1. The permittee must comply with all of the terms, requirements, and conditions of this NPDES Permit. Any violation of this Permit constitutes violation of the Clean Water Act (CWA), its regulations and the California Water Code, and is grounds for enforcement action, permit termination, permit revocation, and reissuance, denial of an application for permit reissuance; or a combination thereof.
2. The permittee shall comply with effluent standards or prohibitions established under 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this Permit has not yet been modified to incorporate the requirement. [40 CFR 122.41(a)(1)]

The California Water Code provides that any person who violates a Waste Discharge Requirement (same as permit condition), or a provision of the California Water Code, is subject to civil penalties of up to \$1,000 per day or \$10,000 per day of violation, or when the violation involves the discharge of pollutants, is subject to civil penalties of up to \$10 per gallon per day or \$20 per gallon per day of violation; or some combination thereof, depending on the violation, or upon the combination of violations.\*

Violations of any of the provisions of the NPDES program, or of any of the provisions of this Permit, may subject the violator to any of the penalties described herein, or any combination thereof, at the discretion of the prosecuting authority; except that only one kind of penalty may be applied for each kind of violation.\*

3. The CWA provides that any person who violates a Permit condition implementing Sections 301, 302, 306, 307, or 308 of the CWA is subject to a civil penalty not to exceed \$10,000 per day of such violation. Any person who willfully or negligently violates Permit conditions implementing these Sections of the CWA is subject to a fine of not less than \$2,500, nor more than \$25,000 per day of violation, or by imprisonment for not more than one year, or both. [40 CFR 122.41(a)(2)]
4. If the permittee wishes to continue an activity regulated by this Permit after the expiration date of this Permit, the permittee must apply for and obtain a new Permit. [40 CFR 122.41(b)]
5. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Permit. [40 CFR 122.41(c)]
6. The permittee shall take all reasonable steps to minimize or prevent any discharge that has a reasonable likelihood of adversely affecting health or the environment. [40 CFR 122.41(d)]
7. The permittee shall, at all times, properly operate and maintain all the facilities and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with this Permit.

Proper operation and maintenance includes adequate laboratory controls, and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities, or similar systems that are installed by a permittee only when necessary to achieve compliance with the conditions of this Permit. [40 CFR 122.41(e)]

8. This Permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a Permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition. [40 CFR 122.41(g)]
9. This Permit does not convey any property rights of any sort, or any exclusive privilege. [40 CFR 122.41(f)]
10. The permittee shall furnish, within a reasonable time, any information the Regional Board or EPA may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Permit. The permittee shall also furnish to the Regional Board, upon request, copies of records required to be kept by this Permit. [40 CFR 122.41(h)]
11. The Regional Board, EPA, and other authorized representatives shall be allowed:
  - (a) Entry upon premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Permit;
  - (b) Access to copy any records that are kept under the conditions of this Permit;
  - (c) To inspect any facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and
  - (d) To photograph, sample, and monitor for the purpose of assuring compliance with this Permit, or as otherwise authorized by the CWA. [40 CFR 122.41(I)]
12. Monitoring and records.
  - (a) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
  - (b) The permittee shall retain records of all monitoring information, including all calibration and maintenance monitoring instrumentation, copies of all reports required by this Permit, and records of all data used to complete the application for this Permit, for a period of at least three years from the date of the sample, measurement, report, or application. This period may be extended by request of the Regional Board or EPA at any time.
  - (c) Records of monitoring information shall include:
    - (i) The date, exact place, and time of sampling or measurements;
    - (ii) The individual(s) who performed the sampling or measurements;
    - (iii) The date(s) analyses were performed;
    - (iv) The individual(s) who performed the analyses;
    - (v) The analytical techniques or methods used; and
    - (vi) The results of such analyses.



- (d) Monitoring must be conducted according to test procedures under 40 CFR Part 136, unless other test procedures have been specified in this Permit.
- (e) The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device, or method required to be maintained under this Permit shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

[40 CFR 122.41(j)]

- 13. All applications, reports, or information submitted to the Regional Board shall be signed and certified in accordance with 40 CFR 122.22 [40 CFR 122.41(k)(1)]
- 14. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this Permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six months per violation, or by both. [40 CFR 122.41(k)(2)]
- 15. Reporting requirements:
  - (a) The permittee shall give advance notice to the Regional Board, as soon as possible of, any planned physical alterations, or additions to the permitted facility.
  - (b) The permittee shall give advance notice to the Regional Board of any planned changes in the permitted facility or activity that may result in noncompliance with permit requirements.
  - (c) This Permit is not transferable to any person, except after notice to the Regional Board. The Regional Board may require modification, or revocation and reissuance of the Permit to change the name of the permittee, and incorporate such other requirements as may be necessary under the CWA.
  - (d) Monitoring results shall be reported at the intervals specified elsewhere in this Permit.
    - (i) Monitoring results must be reported in a Discharge Monitoring Report (DMR).
    - (ii) If the permittee monitors any pollutant more frequently than required by this Permit using test procedures approved under 40 CFR Part 136 or as specified in this Permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.
    - (iii) Calculations for all limitations that require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this Permit.
  - (e) Report of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any compliance schedule of this Permit shall be submitted no later than 14 days following each schedule date.
  - (f) Twenty-four hour reporting.
    - (i) The permittee shall report any noncompliance that may endanger health or the environment to the Regional Board. Any information shall be provided orally

within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and time and, if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

- (ii) The following shall be included as information that must be report within 24 hours under this paragraph;
  - (A) Any unanticipated bypass that exceeds any effluent limitation in the Permit.
  - (B) Any upset that exceeds any effluent limitation in the Permit.
  - (C) Violation of a maximum daily discharge limitation for any of the pollutants listed in this Permit to be reported within 24 hours.
- (iii) The Regional Board may waive the above-required written report on a case-by-case basis.

- (g) The permittee shall report all instances of noncompliance, not otherwise reported under the above paragraphs, at the time monitoring reports are submitted. The reports shall contain all information listed in paragraph 15(f) above.[40 CFR 122.41(1)]

16. Bypass (the intentional diversion of waste streams from any portion of facility) is prohibited. The Board may take enforcement action against the permittee for bypass unless:

- (a) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage. (Severe property damage means substantial physical damage to property, damage to the treatment facilities that causes them to become inoperable, or substantial and permanent loss of natural resources that can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.);
- (b) There were no feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated waste, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that could occur during normal periods of equipment downtime or preventive maintenance; and
- (c) The permittee submitted a notice, at least ten days in advance, of the need for a bypass to the appropriate Board.

The permittee may allow a bypass to occur that does not cause effluent limitations to be exceeded, but only if it is for essential maintenance to assure efficient operation. In such a case, the above bypass conditions are not applicable.

The permittee shall submit notice of an unanticipated bypass as required in paragraph 15(f) above. [40 CFR 122.41(m)]

17. Upset means an exceptional incident in which there is unintentional and temporary noncompliance with permit effluent limitations because of factors beyond the reasonable control of the permittee.

An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper action. A permittee that wishes to establish the affirmative defense of an upset in an action brought for noncompliance shall demonstrate, through signed, contemporaneous operating logs, or other relevant evidence that:

- (a) an upset occurred and that the permittee can identify the cause(s) of the upset;
- (b) the permitted facility was being properly operated at the time of the upset;
- (c) the permittee submitted notice of the upset as required in paragraph 15(f) above; and
- (d) the permittee complied with any remedial measures required under paragraph 7.

No determination made before an action for noncompliance, such as during administrative review of claims that noncompliance was caused by an upset; is final administrative action subject to judicial review.

In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof. [40 CFR 122.41(n)]

18. All existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Regional Board as soon as they know or have reason to believe:

- (a) that any activity has occurred or will occur that would result in the discharge of any toxic pollutant that is not limited in this Permit, if that discharge will exceed the highest of the following "notification levels:"
  - (i) One hundred micrograms per liter (100 µg/L);
  - (ii) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,4-dinitrophenol and 2-methyl-4-b-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
  - (iii) Five (5) times the maximum concentration value reported for that pollutant in the Permit application; or
  - (iv) The level established by the Regional Board in accordance with 40 CFR 122.44(f).
- (b) that they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant that was not reported in the Permit application. [40 CFR 122.42(a)]

\* This paragraph was added or modified by the State Water Quality Control Board to the California Water Code.

## ATTACHMENT C

### WATER QUALITY ORDER NO. 2005-0010-DWQ NPDES NO. CA0103209

#### GENERAL PROVISIONS FOR MONITORING AND REPORTING

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

##### 1. SAMPLING AND ANALYSIS

- a. All analyses shall be performed in accordance with the current edition(s) of the following documents:
  - i. Standard Methods for the Examination of Water and Wastewater
  - ii. Methods for Chemical Analysis of Water and Wastes, EPA
- b. All analyses shall be performed in a laboratory certified to perform such analyses by the California State Department of Health Services or a laboratory approved by the Regional Board Executive Officer. Specific methods of analysis must be identified on each laboratory report.
- c. Any modifications to the above methods to eliminate known interferences shall be reported with the sample results. The methods used shall also be reported. If methods other than EPA-approved methods or Standard Methods are used, the exact methodology must be submitted for review and must be approved by the Regional Board Executive Officer prior to use.
- d. The Discharger shall establish chain-of-custody procedures to insure that specific individuals are responsible for sample integrity from commencement of sample collection through delivery to an approved laboratory. Sample collection, storage, and analysis shall be conducted in accordance with an approved Sampling and Analysis Plan (SAP). The most recent version of the approved SAP shall be kept at the facility.
- e. The Discharger shall calibrate and perform maintenance procedures on all monitoring instruments and equipment to ensure accuracy of measurements, or shall insure that both activities will be conducted. The calibration of any wastewater flow measuring device shall be recorded and maintained in the permanent log book described in 2.b, below.
- f. A grab sample is defined as an individual sample collected in fewer than 15 minutes.
- g. A composite sample is defined as a combination of no fewer than eight individual samples obtained over the specified sampling period at equal intervals. The volume of each individual sample shall be proportional to the discharge flow rate at the time

of sampling. The sampling period shall equal the discharge period, or 24 hours, whichever period is shorter.

2. OPERATIONAL REQUIREMENTS

a. Sample Results

Pursuant to California Water Code Section 13267(b), the Discharger shall maintain all sampling and analytical results including: strip charts; date, exact place, and time of sampling; date analyses were performed; sample collector's name; analyst's name; analytical techniques used; and results of all analyses. Such records shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Regional Board.

b. Operational Log

Pursuant to California Water Code Section 13267(b), an operation and maintenance log shall be maintained at the facility. All monitoring and reporting data shall be recorded in a permanent log book.

3. REPORTING

a. For every item where the requirements are not met, the Discharger shall submit a statement of the actions undertaken or proposed which will bring the discharge into full compliance with requirements at the earliest time, and shall submit a timetable for correction.

b. Pursuant to California Water Code Section 13267(b), all sampling and analytical results shall be made available to the Regional Board upon request. Results shall be retained for a minimum of three years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge, or when requested by the Regional Board.

c. The Discharger shall provide a brief summary of any operational problems and maintenance activities to the Board with each monitoring report. Any modifications or additions to, or any major maintenance conducted on, or any major problems occurring to the wastewater conveyance system, treatment facilities, or disposal facilities shall be included in this summary.

d. Monitoring reports shall be signed by:

i. In the case of a corporation, by a principal executive officer at least of the level of vice-president or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge originates;

ii. In the case of a partnership, by a general partner;

- iii. In the case of a sole proprietorship, by the proprietor; or
  - iv. In the case of a municipal, state or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.
- e. Monitoring reports are to include the following:
- i. Name and telephone number of individual who can answer questions about the report.
  - ii. The Monitoring and Reporting Program Number.
  - iii. WDID Number 6A265300900.

4. NONCOMPLIANCE

Under Section 13268 of the Water Code, any person failing or refusing to furnish technical or monitoring reports, or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars (\$1,000) for each day of violation.

## ATTACHMENT D

### WATER QUALITY ORDER NO. 2005-0010-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 <sup>1</sup>	µg/L	Grab
Rotenolone	Dawson et. al <sup>1</sup>	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

<sup>1</sup> 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.

<b>Analysis</b>	<b>Site</b>	<b>Pre-Treatment</b>	<b>During Treatment</b>	<b>Day After Treatment</b>	<b>Weekly Post-Treatment</b>
Rotenone & Rotenolone	MSKC1	X	every two hours	X	X <sup>2</sup>
	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 <sup>2</sup>
	MSKC2	X	Twice		
DEE/MP	MSCK1	X	Twice	X	X <sup>2</sup>
	MTC1	X	Twice		
	MTC2	X	Twice		
	MTL1	X		X	X
	MTL2	X		X	X
	MTL3	X		X	X

<sup>2</sup> 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 August/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.

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VII. REPORTING

- 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>August 15, 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.

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E. The Discharger shall submit an Aquatic Macroinvertebrate Study Report by **August 1, 2009** if rotenone treatments are conducted only in 2005 and 2006, and by **August 1, 2010** if a third 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:

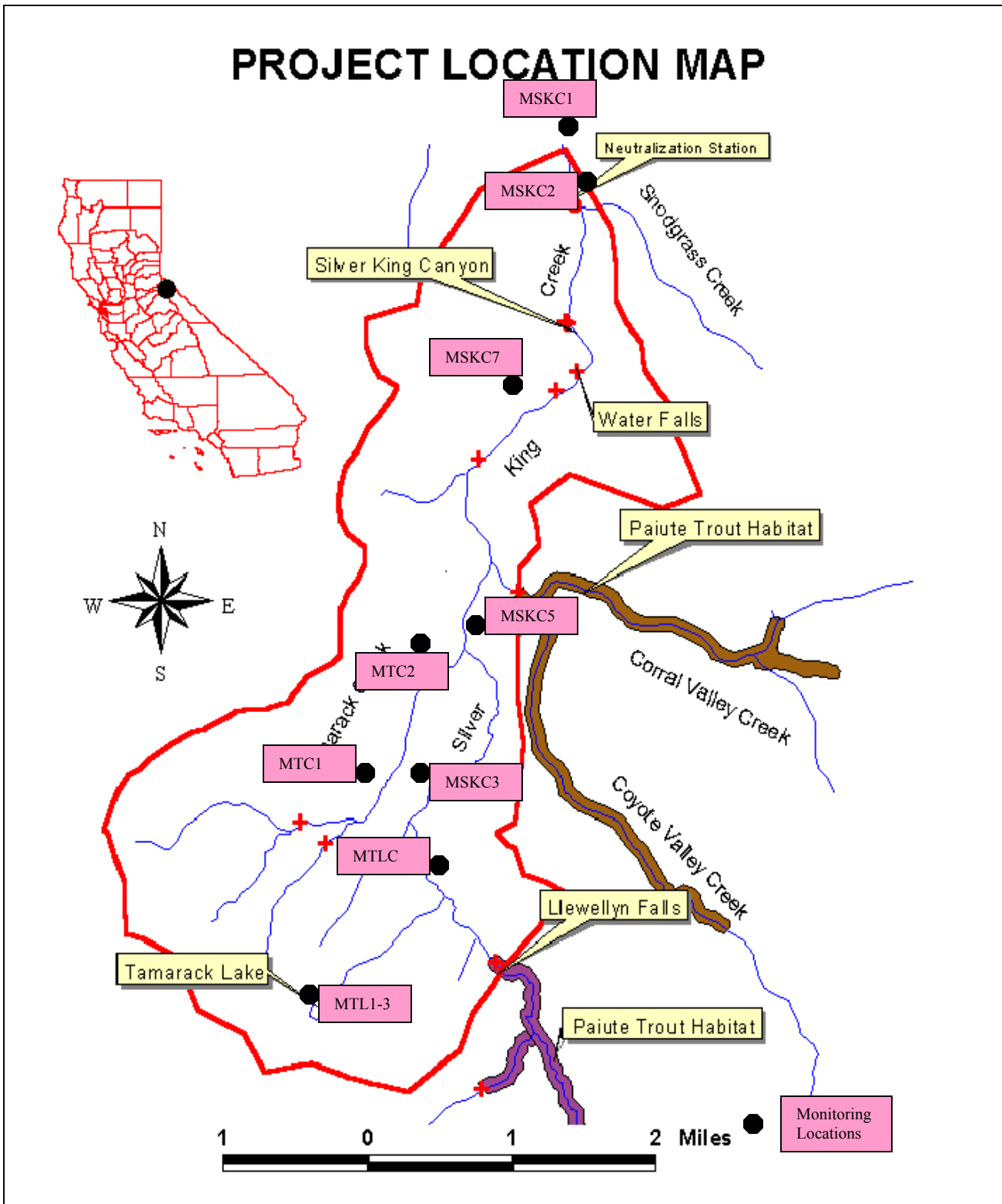
1. Data from all pre- and post-project macroinvertebrate sampling events in tabular, graphic, and electronic form.
2. Summary of analytical methods, statistical methods, and metrics used.
3. Results.
4. Discussion of results, evaluating nature and duration of impacts to benthic macroinvertebrate communities,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

# Attachment 1 Location of Monitoring Stations



## **Attachment 2**

### **Aquatic Invertebrate Monitoring Study Plan**

#### **Interagency Study Proposal**

**June 15, 2003**

### **Evaluation of Rotenone Use in Silver King Creek Basin on Aquatic Macroinvertebrates, 2003-2007**

#### **Background**

The California Department of Fish and Game (Department) proposes to treat Silver King Creek basin with rotenone during the late summer of 2003, 2004, and possibly 2005. The goal of this project is to restore Paiute cutthroat trout (*Oncorhynchus clarki seleniris*), a federally listed threatened species, to its historic habitat. The Department anticipates that successful reintroduction of Paiute cutthroat trout will lead to delisting of the fish as federally threatened, as well as the creation of a Fish and Game Commission designated Heritage Trout Fishery.

The Lahontan Regional Water Quality Control Board has expressed concern regarding possible impacts of rotenone within the project area to non-target organisms, specifically aquatic macroinvertebrates. The Department conducted studies in Silver King Creek (Trumbo et al 2000a) and nearby Silver Creek (Trumbo et. al. 2000b) to evaluate rotenone impacts to aquatic macroinvertebrates during past projects. Both studies found that rotenone use did not affect species abundance, and that there was evidence of short-term impacts. No evidence of long-term impacts were found in either study.

The Department of Fish and Game proposes to evaluate the response of aquatic macroinvertebrates to the chemical treatment of Silver King Creek. This study will be funded through multi-agency cooperation of the Humboldt-Toiyabe National Forest, U.S. Fish and Wildlife Service, and the Department.

#### **Objective**

The primary objective of this study is to determine if rotenone use will significantly impact the biological condition of Silver King Creek. A number of metrics will be analyzed to examine measures of taxa richness, composition and function, including: 1) taxa richness; 2) abundance; 3) Ephemeroptera, Plecoptera, Trichoptera (EPT) richness; 4) EPT Index; 5) number of families; 6) percent dominant taxon; 7) Shannon Diversity Index; 8) mean tolerance value, and 9) Community Similarity Indices (Jaccard and/or Brillouin Index).

#### **Study Design**

A basin approach study design has been selected by the cooperating agencies. Sampling will be conducted pre-treatment at all sites during mid-August 2003, and post-treatment at all sites during mid-August 2005 and 2006. Should the project require a third year of rotenone treatment in 2005, post-treatment sampling would be postponed until 2006 and 2007.

The aquatic macroinvertebrate study will have four pairs of control and treatment sites on the main stem of Silver King Creek (Figure 1). Four of these eight sites have already been located as follows: Site 1 – Upper Fish Valley upstream of Bull Canyon Ck; Site 2 – Upper Fish Valley downstream of Bull Canyon Ck; Site 3 – Lower Fish Valley; Site 4 – Long Valley. Sites 1 and 2 would serve as paired controls for sites 3 and 4 which are situated within the rotenone project area. The two pairs of additional sites (two treatments and two controls) on the main stem of Silver King Creek will be located during summer of 2003.

Additional sites will be identified during early summer 2003 to evaluate the response of aquatic macroinvertebrates to rotenone in first order streams. Treatment sites will be located in the rotenone project area of Tamarack Creek. Control sites upstream of the project area will be situated in stringer meadows of Corral Valley Creek downstream of the main Corral Valley. The additional sites would be situated as follows: Site 5 – upper main stem Tamarack Ck; Site 6 – lower main stem Tamarack Ck; Site 7 – Upper Corral Valley Creek in stringer meadows below the main valley; Site 8 – in stringer meadows downstream of Site 7. One additional pair of control sites will be determined summer of 2003 and will be located in Coyote Valley Creek or another suitable first order tributary stream of Silver King Creek.

### **Sample Collection and Processing**

Samples will be collected from study site riffles by randomly selecting 3 locations out of all possible 0.09 m<sup>2</sup> areas within the site boundary. Aquatic macroinvertebrates will be collected using a D-frame kick net sampler with a 0.5 mm mesh net. Samples will be collected from the lowermost portion of the riffle, working upstream. After sampling, contents of the net will be emptied into a bucket, concentrated with a 500  $\mu$ m sieve, and preserved in 95% ethanol. Any organisms clinging to the sample net or sieve, or remaining in the bottom of the bucket will be put into the sample.

Samples will be processed and keyed by the National Aquatic Monitoring Center (The BugLab) at Utah State University, Logan, UT. The BugLab will provide a taxa list and summary metrics for each sample. Laboratory techniques, taxonomic levels, and metrics analyzed by the BugLab can be reviewed at the website: [www.usu.edu/buglab/](http://www.usu.edu/buglab/). The Buglab website also reviews quality control and assurance measures. The Buglab will archive midges (Chironomidae) and mites (Hydracarina) in separate vials for possible later analysis.

## **Physical and Chemical Habitat Characteristics**

Selected physical and chemical habitat characteristics will be measured to describe sample site characteristics, and assure similarity in habitat. For each sampling site, the following physical parameters will be measured: length, width (top and bottom), gradient, depth, % canopy, % substrate composition, embeddedness. The following physicochemical parameters will be measured for each sampling site: temperature, conductivity, alkalinity, and pH.

Rotenone concentration and duration will be determined as part of water quality monitoring during the rotenone treatment. Although water samples will not be collected at specific aquatic macroinvertebrate sampling stations, selected reaches within the basin will be sampled to evaluate rotenone efficacy during the application.

Latitude and longitude of each sampling site will be recorded with hand-held GPS units, and sample sites will be identified with rebar stakes. Digital photographs will be used to record sample site locations.

## **Data Analysis/Statistics**

Biological metrics will be analyzed for conformity to normality and evaluated for the appropriate transformation. Biological metrics may then be tested for statistical significance using fixed effect two or three factor ANOVA (site vs. year vs. season). The Bonferroni approximation can be applied to ANOVA significance levels to account for dependence among measured metrics (Ramsey 1980). If data deviate from the assumptions of normality, homoscedasticity and linearity, non-parametric analyses will be used such as the Mann-Whitney or Kruskal Wallis tests for testing hypotheses (Zar 1984).

## **Study Design Cost Analysis**

This study will be performed by the Humboldt-Toiyabe National Forest, U.S. Fish and Wildlife Service, and the Department. The Buglab estimates sample processing to cost \$200/ sample. Sample processing costs for the study designs are as follows: 3 samples/site x 14 sites = 42 samples/year; one year = \$8,400; three years (whole study) = \$25,200.

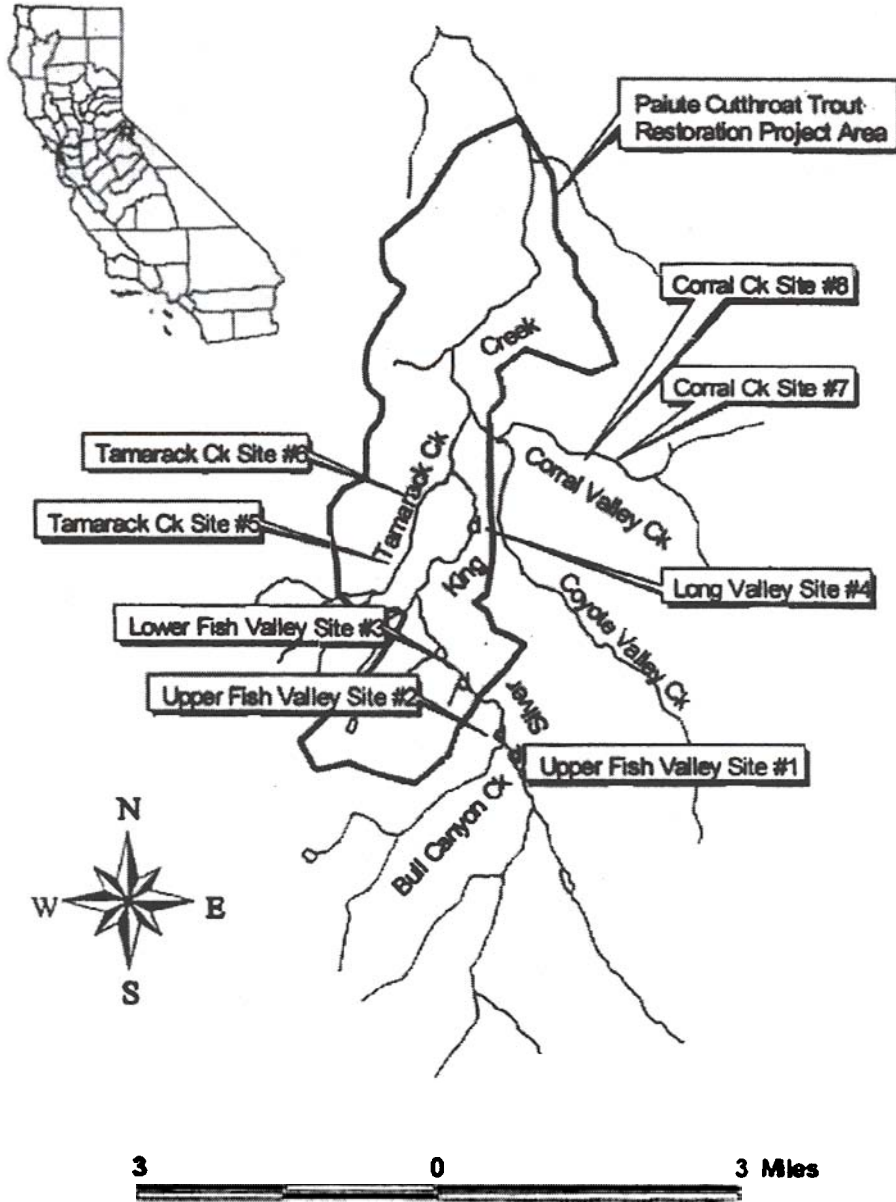
Sample processing costs will be shared by the Humboldt-Toiyabe National Forest and the U.S. Fish and Wildlife Service. Costs associated with personnel, per diem, and equipment will be borne and shared by the participating agencies.



[This outdated invertebrate monitoring site map is superseded by a revised invertebrate monitoring site map included as Attachment 5 to the Monitoring and Reporting Program. Please refer to Attachment 5 for the current map of invertebrate monitoring sites.]

Figure 1.

### Aquatic Invertebrate Sample Site Locations Silver King Creek, Alpine Co., CA



## References

- Ramsey, P.H. 1980. Choosing the most powerful pair wise multiple comparison procedure in multivariate analysis of variance. *J. Applied Psych.* 65(3):317-326.
- Trumbo, J., S. Siepmann, and B. Finlayson. 2000a. Impacts of rotenone on benthic macroinvertebrate populations in Silver King Creek, 1990 through 1996. Office of Spill Prevention and Response, Administrative Report 00-5, March 2000. Pesticide Investigations Unit, Office of Spill Prevention and Response, California Department of Fish and Game. 40 p.
- Trumbo, J., S. Siepmann, and B. Finlayson. 2000b. Impacts of rotenone on benthic macroinvertebrate populations in Silver Creek, 1994 through 1998. Office of Spill Prevention and Response, Administrative Report 00-7, December 2000. Pesticide Investigations Unit, Office of Spill Prevention and Response, California Department of Fish and Game. 37 p.
- Zar, J. H. 1984. *Biostatistical Analysis*, 2nd ed. Prentice Hall, Englewood Cliffs, New Jersey.

Appendix 1. *Normal taxonomic resolution of the Buglab*

Taxon or Taxa group	Buglab's Current Standard Taxonomic Level	Northwest Bioassessment Work Group Minimum Standard Taxonomic Effort
<b>Annelida</b>		
	Genus	Genus
<b>Oligochaeta</b>	Order	Family
<b>Arthropoda</b>		
<b>Hydracarina</b>	Order	Order
<b>Crustacea</b>		
<b>Anostraca</b>	Genus/species	Genus/species
	Genus/species	
<b>Copepoda</b>	Genus/species	
<b>Decapoda</b>	Genus/species	Genus
<b>Ostracoda</b>	Order/Family/Genus	
<b>Amphipoda</b>	Genus/species	Genus
<b>Isopoda</b>	Genus	Genus
<b>Collembola</b>	Order	
<b>Insecta</b>		
<b>Coleoptera</b>	Genus/species	Genus
Except Curculionidae, Heteroceridae, Ptiliidae	Family	Family
<b>Diptera</b>		
<b>Atherceridae</b>	Genus	Genus
<b>Blephariceridae</b>	Genus/species	Genus
<b>Ceratopogonidae</b>	Genus	Subfamily
<b>Chaoboridae</b>	Genus/species	
<b>Chironomidae</b>	Subfamily	Genus
<b>Culicidae</b>	Genus	
<b>Deuterophlebiidae</b>	Genus/species	Genus
<b>Dixidae</b>	Genus	Genus
	Family	

Empididae	Genus	Genus
Ephydriidae	Family	Family
Muscidae	Family	Family
Pelecorhynchidae	Genus	Genus
Psychodidae	Genus	Genus
Ptychopteridae	Genus	Genus
Sciomyzidae	Family	
Simuliidae	Genus	Genus
Stratiomyidae	Genus	Genus
Tabanidae	Genus	Family
Tanyderidae	Genus	Genus
Thaumaleidae	Genus	Genus
Tipulidae	Genus	Genus
Ephemeroptera	Genus	Genus
Ephemerellidae	Genus/species	species
Hemiptera	Genus/species	Genus
Lepidoptera	Genus	Genus
Megaloptera	Genus/species	Genus
Odonata	Genus/species	Genus
Plecoptera	Genus/species	Genus
Pteronarcys	Genus/species	species
Taeniopterygidae	Family/Genus	Family
Trichoptera	Genus/species	
Coelenterata	Class	Class/Order
Mollusca		
Gastropoda	Family/Genus/species	Genus
Pelecypoda	Order/Family/Genus/species	Genus
Sphaeriidae	Family Genus	Family/Genus
Nematoda	Phylum	Phylum
Nematophora	Phylum	Phylum
Porifera	Phylum	Phylum
Turbellaria	Class	Class

Date \_\_\_\_\_

**Attachment 3  
Monitoring Report Cover Letter**

California Regional Water Quality Control Board  
Lahontan Region  
2501 Lake Tahoe Boulevard  
South Lake Tahoe, CA 96150

**Facility Name:**

\_\_\_\_\_  
\_\_\_\_\_

**Address:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Contact Person:**

\_\_\_\_\_

**Job Title:**

\_\_\_\_\_

**Phone:**

\_\_\_\_\_

**Email:**

\_\_\_\_\_

**WDR/NPDES Order Number:**

\_\_\_\_\_

**WDID Number:**

\_\_\_\_\_

**Type of Report (circle one):**

Monthly    Quarterly    Semi-Annual    Annual    Other

**Month(s) (circle applicable month(s)\*:**

JAN    FEB    MAR    APR    MAY    JUN  
JUL    AUG    SEP    OCT    NOV    DEC

\*annual Reports (circle the first month of the reporting period)

**Year:**

\_\_\_\_\_

**Violation(s)? (Please check one):**

\_\_\_\_\_ NO                      \_\_\_\_\_ YES\*

**\*If YES is marked complete a-g (Attach Additional information as necessary)**

**a) Brief Description of Violation:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**b) Section(s) of WDRs/NPDES  
Permit Violated:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**c) Reported Value(s) or Volume:**

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**d) WDRs/NPDES  
Limit/Condition:**

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**e) Date(s) and Duration of  
Violation(s):**

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**f) Explanation of Cause(s):**

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**g) Corrective Action(s)  
(Specify actions taken and a schedule  
for actions to be taken)**

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I certify under penalty of law that this document and all attachments were prepared under my direction or supervision following a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my knowledge of the person(s) who manage the system, or those directly responsible for data gathering, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

If you have any questions or require additional information, please contact \_\_\_\_\_ at the number provided above.

Sincerely,

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

# ATTACHMENT 4

## 2002 Sierra Nevada Fish and Amphibian Inventory Data Sheet Instructions Version 2.1 6/17/02

California Department of Fish & Game  
Fish/Amphibian Survey Protocols  
Revised from original protocols of Roland A. Knapp

### Overview

Fill out a separate data sheet (substitute "Palm entry" for "data sheet" as necessary) for every lake and pond that has a Site ID, regardless of how un-lake like the site is. If the site is dry, frozen, part of another sampled water body, or is a widening of a stream (i.e., there is a current flowing through the site), fill out the top portion of the first page of the datasheet, indicate why a full datasheet was not filled out on the map portion of the datasheet (e.g., "pond was dry"), and leave the rest blank. If you encounter ponds not shown on the 7.5' maps, fill out a data sheet (if they contain fish, amphibians, and/or fairy shrimp). It is critical that all relevant portions of each data sheet be filled out, and that non-relevant portions be indicated as such, not simply left blank. Remember, if the data sheet is improperly filled out, the visit was a complete waste of time and money. Meadows and marshes should always be surveyed, even if they do not have Site IDs. When you visit non-lake habitat such as marshes that contain extensive ponded water, fill out a single data sheet for the entire area.

When you complete surveys in habitat that does not contain any ponded water (e.g., streams), record the start and ending UTM coordinates in the amphibian/reptile visual survey section and complete all other pertinent sections. Many stream sections that will be surveyed are associated with other Site IDs (e.g., 200 m of each inlet and outlet) and the survey data should be entered on the associated Site ID's data sheet. Record all observations in ball point pen. Keep data notebooks and otoliths in separate Ziploc bags to prevent labels from being erased by leaking alcohol.

### General Lake Description

**Site ID:** This is a critical number, as it will be used to link the data sheet to a particular body of water and to identify all samples. This ID is written on the 7.5' maps available for crews to take into the field. Check the Site ID carefully before recording it on the data sheet. If you encounter a lake or pond that is not shown on the 7.5' map or a marsh or meadow that does not have a Site ID, its Site ID will be the number of the nearest lake or pond that has a Site ID plus a decimal place identifier (e.g., 70377.1). Additional Site ID's for nearby unnumbered lake features will be made using consecutive numbers (e.g., 70377.1, 70377.2).

**Date:** Write as month-day-year (Aug-10-01) and always use the three letter abbreviation for month.

**Water type:** Circle the appropriate descriptor for the water type you are surveying (lake, unmapped pond, stream, marsh, spring seep). The determination of whether a water body is perennial or ephemeral should be made based on field determination. Perennial lakes and ponds are shown in dark blue, ephemeral lakes and ponds are shown in white with blue diagonal lines, and marshes are indicated by a marsh symbol. If you encounter an unmapped pond that is of sufficient size to be sampled, circle water type = 3 (unmapped pond). If the water body indicated on the map is frozen, dry, not found, part of another lake, or is a stream widening, your sampling will be limited to filling out the top box on the data sheet. Circle the appropriate reason why the water body was not sampled: stream widening, frozen, dry, not found, or part of another water

body. Stream widenings are those water bodies shown as perennial ponds but that have more than 10% of their surface area with noticeable current, i.e., these are more like stream pools than ponds. If the water body of interest is actually part of another water body, sample and complete a data sheet for the larger water body, and fill out only the top box of the second data sheet for the smaller water body, indicating that it is actually part of the larger water body in the "Location" box.

**Lake name:** Obtain lake names from the 7.5' topographic map. If the lake is unnamed, put a line through the space. Please do not write "unnamed".

**Planning Watershed:** The watershed name for all lakes is given on the "Lakes Checklist." Do not use the name of the outlet creek given on the 7.5' map as the drainage name, as this may not be a complete description.

**Location:** This description should always be provided, and must be detailed enough to allow someone not familiar with the area to pinpoint the lake on a topographic map. This information is particularly critical for unnamed lake features, where it is used to identify lakes for which the incorrect Site ID was recorded on the datasheet. Do not leave this space blank, no matter how obvious the lake feature is. At a minimum, give the distance and the compass direction from the site to two nearby prominent named geographical features (e.g., lakes, peaks, etc.). Lake and peak names, distances, and compass directions should be taken from 7.5' maps.

**County:** Record the county (from 7.5' map) in which the lake feature lies.

**Elevation:** Record the elevation from the 7.5' map, or a calibrated Garmin eTrix Vista GPS. On the data sheet, circle the units used (m or ft). Although elevations will generally be shown in feet, some maps give elevations in meters. Look for labeled contour lines to determine contour interval distance and units. If the exact lake elevation is not given, record the average elevation of the first contour line below the lake and the first contour line above the lake.

**UTM Coordinates:** This is a pair of numbers that are basically x and y coordinates. In our area, they are North and East. These numbers need only be obtained for lakes not shown on the 7.5' maps or for those lakes lacking a Site ID. Use the Garmin GPS unit to obtain the UTM coordinates. Make sure your GPS is setup with the proper settings referenced in the Appendix. These coordinates are critical as they will be used to locate the lake on the Geographic Information System.

**Topographic map:** Record the name of the 7.5' topographic map (or "quad") that contains the lake feature. These are listed in the legend on our CDFG navigation maps.

**Maximum lake depth:** Measure maximum lake depth with the Speedtech SM-5 Depthmate Portable Sounder. Do not spend inordinate amounts of time sounding every part of the lake to find exactly the deepest part. By sounding the deepest-looking piece of the lake, you will quickly get a feel for where the deepest spot actually is. Precise measurements of "maximum depth" are not very important in large deep lakes. However, in shallow lakes (< 5 m) a precise depth ( $\pm 0.5$  m) is very important. Plan to take maximum depths when setting or retrieving gill nets. This data field was ignored too often in 2001, but is one of the more important data for determining future management options! Enter this value on the Fish Data Form at the top of page 3, or at the bottom on page 2 if no gill net fish survey was completed for a site.

**Team Members:** Use complete names.

### Lake Characteristics

Crew leaders will generally conduct the surveys of lake characteristics on all lakes with surface areas  $>0.5$  hectares. The habitat characterization is perhaps the most



subjective of the measurements made using this protocol, and we hope to reduce the potentially high observer bias in these larger lakes by having the information collected by a smaller pool of people. Although priority should be given to crew leaders in surveying lakes with surface areas  $\geq 0.5$  hectares, other crew members should survey these lakes if doing so would save time (e.g., if the crew leader is busy surveying another large lake, and there are no small ponds to survey or samples to collect).

**Littoral zone substrate composition:** Record the name of the person conducting the survey of lake characteristics ("Person recording habitat information"). While walking around the lake perimeter during the amphibian/reptile survey (see Amphibian/Reptile Surveying, below), stop after a set number of paces (see below) and categorize the substrate at the lake edge as one of the following: silt, sand (<2mm), fine gravel (2-32mm), coarse gravel (32-64mm), cobble (64-256mm), boulder (>256mm), bedrock, or woody debris (at this time pine needles = "woody debris"). Categorize the substrate along an imaginary transect line starting at the lake edge, extending perpendicular from shore, and lying along the first 3 m of the lake bottom. Put a dot in front of the substrate category that occupies the greatest proportion of the imaginary transect line. Use the dot-line method for recording the number of "hits" in each substrate category (4 hits: ; 8 hits: ; 10 hits: ), instead of the more typical four vertical lines and a slash. The dot-line method is much more space-efficient and is easier to read. In addition to categorizing the substrate type at each spot, record the presence or absence of aquatic vegetation at each spot (record hits using the dot-line method). Only record aquatic vegetation hits on transect with at least 10% coverage. This avoids over-representing aquatic vegetation in the lake characterization. Record this information under "Substrate transects with aquatic vegetation". Increase the number of paces between transects when surveying large lakes and decrease the number of paces for small ponds. Shoot for fifty transects, as this is a sufficient number to provide an accurate description of the littoral zone of lakes. If you generated a Site ID checklist with lake perimeter information from the fpb\_lakes.shp coverage, you can divide the perimeter distance given by 50 to approximate the number of paces between transects. For very small sites where you can observe the entire littoral zone substrate from a single location, it is permissible to estimate the littoral substrate composition by size category visually, and then to record your estimates as percent values for each size category (make sure the total of all substrate categories equals 100%). If the lake contains large numbers of amphibians, conduct the amphibian/reptile survey first and then walk around the lake a second time to measure substrate composition.

**Water depth at one meter:** At each of the littoral zone transects, also record the water depth at one meter from the shoreline and record in one of the following depth categories (in centimeters): 0-15, 16-30, 31-45, 46-60, >60. As with the littoral zone substrate composition for very small sites, it is permissible to estimate the water depth at one meter visually, and then to record your estimates as percent values for each size category (make sure the total of all depth categories equals 100%).

**Shoreline terrestrial substrate composition:** At each of the littoral zone transects, also record the dominant substrate along an imaginary line starting at the lake shore (or the top of the "bath tub ring" if the lake's water level is below full pool) and running for 1.5 m perpendicular and away from the lake shoreline. As with the littoral zone substrate composition for very small sites, it is permissible to estimate the terrestrial substrate composition by size category visually, and then to record your estimates as percent values for each size category (make sure the total of all substrate categories equals 100%). Note: brush = willows and other woody plants; forbs = non-woody plants.

**Width and depth of inlets:** While walking the lake perimeter, record the average width and depth at bank full of each inlet, even if dry. Inlets generally are widest at the point at which they enter the lake, so obtain the average width and depth upstream of this point. If there are no inlets, circle "no inlets". If inlet is dry enter "Dry" and continue to survey inlet for barriers and amphibians.

**Width and depth of outlets:** While walking the lake perimeter, record the average width and depth at bank full of each outlet, even if dry. Outlets generally are widest at the point at which they leave the lake, so obtain the average width and depth downstream of this point. If there are no outlets, circle "no outlets". If outlet is dry enter "Dry" and continue to survey outlet for barriers and amphibians.

**Presence of fish in inlets and outlets:** Record whether there are fish present in the first \_\_\_ m of each inlet and outlet stream by circling "Y" or "N" for each feature. If the stream habitat in a particular inlet or outlet is such that seeing fish would be difficult and you don't see any fish, circle "?". If there are no inlets or outlets, leave this section blank. If inlets and outlets are dry, fish may be present in isolated pools and this is data that needs to be captured.

**Distance to first barrier on inlets:** Pace off \_\_\_ m of each inlet, recording the distance to the first impassable barrier that a fish swimming upstream from the lake would encounter. Dry inlets should still be surveyed. The barrier location should be recorded as the number of meters from the lake. Barriers are falls >0.75 m high if there is no pool at the base, falls >1.5 m if there is a pool at the base, or steep cascades higher than approximately 1.5 m. Logjams can float during high water, and should generally not be considered barriers. Because fish can often get over remarkable obstacles, be conservative in what you call a barrier. Provide a description of each barrier on page 2 of the data sheet (see Detailed lake and inlet/outlet description, below). If there are no barriers on the first \_\_\_ m of an inlet, write "none". If there are no inlets, leave this section blank.

**Distance to first barrier on outlets:** Pace off \_\_\_ m of each outlet, recording the distance to the first barrier that a fish swimming upstream toward the lake would encounter. Dry outlets should still be surveyed. The barrier location should be recorded as the number of meters from the lake. If there are no barriers on the first \_\_\_ m of an outlet, write "none". If there are no outlets, leave this section blank.

**Description of fish barrier(s), UTM coordinates, photo number:** Provide a GPS UTM coordinate, photo number, and a brief description of each barrier in the spaces provided. If additional space is needed, use page 2 of the data sheet (see Detailed lake and inlet/outlet description, below). Record the photo file number. It is important to read the Appendix for camera setup and file naming information. Make sure your GPS is setup with the proper settings referenced in the Appendix.

**Spawning habitat in inlets and outlets:** For the first \_\_\_ m of each inlet and outlet, make a visual estimate of the amount of the streambed between the lake and the first barrier (or for all \_\_\_ m of stream if there is no barrier) that is suitable trout spawning habitat. The amount of spawning habitat should be recorded in terms of the number of square meters of stream bottom with the following characteristics: gravel 0.5-4 cm in diameter and not cemented into the streambed, water depths of 10-50 cm, and water velocities of 20-60 cm/s for successful spawning.

**Evidence of spawning in inlets and outlets:** Check the first \_\_\_ m of each inlet and outlet for evidence of spawning. This could be spawning trout, redds (nests), or newly-hatched fry (20-30 mm). Redds are often very obvious, being patches of freshly cleaned gravel 0.5-1 m in length. If you aren't sure if what you are seeing is in fact a redd, dig into the downstream portion of the disturbed gravel while holding a net downstream. If it is a redd, you should find eggs in the net after disturbing the gravel. For each inlet and outlet, circle all types of evidence that you find. If you don't find any evidence of spawning, circle "None".

**Area of in-lake spawning habitat:** Estimate the amount of suitable spawning habitat (using the spawning habitat criteria given above) in the lake at the mouth of each inlet and outlet. Look for the presence of spawning trout and completed redds.

**Description of other in-lake spawning habitat:** On the map of the lake that you draw on page 2 of the datasheet (see below), describe any other potential spawning habitat you find in the lake. Restrict your description of "other in-lake spawning habitat" to areas where you observe spawning fish, redds, or large numbers of fry in areas of the lake away from inlets and outlets.

**Fairy shrimp:** During the amphibian survey, be on the look out for schools of fairy shrimp. The distribution of these 2-3 cm crustaceans is poorly known for the Sierra Nevada, so we are interested in describing localities. Look for them in all bodies of water you sample. When walking around a lake, take a few minutes to also look in small pools and ponds adjacent to the lake. If you find fairy shrimp either in your samples or during the survey of lake characteristics, indicate this on the data sheet by circling "Y" or "N" to the questions about fairy shrimp locations ("Present in lake?", "In lake-associated pools?", "Other locations?"). "Lake associated pools" are pools within 2 m of the lake. Be specific in your location descriptions! On the lake map you've drawn (see below), indicate the locations of fairy shrimp populations, and provide a brief description of these locations (e.g., "1 m<sup>2</sup> pool 0.5 m from lakeshore on N side of lake 70675, pool is 10 cm deep"). Information on the fairy shrimp populations should include, at a minimum, location, surface area, and depth of the habitats. For all habitats that contain mature fairy shrimp (1.5-3 cm long, females carrying eggs) and are separated by  $\geq 1$  km from other fairy shrimp samples in the same drainage, collect approximately 10 adults, being sure to collect at least 5 large non-egg bearing individuals (these are likely to be males, and males are needed to key these animals out to species). Preserve the fairy shrimp in a 20 ml vial using 95% ethanol. Make an internal label out of a page from your notebook. The label should contain the date, the Site ID, and the drainage name (in pencil). To simplify the process of determining whether a population is  $\geq 1$  km away from the last fairy shrimp population from which a collection was made, on the topographic map write "(F)" next to the Site ID from which fairy shrimp collections were made.

### Amphibian/reptile surveying

We will be conducting amphibian and reptile surveys at all bodies of water shown on 7.5' topographic maps, streams, and at sites not shown on the map but found during surveys and while traveling between sites.

**Amphibian/reptile observers:** Record the names of all people looking for herptofauna.

**Survey start time and end time:** Record the time at which the survey began and ended. The start time is the time the amphibian survey began, not the time you arrived at the site. Record time as 24 hr time. This data tells when the survey was completed.

**Total survey duration:** Record the total time spent searching for amphibians/reptiles. Do not include time spent surmounting lake-side obstacles (e.g., cliffs), identifying specimens, or recording notes. If two people survey the same site by walking in opposite directions around the lake perimeter, the total survey duration should include the time spent surveying by each person. This data tells how much effort went into the survey.

**Weather/wind/color/turbidity:** Circle the appropriate descriptor for each.

**Stream survey:** Using the GPS unit, record the UTM locations at the beginning and end of your stream survey.

**Stream order:** Stream order is a classification based on branching of streams. On a map showing all intermittent and permanent streams, the smallest unbranched tributaries are designated order 1. Where two first order streams meet, a second order stream is formed. Where two second order streams meet, a third order stream is formed (and so on...). Using your 7.5' topo map, identify which order of stream you are surveying, and record it in the box provided.

**Survey description:** To conduct an amphibian survey, walk slowly around the perimeter of the site, or along the stream, counting the number of adults, sub-adults, larvae, and egg masses you find of each species. Species abbreviations are given on the data sheet. Use the sterilized D-net or aquarium net to catch amphibians and reptiles for identification if necessary. Consult the field guide provided for adult and larval identification. Under "Comments", record any interesting observations made during the survey (e.g., mountain yellow-legged frog larvae found only in shallow lagoon on NW side of lake). Also record locations of interesting observations on the map of the lake that you draw (see below). If you are surveying inlets or outlets of a lake and encounter amphibian species, record your observations on a separate line on the data sheet and note the approximate locations and species on the inlet and/or outlet diagrams on page two.

**Calling?:** Were any frogs calling during your survey? Circle yes or no.

**Voucher specimens/tissue samples:** At this time, all amphibian voucher specimens and tissue samples will be collected during a separate effort from this inventory.

**Photo Vouchers:** Betsy and Stafford to add.

**Diseased/Checked (mouthpart inspection):** Recent studies indicate that a chytrid fungus is the likely proximate cause of amphibian declines in several parts of the world. Little is known about this fungus, although we know that it is occasionally found on frogs in the Sierra Nevada. When the fungus attacks the larvae, it deforms their mouthparts. Therefore, for all sites that contain frog larvae, capture 10 larvae with the D-net and inspect their mouthparts for deformities. . On the datasheet, indicate the number of larvae evaluated and the number of these with deformed mouthparts. Release the larvae back into the lake after you have completed your inspections.

Note: chytrid does not show up on toad mouth parts, but does on *Rana*.

**Survey Method:** Circle the method used. Note: Mountain yellow-legged frogs do not have a significant call, so aural surveys will not apply.

**Air and Water Temperatures:** Measure the air temperature from the lake shore at 1 meter above the lake surface. Measure water temperature approximately 0.5m out from shore and 10cm under the water surface. When possible, temperatures should be measured during midday (1100 – 1500). Record the time that temperatures were measured after the @ symbol and the temperature units (°C or F).

### Detailed Lake and Inlet/Outlet Description

**Drawing of lake perimeter, inlets, outlets, in-lake spawning areas, locations of fairy shrimp populations, and areas of special interest:** Use Palm drawing capabilities for 2002, with paper as backup. Based on the 7.5' map, draw the lake perimeter. Add the numbered inlets and outlets from the data sheet. Inlets should be indicated with arrows pointing toward the lake, and outlets should be indicated with arrows pointing away from the lake. If you find in-lake spawning areas or other areas of interest (concentrations of amphibians, locations of adjacent ponds containing fairy shrimp, etc.), indicate these on the map. Also indicate general terrestrial habitat types found around the lake (meadows, talus fields, etc.). If the lake feature is not shown on the 7.5' map, record the approximate dimensions (length, width).

**Description of inlets/outlets:** Provide a detailed description of the physical characteristics of inlets, outlets, and barriers. For example, are inlets and outlets very steep cascades or meandering streams? How high are the barriers? Are they falls or cascades? If fish were present in inlets, were they found only below any barriers, or were they also found above the barriers? Note locations of any amphibians observed. Provide a similar description for the outlets.

**Photo Numbers:** Record photo file number. See Appendix for camera setup and additional file naming information.

### **Fish Surveying**

We will be conducting fish surveys at all bodies of water shown on 7.5' topographic maps and at sites not shown on the map but found during surveys and while traveling between sites.

**Fish survey:** Record whether fish were surveyed visually or using gill nets. Except for small, shallow (<2 m) bodies of water in which the surveyor can see the entire lake bottom, we typically sample fish populations using gill nets. If there is any question as to whether fish are present in a lake, set a net. The only other exception is lakes/ponds where populations of yellow-legged frogs are present. The decision whether to set a gill net in a shallow pond is up to the crew leader, but keep in mind that fish can live in some very marginal habitats. If only a visual fish survey is needed (e.g., because the lake is < 2 m deep and you can see the entire bottom and there is positively no fish, or because there is a healthy population of frogs), you need not fill out the third and fourth pages of the datasheet.

**Justification:** If you surveyed for fishes visually, provide a brief justification as to why you chose this method (e.g., "pond only 50 cm deep, entire bottom visible, no fish seen or frog population present").

**Site ID:** If you are setting a gill net to survey a fish population, fill out pages 3 and 4 of the datasheet. First, record the Site ID again. This identifier will ensure that both sheets of the datasheet are associated with the correct lake. Make sure that the Site ID you record is the correct one and matches the Site ID on the first page of the datasheet.

**Water temperature:** Measure water temperature approximately 0.5 m out from shore and 10 cm under the water surface. Record temperature in Celsius. Temperature should be measured during midday (1100-1500) when possible.

**Description of net location/setting nets:** Circle the appropriate location and provide a brief description of the area in which the net was set ("Comments"). Our fish survey methods are designed to provide an accurate representation of fish species composition and size structure in lakes and ponds, as well as provide an estimate of catch per unit effort (CPUE) at each location. In order to quantify the size structure of each fish species present at a particular location, we need a sample of at least 20 fish, and preferably not more than 50. Obviously, in lakes that have a very small fish population, capturing even 10 fish may not be possible. Nets should be stored and transported in stuff sacks to keep them from getting tangled and to keep them out of the sun. When moving from basin to basin, be sure to sterilize nets thoroughly to prevent the spread of disease. We will set one net in each lake for 8-12 hours. Nets can be set at any time of day. To minimize logistical problems and safety hazards, do not pull nets at night. Time your net sets appropriately. For example, don't set a net at 5 PM, since this would mean either pulling the net at 1-5 AM or waiting until morning and exceeding the 12 hour maximum set duration. You should plan on setting nets in the late evening or early morning. If you are setting a net in a lake with an extremely dense trout population (typically lakes with brook trout), you may want to paddle over the net with a float tube after 4 hours and get a rough count of the number of fish captured. If you have 40 or more fish after 4 hours, pull the net to avoid capturing an inordinate number of specimens. Use this 4 hour net set duration only when absolutely necessary. If gill-netting a lake that contains amphibians, you need not worry that the net will trap them. If turtles are present, set the gill nets during the day only and check the nets frequently to ensure that these species are not getting entangled.

Gill nets should always be set at the lake outlet, if present and if conditions allow. If an outlet does not exist, or is located in an area that is difficult to net (water <2 m deep, log

jams, etc.), set nets at the inlet. If an inlet is not present or is not suitable, set the net in a suitable location anywhere along the lake shore. If possible, choose an area that is 3-8 m deep. Before setting a gill net, submerge the entire net (still contained on the handle); dry nets are much more susceptible to tangling. To set the net, put a small rock into each of two mesh bags and clip one bag to the shore end of the net (end with loop). Get in your float tube and wedge the bag between rocks at the lake shore and pull on it gently to ensure that it is firmly anchored. With the net lying across the float tube (lead-line on your left and net handle in your right hand or vice versa), paddle backwards slowly while feeding out the net. The net should be set perpendicular to the shore. If you encounter a tangle while feeding out the net, shake the net. Do not pull on the net as this will often tighten the tangle. Shaking will nearly always rid the net of the tangle. When you get to the end of the net, attach a float to the handle and then clip the second bag to the bottom of the net. Paddle backwards until the net is taught, and then drop the bag. Record the time when you finish setting the net.

After 8-12 hours, retrieve the net by pulling the mid-lake end of the net up by the float. Detach the float and the bag. Pull the net toward you, placing the float line on one side of the float tube and the lead line on the other. Continue pulling in the net until you reach the shore. Remove the second bag. To carry the net to an area for fish removal, cradle the net over your arms keeping the lead line on one side and the float line on the other. Lay the net down in a meadow or on a sandy flat (a meadow is preferable, but nearly any place will work; stay away from areas with lots of woody vegetation, pine needles, pine cones, and sharp rocks since they will get snagged in the net). Spread out the first 10 feet of net and remove the fish. After removing all fish from the first 10 feet of net, spread the next 10 feet of net and fold up the first 10 feet. Continue until you have removed all fish from the net. Restraining the net onto the handle, rinse the net in the lake, dry the net in the shade, tie the net in a knot to prevent tangling, and stuff it into a sack. The net may be set again without sterilization if the receiving water is located downstream from the previous netting site. If the next netting site is located above the previous site, or in a separate drainage (even a small side drainage within the same basin) then the net must be sterilized (see appendix).

If no fish were captured, write "no fish" across the fish portion of the data sheet. If fish were captured, record the species, length, and weight of all fish. Species abbreviations are given at the bottom of the data sheet. Measure fish using the vinyl tape laid out on the ground. Measure fish total lengths to the nearest mm. Weigh fish using a Pesola spring scale. Before weighing fish, ensure that all debris (small rocks, etc.) are removed from the fish. Use the 60g scale for all fish <100 g, and the 300g scale for larger fish. Outliers may need to be weighed in parts.

All fish will need to be cut open to determine sex. If someone on your crew is able, also note the general contents of fish stomachs (e.g., chironomid pupae, terrestrial insects, etc.). If you encounter a lake that contains both fish and amphibians, look through the fish stomachs very carefully for amphibian remains.

Female fish will have eggs ranging from very small (early) to large and flaccid (late, deflated looking). Make a check mark in the appropriate box for each female fish sampled.

Fish age-analysis can be used to determine if a population that has been supported by biennial (or less frequent) stocking is self-sustaining. Otoliths (ear-bones) should be collected from up to twenty of the sampled fish over the range of sizes captured that are less than 200 mm total length, and only from lakes where it is difficult to determine whether fish are self-sustaining (young-of-the-year are not visibly present in tributaries or around margins of lake). Do not collect otoliths from brook trout, since the Department no longer stocks them in most waters. Place otoliths from each fish into a separate vial labeled with the Fish #. Label the vial with a fine-tip Sharpie. Keep all vials for a particular lake's otolith sample in a small Ziploc bag with an internal paper label that includes the date, the Site ID, the drainage, and the species of fish.

Be careful about disposing of fish carcasses, as we don't want the carcasses attracting the attention of backpackers or bears. The best disposal method is to pop the fish's swim-bladders, put the fish in a sack, paddle out into the lake until you reach a relatively deep area, and dump them. Burial of fish on land should generally be avoided, as animals can smell the fish and will dig them up (no matter how deep you bury them).

**Net set time and date:** Record the time when you completed the net setting process, not the time when you started setting the net. Record the time as 24 hr time. Record the date on which the net was set.

**Net pull time and date:** Record the time when you began pulling the net. Record the date on which the net was pulled.

**Net sterilization:**

## **DISINFECTANT SAFETY AND USE**

### **QUAT-128**

#### **Background**

A commercial grade disinfectant will be used on nets and other equipment in the field to prevent the spread of disease pathogens from one survey area to another. Of particular concern is the chytrid fungus that infects frogs. In the past, chlorine has been used as a disinfectant, however, chlorine has proven to greatly accelerate the deterioration of the lightweight gill nets. A commercial grade quaternary ammonium disinfectant will be used to replace chlorine. Quat-128 (by Genlabs) has wide a germicidal range, is noncorrosive, and low toxicity. Although relatively safe, certain precautions and safety protocols should be observed when handling the disinfectant in its concentrated or diluted form.

#### **Safe Handling**

All persons handling concentrated Quat-128 must wear rubber or latex gloves and eye protection. The area where handling occurs should be well ventilated. Although Quat-128 is low in toxicity, prolonged skin contact can be irritating. If skin contact is made, wash off with soap and water. If Quat-128 gets in eyes, flush with water for 15 minutes. Do not ingest Quat-128 liquid or inhale fumes. Dispose of diluted Quat-128 by pouring on ground, well away from water bodies or streams.

#### **Disinfectant Protocol for Nets and Equipment**

**Dilution:** 1 part Quat-128 to 60 parts water (2 ounces of Quat-128 per gallon of water).

Clean mud and organic debris from all gear prior to disinfecting.

Soak gear in solution for 20 minutes and let dry.

Rinse gear just before next use.

Specific techniques for mixing disinfectant, making a soaking container, and disposal will be covered in training.

All persons must acknowledge that they have read the Material Safety Data Sheet for Quat-128 and understand the safety hazards and health concerns associated with this product.

### **Field review of data sheets**

At the end of each day, the crew leader should review all data sheets for completeness and clarity. Once review of a datasheet is completed, the crew leader should initialize the field review box on pages 2 and 3 of the datasheets. Make sure all of the spaces on the data sheets have been filled in. These data sheets are all the state has to show for the time and money that went into each survey. Protect the data sheets as if they were your most prized possession!

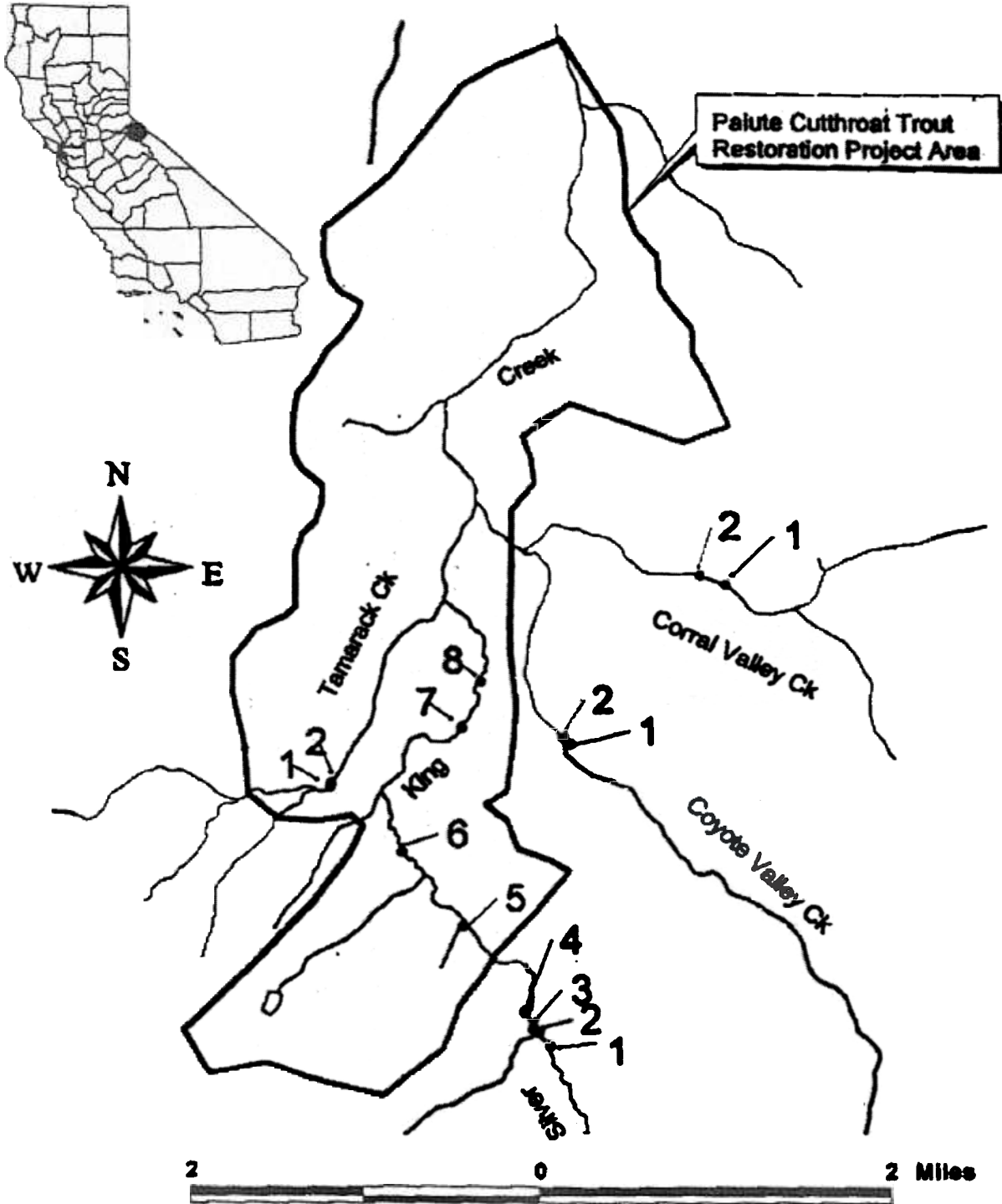
**Gear treatment.** All gear in contact with survey waters must be thoroughly washed between trips to avoid transferring diseases. Gill nets placed in large mesh bags can be machined washed on a delicate cycle with a cup of bleach added as a disinfectant. Hang dry nets in the shade, tie each net in a knot to prevent tangling, and stuff them into individual sacks.

J:\2002\_HML\_Surveys\surveyprotocol02.doc



Attachment 5

# Aquatic Invertebrate Sample Site Locations Silver King Creek, Alpine Co., CA



## ATTACHMENT E

### WATER QUALITY ORDER NO. 2005-0010-DWQ NPDES NO. CA0103209

#### FACT SHEET

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

Pursuant to provisions of the federal Clean Water Act (CWA), the California Department of Fish and Game (DFG) has submitted an application to the Lahontan Regional Water Quality Control Board (Regional Water Board) for a National Pollutant Discharge Elimination System (NPDES) permit to regulate discharges of rotenone and its byproducts to Silver King Creek and its tributaries in the Carson River Hydrologic Unit. Silver King Creek is a water of the United States. The State Water Resources Control Board (State Water Board) has decided to issue this permit. This Fact Sheet provides facts and legal, methodological, and policy issues considered in preparing the draft NPDES Permit.

#### **AVAILABILITY OF DRAFT PERMIT; PUBLIC NOTICE AND REVIEW PROCEDURES**

On September 8, 2004, the Regional Water Board held a hearing on a draft NPDES permit for the proposed project. The Regional Water Board did not act on the draft permit. On June 3, 2005, State Water Board staff sent a draft permit with only minor revisions to interested parties. Written comments were due by 5:00 p.m. on July 5, 2005 to Debbie Irvin at the State Water Board letterhead address and fax number. A contact person and phone number were provided for additional information. Also on June 3, 2005 and June 6, 2005, the State Water Board published a notice in two local newspapers of record, the Tahoe Daily Tribune and the Record-Courier, respectively. The State Water Board held a hearing on July 6, 2005.

#### **BACKGROUND**

On March 12, 2001, the Ninth Circuit Court of Appeals held that discharges of pollutants from the use of aquatic pesticides to waters of the United States require coverage under an NPDES permit (Headwaters, Inc. v. Talent Irrigation District<sup>1</sup>). The Headwaters, Inc. v. Talent Irrigation District decision was issued just prior to the major season for applying aquatic pesticides. Because of the serious public health, safety, and economic implications of delaying applications of aquatic pesticides, the State Water Resources Control Board (State Water Board) adopted an interim NPDES permit, Water Quality Order (Order) No. 2001-12-DWQ on an emergency basis.

The DFG previously obtained coverage under the above-cited Order for a proposed multi-year project to treat portions of Silver King Creek with rotenone, a type of aquatic pesticide toxic to gilled organisms such as fish. Due to delays in implementing the proposed project (which is the subject of this NPDES Permit), DFG was unable to exercise its permit rights under the above-cited Order, which expired in January 2004.

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<sup>1</sup> Headwaters, Inc. v. Talent Irrigation District, (9<sup>th</sup> Cir. 2001) 243 F.3d 526.

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In reissuing the statewide General Order, the State Water Board did not include NPDES permit coverage for fishery management projects by DFG using rotenone. Therefore, these projects must be regulated under separate individual or General NPDES permits.

**AQUATIC PESTICIDE PROJECT DESCRIPTION**

The use of aquatic pesticides by DFG is necessary to manage resources and maintain beneficial uses, such as to protect and/or restore threatened and endangered species. In this case, the DFG, in cooperation with the U.S. Department of Agriculture, Humboldt-Toiyabe National Forest (USFS), and the U.S. Fish and Wildlife Service (USFWS), proposes to use the aquatic pesticide rotenone as part of recovery efforts for Paiute Cutthroat Trout, *Oncorhynchus clarki seleniris*, at Silver King Creek. Paiute Cutthroat Trout is the rarest subspecies of trout in North America, indigenous only to the Silver King Creek watershed. Paiute Cutthroat Trout was listed by the USFWS as federally endangered on October 13, 1970 (Federal Register 35:16047) and reclassified as federally threatened on July 16, 1975 (Federal Register 40:29863). Rotenone will be used to eradicate introduced fish species that can out-compete and interbreed with Paiute Cutthroat Trout, from portions of Silver King Creek and associated tributaries, prior to introduction of the native trout.

Specifically, the DFG will discharge into Silver King Creek and associated tributaries between Snodgrass Creek (Silver King Canyon) and Llewellyn Falls (see map, Attachment A in the NPDES Permit) rotenone formulation and potassium permanganate (an oxidizing agent used to detoxify rotenone). Discharges will also be made into Tamarack Lake. Treatment applications are anticipated once each year for up to three years to ensure all fish are eradicated prior to restocking the treated waters with pure strains of Paiute Cutthroat Trout. The Discharger proposes to apply rotenone in the summer of 2005. Additional treatments will be scheduled as necessary to ensure complete eradication of non-native fish.

Under this NPDES Permit, DFG is limited to use of two commercially available rotenone formulations for use with this project, specifically Nusyn-Noxfish and CFT Legumine. Use of other formulations is not authorized under this NPDES Permit.

Nusyn-Noxfish will be applied at a target concentration of 1 mg/L formulation (25 µg/L rotenone) to all flowing streams except Tamarack Creek. The specific quantity of Nusyn-Noxfish to be discharged is dependent on flow, and is estimated at approximately 10 gallons per treatment. CFT Legumine will be applied at a target concentration of 1 mg/L formulation (50 µg/L rotenone) to Tamarack Creek, and Tamarack Lake. The specific quantity of CFT Legumine to be discharged is dependent on Tamarack Lake volume estimates, and is estimated at approximately 50 gallons per treatment. Rotenone will be applied to streams using drip stations, with hand spraying in backwater areas as necessary. DFG will apply rotenone to Tamarack Lake from non-motorized rafts using gasoline-powered pumps.

DFG will operate a detoxification station downstream of the application areas in Silver King Creek, at the confluence of Silver King Creek and Snodgrass Creek. DFG will apply potassium permanganate at a rate of approximately 3 mg/L as the detoxifying agent. The application of potassium permanganate will temporarily discolor the water (resulting in a purple color) for up to two miles downstream of the

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detoxification station. Under these conditions, potassium permanganate is expected to be quickly reduced to manganese oxide, and does not persist for more than a day following the end of detoxification. Potassium permanganate will not be applied to Tamarack Lake.

The proposed project is within areas designated as federal wilderness within the East Fork Carson River Hydrologic Unit (Dept. of Water Resources Hydrologic Unit #632.00).

### **WATERS OF THE UNITED STATES**

This NPDES Permit regulates the discharge of pollutants associated with the application of aquatic pesticides to waters of the United States. "Waters of the United States" include all waters currently used, used in the past, or susceptible to use in interstate commerce; all interstate waters; and all other waters the use, degradation, or destruction of which would or could affect interstate or foreign commerce. Waters of the United States include waters used by interstate or foreign travelers for recreation, waters from which fish or shellfish are taken and sold in interstate or foreign commerce, impoundments of and tributaries to waters of the United States, and wetlands adjacent to waters of the United States. Waters of the United States include, but are not limited to, irrigation and flood control channels that exchange water with waters of the United States.

### **WATER QUALITY STANDARDS**

The CWA defines Water Quality Standards as "Provisions of state or federal law which consist of designated uses for the waters of the United States, water quality criteria for waters based upon such uses, and antidegradation policies. Water quality standards are to protect the public health or welfare, enhance the quality of water and serve the purposes of the Act." [40 Code of Federal Regulations (CFR) section 131.3(i)].

In California, *Water Quality Control Plans* designate the beneficial uses of waters of the State and water quality objectives (WQOs) to protect those uses. The State and Regional Water Boards adopt *Water Quality Control Plans* through a formal administrative rulemaking process, and, upon approval by the United State Environmental Protection Agency (U.S. EPA), the WQOs for waters of the United States (generally surface waters) become State water quality standards. The Regional Water Board adopted an updated *Water Quality Control Plan for the Lahontan Region* (Basin Plan) that became effective on March 31, 1995. The Basin Plan provides a strategy for protecting beneficial uses of surface and ground waters throughout the Lahontan Region, including 1990 and 1993 amendments of the preceding Basin Plan to allow conditional use of rotenone by DFG.

The Basin Plan rotenone policy allows use of rotenone by DFG for certain specific types of fishery management activities, including restoration or enhancement of threatened or endangered species. Eligibility criteria and conditions are set forth in Chapter 4 of the Basin Plan. For DFG projects meeting the eligibility criteria and conditions, the Basin Plan rotenone policy grants a variance from meeting Basin Plan water quality objectives (such as the pesticides and toxicity objectives) that would otherwise apply. Projects qualifying for the variance are instead subject to specific water quality objectives for DFG rotenone use established in Chapter 3 of the Basin Plan. A Memorandum of Understanding

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(MOU) between the Regional Water Board and DFG was executed in 1990 to implement the Basin Plan policy. Certain aspects of that MOU are superseded or rendered invalid by the Headwaters, Inc. v. Talent Irrigation District decision and changes to State law. Namely, discharges of aquatic pesticides are now required to be in compliance with an NPDES permit. The MOU nonetheless provides a framework for compliance with the Basin Plan.

### **TOXICS RULES AND STATE IMPLEMENTATION POLICY**

U.S. EPA has established water quality criteria in California for priority pollutants in the National Toxics Rule (NTR) and the California Toxics Rule (CTR). The NTR and CTR criteria are also water quality standards.

The State Water Board has adopted a *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (SIP). The SIP establishes procedures for implementing water quality standards for NTR/CTR priority pollutants<sup>2</sup> in NPDES permits. Rotenone itself is not a designated priority pollutant and, therefore, is not subject to the SIP.

Section 5.3 of the SIP allows for short-term or seasonal exceptions from its requirements for resource or pest management activities conducted by public entities. In order to qualify for a categorical exception from meeting priority pollutant standards, a public entity must fulfill the requirements listed in Section 5.3. Among other requirements, entities seeking an exception to complying with water quality standards for priority pollutants must submit evidence of compliance with the California Environmental Quality Act (CEQA, Public Resources Code 21000, et seq.). The State Water Board has discretion to grant an exception for a qualifying project. In this case, the DFG certified a mitigated Negative Declaration for the project and otherwise qualifies for an exception. The proposed NPDES Permit includes an exception to the SIP.

To further bolster the basis for the State Water Board to grant an exception to the SIP, DFG has provided chemical testing data for volatile and semi-volatile organic compounds to demonstrate that the rotenone formulations do not contain priority pollutants of that type at levels that, consequent to discharge, would exceed applicable federal water quality standards established for California. In addition, State Water Board staff have reviewed confidential/proprietary information from the manufacturers of the rotenone formulations proposed for use by DFG. State Water Board staff review found that priority pollutants were not contained in the products or formulations.

### **RELATED AQUATIC PESTICIDE REGULATIONS**

Pesticide formulations contain disclosed active ingredients that yield toxic effects on target organisms and may also have toxic effects on non-target organisms. They also contain inactive or inert ingredients, as well as adjuvants. Adjuvants are compounds chosen by the discharger and added to aquatic pesticides during an application event to increase the effectiveness of the aquatic pesticides on target organisms.

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<sup>2</sup> The water quality standards for priority pollutants are listed in 40 Code of Federal Regulations (CFR), § 131.38 (b)(1).

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According to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), U.S. EPA has sole jurisdiction of pesticide label language. Label language and any changes thereto must be approved by U.S. EPA before the product can be sold in this country. As part of the labeling process, U.S. EPA evaluates data submitted by registrants to ensure that a product used according to label instructions will cause no harm (or “adverse impact”) on non-target organisms that cannot be reduced (or “mitigated”) with protective measures or use restrictions. Registrants are required to submit data on the effects of pesticides on target pests (efficacy) as well as effects on non-target organisms. Data on non-target effects include plant effects (phytotoxicity), fish and wildlife hazards (ecotoxicity), impacts on endangered species, effects on the environment, environmental fate, breakdown products, leachability, and persistence; however, FIFRA is not necessarily as protective of water quality as the Clean Water Act (CWA).

The Department of Pesticide Regulation (DPR) is responsible for reviewing the toxic effects of aquatic pesticide formulations and determining whether a pesticide is suitable for use in California’s waters through a registration process. To do this, DPR also reviews data submitted by the registrants. While DPR cannot require manufacturers to make changes in labels, DPR can refuse to register products in California unless manufacturers address unmitigated hazards by amending the pesticide label. Consequently, requirements that are specific for use in California are included in many pesticide labels that are approved by U.S. EPA.

DPR also licenses applicators of pesticides designated as a “restricted material.”<sup>3</sup> To legally apply these pesticides, the applicator must be a holder of a Qualified Applicator Certificate or work under the supervision of someone who is certified. For aquatic pesticides, the qualified Applicator Certificate must have the category “aquatic.”

### **EFFLUENT LIMITATIONS**

NPDES permits for discharges to surface waters must meet all applicable provisions of sections 301 and 402 of the CWA. These provisions require controls that utilize best available technology economically achievable (BAT), best conventional pollutant control technology (BCT), and any more stringent controls necessary to reduce pollutant discharge and meet water quality standards. Controls to achieve limitations on effluent constituents are generally required.

Title 40, CFR section 122.44 states that if a discharge causes, has the reasonable potential to cause, or contributes to an excursion of a numeric or narrative water quality criterion, the permitting authority must develop effluent limits as necessary to meet water quality standards. Title 40, CFR section 122.44(k)(3) allows these effluent limits to be requirements to implement Best Management Practices (BMPs) if numeric effluent limits are infeasible. It is infeasible for the Regional Water Board to establish numeric effluent limitations in this NPDES Permit because:

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<sup>3</sup> DPR designates a pesticide as a restricted material in California if it poses hazards to public health, farm workers, domestic animals, honeybees, the environment, wildlife, or crops other than those being treated (“Regulating Pesticides: A Guide to Pesticide Regulation in California,” October 2001, DPR).

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1. Pesticides are products of specific formulation. Though pollutants in pesticides are discharged from a point source (or sources), they are not an “effluent” in the conventional sense of the word. A sufficient amount of the active ingredient must be discharged to achieve the target concentration that provides the intended effect. There is no point in requiring treatment to achieve effluent limits in this case. Treatment, in many cases, may render the pesticide useless for control purposes.
2. The regulated discharge is the discharge of pollutants associated with the application of aquatic pesticides. These include over-applied pesticide product and pesticide residues. At what point the pesticide becomes a residue is not precisely known and varies depending on such things as target species, water chemistry, and flow. Therefore, in the application of aquatic pesticides, the exact effluent is unknown.

Therefore, the effluent limitations contained in this NPDES Permit are narrative and include requirements to implement appropriate BMPs, including compliance with all pesticide label instructions, and to comply with receiving water limitations. The BMP requirements are included in DFG’s NPDES Permit application and other information provided to the Regional Water Board by the DFG and are incorporated in the NPDES Permit by reference and by specific provisions. BMPs provide the flexibility necessary to establish controls to minimize the magnitude, area and duration of impacts caused by the discharge of aquatic pesticides.

The BMPs required herein constitute BAT and BCT and will be implemented to minimize the magnitude, area and duration of impacts caused by the discharge of aquatic pesticides in the treatment area and to allow for restoration of water quality and protection of beneficial uses of the receiving waters following completion of treatment events.

### **RECEIVING WATER LIMITATIONS**

Once an aquatic pesticide has been applied to an application area, the pesticide product can actively treat the target species within the treatment area. During the treatment event, the aquatic pesticide is at a sufficient concentration to actively kill or control targets. The minimum effective concentration, and the time required to reach it, vary due to site specific conditions, such as flow, target species, and water chemistry. The NPDES Permit contains receiving water limitations applicable for rotenone projects as contained in the Basin Plan. The receiving water limitations require that an application event does not result in an excursion from applicable water quality standards in the receiving waters as defined in the NPDES Permit.

Water quality monitoring to verify compliance with receiving water limits is required in the project areas and in the downstream receiving waters both during and following the treatment events, as described below and in the Monitoring and Reporting Program.

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**CEQA EXEMPTION**

Pursuant to CWC section 13389, the State Water Board is exempt from the requirement to comply with the CEQA when adopting NPDES permits. While adoption of this NPDES Permit is exempt from preparation of a CEQA document, public entities receiving exceptions pursuant to section 5.3 of the SIP are required to prepare a CEQA document, as discussed below.

**SIP EXCEPTION**

The SIP contains implementation provisions for water quality standards for priority pollutants. The SIP provides that categorical exceptions may be granted to allow short-term or seasonal exceptions from meeting the priority pollutant criteria/objectives if “necessary to implement control measures . . . for resource or pest management . . . conducted by public entities to fulfill statutory requirements.” The SIP specifically refers to fishery management as a basis for a categorical exception. The exceptions are available only to public entities that have adequately provided the following, as listed in the SIP:

1. CEQA documentation including notifying potentially affected public and government agencies;
2. A detailed description of the proposed action which includes the proposed method of completing the action;
3. A time schedule;
4. A discharge and receiving water monitoring plan that specifies monitoring prior to application events, during application events, and after completion with the appropriate quality control procedures;
5. Contingency plans.
6. Residual waste disposal plans.

The DFG has prepared and certified a Mitigated Negative Declarations (MND) for the discharge of aquatic pesticides in accordance with CEQA. As the lead agency under CEQA, the DFG determined that the project would not have a significant effect on the environment and that the water quality or related water quality impacts identified in the environmental assessment of the project are less than significant. That determination was not challenged in accordance with statutory requirements of the CEQA.

As required in section 15096 of the CEQA Guidelines, the State Water Board, as Responsible Agency under CEQA, considered the MND approved by the DFG and finds that the project will have less than significant water quality impact if the waste discharge requirements in this NPDES Permit are followed.

DFG has complied with the exception requirements of SIP section 5.3. The State Water Board has considered this matter and has granted DFG an exception pursuant to section 5.3 of the SIP.



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NPDES No. CA0103209**

**MONITORING REQUIREMENTS**

This NPDES Permit requires compliance with the Monitoring and Reporting Program (MRP) developed for the project. The goals of the MRP are to:

1. Determine compliance with the receiving water limitations and other requirements specified in this NPDES Permit;
2. Support the development, implementation, and effectiveness of BMPs;
3. Assess the chemical, physical, and biological impacts on receiving waters resulting from aquatic pesticide applications;
4. Assess the overall health and evaluate long-term trends in receiving water quality;
5. Demonstrate that water quality of the receiving waters following completion of resource management projects fully support beneficial uses;

In order to meet the MRP goals, DFG must provide information on the volume or volumetric flow rate of waters in the treatment areas and other information used to calculate the dosage and quantity of each pesticide used.

The NPDES Permit requires pre-project and post-project monitoring of benthic macroinvertebrate communities in the treatment areas and in “control” sites not subject to treatment. The monitoring as described in the MRP is reasonably necessary and adequate to assess the impacts on these communities and their post-project recovery status. Such monitoring on past projects has been a subject of controversy and disagreement among entomologists and others with expertise in the field.

Within two years following the last treatment for a specific project element, a fisheries biologist or related specialist from DFG must assess the condition of the treated waters, and certify in writing whether all applicable beneficial uses have been restored. Pursuant to the MOU, that assessment must consider the condition of fish and macroinvertebrate populations in the affected waters.

The MRP specifies the analytical methods that must be used. Analytical detection limits are specified in those methods, with the exception of di(ethylene glycol) ethyl ether, and 1-methyl-2-pyrrolidone, for which specific published analytical methods are not available (those two constituents will be analyzed by modified U.S. EPA Method 8015). Detection limits must conform with limits established in the analytical methods and, where detection limits are not specified within the method, detection limits shall be the lowest achievable using state-of-the-art analytical laboratory equipment and methodologies.

Detection limits for U.S. EPA Methods 8260 (Volatiles) and 8270 (Semi-volatiles) are available online at the website [http://www.epa.gov/epaoswer/hazwaste/test/8\\_series.htm](http://www.epa.gov/epaoswer/hazwaste/test/8_series.htm). DFG Reporting Limits for constituents analyzed by other methods are as follows:

**ATTACHMENT E**

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<b>Constituent</b>	<b>Reporting Limit (µg/L)</b>
rotenone	2
rotenolone	2
piperonyl butoxide	10
1-methyl-2-pyrrolidone	10
Di(ethylene glycol) ethyl	10

DFG has provided the results of chemical scans of Nusyn-Noxfish and CFT Legumine using the above-cited methods and reporting limits. The information is tabulated for comparative purposes in an Attachment 1 to this Fact Sheet titled “Expected Chemical Concentrations.”

The MRP provided by this NPDES Permit is considered baseline monitoring. DFG mitigation monitoring plans required for CEQA mitigation measures must also be implemented.

**NPDES PERMIT RE-OPENER AND REVOCATION/TERMINATION PROVISIONS**

This NPDES Permit contains standard provisions that state the NPDES Permit may be modified, revoked and reissued, or terminated for cause. Cause includes, but is not limited to, any violation of the NPDES Permit. Any violation of the NPDES Permit constitutes a violation of the Clean Water Act and constitutes grounds for enforcement action, permit termination, permit revocation and reissuance, denial of an application for reissuance, or a combination of the above.

**ATTACHMENT 1**

Expected Chemical Concentrations

# FACT SHEET ATTACHMENT: EXPECTED CHEMICAL CONCENTRATIONS

Expected Chemical Concentrations: old formulations versus formulations proposed for use in 2004 Silver King Creek Project  
(prepared by Jason Churchill)

(updated 8/10/04, JJC)

Analyte (Priority Pollutants are indicated with an asterisk)	carcinogenicity classification <sup>a</sup>	2004 FORMULATIONS				OLD FORMULATION <sup>a</sup>		California Primary MCL <sup>2</sup> (ug/L)	California DHS Action Level <sup>1</sup> (ug/L)	CTR Most Stringent Criterion <sup>3</sup> (ug/L)
		conc. in formulation (mg/L)	CFT Legumine <sup>5</sup>	Nusyn-Noxfish <sup>4</sup>	CFT Legumine <sup>5</sup>	conc. (ug/L) at 1ppm applied formulation	Nusyn-Noxfish			
rotenone (active ingredient)		20,000	43,000	20	43	not analyzed, est. 25 ug/L				
rotalolone (breakdown product)		2,500	5,300	2.5	5.3	not analyzed				
piperonyl butoxide (synergist)		21,000		21		not analyzed, est. 25 ug/L				
n-methyl-2-pyrrolidone			90,000		90					
difethylene glycol ethyl ether			569,000		569					
trichloroethylene	B2	<4		<0.004			0.91	5	2.7	
acetone	D						0.034			
anthracene	D						1.52			
benzene	A						0.006	1	9,600	
ethylbenzene	D	120		0.12			0.048	300		
isopropylbenzene ("cumene")	D	8,040		8.04						
n-propylbenzene	D	43,000		43						
1,3,5-trimethylbenzene	D	156,000		156						
1,2,4-trimethylbenzene	D	68		0.068						
sec-butylbenzene		3,700		3.7						
n-butylbenzene		2,200		2.2						
methylene chloride	B2						0.059	5	4.7	
naphthalene	C	1,200	350	1.2	0.35	(2-methyl naphthalene) 100	110		170 no value in CTR	
methyl naphthalene	D	750	140	0.75	0.14					
phenanthrene	D						3.25			
bis (2-ethylhexyl) phthalate	B2						1.52	4	1.8	
toluene	D	<4		<0.004			0.042	150	6,800	
p-isopropyltoluene	D	5,900		5.9						
Xylenes	D	1,240		1.24			3.2	1,750		

**carcinogenicity key<sup>a</sup>**

- A = Known human carcinogen; sufficient epidemiologic evidence in humans
- B = Probable human carcinogen
- B1 = Probable human carcinogen; limited epidemiologic evidence in humans
- B2 = Probable human carcinogen; sufficient evidence from animal studies; no or inadequate human data
- C = Possible human carcinogen; limited evidence from animal studies; no human data
- D = Not classified as to human carcinogenicity; no data or inadequate evidence
- E = Evidence of non-carcinogenicity for humans

Target formulation concentration in receiving water:

Nusyn-Noxfish = 1 ppm  
CFT Legumine = 1 ppm

<sup>a</sup> Information from "A Compilation of Water Quality Goals," August 2003, Regional Water Quality Control Board, Central Valley Region  
<sup>b</sup> based on analytical report for Nusyn-Noxfish lot #50686 submitted by DFG July 16, 2002  
<sup>c</sup> based on analytical report for CFT Legumine submitted by DFG by fax July 8, 2004  
<sup>d</sup> highest concentration reported for nine lots tested, from CDFG's final 1994 Programmatic EIR "Rotenone Use for Fisheries Management," Table 3