ENCLOSURE 3

07-0094

Comment Letter 1

From: "Don C. Erman" <dcerman@ucdavis.edu>
To: BWarden@waterboards.ca.gov
Date: 11/3/2009 4:06 PM
Subject: rotenelone

Dr. Warden,

I noticed in the Tentative NPDES permit (and in the previous permit from 2005 for the same project) that reference is made to providing source literature for any chemical test outside EPA approved methods and Standard Methods. ("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.")

The Tentative NPDES permit cites an article by Dawson et al. 1983 (Dawson, V. K., P.D.Harman, D.P. Schultz, and J. L. Allen. 1983. Rapid method for measuring rotenone in water at piscicidal concentrations. Trans. Amer. Fish. Soc. 112:725-727.) as the authority source for the methods used to test for rotenolone.

This two page article deals exclusively with rotenone. The word rotenolone does not appear in the article.

What is/has been the method and authority for tests of rotenolone? 1

Don Erman

Comment Letter 2

From: Julia Olson <jaoearth@aol.com>
To: BWarden@waterboards.ca.gov
CC: patty@alt2tox.org; LKemper@waterboards.ca.gov
Date: 6/7/2009 8:54 AM
Subject: Re: Silver King Creek NPDES packet

Thank you. Please let me know about our request that you extend the deadline for comments. 1
Julia Olson

On Jun 5, 2009, at 11:33 AM, Bruce Warden wrote:

> Hi Julia,
>
> Sorry for the oversight. Attached is a pdf version of the tentative
> permit. A hard copy is going out to you in today's mail.
>
> Bruce T. Warden, Ph.D.
> Environmental Scientist
> Lahontan Regional Water Quality Control Board
> 2501 Lake Tahoe Blvd.
> South Lake Tahoe, CA 96150
> (530) 542-5416
> (530) 544-2271 fax
> bwarden@waterboards.ca.gov
>
>
> >>> Julia Olson <JAOEarth@aol.com> 6/4/2009 9:12 PM >>>
> Mr. Warden,
>
> I emailed you a couple of weeks ago requesting the NPDES permitting
> packet that was sent out to interested parties. As of today, I still
> have not received it. I will be submitting comments on behalf of my
> clients and will not be able to adequately comment without the
> information. As far as I can tell, it is not posted on your website.
> If it is, please send me the appropriate links to all of the
> documents.
>
> I understand you have postponed the deadline to June 12 for
> submitting comments. However, I am out of town on business from now
> until June 13. Given that the item is not on the Board's agenda until
> January 2010, I respectfully request that you extend the deadline at
> least by several weeks, if not several months, to allow the public to
> fully participate and for me to receive the information which I have
> requested.
>
> Given the intentional delay by the Board in hearing this matter, the
> timing of requiring public comments on the permitting seems strange
> also in light of the fact that the proposed project could change
> significantly because of comments received by USFWS on the DEIS.
>
> Thank you for your consideration of this matter.
>
> Sincerely,
>
> Julia Olson
>
>
> Julia A. Olson
> Wild Earth Advocates
> 2985 Adams St.
> Eugene, OR 97405
> 541-344-7066
> f: 541-344-7061
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>
>
>
> <Silver King NPDES Permit PDF.pdf>

Californians for Alternatives to Toxics

315 P Street, Eureka, CA 95501

phone 707-445-5100 fax 707-445-5151

cats@alternatives2toxics.org http://www.alternatives2toxics.org

May 4, 2009

To: Robert D. Williams, Field Supervisor
Nevada Fish and Wildlife Office
U.S. Fish and Wildlife Service
1340 Financial Boulevard, Suite 234
Reno, Nevada 89502
fw8pctcomments@fws.gov
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Stafford Lehr
Senior Environmental Scientist
Paiute Cutthroat Trout Restoration Project
California Department of Fish and Game
North Central Region
1701 Nimbus Road
Rancho Cordova, CA 95670
SilverKingPublicComment@dfg.ca.gov

From Julia Olson on behalf of:

Californians for Alternatives to Toxics
315 P Street
Eureka, CA 95501

and

Wilderness Watch
P.O. Box 9175
Missoula, MT 59807

Re: Comments on the Draft Environmental Impact Statement/Report (DEIS/DEIR) for the Paiute Cutthroat Trout Restoration Project, Carson-Iceberg Wilderness, Humboldt-Toiyabe National Forest, Alpine County, CA; Rotenone poisoning in the Silver King Creek watershed.

Mr. Williams:

Californians for Alternatives to Toxics ("CATs") and Wilderness Watch (jointly referred to herein as CATs) submit these comments on the Paiute Cutthroat Trout Restoration Project DEIS/DEIR ("DEIS"). CATs is a non-profit organization dedicated to promoting alternatives to the use of pesticides and toxic chemicals in order to keep such chemicals out of the environment and prevent harmful results to people, animals, water and the land. Wilderness Watch is a non-profit organization dedicated solely to protecting the lands and waters in the 110 million-acre National Wilderness Preservation System. Wilderness Watch strives for proper stewardship of these remarkable Wilderness reserves through citizen oversight, education, and continual monitoring of federal management activities.

Both CATs and Wilderness Watch were plaintiffs in the prior lawsuit, which led to the preparation of this DEIS and which resulted in an injunction of this project in 2005. Both organizations have a long-standing interest in protecting this watershed from poisoning. Members of both organizations depend for their health, culture, education, recreation, enjoyment and well-being on the preservation and protection of Sierra Nevada wilderness areas and all the natural resources, species and biodiversity within them.

Please send a copy of the FEIS/FEIR, ROD, other notices, WDR permits and any other documents relevant to this project to the above addresses for CATs and Wilderness Watch. Please also send copies of the same to the attorneys who represented CATs in its prior lawsuit against the Forest Service on this same rotenone project, Julia Olson and Pete Frost, at the following addresses:

Julia A. Olson
Wild Earth Advocates
2985 Adams Street
Eugene, OR 97405

Peter M.K. Frost
Western Environmental Law Center
1216 Lincoln St.
Eugene, OR 97401

CATs appreciates that the USFWS and CDFG have finally prepared a joint EIS/EIR to evaluate this project. However, the NEPA/CEQA analysis is deficient in many respects and does not properly consider, disclose or evaluate critical impacts of this project or reasonable alternatives to the preferred alternative. Further, the agencies have not addressed probable violations of other federal and state laws, if this project were implemented. All of these concerns are addressed below. Because the DEIS is so deficient, CATs respectfully requests that the agencies withdraw the project, or issue a new DEIS for public review and comment. Further, CATs requests that the use of rotenone be removed from consideration for this project and that non-piscicide means of protecting Paiute cutthroat trout and other native fish populations be used in order to

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preserve the integrity of this wilderness stream ecosystem and increase the probability that it will remain an important source of biodiversity in the face of global warming and continued human impact. CATs strongly opposes single species management, in the form of poisoning, to the detriment of other native species in the ecosystem.

NEPA/CEQA

In 2005, in issuing a preliminary injunction enjoining the 2004 iteration of this stream poisoning project, the Federal District Court for the Eastern District of California recognized "[Nancy] Erman's and Dr. Herbst's notable and well recognized expertise in the precise area of Sierra Nevada mountain invertebrate ecology" and found that "their opinions and concerns deserved close and extensive attention; the Service should have carefully and publicly weighed their opinions against other comparable expert opinions. While the Service's conclusions are clear in the EA and FONSI, how and why the Service reached those conclusions is not at all clear. That process of assessing and balancing the environmental impacts deserves far more transparent and careful analysis." *CATs v. Troyer*, NO. CIV. S-05-1633 FCD KJM, p. 9 (E.D. Cal. Aug. 31, 2005).

The Court also held, that "it appears to the court that the solid scientific data regarding Ms. Erman's declaration that there is a high probability that rare and endemic species live in the Project area, is 'precisely the [type] of information . . . that is required before a decision that may have a significant adverse impact on the environment is made.' *National Parks & Conservation Ass'n v. Babbitt*, 241 F.3d 722, 733 (9th Cir. 2001)." *CATs v. Troyer*, NO. CIV. S-05-1633 FCD KJM, p. 9 (E.D. Cal. Aug. 31, 2005). "The court notes that on this issue, the Forest Service had two years to gather this information, between the earlier 2002 EA and the 2004 [and] choose not to do so." *Id.* at p.9, fn. 9.

As described herein and in the 2009 Comments of Nancy Erman and Don Erman, attached as Exhibit A, the agencies have not carefully and with transparency analyzed the impacts of the project. Nor did the agencies diligently collect the relevant data that would have allowed for informed decision-making. The DEIS continues to ignore much of Erman's work and comments over the years. 5

Proposed Action and Alternatives

The stated purpose of the project is to prevent hybridization of Paiute cutthroat trout with other salmonids as a step towards preventing extinction of the fish and to allow it to be removed from the federal threatened species list. The second stated purpose is to restore Paiute cutthroat trout to its so-called "historic range as stated in the Revised Recovery Plan (USFWS 2004)." p.1-3.

1. The DEIS should have considered an alternative that would have specifically addressed the agencies' perceived threat of an illegal introduction of non-native trout into Paiute cutthroat trout habitat above Llewellyn falls. The primary stated project purpose is to prevent hybridization with other salmonids and the only threat of hybridization specified in the EIS is that someone, like a rogue angler, might intentionally or 6

accidentally remove a live non-native trout from below Llewellyn falls and move it to the stretch of stream above the falls where native Paiute cutthroat trout live.

2. It does not seem possible to wholly prevent an illegal transplant. If an angler wanted to do so, he could accomplish the task in such a remote location by carrying in a fish and placing it in the water. However, because the EIS pinpoints anglers as the real threat, a reasonable alternative (or component of an alternative) that should have been considered would be to prohibit fishing in the stretch of creek below Llewellyn falls or to prohibit fishing in the entire watershed or wherever the threat seems most likely to exist. In addition to restricting fishing, the agencies could increase fishing and backcountry education when permits for entry into the wilderness are issued in order to make users aware of the risk to the Paiute cutthroat trout. Further, the agencies could create a greater wilderness ranger or volunteer presence in this stretch of creek to talk to anglers or hikers about how to handle fish appropriately in the area. As the DEIS notes, informational kiosks or signs could be posted outside of wilderness informing people of the restrictions on moving fish.

3. None of the alternatives really address how to decrease the chances of an illegal transplant to Paiute cutthroat trout habitat or what methodology they are employing in stating that the preferred alternative will reduce chances of an illegal transplant. Even if the project successfully removed non-native or hybridized fish from the 11 miles of Silver King Creek, below the alleged barriers, there will still exist non-native and hybridized fish that could be illegally moved upstream (and as we demonstrate below, the fish may on their own pass the barriers which are not truly impassable at high water). Thus, no matter how much of Silver King Creek is inhabited by Paiute cutthroat trout, there will always be the risk of an illegal transplant, which could contaminate that stretch of creek up to Llewllyn falls. The DEIS completely ignores this reality, even though preventing illegal transfer is intended as the primary project purpose.

4. An alternative addressing illegal fish transplanting does not address the other stated purpose of the project, which is to "restore Paiute cutthroat trout to its historic range as stated in the Revised Recovery Plan (USFWS 2004)." However, the reference to the Revised Recovery Plan is a red herring as there is no scientifically valid evidence establishing that the creek below Llewellyn falls was ever historical habitat for the Paiute cutthroat trout and there is evidence stating that native habitat for the Paiute CT was above Llewellyn Falls (J.H. Ryan in Schaffer 1992). The DEIS should explicitly provide the scientific evidence demonstrating that the habitat below Llewellyn falls was Paiute CT historic habitat. In addition, there are no known genetic markers to distinguish the Paiute cutthroat trout from the Lahontan cutthroat trout. How will managers stock SKC with pure Paiute cutthroat trout, when it cannot genetically or visually distinguish them from Lahontan cutthroat trout? Further, the agencies have recently admitted that visually, they cannot distinguish between a pure Paiute cutthroat, a Lahontan cutthroat or a hybridized one. Since the DEIS admits there is no way to genetically test in the field, how can this project be successful?



5. One significant flaw with the current alternatives presentation and analysis is that it does not take a hard look at why the preferred alternative should be selected over Alternative 3 when both alternatives can achieve the project's purpose and Alternative 3 would do so without killing other gill-breathing organisms, such as macroinvertebrates. Neither alternative is guaranteed to be 100% successful, but the preferred alternative has significant and unmitigable consequences, which may permanently eliminate other rare and endemic species to the creek and wilderness area. The EIS should clearly disclose why the perceived disadvantages of Alternative 3 outweigh the significant harm caused by stream poisoning in the preferred alternative, including the unavoidable adverse effects and irretrievable commitments of natural resources to species and water quality, which are completely avoided by Alternative 3. This is not addressed head on in the DEIS and is an essential component of informed decision-making for this project. 8

6. Relatedly, the DEIS does not explain why a ten-year project (Alternative 3 in its worst-case scenario; it could be completed in three years, however) will not achieve the project purpose or will have adverse effects compared to the three-year rotenone alternative. The DEIS merely states that it would be a low-efficiency method, but it does state that it would be conducted until "fish are no longer found," which suggests that it is an effective method for achieving the project purpose. p. B-24. Efficiency is a function of many different factors, which are not fully disclosed in the EIS. For instance, how many people and hours would it take to implement the mechanical removal, compared to the poisoning? Could volunteers be used for the formal and not the latter? The PCT populations are currently stable, the fish have survived for hundreds or thousands of years, five back up populations in discrete stream segments exist and the DEIS presents no evidence to show that ten years is an unacceptable timeframe for completing the project. 9

7. The DEIS is facially biased toward the preferred alternative and does not present a valid comparison of the efficacy of Alternatives 2 and 3. It is undisputed fact that rotenone poisoning does not always have the intended effect of removing all non-native fish from a stream system, as is evidenced by poisoning projects within this watershed and many others, but the DEIS does not disclose this fact. Instead, the DEIS assumes that the project will be successful and uses that as a benchmark by which to compare Alternative 3, to which it does not give the same assumption. These agencies have also had frequent mishaps when applying piscicides in the past including accidents, using the wrong amount, not neutralizing soon enough, etc. There is no guarantee that the rotenone alternative will guarantee a pure strain of PCT, but the DEIS does not admit that and it should in order to give the public and decision-makers a fair analysis of the two action alternatives. 10 11

8. In the DEIS' description of Alternative 3's impacts on PCT and the project purpose, it states without any citation to evidence, that "[e]lectrofishing or various net methods may not result in complete removal of undesired trout species in the treatment area. Therefore, this alternative *may* not meet the purpose and need for the proposed Action and *may* not be consistent with the Revised Recovery Plan." p.5.1-49 (emphasis added). Those are a lot of conclusory "mays," without supporting evidence. The DEIS 12

must state what the comparative chances of success are for both alternatives, taking into account the greater likelihood of accidents or mistakes in stream poisoning than with elecrofishing or gillnetting. It must also cite to valid evidence of the success of non-poisoning methods on other similar systems. The agencies did not take a hard look at the viability of this alternative. In Erman and Erman's comments on the DEIS, they cite multiple references demonstrating that mechanical removal of fish is an effective way to remove non-native fish. Both the Forest Service and the National Park Service have successfully removed all fish from streams, rivers and small lakes, in some instances even where rotenone failed. Yet, the DEIS states only that electrofishing, presumably alone, is not a proven method to remove all fish. p. 5.10-3. Yet, Alternative 3 is not just about electrofishing and again the DEIS cites no supporting evidence for this claim. Alternative 3 deserves greater attention and analysis and a complete review, using Erman's references as a starting point. 12

9. Alternative 3 could be strengthened further by restricting fishing and through enhanced education and warden or ranger patrol of the area, as described above and by using greater specificity of mechanical removal methods and protocol such as that discussed in Erman and Erman 2009.

10. The agencies should consider an alternative that does not include motorized forms of access within the wilderness area.

11. Erman and Erman propose other alternatives to further strengthen Paiute cutthroat trout populations if having small isolated populations is a risk. Current fragmentation of populations has been created by the agencies and could be undone. (Exhibit A; Erman and Erman 2009). 13

12. The designation of Alternative 2 as the environmentally preferred alternative, when it is the only alternative that results in significant adverse effects, violates both CEQA and NEPA's mandate to fully and accurately disclose impacts. There are no significant adverse impacts stated for Alternative 3, not even to Paiute CT. Thus, besides the No Action Alternative, Alternative 3 is the environmentally preferred alternative.

Environmental Consequences

13. The DEIS does not consider, analyze and disclose a complete inventory of all other species, in addition to Paiute cutthroat trout, in the streams to be poisoned. 14

14. The DEIS does not consider, analyze and disclose all published literature and unpublished agency literature on the impacts of stream poisoning with rotenone formulations on non-target species. 15

15. Nineteen years ago, CDFG claimed in the Programmatic EIR for Rotenone use that it would be doing species level studies on macroinvertebrates. Yet, to date, none has been done. In lieu of actually identifying the species that could be extirpated or go extinct as a result of this project, the agencies now claim one of two things depending 16

upon the page of the DEIS you are reading, either: (a) we haven't looked, therefore no rare or endemic species exist that would be harmed or (b) the project could result in the loss of rare or endemic species and this would be a significant and unavoidable impact. This is not sufficient environmental analysis. The public and the decision-makers are entitled to know if the project is about trading the viability of one or multiple rare species of macroinvertebrates for a habitat extension for PCT, in a wilderness area.

16. In its review of rotenone, EPA concurred with Erman and Erman that system functioning could be altered as a result of rotenone's significant impacts on invertebrates. The DEIS fails to thoroughly evaluate and disclose the potential impact of this project, not just on some species of invertebrates, or populations, but on ecosystem functioning.

17. The DEIS incorrectly concludes that there would not be a significant impact to amphibians because it is moving them out of the project area. Is this a separate project that is already occurring without NEPA review? Or is it a part of this project? How many have been found and how many have been successfully relocated?

18. The DEIS should disclose and analyze the fact that the agencies are not moving tadpoles and cannot easily remove any frogs or toads from the area and that many will be killed as a result of the project. Also because their habitat will be poisoned, their food source will be affected. All of this is a significant adverse effect to amphibians in the project area, including mountain yellow-legged frogs and potentially Yosemite Toads.

19. The DEIS does not consider, analyze and disclose the impacts to other native fish within the project area including the mountain sucker, a sensitive species, the Paiute sculpin or the mountain whitefish.

20. The DEIS does not adequately analyze of disclose that springs and seeps are refuges or repositories for species that may expand their ranges as temperatures change in the future. These habitats are critical to biodiversity and longevity of species and the impacts of poisoning them are not fully disclosed in the DEIS. Significant adverse impacts are likely to occur to these micro-ecosystems, where nearly all animal life within them will be killed.

21. The DEIS inadequately discusses aquatic and terrestrial food web impacts of stream/lake poisoning. Erman and Erman 2009 discuss the importance of aquatic invertebrates on the food web. This information is not addressed in the DEIS and is an important impact of the project.

22. The DEIS must consider analyze and disclose a complete compilation of all past errors, mistakes, and accidents in past poisoning projects in the Lahontan Basin specifically and other areas generally so that the full potential ramifications of this project and mitigation efforts can be evaluated and understood.

23. The DEIS must provide scientific evidence that areas to be poisoned and stocked with Paiute cutthroat trout were the historic habitat of the PCT, since restoring historic



habitat is one of the purposes of the project. Citing only the 2004 Recovery Plan does not constitute valid evidence as the 2004 Recovery Plan relied upon the invalid 2002 Forest Service EA for this same project. Where is the proof of historic habitat? The DEIS should reference published genetic work on the PCT, including all theories for past distribution of this sub-subspecies.

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24. The DEIS overstates the potential impact from a catastrophic event. It ignores recent events, such as the 1997 flood and the impacts from it. It was the largest flood on record for 87 years and there were no noticeable impacts to Paiute CT. This kind of comparative analysis of threats to species should be honestly disclosed and evaluated and contrasted to the immediate death that rotenone will cause to species.

25. The DEIS must address the true impacts of this project on PCT, when scientific evidence indicates that there are no molecular markers to distinguish between Lohanton cutthroat trout and Paiute cutthroat trout and that determining their true genetic relationship and the possibility of hybridization would be important prior to any restoration projects. (Cordes et al. 2004).

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26. The entire impacts assessment to fish should be reevaluated in light of the gross error in calculating the number of adult Paiute CT in the Silver King Creek drainage. More than four times as many adults than the DEIS claims live in the drainage. Erman and Erman 2009. If the entire impacts analysis was founded on only 1,020 fish when actually there are at least 4,151, the analysis should be altered significantly.

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27. The DEIS fails to disclose and analyze a complete list of chemical ingredients to be placed in the SKC watershed, including all inert ingredients of identified products.

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28. The DEIS underestimates the true impacts of rotenone on aquatic life because it does not account for preexisting toxins, which work synergistically or cumulatively with rotenone to weaken the natural defense systems of organisms. The rotenone risk assessment and other literature discuss these effects.

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29. The DEIS's evaluation of the links between Parkinson's disease and rotenone is also inadequate. It ignores hundreds of more recent published articles on the issue. (Erman and Erman 2009). This is a significant issue for the workers and any other handlers of the pesticide. The role of accidents in stream poisoning and work over uneven terrain should be factored into the analysis of possible spills and exposure.

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30. The DEIS does not provide valid scientific evidence that an impermeable barrier to upstream fish migration exists at all times in all years at the lower boundary of the proposed stream poisoning project. The singular memo supporting the agencies' belief that the barrier is impassable was based on a low-water visit to the area, where it was determined that the barrier was between 8-10 feet high. As Erman and Erman (2009) demonstrate in their expert comments, Rainbow/steelhead trout can leap 10.8 feet vertically or 9.8 feet vertically while extending 9.8 feet horizontally. Thus, even at low water, fish could likely surpass the alleged 8-10 foot barrier. Further, at high water, even

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Heise admitted that the barrier may not be impassable and that at flood levels, the barrier would be reduced to 2-3 feet in height. The entire poisoning project would be for naught if the barrier is passable, which seems likely. The significant adverse impacts that will certainly occur as a result of the stream poisoning clearly deserve more than one low water unscientific assessment of impassability, but a rigorous consideration by unbiased scientists on the certainty of the barrier and risks involved in relying upon it. 29

Cumulative Impacts

31. The entire cumulative impacts discussion is inadequate. The DEIS lists in a chart specific actions that may have a cumulative impact on the project area, but it never discusses what those cumulative impacts would be for those projects combined with the proposed action. Courts have repeatedly held that a list does not make an adequate cumulative impacts analysis. 30

Global Warming:

32. The DEIS only looks at global warming in terms of the project's impacts on carbon dioxide emissions, but it ignores the cumulative effects that global warming will have on the project area combined with the project's impacts. The combination of poisoning and global warming would be worse and unpredictable for invertebrates. Scientific evidence indicates that species at the top of mountains and the farthest north, such as those in cold alpine streams, will be the first to go as temperatures warm. If species are already at high elevations and in cooler environments, they cannot easily adapt to warming temperatures by moving higher in elevation. Species living in a cool alpine stream system, with limited mobility will also be at risk. There is scientific evidence that the level of aquatic macroinvertebrate gene flow among habitats may be critical to the degree of impact seen from large scale global-warming. (Hogg 1996). There is a body of literature describing the impacts of global warming on macroinvertebrate species and populations, which should be reviewed and addressed in the EIS. (*See e.g.* Burgmer 2007; Chessman 2007; Durance 2007; Hogg 1996). 31

Residual Pesticides and Toxins:

33. There is valid scientific evidence that pesticide residues and other contaminants remain in the aquatic sediments of even remote waters in National Parks and wilderness and that they adversely affect aquatic organisms. The DEIS should consider the cumulative and synergistic effects of toxins in the aquatic ecosystem and their effect on all wilderness species and functioning. Amphibians and invertebrates generally have been highly effected by pesticides. 32

Past Stream Poisoning:

34. The DEIS should disclose the cumulative impacts of stream and lake poisoning in the Sierra Nevada and how many stream systems have been impacted by poisoning and will no longer provide baseline conditions for study and protection of watersheds. 33

Specifically, the DEIS should provide a complete history and locations of all past, present and reasonably foreseeable stream/lake poisoning projects conducted in the Sierra Nevada by the CDFG and/or US Fish and Wildlife Service as part of the cumulative impact analysis of use of poisons on target and non-target species. Further, the DEIS does not adequately assess the on-the-ground impacts from past poisoning within this watershed. It should disclose everything that has been lost already by poisoning, both in terms of documented impacts and presumed impacts where data collection and study are lacking, but based upon relevant scientific understanding. All of the past spills, mistakes, etc. should be disclosed in the DEIS so that the public can understand the true impacts of these kinds of projects. We need to know what has already been lost, to understand the true impacts of what more we will be losing. 33

Continued Fish Stocking Practices:

35. The DEIS should address the cumulative impacts within the watershed and the High Sierra Nevada more generally of fish stocking by government agencies or their agents. Specifically, the DEIS should include a complete review with dates and mapped locations of all past fish stocking, planned and accidental, by state and/or federal agencies in this watershed. These actions have a significant effect on the area and are cumulative to this project's impacts. The government agencies have largely created the problem they now seek to remedy through stream poisoning, yet fish stocking of non-native fish continues and this story must be completely disclosed to the public and decision-makers. A complete discussion of past fish stocking and future (planned) fish stocking practices and actions must be disclosed and analyzed. The CEQA document being prepared by CDFG about fish stocking practices in California has cumulative impacts with this project and must be analyzed here.

Recreational Fishing

36. The DEIS fails to consider how this project will be used for the purpose of establishing a fishery for the Paiute cutthroat trout and for including the PCT in the Heritage Trout fishing contest run by the CDFG. The DEIS avoids any analysis of the impacts of this project on future fishing by claiming that those decisions will be made later by the Fishing Commission. But the agencies have an obligation to assess reasonably foreseeable connected actions and impacts. The DEIS should answer the question of whether a goal of the project is to increase fishing of PCT above or below Llewellyn Falls.

Reasonable and Appropriate Scientific Methods/Data for Evaluating Impacts

37. The DEIS fails to disclose or evaluate the sampling and data collection protocol and methodologies proposed repeatedly by N. Erman since at least 1994. The DEIS claims that species' inventories would require sampling at multiple stations over different seasons and across multiple years, but it does not state that such sampling cannot be done or that it is infeasible. Instead it states that it is outside the scope of the project. What the agencies fail to recognize is that this sampling is a prerequisite to the project, not outside 34

its scope. The agencies have had seven years since this project was first proposed to conduct macroinvertebrate sampling and have intentionally failed to do so, even after the Court's ruling that this type of information must be gathered *before* a decision to proceed with this project is made. The collection of data would remove speculation as to the true effects of the project. This is precisely what the agencies continue to avoid doing.

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38. The DEIS' confused findings that there are no known rare or endemic macroinvertebrate species in the project area (for the unstated reason that no one has looked for them) and that there will be significant adverse effects and possible significant cumulative effects to such rare and endemic species does not comport with NEPA or CEQA's mandates that agencies take a hard look at the impacts of a project and provide sufficient disclosure and analysis to the public and to allow for truly informed decision-making. The decision-making occurring here is no more informed as to the effects on macroinvertebrates than it was in 2004-05, when this same project was enjoined for lack of appropriate analysis.

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39. Erman and Erman 2009 point to many other flaws in scientific methodology and analysis throughout the DEIS and the appendices, including the most recent analysis of Vinson and Vinson. All of these errors make the DEIS unreliable as an environmental review document. Significantly, the errors they point to cannot be ascribed to conflicting expert opinion, but to unscientific and unreliable analyses.

40. One significant issue raised by Vinson and Vinson is that the creek below Lewellyn Falls had been previously poisoned, which is not otherwise noted on the maps in the DEIS. Was the project area of the creek previously poisoned, which the agencies have not stated in the past, and if so, where is the evidence and project information?

41. In addition to the scientific literature and evidence referenced above, there is an extensive body of material already available for the USFWS' use in preparing the draft EIS, including public comments and expert testimony. Thus, the USFWS should review, analyze and disclose and compile as part of its administrative record for this project: (1) all of the past correspondence and documentation on the first two Environmental Assessments prepared for this project by the Forest Service; (2) all of the correspondence and documentation to the Lahontan Regional Water Quality Control Board and the State Water Resources Control Board regarding this project and the NPDES permitting; (3) all of the pleadings and declarations filed during CATs' challenge to the most recent Forest Service EA and FONSI for this project and (4) the Honorable Judge Damrell's written opinions on CATs' requests for a temporary restraining order and preliminary injunction over this project.

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CLEAN WATER ACT and PORTER-COLOGNE

42. The agencies must obtain an NPDES permit or WDR for this project. The DEIS incorrectly concludes that the project would not violate the Lahontan Basin Plan's requirement for a two-year recovery of invertebrates. The scientific evidence does not

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support this conclusion, but shows that invertebrates do not recover within two years. Impacts in Silver Creek and other stretches of Silver King Creek were significant and long-term, exceeding the two-year limit in the basin plan. Thus, the project would violate the Basin Plan and the Clean Water Act.

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43. The antidegradation policy of the Clean Water Act requires that water quality and beneficial uses be protected. Silver King Creek is designated for "COLD" water habitat beneficial uses, which includes protection of all aquatic life, including invertebrate communities. This project does not protect, but adversely effects the cold water habitat beneficial uses of the waters. This project would violate the Clean Water Act.

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44. The DEIS also fails to disclose the status of the permitting process and when the agencies will seek the permit.

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WILDERNESS ACT

45. The DEIS admits that the action would impair the untrammeled quality of wilderness, but misstates the reasons for this. The wilderness values of the resource include all of the native species, not just the Paiute CT, and water quality. It irrevocably harms the wilderness values of the area to extirpate native, rare or endemic species or otherwise reduce abundance and diversity of macroinvertebrates. The consequences to amphibians and other animals up the food chain are also significant. The DEIS does not adequately or accurately discuss how this project affects these wilderness resources of the Carson-Iceberg Wilderness Area.

46. The proposed action will cause adverse impacts on people's opportunity for primitive recreation. The impacts on wilderness visitors who will be unable to drink from the creek, because it will contain poison, during their wilderness visit is also significant.

47. The loss of the stretch of stream as a baseline for scientific study also harms the wilderness value of the area. The ability of natural processes to operate free of human influence is an important wilderness value. This project represents further invasive manipulation that is cumulative to decades of manipulation of these streams and the fisheries, from stocking and other agency action. When will the area truly be treated as wilderness and not be tampered with?

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48. The DEIS does not demonstrate a sufficient need for the project or even a guarantee that the project will be successful, both of which should be present before the wilderness area is poisoned. The Wilderness Act does not allow for single-species management at the expense of other native species, particularly when the real purpose of the action is to expand a fishery outside of proven historic habitat and not take any steps at reducing or prohibiting angling, the potential cause of unlawful transfer of fish above Llewellyn Falls.

49. The preferred alternative in its current form violates the Wilderness Act and should not be implemented.

NFMA

50. The DEIS does not address the Forest Service's obligations under the Sierra Nevada Forest Plan Amendment ("Framework"), including its species monitoring requirements. The DEIS does not demonstrate that the agencies have done the appropriate monitoring to comply with the Forest Plan/Framework requirements.

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PROPOSITION 65

51. The discharge into Silver King Creek of chemicals contained in the rotenone formulations violates California's Proposition 65 because such chemicals are known to cause cancer or reproductive toxicity. CDFG is exempt from Proposition 65, but the federal agencies involved in this project are not exempt. The DEIS must explain how their actions do not violate Prop. 65.

41

CALIFORNIA TOXICS RULE

52. Because the EIR is deficient, the agencies have not complied with the exception requirement of the CTR. The DEIS has not shown adequately that the Section 5.3 requirements would be fulfilled.

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In conclusion, we respectfully ask the agencies to reconsider the need for this project. If there is a scientifically valid demonstrated need and there is adequate evidence that an impassable barrier exists, that genetic differentiation between species is possible, and that the area below Llewellyn Falls truly was historic habitat for the Paiute cutthroat trout, we ask that the agencies fully develop Alternative 3 and eliminate poisoning as a viable alternative. The consequences are too great.

Thank you for this opportunity to comment.

Sincerely,

_____/s/_____
Julia A. Olson
Attorney for CATs

See Response to Comment Letter 7

Date: April 29, 2009

To:
Robert D. Williams
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Re: Comments/ Draft Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) for the Paiute Cutthroat Trout Restoration Project, Carson-Iceberg Wilderness, Humboldt-Toiyabe National Forest, Alpine County, CA. Rotenone poisoning in the Silver King Creek watershed.

We are filing these comments on this EIS/EIR as private citizens, in the public interest.

The preferred alternative in this Draft EIS/EIR is the same project that has been proposed by the Agencies ((California Department of Fish and Game (CDFG), U.S. Fish and Wildlife Service (FWS), and U.S. Forest Service (USFS)) since 2002. It is a proposal to poison streams, springs, and a lake in a California Wilderness Area for the purpose of removing non-native fish. The

Agencies propose to poison one or more times a year for three years with several rotenone formulations.

We have filed comments on this project at every opportunity for public comment since 2002 and in the court proceedings. We include by reference our comments previously filed (by one or both of us) with the CDFG, FWS, USFS, Lahontan Regional Water Quality Control Board (Lahontan RWQCB), the State Water Resources Control Board (State WRCB), and the court. We have subsequently also filed comments with the EPA on the use of and impacts of rotenone formulations and antimycin in streams and lakes (Erman and Erman 2005, 2006, 2007). We will not attempt to repeat here all the evidence we have already filed on this issue but will assume it is in Agencies' files and is part of the official record. If the Agencies need copies of any of the above documents, we will provide them upon request.

The fundamental questions regarding this project are as follows:

a). Are the probable losses of native, non-target species; of losses and changes to the terrestrial and aquatic food web; and changes in community composition and species assemblages worth the potential benefit of a larger population of this cutthroat trout subspecies?

b) Is there a true barrier to upstream fish migration in the Silver King Creek canyon, and if not, what will further poisoning downstream in this watershed accomplish?

c) What is the real genetic status of this trout, what was its true native habitat, and can this subspecies be identified well enough to manage it and move it around?

Question "a" is fundamental to any intentional poisoning in a Wilderness Area, National Park or any other area of special ecological signficance. Questions b and c are critical to the analysis of long-term success of the Agencies' desire to expand this population of trout and whether or not there is a good reason for the project.

We state at the outset that we are in favor of either Alternative 1, the No Action Alternative or a modified Alternative 3, Combined Physical Removal of fish. We do not support Alternative 2, the Proposed Action using rotenone poisons. We support efforts by the Agencies to remove the non-native fish, that the CDFG has stocked for decades, from as many habitats as possible. We think removal can be done in ways that do not harm non-target, native species. Alternative 2 is not such a method. Further, our analysis of the whole project and its history suggest that the objective of this particular project—to expand this population of cutthroat trout subspecies downstream—may not be possible because of physical conditions in the habitat and the Agencies' continued actions in the watershed.

The EIS/EIR produced some new information on the genetic status of the trout subspecies. It also contains contradictions, errors, and misrepresentations of past events and known science. Some relevant information has been omitted from the EIS/EIR.

We have reviewed the EIS/EIR and many of the supporting documents.

Omissions in Executive Summary under 1.4 Public Involvement Summary

Before discussing the merits of the project, we must make some relevant corrections/additions to the past environmental review process that have been omitted in the Executive Summary.

The CDFG issued a negative declaration on the project in 2002. Comments filed with CDFG by one of us were ignored. We asked for preparation of a joint EIS/EIR when the project was first proposed in 2002.

The current project was halted by legal action twice since 2002. First, it was withdrawn by the USFS in 2003 after legal documents were filed in US District Court to force the USFS to complete an environmental assessment (EA) on the proposed project (Case No.: Civ-S-03-1756 GEB (PAN)). At that time the Lahontan RWQCB had not issued an NPDES permit or held a

hearing on the project. However, the Executive Officer of the Lahontan RWQCB had given his approval for the project.

The USFS issued a Draft EA in February, 2004. A Decision Notice and Finding of No Significant Impact (FONSI) was filed on IV-30-2004. Appeals were filed in June 2004. The USFS denied Appeals in August, 2004.

The Lahontan RWQCB held a hearing on a draft NPDES for the project in September, 2004, and declined to issue the NPDES permit. Upon appeal from the CDFG, FWS, and Trout Unlimited, the State WRCB over-ruled the Lahontan RWQCB in July, 2005, and issued an NPDES permit for the poisoning project. In August, 2005, the project was stopped by a preliminary injunction in U.S. District Court, eastern district of California (No. Civ. S-05-1633 FCD KJM) for failure of the USFS to prepare an EIS to address the concerns raised by the public and independent scientists.

We commented in detail on the FWS Draft Revised Recovery Plan for the Paiute cutthroat trout. Our comments were ignored in the final plan that was issued August 10, 2004.

Impacts of Rotenone Formulations on Non-Target Species

Aquatic Invertebrates:

We told CDFG (and the Lahontan RWQCB) as early as 1994 (Erman 1994) that they should conduct species-level inventories of aquatic invertebrates prior to poisoning lakes and streams. We reiterated the need for species inventories to the Agencies in 2002. We presented information during court proceedings on how this could be done reasonably. In the present document the Agencies claim that such species inventories are "infeasible" to conduct and anyway they know that no rare or endemic species have been found ("No benthic invertebrate species strictly endemic to the Silver King Creek Watershed have been identified." (5.1-26 2nd para. under Rare and Endemic species). So, in other words their logic is, "if we don't look for them, we won't find them and so, therefore, they don't exist."

But in another part of the document we find this sentence: "In conclusion because the treatment could result in loss of rare or endemic species, this would be a significant and unavoidable impact" (p. 5.1-46). This conclusion seems strange in a project that is being proposed to "save" a "species" of fish. (In a later section we will discuss the use of "species" as it applies to the Paiute cutthroat trout.)

We contrast the statements in this document with earlier wording by CDFG in the Final Programmatic EIR (subsequent) for Rotenone Use for Fisheries Management, July 1994.

> "CDFG personnel are currently involved in a multi-year study of the effects of rotenone on macroinvertebrates from the Silver King Creek drainage (Alpine County). This study involves the identification of invertebrates at the species level prior to, during and for three years after scheduled treatments." (p. 103, Final Programmatic EIR (subsequent) on Rotenone Use. (July 1994). (Our emphasis added).

We later analyzed the data from the studies referred to above (Trumbo et al., 2000a and Trumbo et al., 2000b). We found that only larval specimens had been collected and that no species level studies had been done. The agencies have now had 19 years to do the species level studies they claimed they had been doing in the 1994 CDFG Programmatic EIR. That is more than enough time to do several species level studies in several watersheds.

Further, contrary to statements made by CDFG in correspondence with the Lahontan RWQCB, long-term significant impacts had occurred in aquatic invertebrate composition following poisoning of upper parts of the Silver King stream system from 1991 to 1993. We presented results of our analyses to the Lahontan RWQCB, State WRCB, USFS, FWS, the court, and more recently to the EPA. The findings are summarized in Erman and Erman 2006 (Exhibit A). We included in that summary the direct statements from the original Mangum Reports on Silver King Creek stating how many invertebrate taxa were still missing at the end of the study. We also included

a literature review of other studies showing impacts to macroinvertebrates from rotenone poisoning.

The EPA (2006) corroborated our evidence of long-term impacts in their review of our material and that of others:

> "Despite the fact that invertebrates are less conspicuous members of the aquatic community, they are a major component of aquatic ecosystems and food webs. Any significant effects on invertebrates would most likely influence other components of the ecosystem. Effects may not be limited to merely a change in total biomass as a result of widespread mortality but any changes associated with differential sensitivity could bring about significant changes in the community structure, which could alter system function (p.5)."

> "The ecological risk assessment of rotenone states that aquatic macroinvertebrates exhibit roughly similar sensitivity to rotenone as do fish, that it is likely that most if not all fish and macroinvertebrates will be killed in the targeted treatment area, and that the entire aquatic food chain can be affected. The expectation is that treated streams/lakes will repopulate through immigration and/or restocking. Whether species density/richness is identical to pretreatment conditions is uncertain; however, EFED concurs with the Ermans that it is possible that more tolerant species can potentially displace those less tolerant to rotenone if rotenone is repeatedly applied (p. 6)."

> "Whether chemical means of manipulation should be used over other mechanical control measures or to what extent other species should be sacrificed to aid in the recovery of endangered species are important questions which the Ermans raise; however, the answers involve policy issues and are beyond the scope of screening-level risk assessment (p. 6)."

> "The chapter [on risk assessment] states that although the lowest toxicity value for freshwater invertebrates (48-hr EC50=3.7 µg/L) was chosen for risk assessment purposes, it is likely that more sensitive invertebrates could be found in the wild (p. 5)."

Dr. David Herbst had also reviewed the Trumbo et al. (2000 a, b) reports and found significant impacts to non-target invertebrates (Herbst 2002, Exhibit B).

The Lahontan RWQCB stated the need for a species inventory of non-target species prior to commencement of the project. They acknowledged and are aware that short- and long-term impacts occurred on the aquatic community composition during the last poisoning of the Silver King Creek basin (Harold Singer letter to Robert Williams, July 3, 2006, Exhibit C).

The Agencies have now had many years to conduct species level aquatic invertebrate studies. They are ambiguous in their responses to the issue: on one hand claiming that they are or have been conducting such studies; on the other hand claiming that it can not be done and is too difficult (5.1-26, 5.1 27). And further the EIS/EIR makes the argument that even if there were rare or endemic species present in the past, they may have already been lost because of previous poisonings (5.1-46). While we agree with this last possibility, it seems to us even more reason not to poison the remaining previously unpoisoned stream sections. We find it astonishing that the Agencies would use the possibility that they have already destroyed species in a Wilderness Area as an argument for further destruction.

We previously have explained in detail how and why adult invertebrate specimens must be collected to determine the species of most aquatic invertebrates. The confusion shown by the Agencies about what the term "species" means for the both fish and invertebrates is almost beyond belief. We assume they are purposely trying to confuse the issue to the public and other reviewers.

The Mangum lab (Provo, Utah USFS lab, no longer in operation) identified larval forms, not adults. That government lab did not, in general deal with adult specimens that could be identified to the species level. It was a biomonitoring laboratory established to see patterns at more general taxonomic levels such as genus, family, order, and class. We note that the Vinson and Vinson (2007) study that was conducted on aquatic invertebrates from 2003 to 2006 was also a study of immature larval forms and more general taxonomic levels. Therefore, many of the statements made in the section of the EIS/EIR on special status macroinvertebrates and rare and endemic species must be disregarded.

For example, the statement that "Vinson and Vinson provide the species list for both historic and recent data"(EIS 5.1-27) is false. There is no species list for any of these studies. The Agencies know this and have stated it on the previous page (5.1-26). Vinson and Vinson acknowledge this in their report as follows: "The collection of adult insects would greatly facilitate our knowledge of species present in the Silver King Basin, which would assist in the routine identification of larval insects" (Vinson and Vinson 2007, p. 68).

The Vinson and Vinson study includes a review of literature on rotenone impacts to non-target species. In their original report they conclude the following:

> "The results of three longer-term more intensively sampled studies in mountain streams suggest that common taxa will quickly recolonize treated areas and rarer taxa may be eradicated for a number of years or potentially forever."(Vinson and Vinson, Summary, p. x).
>
> They also state "This suggests that rotenone impacts to invertebrates will be greatest in mountain streams characterized by cold water and high oxygen levels as these streams are characteristically dominated by small gilled invertebrates, namely Ephemeroptera, Plecoptera, and Trichoptera" (p. 13,14).

The stated purpose of the Vinson and Vinson report was "to evaluate the effects of previous rotenone treatments on aquatic invertebrate

assemblages in the Silver King Basin." We, like Vinson and Vinson (p.xiii, #5), found the data unsuitable for such an evaluation. There were too many variables to make a comparison with the earlier studies (1990–1996). Samplers used were different (a modified Winget Surber sampler vs. a standard Surber sampler), mesh sizes were different (0.280mm vs. 0.5mm). The stations had been changed, the number of stations were not the same. The control stations were different. Thus, local stream conditions (microhabitats) could not be accounted for. Vinson and Vinson analyzed the data but apparently did not do the sampling. There was no information on who collected the samples. We assume the people doing the sampling were different in both studies and may have been different from one date to the next, thereby introducing another source of variation. Sampling protocols were different. Stratified random samples were collected in the 1991-96 study, while three samples in a single riffle were collected in the 2002-2006 study. And, finally, the samples were analyzed in different laboratories with different protocols. The Provo, Utah USFS lab subsampled in the laboratory; the Utah State BLM lab counted all individuals in the sample.

No credible scientific comparison could or should be made between these studies. The first principle of replication of a study is to use the same methods.

In addition, we found some major errors in understanding what has and has not been poisoned previously in the Silver King watershed. The Agencies need to get their stories straight on this question. New information appears in the Vinson and Vinson report that claims Silver King Creek below Lewellyn Falls had been previously poisoned. This claim is contrary to information in the earlier EA and to testimony given before the Lahontan RWQCB. The information is attributed to Finlayson, personal communication (Table 3, p. 23, Vinson and Vinson 2007). Either the CDFG poisoned this stream section illegally or the Vinson and Vinson report has made an error that would invalidate the results of their analyses: What is a treatment and what is a control (i.e., non-poisoned) station?

Also, Vinson and Vinson state that one of the two stations on Bull Canyon Creek is a control station (Table 4, Vinson and Vinson 2007). This

station is clearly below the junction with the mouth of Whitecliff Lake which, according to Ryan and Nicola (1976) was poisoned to remove "heavily spotted trout" in an earlier project and was also poisoned in the 1991-93 project (Flint, et al., 1998). Again, if invertebrate sampling stations were not controls but were considered such, and visa versa, no data analyses would be valid.

It seems that Vinson and Vinson made a major error in data conversion of the earlier Mangum data. The Mangum data were already given in numbers/m^2 and Vinson and Vinson multiplied those numbers by 0.279 and presented them as m^2 in their tables.

The Vinson and Vinson analyses were made at so general a taxonomic level it would not be possible to see differences between treatments and controls. Our analyses of the Trumbo et al. (2000 a, b) reports found impacts to aquatic invertebrates three years after the final poisoning in Silver King Creek for a total of, at least, six years of impacts. Invertebrate sampling was discontinued by the Agencies three years following the poisoning in Silver King Creek. In another nearby watershed, Silver Creek, major impacts were evident two years following final poisoning for a total of five years of impact. It is unclear why the Lahontan RWQCB only required three years of follow-up study in the case of Silver King Creek and two years of follow-up study in Silver Creek. In both cases impacts were still evident at the time the studies were ended (Erman and Erman 2006, Exhibit A). Both studies showed significant long-term impacts to macroinvertebrates including decreases in species diversity, decreases in number of taxa, decreases in number of stoneflies and major reductions in the stonefly family Peltoperlidae, the most abundant stonefly group prior to poisoning.

In 2003, CDFG provided the Lahontan RWQCB staff the following statement: "No evidence of long-term impacts were found in either study" (Interagency Study Proposal, LRWQCB files, June 15, 2003, Evaluation of Rotenone use in Silver King Basin on Aquatic Macroinvertebrates, 2003-2007).

The Antidegradation Policy of the Clean Water Act states that "where high quality waters constitute an outstanding National resource, such as

waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected"(Code of Federal Regulations, Title 40, Sec. 131.12). The Lahontan RWQCB considers water quality of Silver King Creek to be "exceptional" (p. 5.4–3, EIS/EIR).

The Water Quality Standards Handbook (4.7) outlines specific requirements for ONRWs ((40 CFR 131.12(a)(3)). "ONRWs are provided the highest level of protection under the antidegradation policy." "The regulation requires water quality to be maintained and protected in ONRWs." "ONRWs are often regarded as the highest quality waters of the United States. The regulation "permits States to allow some limited activities that result in temporary and short-term changes in the water quality of ONRW. Such activities must not permanently degrade water quality or result in water quality lower than that necessary to protect the existing uses in the ONRW. It is difficult to give an exact definition of 'temporary' and 'short-term' because of the variety of activities that might be considered. However, in rather broad terms, EPA's view of temporary is weeks and months, not years." (Our emphasis added)

The antidegradation policy further states for all water bodies, even those without ONRW status, that "species that are in the water body and which are consistent with the designated use (i.e., not aberrational) must be protected, even if not prevalent in number or importance. Nor can activity be allowed which would render the species unfit for maintaining the use. Water quality should be such that it results in no mortality and no significant growth or reproductive impairment of resident species" (Water Quality Standards Handbook, Appendix I-3, 4.9.2.2). And these protections hold for all existing aquatic life whether or not a water body supports fish.

In Chapter 5 the EIS/EIR states "Similarly, the Federal Antidegradation Policy, Title 40 C.F.R. section 131.12, dictates that water quality shall be preserved unless deterioration is necessary to accommodate important economic or social development." (p. 5.4-14) Federal policy, however, does not end with this paraphrase of the Antidegradation Policy. The next sentence from Title 40 CFR, section 131.12, part a (2) is "In allowing

such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully." (our emphasis added).

Food Web Impacts and Terrestrial and Aquatic Species:

The importance of aquatic invertebrates to the food webs of aquatic and riparian species in the Sierra Nevada was discussed in detail in Erman 1996. Insects are food for other larger insects, fish, and amphibians in the water, and emerging adult insects are a major source of food for many terrestrial insects, spiders, birds, amphibians, reptiles, and mammals including bats (e.g., Nakano and Murakami 2001; Sanzone, et al., 2003; Ballinger and Lake 2006; and Pope, et al., 2009). The loss of large portions of emerging insects for several years during and following poisoning of miles of stream and a lake would be a major impact to riparian animals.

No list of terrestrial species for the Silver King basin has been provided in the EIS/EIR, but species of concern (e.g., yellow warbler, willow flycatcher) are mentioned as feeding on emerging aquatic insects. The impacts of food loss to these species are dismissed, apparently with no data to support the opinion of the Agencies.

Major poisoning disturbances cause changes in quality and quantity of invertebrate assemblages. These changes in turn cause changes in the emergent insect food supply and alter available invertebrate food in not only the aquatic habitat but also the terrestrial environment. To reiterate an earlier EPA (2006) statement, "...any changes associated with differential sensitivity could bring about significant changes in the community structure, which could alter system function."

A particularly noticeable omission in the EIS and the FWS Revised Recovery Plan for the Paiute CT is that no food habit studies have been conducted for the fish. The Agencies do not know what invertebrates are the preferred food of the Paiute CT. Neverthless, they are planning to poison the food supply of the very fish they are attempting to "save."

Other considerations regarding aquatic invertebrates:

The Agencies have assumed that upstream species will recolonize downstream areas after poisoning events or that species will fly upstream (EIS, 5.1-19). While this may be true for some species, it will not be true for all or even most species. Macroinvertebrate species, as most animal species, occupy specific habitats. Some species have narrow habitat requirements and are locally distributed along a stream gradient. Other species are generalists and can live in a wide diversity of habitats.

In studies on small streams in the Sagehen Creek basin, eastern Sierra Nevada, similarity of caddisfly species composition was only 38% between the spring source and a site 270 meters downstream, and the species similarity at 470 meters downstream from the spring source had decreased to 20% (Erman 1996).

Species that are generalists, commonly called "weedy" species, may return in high numbers following a poisoning event. Dispersal mechanisms vary by species and some species actively disperse only a few meters (Erman 1984, Sode and Wiberg-Larsen 1993). More restricted species may never return to the area following poisoning. Studies in Denmark at the species level have found aquatic invertebrate species missing up to 40 years following poisoning with insecticides or severe organic pollution (Sode and Wiberg-Larsen 1993).

The Agencies have an incomplete and incorrect understanding of the "EPT index" that they like to use in biomonitoring. The absolute and relative abundance of mayflies, stoneflies and caddisflies do not necessarily mean a healthy stream system as implied in the EIS. For a discussion of the limitations and cautions of broad taxa monitoring see Erman 1996. High numbers of generalists (including species of EPT) can mean disturbed systems. Here, again, species identification can be critical.

Monitoring must answer the questions that are asked by the treatment. In the case of poisoning, the questions are how will poisoning change the non-target species assemblages and will species disappear or be reduced over the long-term. General indices like an EPT index, which is at the taxonomic level of order, can not answer the question. Some species will return after even the most drastic disturbances in aquatic systems. The question is not, will something return, or will the same orders of insects return, or will some class of invertebrates return; but rather, will the same species return in the same numbers and proportions? The gross level of analyses conducted by the Agencies did not ask or answer the relevant questions for this proposed project.

Undisturbed streams in relatively pristine habitats show stability of macroinvertebrate populations from year to year making them excellent references for use in long-term biomonitoring programs (Erman 1989; Robinson et al., 2000).

Amphibians:

The mountain yellow-legged frog was present in abundance in the Silver King basin in 1993. Several thousand were seen along the shores of Whitecliff Lake. They were also found in Upper Fish Valley and near the confluence with Fly Valley Creek (USFS EA 2004). The present EIS/EIR states "although this species (yellow-legged frog) could occur in the proposed project area, it has not been documented in recent surveys (2001 to present); thus the potential for its occurrence would be low." But then it goes on to state that the Agencies have been relocating juvenile amphibians "to outside the proposed project area" (5.3-11, 12). When and for how long have the Agencies been relocating "juvenile amphibians?" Because it would be impossible to relocate all or even most of the tadpoles or frogs or toads in the area, this reason for claiming poisoning will not affect them is unacceptable. Poisoning their habitat will kill yellow-legged frogs, tadpoles and adults, and

possibly immature Yosemite toads, and it will surely reduce and/or eliminate the food of adults.

As of October 16, 2008, the EPA has made a "May Affect" and "Likely to Adversely Affect" determination for the California red-legged frog (CRLF) from the use of rotenone as a piscicide. The EPA has also determined that there is the potential for modification of CRLF designated critical habitat from the use of rotenone as a piscicide. "Indirect effects to the CRLF may also occur through the loss of both vertebrate and invertebrate aquatic forage items." (EPA webite)

The same impacts of rotenone would be expected to occur directly on the mountain yellow-legged frog and its food web.

Other Sensitive Fish in Silver King Creek:

The EIS/EIR has reported no sensitive species of fish other than Paiute CT in the proposed project area. We suggest the Agencies look more closely in the reach of Silver King Creek below Snodgrass Creek (the area within the travel time of potassium permanganate and residual rotenone). According to the California Natural Diversity Database list of Special Animals, the mountain sucker (*Catostomus platyrhynchus*) is on the list of sensitive fish species. Although not collected in the sample station immediately above Snodgrass Creek on Silver King Creek, the next station downstream is on the E. Fork Carson River just above the junction of Wolf Creek. This station does contain mountain sucker (Deinstadt et al. 2004). The EIS/EIR should also reveal that within the main project area, the poison will eliminate native Lahontan basin populations of Paiute sculpin (*Cottus beldingi*) and mountain whitefish (*Prosopium williamsoni*) known to exist in the reach above Snodgrass Creek (Deinstadt et al. 2004).

Springs, Their Protection, and Implications of Climate Change

Our research has revealed rare, endemic, and relict species of invertebrates in many springs, seeps, and headwater streams in the Sierra Nevada (e.g., Erman, 1981, 1984, 1989, 1992, 1997, 1998; Erman and Erman 1990, 1995; Erman and Nagano 1992, Wiggins and Erman 1987). The constant temperature in many seeps and springs makes them habitats for species that were more widespread in the past during different climate conditions, some warmer, some colder. Springs, therefore, are refuges or repositories for species that may expand or shrink their ranges as temperatures change in the future. As such they should receive special protection from resource management agencies. But we find no such consideration for these habitats in this EIS.

The preferred alternative plans to poison springs and seeps (e.g., p. 3-3, 3-8, B-22, p. 5.3-1, p. 5.3-11, C-4), but the EIS (5.1-19) cites Erman (1996) for evidence of endemics in springs. And later, the EIS/EIR states "Endemic species are more likely to occur in small, isolated habitats, such as springs. However, no endemic macroinvertebrate species have been found to date in Silver King Creek Watershed (p. 5.1-21)." Again, we emphasize that no species level studies have been conducted by the Agencies in springs, seeps, or any other aquatic habitats in the Silver King basin, and so they have no scientific basis for this statement. And no studies of any kind have been done on aquatic invertebrates in springs, seeps, or Tamarack Lake so far as we are aware.

A Memorandum of Understanding was signed in 1999 by the Bureau of Land Management, the FWS, the National Park Service, the U.S. Geological Survey, the USFS, the Smithsonian Institution, and the Nature Conservancy for conservation of springsnails and their habitats, to protect sites and avoid the need to list species of springsnails pursuant to the Endangered Species Act. How has that MOU been followed in this EIS?

Inadequate Evaluation of Global Warming and Added Stress of Poisoning

Global warming is already causing changes in species composition of lakes and streams (e.g., Burgmer et al., 2007, Durance and Ormerod 2007). Experimental manipulation of first-order streams has shown varied and unpredictable responses in a suite of invertebrate taxa and species (Hogg and Williams 1996). In our studies of springs before, during, and following drought in the Sierra we found that springs with rising temperatures during droughts had lower numbers of Trichoptera species (Erman and Erman 1992, 1995). The added stress of poisoning can only exacerbate species losses and changes occurring at higher elevations because of climate change.

Absence of Impermeable Barrier to Upstream Movement of Non-native Fish

The existence of a natural, absolute barrier in the Silver King Creek Canyon is critical to the successful permanent removal of unwanted fish in Silver King Creek below Llewellyn Falls. No such barrier exists, in our opinion. The EIS/EIR cites Heise 2000 as the authority for their opinion that there is a real barrier (5.1-9). A reference to Heise is not present in the References cited at the end of this chapter. We assume this reference is to a memorandum that was produced by the Agencies during court proceedings in 2005 (Exhibit D). In this memo Mr. Heise gives his opinion on the falls in lower Silver King Canyon. He states that he only observed the area during low flow and that while he thinks it could be a barrier to fish migration there is a "remote chance" that it is not. He states, however that "a vertical fall of eight feet may be reduced to two or three feet when the stream rises to flood levels. Evidence of high flow at the subject barrier site suggests that the flood flows could be four to six feet or more in depth."

Rainbow/steelhead trout have the greatest capacity for leaping falls of any migratory salmonid. They can leap about 3.3 m (10.8 ft.) vertically or slightly less than 3 m (9.8 ft.) while extending about 3 m (9.8 ft) horizontally (Reiser et al., 2006). Thus, passing the vertical falls present in Silver King Canyon even at low flow seems within the range of large rainbow trout. It

seems likely that large Lahontan cutthroat trout could also pass these falls and may have in the past.

Without physical measurements, statements about barriers become merely subjective argument. Scientific judgement of potential barriers should be based on accurate data on

1) difference in surface elevation between the upstream water surface and the plunge pool,
2) the horizontal distance from the fall's crest to the plunge pool, and
3) the leaping characteristics of the pertinent fish species (Powers and Orsborn 1985, Reiser et al., 2006).

Further, these data should be obtained at a range of stream flows in order to establish a rating curve of changes in fall distance and other features (Reiser et al., 2006).

Attached to the copy of the Heise memorandum was a handwritten sheet, titled Barrier Costs, calculating the cost of building fish barriers in the Kern River basin (for golden trout management) and in the Silver King Creek Canyon. It seems the CDFG suspected in 2000 that they may not have a natural barrier in Silver King Canyon. The sorry pattern of poisoning streams repeatedly and then learning that there is no barrier to upstream fish migration has already been tried in the Golden Trout Wilderness. Is it a contingency plan of the Agencies to begin poisoning and then argue for constuction of a barrier (estimated in this 2000 memo at a cost of 1.5 million dollars) later, in a Wilderness Area, as they have done in the Golden Trout Wilderness where so many costly mistakes have been made in fish management? The possible barrier construction discussed at p. 3-14 in the EIS does not sound like the same barrier Heise was referring to in his memo.

Fishing in Silver King Creek

The EIS/EIR has frequently raised the specter of someone moving hybrid or non-pure PCT above existing fish barriers, especially Llewellyn Falls. "Introduced trout pose the greatest risk to the species."and …."the threat of humans moving other trout species into these protected reaches

continues. An ill intentioned angler could easily catch a rainbow trout and release it above Llewellyn Falls, involving a transport of the fish only a few hundred feet. This action would unravel decades of restoration efforts and place the populations of Paiute cutthroat trout in Upper Fish Valley and Four Mile Canyon Creeks at risk" (p. 5.1-11 EIS/EIR).

And further, "Llewellyn Falls is easily accessed by the public, which could lead to rogue or inadvertent transfer of hybridized fish to areas above the falls" (p. C-2).

If anglers are the problem, why has fishing been continued and promoted in Silver King Creek? Fishing was stimulated below the falls even during the period of the last poisoning project from 1991-1993, for example, the EIS states: "... during 1991, approximately 800 rainbow-Paiute cutthroat hybrids were collected by electrofishing and stocked into Lower Fish Valley and Tamarack Lake using a helicopter. These non-native trout hybrids provided good fishing for anglers during the early and mid-1990s" (p. 5.1-16). The section open to fishing extends upstream to Tamarack Lake Creek, above the junction of Coyote and Corral Creeks and their "secure" pure populations of Paiute cutthroat trout. Fishing was continued up to the last request for closure of Silver King Creek in 2005, and then the Agencies asked the California Fish and Game Commission to withdraw the closure in 2006 after the federal court blocked the project. Recently, the Agencies asked the Fish and Game Commission to increase the allowable daily take from 5 to 10 fish (p. 3-3). That request was finalized by the Commission on April 9, 2009. The request was made specifically to increase the removal of fish from the project area. These actions belie the Agencies' concerns for the threat of anglers moving fish.

The other "most important" threat to continued survival of Paiute cutthroat trout is said to be the existing small, isolated fragmented populations. So, on one hand, isolated populations are a threat; yet on the other hand, they provide a margin of safety from "ill intentioned anglers" or

other "catastrophic events." However, if the proposed Action is conducted, the entire 11 miles of connected stream habitat would become fully exposed to "rogue transfer" from below Snodgrass Creek or to other, imagined catastrophes. In other words, expanding the population downstream in no way lessens the threat of "rogue transfer."

The Agencies are now trying to remove themselves from analysis of implications of a future fishery for Paiute CT as part of the Heritage Trout Fishing Program, claiming it is a decision for the California Fish and Game Commission (e.g., p. 5.1-30, 5.6-9) and "not part of the proposed Action (or its alternatives) which focuses on restoration of the species" (p. 5.1-30). Others in the CDFG, however, have written: "The planned addition of a catch-and-release Paiute cutthroat trout fishery below Llewellyn Falls, which is conditioned on removal of the existing trout population, will provide a unique opportunity" (p. 113, Deinstadt et al., 2004).

And earlier, "By the summer of 1973, following a year of discussions and meetings both within the Department of Fish and Game and between the Department and the U.S. Forest Service, it was finally decided that restoration of pure Paiute cutthroat in the mainstream above Llewellyn Falls would be attempted..." and "It was further decided that restoration of pure Paiute cutthroats would be extended to all of Silver King Creek and its tributaries above Silver King Canyon" (p. 38, Ryan and Nicola, 1976).

Nevertheless, in the 1985 FWS Recovery Plan (U.S. Fish and Wildlife Service 1985) the Paiute CT would be considered recovered "when a pure population of Paiute CT has been reestablished in Silver King Creek above Llewellyn Falls." That objective has been met.

The EIS/EIR is inadequate because it has highlighted the continuing threat from anglers moving fish, yet has not evaluated the sport fishery being planned to follow removal of hybrid fish from the proposed areas or the current newly expanded fishery above Silver King Creek canyon.

Agencies Moving Hybrid Fish in Wilderness Areas

Prior to the 1991 poisoning of the Upper Silver King basin hybrid fish were captured and moved to other places in the Wilderness Area (Tamarack Lake and Poison Lake) and in the east Carson drainage (Ryan as cited in Schaffer 1992). Moving hybrid fish to other areas in the Wilderness Area was apparently still occurring as recently as 2004, according to the Trout Unlimited website, August 3, 2004. If the Agencies have so much trouble with hybrid fish polluting Lahontan CTs and Paiute CTs, why have they been expanding the populations of hybrid fish anywhere, let alone in a Wilderness Area and in the same major drainage, the East Carson River, where they think they have pure populations of Lahontan CTs and Paiute CTs? And why has it been CDFG policy for so long to move unwanted hybrid fish, or for that matter non-native fish of any kind, to other areas in a Wilderness Area without any environmental analysis or recognition that this is a form of biological pollution? "Ill-intentioned anglers" and "rogue transfer" of fish are not the only, or even the major agents, of non-native fish pollution in the Sierra.

We previously raised our concerns about the transport of salvaged hybrid fish into the Poison Creek drainage where pure Lahontan cutthroat trout were said to live (Deinstadt et al., 2004). In the EIS/EIR, a small tributary of Silver King Creek is now labeled "Poison Flat" (Fig. 1-1). Deinstadt et al. states, "Poison Flat Creek is a northern fork of Poison Creek and is not named on maps. Because of its close proximity to Poison Flat it is informally called Poison Flat Creek" (p. 109). Several references to the unnamed tributary of Silver King Creek refer in the EIS/EIR to Poison Flat (e.g., p. 3-4, 5.2-13, 5.4-1). We suggest that the EIS/EIR avoid references to the tributary of Silver King Creek in any way as "Poison Flat" so that confusion in future stocking, fishing, or surveys will be avoided.

Other Catastrophes

The EIS/EIR frequently mentions the risks of extinction from low frequency, large events, e.g., flood and fire. These risks are overblown. In one place (p. 5.1-2, EIS/EIR), occasional floods, forest fires, and drought help create a "...mosaic of patchy, dynamic habitats that support diverse and resilient communities of aquatic and terrestrial flora and fauna." But later in the EIS/EIR: "Due to the small and restricted populations that continue to face threats from catastrophic events such as floods, fire, and non-native fish populations..." (p. 5.1-8), and "...remaining Paiute cutthroat trout populations are vulnerable to extinction through stochastic factors such as ... catastrophic events such as floods and fire..." (p. 5.1-12).

The Paiute cutthroat survived, presumably, over the many years of its existence, in the face of naturally occurring fire and flood when it was confined to a much smaller habitat than it currently occupies. Fish surveyors in the Silver King Creek watershed point out that "Effects of the 1997 flood were not evident from the Four Mile Canyon Paiute cutthroat trout populations or our observations" (p. 108, Deinstadt et al. 2004). This flood was the largest in the 87 years of record for the closest USGS gaging station, the W. Carson River at Woodfords.

Other long-term studies in the eastern Sierra Nevada have shown the persistence and resilience of Lahontan Basin fishes under the natural regime of floods and drought (Erman 1986, Erman et al., 1988).

Risks of large fires are lowest at the highest elevations (such as the Silver King Creek basin) of the Sierra Nevada and especially so in remote locations where attempts at fire suppression and hence fuel build up are minimal (McKelvey et al., 1996).

Taxonomic status of Paiute Cuttroat Trout

For the first time, we learned in this EIS/EIR that the Paiute cutthroat trout, *Oncorhynchus clarki seleniris*, (Paiute CT) can not be separated visually in the hand from hybrids of it with rainbow trout, *Oncorhynchus mykiss*; golden trout, *Oncorhynchus mykiss aguabonita*; and Lahontan cutthroat trout, *Oncorhynchus clarki henshawi* (Lahontan CT). We also learned in the EIS that genetic markers have not yet been found to separate the Paiute CT from the Lahontan CT.

We commented previously on the subject of genetic composition of the fish in Silver King Creek and cautioned against moving or poisoning fish before key questions were resolved. Now, again, the Agencies want to push ahead with "restoration" before they know the answer to a fundamental question of the "purity" of Paiute cutthroat trout populations. Lahontan CT have been present in Silver King Creek prior to any attempts at Paiute CT recovery (Ryan and Nicola 1976). And yet, the Agencies still cannot say either that there is any genetic difference between a Lahontan cutthroat and a Paiute cutthroat or whether or not Paiute cutthroat populations are hybrids of the two. The final sentence from the paper by Cordes et al. (2004) is critical: "Additionally, the development of molecular markers that can distinguish between LCT and PCT would be important for determining their genetic relationship and investigating the possibility of introgressive hybridization between the two groups prior to any restorations." (p. 116, our emphasis added).

More recent genetic studies (Finger et al., 2008) plus the summaries in the Draft EIS/EIR support our earlier misgivings about any project going forward. These findings are as follows:

1. In both a report to the USFS and CDFG (Israel et al., 2002) and the subsequent published paper (Cordes et al., 2004) researchers found no way to

separate Paiute cutthroat trout from Lahontan cutthroat trout by the means they used to identify hybrids.

2. The most recent genetic study by Finger et al. (2008) developed more methods of separating and distinguishing "pure" and hybrid trout from Silver King Creek. This study developed single nucleotide polymorphism markers (SNPs) that are said to be quick, inexpensive, and effective for characterizing introgressed populations and to improve on past molecular markers that "...are costly, time consuming, and often are not diagnostic for distinguishing between *O. mykiss* and *O. clarkii*."(Finger et al., 2008, p. 4). Nevertheless, although the new methods could distinguish between subspecies of *O. mykiss* (i.e., between rainbow and golden trout subspecies) and between rainbow and cutthroat trout, the SNPs could not separate or distinguish between subspecies of cutthroat trout (*O. clarkii*) (i.e., between Paiute and Lahontan cutthroat trout).

3. The Draft EIS/EIR points out in several places (e.g., p. 5.1-34, 5.1-48) that Paiute CTs cannot be distinguished from hybrids in the field: "There is no practical way to identify or separate, in situ, potentially pure Paiute cutthroat trout from hybrid individuals in treated areas."

We wonder, then, how Paiute CT can be separated and restocked after rainbows, Lahontans, and hybrids are removed from the area. We also wonder what the CDFG has been moving around and calling Paiute CT if they can not separate it visually.

The Agencies have moved Paiute CTs into several other areas where it was not native, and so there are now four or five other populations of it in other streamsheds. In the Silver King Creek basin there are now six separated populations of the Paiute CT in part because the Agencies purposely enhanced barriers on some of the smaller streams to separate the fish. Now they claim the isolated populations are a threat to the survival of the fish (see following section on Fragmentation).

Furthermore, there are conflicting opinions among scientists in the published literature about the origin and age of this subspecies. Is it an old form (J. H. Ryan in Schaffer 1992, Nielsen and Sage 2002) or a relatively recent form (Behnke and Zarn 1976), in evolutionary terms? Or is it perhaps an even more recent color variation that developed in a population of Lahontan CT, that were moved over maybe the last 120 or fewer years?

Ryan reported that the native habitat of the Paiute CT was above Llewellyn Falls (J. H. Ryan in Schaffer 1992). The type locality for the subspecies is above Llewellyn Falls, that is, the location where the specimens were first collected and subsequently described by Snyder in 1933. The Agencies have rather recently decided, with no scientific evidence, that the native habitat was below Llewellyn Falls.

Fragmentation of Existing Populations of Paiute CT

The EIS/EIR has built a case for expanding the range of PCT below Llewellyn Falls partly based on the fragmented character of existing populations within and outside the Silver King Creek basin. It cites references that claim minimum stream lengths needed to save a species. "Given the current literature in trout population ecology, the existing small isolated populations of Paiute cutthroat trout are not large enough to sustain the subspecies in the long term" (p. 5.1-12 EIS/EIR). The Agencies have not fully acknowledged (p. 5.1-2) that some of the present fragmentation in Silver King Creek is from their own actions and could be undone.

If more connectedness is important, the EIS/EIR should consider actions that would expand connectedness of existing populations in addition to moving fish among populations. Within the upper mainstem of Silver King Creek above Llewellyn Falls, there are now 2.7 miles of stream without barriers (Table 5.1-7). Prior to construction in 1972 of an artificial barrier by the Agencies (p. 5.1-2 EIS/EIR), Four Mile Canyon Creek (1.9 miles) had only a 2 ft falls that was not a fish barrier. "With the cooperation and assistance of

the Toiyabe National Forest personnel, an artificial barrier was constructed in 1972 on a natural falls about 0.6 m (2 ft.) high, situated between several large granite boulders approximately 0.4 km (1/4 mi.) upstream from the mouth" (p. 36, Ryan and Nicola 1976).

In addition, the Agencies have likely enhanced or altered barriers on Bull Canyon Creek (0.6 miles). "The 1975 survey, however, revealed that heavily spotted fish were present upstream as far as the mouth of Whitecliff Lake Creek. An inspection of the barrier site revealed that the stream had bypassed the natural barrier" (p. 43, Ryan and Nicola 1976). Thus, it would be possible to redirect Bull Canyon Creek around the existing barrier as naturally occurred in the past and remove the artificial barrier on Four Mile Canyon Creek, thereby restoring an additional 2.5 miles to the existing 2.7 miles on Silver King Creek for a total of 5.2 miles. Removal of these artificial barriers would nearly double the distance of interconnected stream and restore the streams to a natural state.

Missing basic life history information and characteristics of Paiute CT

For all of the Agencies' professed concerns for the threatened Paiute CT over the past more than 40 years, they have failed to obtain some of the most basic biological information about the fish. We brought to the attention of the FWS five years ago many gaps in data, and the information is still missing in the EIS as follows:

1. No data on food habits of fish from Silver King Creek, and yet, the Agencies are ready to poison out the native invertebrates in the "native" habitat of the fish.
2. No data on age and growth except from fish transplanted to the North Fork Cottonwood Creek a non-native habitat.
3. No data since 1956 when Ryan and Nicola (1976) reported on ages of 40 fish from Silver King Creek.

4. No data in last 53 years on length at age for fish from Silver King Creek.
5. No data on length – frequency for populations in Silver King Creek.
6. No data on when fish reach sexual maturity in Silver King Creek and, therefore, whether 150 mm (the standard size CDFG considers "catchable" or adult trout) as the rule for "adult" makes any sense.
7. No data on fecundity of fish in Silver King Creek.
8. No data on any differences in age/growth/sexual maturity by sex (even though typically trout males mature a year earlier than females).
9. No data to support or refute that there are assumed (by FWS in Revised Recovery Plan) to be only three age classes of PCT in Silver King Creek.
10. No current field data on age class composition in the EIS/EIR although the Revised Recovery Plan said it would "now" (as of 2004) begin "to monitor abundance and age class composition." (Have they?)
11. No data on microhabitat (e.g., depth, velocity, substrate) preferences.
12. No data on meristic characteristics of PCT (e.g., pyloric ceaca, gill rakers, basibranchial teeth, scale counts) since Behnke and Zarn (1976) examined Snyder's original 1933 collections.
13. No data (as listed above) on any of the out-of-basin populations except NF Cottonwood Creek collected in the early 1970s.

Errors in Estimate of Number of Fish

We think the values presented in the EIS/EIR (p. 5.1-9) for the number of fish in Upper Silver King Creek and the other tributaries are far too low. The EIS/EIR states: "Approximately 1,020 adult Paiute cutthroat trout reside in the Silver King Creek drainage, based on CDFG population assessments in 2001 (FWS 2004). CDFG estimated approximately 424 fish in Upper Silver King Creek above Llewellyn Falls, and an effective population size of 400-700 fish in Four Mile Canyon, Fly Valley and Corral Valley Creeks combined" (p. 5.1-9).

Shown below are the values we computed from FWS (2004) data given as 2000 and 2001 CDFG estimates (which in nearly all cases were lower than the multi-year average). Data for Coyote Valley Creek are the mean of the two test sections. Data for Bull Canyon Creek are from Deinstadt et al. (2004).

Stream	Adult/mile	Habitat in Miles	Total Adults (> 150mm)
Upper Silver King Ck.	353	2.7	953
Four Mile Cyn. Ck.	126	1.9	239
Bull Canyon. Ck.	160	0.6	96
Fly Valley Ck.	190	1.1	209
Corral Ck.	95	2.2	209
Coyote Ck.	884.5	3.0	2,654
Total Adult Paiute Cutthroat			4,151

If the mean value for stations with many sample years is used, the total number of adult Paiute cutthroat trout is 4,726.

Clearly, if correct values for all the sections were used, there are four times as many adult Paiute cutthroat trout in the Silver King Creek drainage as reported in the EIS/EIR.

Errors and Accidents in Rotenone Projects

We have previously documented many accidents that occurred in past rotenone applications (e.g., Exhibit A) Most problems were reported by Regional Water Quality Control Boards doing independent monitoring. Some were found in CDFG reports following rotenone projects. They illustrate the difficulty the Agencies have in executing aquatic poisoning projects without major incidents and unforeseen accidents.

Hazards and Hazardous Materials

The EIS/EIR declares there is no need to consider Hazards and Hazardous Materials because "...The proposed Action and alternatives would not transport...or dispose of hazardous materials (p. 4-3)." How, then, can the Agencies get to Silver King Creek with 300-600 pounds of potassium

permanganate and 20 (or 50, p. 3-9) gallons of rotenone fomulation? The project would involve hazardous materials and the EIS must deal with that fact. It must also analyze the poor record the Agencies have for conducting these poisoning projects responsibly and without accidents.

Interactions of Rotenone With Other Pesticides

There is strong evidence that residues of common herbicides, insecticides and piperonyl butoxide (PBO) may remain in aquatic sediments (Woudneh and Oros 2006) or in the water, even in remote national parks (LeNoir et al., 1999, Angermann et al., 2002) and that they affect aquatic organisms (Relyea 2005).

With many toxins, such as rotenone, antimycin and other pesticides, the effect on the electron transport system in mitochondria is mediated by an organism's natural defenses. But when certain compounds are also present in the environment, toxicity is increased because the natural defense system (cytochrome P450) is reduced (Li et al., 2007). This result is well established for the role of PBO, a synergist in formulations of rotenone and other insecticides. However, it is also known that other pesticides themselves may function much like PBO (in blocking cytochrome P450) and, hence, increase substantially the toxicity of insecticides. The EPA is aware of these relationships, and in their rotenone risk assessment EPA cited the work by Bills et al., (1981), for example, that showed polychlorinated biphenyls (PCBs) multiplied the toxicity of rotenone to fish. There is other work that has established similar relationships among a range of pesticides and herbicides (e.g., Bielza, et al., 2007).

It is likely that low level residues of pesticides are present now in many aquatic habitats and that PBO is present in sediments of Silver King Creek from earlier projects. We are unaware of any fish poisoning project that has analyzed water or sediments for low level pesticide residue prior to applying piscicides. The effects of rotenone formulations in these waters are

underestimated because of the possible presence of other pesticides already in the water.

Rotenone and Parkinson's Disease

Prentiss Inc., Foreign Domestic Chemicals, and Tifia International LLC, manufacturers of rotenone in the U.S., have petitioned the EPA to remove rotenone from the list of pesticides for terrestrial use, but not (yet) for aquatic use (EPA wesite). We suspect, but do not know for sure, that this petition is because of the growing evidence of the connection between rotenone and Parkinson's disease.

The discussion in the EIS/EIR (p.5.3-9) of potential links between rotenone and Parkinson's disease (PD) is as incomplete as that given in the American Fisheries Society's Task Force on Fishery Chemicals (2000). Since the original article by Betarbet et al., 2000, many studies have been published in peer reviewed literature on this association. At latest count, there are 352 studies linking rotenone and PD in the Web of Science. In a recent review on the more general link between PD and many pesticides, including rotenone (Hatcher et al., 2008), the authors noted that "...rotenone is very hydrophobic and, thus, easily can cross biological membranes without the need for a transporter." They concluded "there is evidence of a role for rotenone in PD pathogenesis" although it is "unlikely a major contributor because of its limited commercial use, short half-life in the environment and low bioavailability." Similarly, Brown et al., (2006) concluded that sufficient data suggest rotenone affects development of PD. They, too, caution that although the weight of evidence is sufficient to conclude that a generic association between pesticide exposure and PD exists, more data are needed to prove conclusively cause-effect.

Furthermore, rotenone testing for PD associations generally have not included other cube resins, especially deguelin and tephrosin (Fang and Casida 1999, Cabizza, et al., 2004), that are major components equal to or

greater in concentration than rotenone in the active ingredients of the proposed piscicide formulations. For example, in Nusyn-Noxfish the active ingredients are 2.5% rotenone, 2.5% piperonyl butoxide, and 5% other cube resins. These cube resins have been likewise shown to interfere with mitrochondial function in the same way as rotenone (Caboni et al., 2004).

Silver King Creek is in a remote area. The threat of exposure to rotenone and the threat of Parkinson's Disease would be primarily to the people applying the poisons and working along the stream during the project.

Rotenone Concentrations

The EIS/EIR states that the proposed project would use lower rotenone concentrations than have been used in the past (e.g., p. 5.3-11). We find no basis for this statement. The proposed chemical formulations would all result in a target concentration of 25 μg/L of rotenone (Table 5.3-1). According to Trumbo et al. (2000a) this target concentration is exactly the same as that used from 1991 to 1993.

Alternative 3, Combined Physical Removal of fish

Alternative 3 is dismissed by the Agencies as being too difficult and taking too long. We disagree. Mechanical removal of fish, using seines, blocking nets, and electrofishing equipment is possible and can be done in ways that would not greatly disturb the aquatic environment or species.

Thompson and Rahel (1996) found that with three-pass removal electofishing they were able to remove a high proportion of fish in 1 year. The lowest efficiency was for small (age-0) brook trout. However, because the remaining fish the next year were immatures, there was no reproduction and thus, "recruitment was virtually nonexistent following 1-2 years of

population control." Therefore, once the large fish are taken, the problem gets easier.

The USFS is currently removing non-native fish in the Upper Truckee River as part of a Lahontan CT Trout restoration project, and they are doing it with a combination of electrofishing and gill netting (See attached Exhibit E). They tried poisoning with rotenone first to remove brook trout in Meiss Meadow and failed. They then switched to electrofishing and were successful as of 2007. They are continuing mechanical removal in the Upper Truckee River. The attached map in Exhibit E illustrates a complicated habitat.

In Sequoia-Kings Canyon National Parks, biologists recently have been successful in removing all fish from small lakes and feeder streams by entirely physical means (nets and electrofishing) (D. Boiano, NPS fishery biologist, pers. comm. 2005). Fish have been successfully removed from lakes using gill nets in other places (e.g., Knapp and Matthews 1998; Pope et al., 2009).

In the Silver King Creek system electrofishers could begin at the upstream areas and move downstream so that downstream drift of fish would not be a problem. Block nets could be positioned to limit fish movement between upstream and downstream sections. Regular tending of nets to remove debris or maintain position should be possible, especially with volunteers. The Agencies can make little use of volunteers in the poisoning option, given the requirements of training, licensing, risk, and Personal Protective Equipment. But physical removal would be amenable to volunteer labor needed for the many tasks and could effectively reduce total project costs as well as enhance project efficiency (e.g., tending block nets, hauling supplies, refreshing workers, etc.).

An excessively high voltage is not necessary to collect fish, but fish would have to be killed and buried after they are collected. Moving non-native hybrid fish to other areas in the Wilderness Area and in the same East

Carson River drainage, as the Agencies have been doing, is unsound management that leads to more problems later and should be ceased immediately in all Wilderness Areas.

Conclusion

In conclusion, the single species management approach proposed in the preferred alternative is out-of-date. It should be rejected. Ecologists have known for decades that species are interwoven and interdependent. Applying non-specific poisons to whole communities for the goal of expanding the range of a single population of fish is unacceptable in modern ecology. The preferred alternative would cause long-term changes of at least 6 years to the structure and function of the biological community. Poisoning may eliminate some non-target species forever, as the Agencies admit in this EIS/EIR. The Clean Water Act requires that existing uses be protected in waters of exceptional quality. The Agencies have refused, again, to conduct a species level inventory of aquatic invertebrate species. An alternative management strategy exists and should be used if the agencies want to try to eliminate the non-native fish they have stocked in the stream system. But before even that alternative is contemplated, a critical question is whether or not an impermeable barrier to upstream fish movement exists. Further, scientists are unable at this time, to genetically differentiate between Lahontan cutthroat trout and Paiute cutthroat trout, and the Agencies cannot visually distinguish "pure" Paiute cutthroat trout from hybrids, thereby making management strategies unrealistic.

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Comment Letter 3

From: "jim donald" <jdonald@gbis.com>
To: BWarden@waterboards.ca.gov
Date: 6/2/2009 3:58 PM
Subject: Silver King NPDES permit
Attachments: Silver KingDEIR6-09LRWQCBcomments.doc

Dear Bruce,

Attached are comments from Friends of Hope Valley in support of Alternative 1 in the Silver King DEIR.

Thank you,
Jim Donald, Board Member
Friends of Hope Valley

Friends of Hope Valley

PO Box 431 Markleeville, CA 96120

June 2, 2009

Bruce T. Warden, Ph.D.
Environmental Scientist
Lahontan Regional Water Quality Control Board
2501 Lake Tahoe Blvd.
South Lake Tahoe, CA 96150
bwarden@waterboards.ca.gov

Dear Mr. Warden,

Friends of Hope Valley remains strongly opposed to the use of rotenone to re-establish populations of Paiute Cutthroat Trout in the Carson Iceberg Wilderness on Silver King Creek above the confluence of Snodgrass Creek. We therefore support Alternative 1, no action, in the 2009 DEIR.

We question the priority of implementing this project now in this time of economic uncertainty. Expenditures necessary for this project seem misdirected in this time of housing foreclosures and rising unemployment. That the PCT now exist in more stream miles than ever historically obviates the need for additional habitat.

The use of rotenone in a wilderness is inconsistent with the wilderness act of 1964. Users have a reasonable expectation of clean water, healthy riparian zones and solitude and it is a violation of the public trust to so disrupt a wilderness 3 years in a row. 1

We remain concerned that residues of rotenone, the oxidizer potassium permanganate, and the VOC solvents will remain in the ecosystem for years. We remain concerned that discernable traces of these compounds will be present in the Carson River watershed and that they will come back to visit us when we eat the melons grown in Fallon. Everything that goes in the upper watershed ends up in the Carson Sink and considering that geologic events may not change that area for many thousands of millennia, we think you should be careful what you put in there. 2

As previously noted, we are concerned with the impact of rotenone on the aquatic ecosystem. Studies have shown that up to 12% of the benthic macro-invertebrates may never repopulate poisoned waters. Previous biotic sampling admits that rare, endemic or endangered species may not be detected before being wiped out. This alone is reason enough not to implement. 3

Indeed we question whether the State Water Board will even issue an NPDES permit for this project. If after spending huge amounts of money for environmental studies you find yourself without a permit the project will stall. Inevitable litigation will cost agencies and environmental groups untold sums of cash.

We again question the probability of success, citing Lake Davis as an example. Despite repeated attempts the Northern Pike are still there. We suggest that this will happen on Silver King also. The fish barriers of 8 and 10 feet in Silver King canyon are not sufficient to maintain genetic isolation during high water events. Artificial barriers will not survive the rigorous conditions in this canyon. 4

We feel strongly that the money available for this project could be used for restoration work elsewhere that would benefit more people in better ways. There are many areas that need attention and one only need look at CDFG lands in Hope Valley to see the need for ecosystem restoration. The cost benefit ratio for the PCT project is so narrow that it will barely be noticed. The fish already exist in viable populations. Think of what you could do Heenan Lake/Hope Valley areas with the money available for this project.

It has become painfully evident in the last few years that the planet has limited resources and limited carrying capacity for what we put into it. We request that you use more care in protecting future resources and use your agenda to establish harmonious relationships between people and the environment. We therefore ask that you take no action in this project. Thank you.

Sincerely,

Debbi Waldear, James C. Donald, John Barr, Greg Hayes, Gay Havens,

Board Members

Friends of Hope Valley

Jdonald@gbis.com and dwaldear@gbis.com

Comment Letter 4

....NOTICE....
Submittal of Written Material for Water Board Consideration

In order to ensure that the Water Board has the opportunity to fully study and consider written material, it is necessary to submit it at least ten (10) days before the meeting. This will allow distribution of material to the Board Members in advance of the meeting. Pursuant to Title 23 California Code of Regulations Section 648.4, the Water Board may refuse to admit written testimony into evidence unless the proponent can demonstrate why he or she was unable to submit the material on time or that compliance with the deadline would otherwise create a hardship. If any other party demonstrates prejudice resulting from admission of the written testimony, the Water Board may refuse to admit it.

A copy of the procedures governing Regional Water Board meetings may be found at Title 23, California Code of Regulations, Section 647 et seq., and is available upon request. Hearings before the Water Board are not conducted pursuant to Government Code Section 11500 et seq.

COMPLETE FORM AND RETURN

RECEIVED
JUN 1 2009
BY BW

TO: CA Regional Water Quality Control Board, Lahontan Region (Bruce Warden)
2501 Lake Tahoe Blvd.
South Lake Tahoe, CA 96150

SUBJECT: Comments on tentative NPDES Permit for **DEPARTMENT OF FISH&GAME, PAIUTE CUTTHROAT TROUT RESTORATION PROJECT, SILVER KING CREEK, ALPINE COUNTY**

X We concur with proposed requirements
_____ We concur; comments attached
_____ We do not concur; comments attached

K. Tisdale (Sign)
Kim Tisdale, Fisheries Supervisor (Type or Print Name)
Nevada Department of Wildlife (Organization)
1100 Valley Rd (Address)
Reno NV 89512 (City and State)
775 688 1882 (Telephone)

Comment Letter 5

From: "Jenny Francis" <jfrancis@caltrout.org>
To: BWarden@waterboards.ca.gov
CC: LKemper@waterboards.ca.gov
Date: 5/29/2009 2:24 PM
Subject: Paiute NPDES Permit
Attachments: CalTroutletteronLRWQCBNPDESPermit_Paiute_final.doc

Bruce,
attached is our support letter for the application by DFG for the proposed Paiute project in Silver King Creek.
Let us know if you have any questions or comments.
Thanks for your efforts!

Jenny Francis
Northern Sierra Regional Program Manager
California Trout
530-541-3495
jfrancis@caltrout.org
www.caltrout.org <http://www.caltrout.org/>

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"When one tugs at a single thing in nature, they find it all attaches to the rest of the world." -John Muir

May 30, 2009

CALIFORNIA TROUT
870 Emerald Bay Rd., Suite 303, South Lake Tahoe, Ca 96150
Phone/fax 530-541-3495

501(c)3 Tax Exempt ID: 23-7097680

Pauite Cutthroat Trout Restoration Project
Attn: Dr. Bruce Warden
California Regional Water Quality Control Board
2501 Lake Tahoe Blvd, SLT, CA 96150

Re: Tentative National Pollutant Discharge Elimination System (NPDES) Permit for Department of Fish & Game's (DFG) proposed Paiute Cutthroat Trout Restoration Project, Silver King Creek, Alpine County.

Dear Mr. Warden:

California Trout would like to express our **support** for the NPDES application by DFG for the proposed Paiute Cutthroat Trout Restoration Project in Silver King Creek. In addition to providing support comment letters on behalf of California Trout, our new Northern Sierra Regional Program Manager actively solicited additional support comment letters during the public review process of the Draft EIS/EIR at local events, through email alerts to California Trout's nearly 7,000 members statewide, and by sharing support letter templates with partnering groups like Trout Unlimited, all in an effort to help move this crucial project forward. This effort garnered **approximately 437 support** letters from community members for the proposed rotenone treatment during this phase of the permitting process. 1

Although implementation of the recovery plan has been stalled by litigation in the past, we are pleased to see the process now being resolved and moving forward with all potential environmental threats being addressed by the preparation of an (EIS/EIR) by the USFWS and CDFG. In CalTrout's recent report, SOS: California's Native Fish Crisis, Paiute were given a score of "2". This means they're vulnerable to extinction within the next 100 years in their native range without substantial intervention.

CalTrout believes that the successful restoration projects implemented by CDFG and USFWS on the upper reaches of Silver King Creek and its tributaries, which resulted in pure-strain Paiute populations, serve as an excellent example of what can be

accomplished in the remaining 11 miles of Silver King Creek. If successful, the Paiute will be restored to its full native range and set the stage for eventually delisting the species. Recovering the Paiute and removing it from the endangered species list would be an unparalleled conservation victory for California and demonstrate to the nation just how critical the ESA is for bringing our fish and wildlife resources back from the brink of extinction.

Rotenone occurs naturally in the roots and stems of several plants. Research shows that its environmental impacts are minimal and its harmless to humans when applied properly. This option would most thoroughly remove the introduced species that threaten the long-term survival of Paiute.

When Rotenone is used as a fisheries tool to eradicate non-native species for a native species reintroduction, it alone cannot ensure long-term success for the reintroduction. Once a non-native species is eradicated, for instance, it may be reintroduced through active planting by individuals or by migration. In addition to chemical treatment, **California Trout would like to stress their support of necessary follow-up management actions to minimize or neutralize the possibility of non-native reintroduction.** Such steps may include development of barriers upstream and downstream of the reintroduced habitat area (to prevent migration of non-native species) and/or active stream monitoring by regulatory personnel, volunteers, or others to prevent individuals from planting non-native species. 2

Likewise, if the habitat in which a reintroduction takes place is not healthy enough to allow for long-term survival of the reintroduced species, then the use of rotenone is inappropriate if used alone. In this case, restoration measures that re-establish stream processes and characteristics that support a healthy population of the reintroduced species must be taken to ensure long-term success.

California Trout appreciates all that is being done to protect and restore this native legacy species for future generations to enjoy. We hope to continue to partner on this and other projects to protect and restore wild and heritage trout in California. If you have any suggestions for how we may be of future assistance or have any questions don't hesitate to contact our Northern Sierra Regional Program Manager directly.

Sincerely,

Jenny Francis

Jenny Francis
Northern Sierra Regional Program Manager
California Trout
PO Box 9122
SLT, Ca 96158
530-541-3495
jfrancis@caltrout.org

Comment Letter 6

RECEIVED
JUN 01 2009
By BW

Date: May 23, 2009

To: California Regional Water Quality Control Board, Lahontan Region
2501 Lake Tahoe Boulevard
South Lake Tahoe, California 96150
(530) 542-5400
(530) 544-2271 Fax
www.waterboards.ca.gov/lahontan

From: Ann McCampbell
11 Esquila Rd
Santa Fe, NM 87508
(505) 466-3622
(505) 466-2690 Fax
DrAnnMcC@aol.com

Attention: Bruce Warden

Re: TENTATIVE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT FOR DEPARTMENT OF FISH & GAME, PAIUTE CUTTHROAT TROUT RESTORATION PROJECT, SILVER KING CREEK, ALPINE COUNTY

The Lahontan Board should decline to issue an NPDES Permit for Silver King Creek Paiute Cutthroat Trout (PCT) Project, because, among other reasons, the California Department of Fish & Game (CDFG) has not complied with conditions required by the Board when it denied the NPDES Permit in 2004. Specifically, CDFG has not conducted studies to determine whether rare or unique benthic macroinvertebrate species are present in the project area, nor is there evidence that it has provided the Board with raw data and any analysis from pre-project macroinvertebrate surveys conducted in 2003 and 2004, and raw data from previous CDFG macroinvertebrate studies of Silver King Creek rotenone treatments conducted in the 1990's. 1

There are many other reasons to deny the Permit.

There is no need for this project. PCT are already well-established and it is unfathomable that a Wilderness area would be poisoned, not because additional stream miles are required for restoring a native fish, but because of the hope that this will diminish the chance of introduction of nonnative fish into restored areas, even though other methods such as posting signs or guards, closing the area to fishing, and extensive education of the angling community could achieve the same thing.

The project is not necessary for recovery of PCT and is only being proposed by those who want to provide the opportunity for anglers to win Heritage Trout Awards from the California Department of Fish & Game. To be eligible for this award, an angler must 2

catch a certain number of native fish in their historic habitats. But even for this goal, the proposed project is flawed, because no one knows if the project area is, in fact, the historic habitat of the PCT and PCT cannot be genetically distinguished from Lahontan trout, making it impossible to know whether a PCT has been caught. 2

The intent of the Endangered Species Act (ESA) is to protect all species, not just fish. It is an abuse of the ESA to use it as an excuse to poison an entire aquatic ecosystem for the benefit of one species. This is especially true in a Wilderness Area which is meant to be a sanctuary for all species.

In fact, deploying toxic pollutants in a wilderness area violates the Wilderness Act and Forest Service regulations. The Wilderness Act states that wilderness areas are to remain "*untrammeled*" by man. Destroying aquatic life certainly constitutes significant "*trammeling*". The Forest Service Manual Title 2300 on Wilderness Management instructs staff to "*Maintain wilderness in such a manner that ecosystems are unaffected by human manipulation ...*". The express intent of this project is human manipulation of the ecosystem. 3

The Board has an obligation under the Basin plan to protect aquatic species in the Basin from harm from toxic pollutants, including in the proposed project area. Deploying rotenone would lead to long-term negative impacts on the macroinvertebrate and amphibian communities. Indeed, the macroinvertebrates have still not recovered from rotenone-containing piscicide deployments in the early 1990's. The extent of impacts of these products on other species is unknown. 4

There is more than sufficient evidence to anticipate that this project can *not* comply with the Basin plan, which requires that the ecosystem be fully recovered within two years after a rotenone application. Since the project would violate the Basin plan, a Permit should be denied. 5

If the Permit is issued, it should require that macroinvertebrates be surveyed and monitored *at the species level* in order to accurately assess the damage that is caused by rotenone use. 6

Following the lead of the California EPA that adopted a precautionary policy about cumulative impacts of environmental harm, the Board should err on the side of caution and deny approval of this project on the grounds that it would add to damage already done by previous rotenone applications. 7

The Board also needs to take into consideration the viability of the project given that it is questionable whether there are natural downstream barriers that would prevent migration of non-native fish into the project area. If non-native fish gain access to the project area after it is stocked with PCT, the whole project will have been for naught. 8

Chemicals for which there are no water standards - such as rotenone, rotenolone, piperonyl butoxide (PBO), n-methyl-2pyrrolidone, and diethylene glycol ethyl ether - 9

should *not* be allowed in Silver King waters. Approving their use because they do not violate existing standards is specious logic and an attempt to exploit a regulatory loophole. Lack of standards does not mean they are non-hazardous and acceptable.

9

The Board's decision to approve the use of rotenone should not rely on the fact that it is registered by the EPA, since EPA registration does not mean that a pesticide is "*safe*," "*nontoxic*," or "*harmless*". In the case of rotenone, for example, there is increasing evidence linking rotenone with Parkinsonism. Indeed, use of rotenone has become the standard laboratory technique for inducing Parkinsonism in lab animals.

10

In addition, "inert" ingredients in pesticide products are essentially unregulated by EPA. The EPA does not screen chemicals to decide if they should be allowed as "*inert*" ingredients. It merely assigns them to one of four lists, List 1 – Inerts of Toxicological Concern, List 2 – Potentially Toxic Inerts, High Priority for Testing, List 3 – Inerts of Unknown Toxicity, List 4A – Minimal Risk Inerts, List 4B – Inerts that will not adversely affect public health or the environment given current use patterns.

Xylene and toluene are on List 2 (Potentially Toxic Inerts) and naphthalene, piperonyl butoxide, N-methyl-2-pyrrolidone, and trimethyl benzene are on List 3 (Inerts of Unknown Toxicity). These chemicals are found in the products proposed for use in this project.

Since there is abundant data on the toxicity of many of the List 3 "*inerts*," it appears that their toxicity is only "*unknown*" to the pesticide office of EPA. In fact, more than 200 chemicals used as "*inert*" ingredients are considered to be hazardous pollutants in air and/or water (The Secret Ingredients In Pesticides: Reducing the Risk, Eliot Spitzer, Attorney General of New York State, Environmental Protection Bureau, May 2000).

11

Therefore, EPA registration of CFT Legumine and Nusyn-Noxfish does not guarantee the safety of their use and it is incumbent on the Board to make an independent assessment of their potential to harm the environment and nontarget organisms.

Although touted as the safer and more environmentally-friendly alternative to Nusyn-Noxfish, CFT Legumine contains "*inert*" ingredients that may be as, or more, harmful than those in Nusyn-Noxfish.

CFT Legumine contains n-methyl-2-pyrrolidone, which is a developmental/reproductive toxin on the Prop 65 list, and also contains diethylene glycol ethyl ether, which is a mutagen and reproductive toxin.

Since there are no safe levels of endocrine-disrupting chemicals, n-methyl-2-pyrrolidone may cause adverse impacts at any level, but certainly at levels far lower than the petroleum solvents in standard Noxfish. Any detectable amount of a developmental toxin in the project area is of concern, since this area has a beneficial use of "*domestic water supply*" and the Basin Plan requires that beneficial uses be maintained.

There are also no safe levels for carcinogens, such as naphthalene, a chemical which is present in Nusyn-Noxfish and on the Prop 65 list. Allowing concentrations of naphthalene per the Basin Plan and rotenone plan should be reconsidered after review of scientific evidence that has become available since the plans were approved.

The board should not base its decision about the proposed project on the out-of-date Basin and rotenone plans. For one thing, since those plans were approved, the EPA listed piperonyl butoxide (PBO) as a possible carcinogen in 1995. This could not have been considered when the MOU was written. 12

Estimates of chemical concentrations in the project area likely underestimate the true deployment concentrations. In the Nusyn Noxfish label under "*Use in Flowing Streams and Rivers*," it says that live fish should be placed upstream of multiple application sites to make sure that a lethal dose of rotenone is arriving at the next station. If a lethal dose is arriving at a station and another lethal dose is dispensed by the station, then at the very least there will be double the lethal dose at each station. And it is likely that more than a lethal dose is dispensed by each station because in order to have a lethal dose arrive 2 miles downstream at the next station and because rotenone will be breaking down en route, more than a lethal dose of rotenone needs to be dispensed at each station. And depending on how many stations are used at one time, the concentration of rotenone and its accompanying "*inert*" ingredients might actually be magnified significantly. 13

The amount of rotenone (and "*inerts*") applied by backpack sprayers is completely unkown. Water monitoring should include sampling of areas where rotenone is applied by backpack applications in order to determine and document what concentrations are deployed by that method.

Using potassium permanganate to neutralize rotenone presents several problems. Potassium permanganate itself is toxic to fish and excess amounts (that which does not chemically react with piscicide chemicals) flows downstream out of the project area. Potassium permanganate also does not neutralize all of the "inert" ingredients and many of them will continue to flow downstream. (CDFG should be required to determine and inform the Board about which chemicals will not be neutralized by potassium permanganate). And attempts to neutraliize rotenone are not always successful, as documented by numerous unintentional fish kills below project boundaries in previous projects. 14

No chemicals deployed in the project should be allowed to exceed detection limits outside of project boundaries. This includes all active and "inert" ingredients of piscicides, potassium permanganate, and any surfactants or dyes or other chemicals put in the water, as well as their degradation products. It is not adequate to only measure rotenone, rotenolone, TCE, xylene, or acetone (or benzene or ethylbenzene). CDFG should be required to identify all the chemicals and degradates that might be present in the water and monitor them. The analytical detection limits for all the identified chemicals should also be disclosed. 15

The tentative NPDES violates federal law (FIFRA) by proposing that "*Fish not collected at the block nets would be left in the stream to decompose and become part of the food chain*". The label instructions for both Nusyn-Noxfish and CFT Legumine say "*Properly dispose of dead fish* ***... Do not use dead fish for food or feed***." The label also states "*it is a violation of Federal law to use this product in a manner inconsistent with its labeling.*" 16

It strains credulity to claim that "*this Permit is consistent with the State non-degradation and federal anti-degradation policies*." Nothing could be farther from the truth. The proposed project consists of putting known toxic pollutants, in toxic amounts, into drinking water of California. 17

Thank you for allowing me to comment on the Tentative Permit. Please keep me informed of any decisions, actions, or meetings regarding this project.

Feel free to contact me if you have any questions or would like additional information.

Respectfully submitted,

Ann McCampbell, MD

Comment Letter 7

From: "Nancy A. Erman" <naerman@ucdavis.edu>
To: LKemper@waterboards.ca.gov
CC: JAOEarth@aol.com; HSinger@waterboards.ca.gov; BWarden@waterboards.ca.gov...
Date: 5/18/2009 1:19 PM
Subject: Stream/lake poisoning/rotenone/Silver King basin

Dear Ms. Kemper:

We have received your letter of May 5, 2009, and the attached tentative NPDES permit for poisoning with rotenone formulations the waters of Silver King Creek basin in the Carson-Iceberg Wilderness Area. We understand from your letter that comments received after today, May 18, 2009, will not be given full consideration by staff in the proposed Board Order to be given to the Lahontan Water Board. We sent a complete copy of our comments and exhibits on the Draft EIS/EIR for this proposed project with a transmittal letter to Harold Singer on or about April 30, 2009. We would like those comments to be considered by the Lahontan Board staff and Board as part of our comments for the tentative NPDES permit. We do not concur with the tentative NPDES permit.

We have had time for only a cursory examination of your draft NPDES permit. We note internal contradictions, disparities between the NPDES permit and the EIS/EIR, and incorrect assertions in the permit. We will prepare additional comments when we have time. We commented in detail on the past tentative permit for this project (2004, 2005) and note some of the same incorrect information in the current tentative permit.

The Water Board website states that the hearing date for this issue before the Lahontan Board now has been changed from July 8 and 9, 2009, to dates in October 2009. Would you please tell us what the new dates for public written comments are?
The letter you sent is confusing. It gives three different times for written comments to be submitted---May 18, June 5, and 10 days before the hearing. The same letter appears on the Board website for the October meeting. Would you please clarify for us the date for submission of comments?

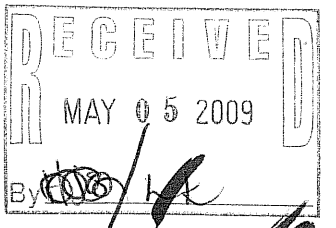
Thank you for your attention to these matters.

Sincerely,

Nancy Erman

43200 East Oakside Place
Davis, CA 95618
e-mail: naerman@ucdavis.edu

April 30, 2009



Harold Singer, Executive Officer
Lahontan Regional Water Quality Control Board
2501 Lake Tahoe Boulevard.
South Lake Tahoe
CA 96150

Dear Mr. Singer:

Enclosed, for your information, are the comments we have filed with the U.S. Fish and Wildlife Service on the Draft EIS/EIR for the Paiute Cutthroat Trout Restoration Project in the Carson-Iceberg Wilderness, Humboldt-Toiyabe National Forest, Alpine County, Silver King Creek Basin, California.

Feel free to contact us if you, your staff, or Board have questions.

Sincerely,

Nancy A. Erman

Date: April 29, 2009

To:
Robert D. Williams
State Supervisor
Nevada Fish and Wildlife Office
U.S. Fish and Wildlife Service
1340 Financial Boulevard, Suite 234
Reno, NV 89502

From:

Don C. Erman
Professor Emeritus
Aquatic ecology/ fisheries biology
Department of Wildlife, Fish, and Conservation Biology
University of California, Davis
43200 East Oakside Place
Davis, CA 95618
530/758-1206
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and

Nancy A. Erman
Specialist Emeritus
Aquatic ecology/ freshwater invertebrates
Department of Wildlife, Fish, and Conservation Biology
University of California, Davis
e-mail: naerman@ucdavis.edu

Re: Comments/ Draft Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) for the Paiute Cutthroat Trout Restoration Project, Carson-Iceberg Wilderness, Humboldt-Toiyabe National Forest, Alpine County, CA. Rotenone poisoning in the Silver King Creek watershed.

We are filing these comments on this EIS/EIR as private citizens, in the public interest.

The preferred alternative in this Draft EIS/EIR is the same project that has been proposed by the Agencies ((California Department of Fish and Game (CDFG), U.S. Fish and Wildlife Service (FWS), and U.S. Forest Service (USFS)) since 2002. It is a proposal to poison streams, springs, and a lake in a California Wilderness Area for the purpose of removing non-native fish. The

Agencies propose to poison one or more times a year for three years with several rotenone formulations.

We have filed comments on this project at every opportunity for public comment since 2002 and in the court proceedings. We include by reference our comments previously filed (by one or both of us) with the CDFG, FWS, USFS, Lahontan Regional Water Quality Control Board (Lahontan RWQCB), the State Water Resources Control Board (State WRCB), and the court. We have subsequently also filed comments with the EPA on the use of and impacts of rotenone formulations and antimycin in streams and lakes (Erman and Erman 2005, 2006, 2007). We will not attempt to repeat here all the evidence we have already filed on this issue but will assume it is in Agencies' files and is part of the official record. If the Agencies need copies of any of the above documents, we will provide them upon request. 1

The fundamental questions regarding this project are as follows:

a). Are the probable losses of native, non-target species; of losses and changes to the terrestrial and aquatic food web; and changes in community composition and species assemblages worth the potential benefit of a larger population of this cutthroat trout subspecies? 2

b) Is there a true barrier to upstream fish migration in the Silver King Creek canyon, and if not, what will further poisoning downstream in this watershed accomplish? 3

c) What is the real genetic status of this trout, what was its true native habitat, and can this subspecies be identified well enough to manage it and move it around? 4

Question "a" is fundamental to any intentional poisoning in a Wilderness Area, National Park or any other area of special ecological signficance. Questions b and c are critical to the analysis of long-term success of the Agencies' desire to expand this population of trout and whether or not there is a good reason for the project.

We state at the outset that we are in favor of either Alternative 1, the No Action Alternative or a modified Alternative 3, Combined Physical Removal of fish. We do not support Alternative 2, the Proposed Action using rotenone poisons. We support efforts by the Agencies to remove the non-native fish, that the CDFG has stocked for decades, from as many habitats as possible. We think removal can be done in ways that do not harm non-target, native species. Alternative 2 is not such a method. Further, our analysis of the whole project and its history suggest that the objective of this particular project—to expand this population of cutthroat trout subspecies downstream—may not be possible because of physical conditions in the habitat and the Agencies' continued actions in the watershed. 5

The EIS/EIR produced some new information on the genetic status of the trout subspecies. It also contains contradictions, errors, and misrepresentations of past events and known science. Some relevant information has been omitted from the EIS/EIR.

We have reviewed the EIS/EIR and many of the supporting documents.

Omissions in Executive Summary under 1.4 Public Involvement Summary

Before discussing the merits of the project, we must make some relevant corrections/additions to the past environmental review process that have been omitted in the Executive Summary.

The CDFG issued a negative declaration on the project in 2002. Comments filed with CDFG by one of us were ignored. We asked for preparation of a joint EIS/EIR when the project was first proposed in 2002.

The current project was halted by legal action twice since 2002. First, it was withdrawn by the USFS in 2003 after legal documents were filed in US District Court to force the USFS to complete an environmental assessment (EA) on the proposed project (Case No.: Civ-S-03-1756 GEB (PAN)). At that time the Lahontan RWQCB had not issued an NPDES permit or held a

hearing on the project. However, the Executive Officer of the Lahontan RWQCB had given his approval for the project.

The USFS issued a Draft EA in February, 2004. A Decision Notice and Finding of No Significant Impact (FONSI) was filed on IV-30-2004. Appeals were filed in June 2004. The USFS denied Appeals in August, 2004.

The Lahontan RWQCB held a hearing on a draft NPDES for the project in September, 2004, and declined to issue the NPDES permit. Upon appeal from the CDFG, FWS, and Trout Unlimited, the State WRCB over-ruled the Lahontan RWQCB in July, 2005, and issued an NPDES permit for the poisoning project. In August, 2005, the project was stopped by a preliminary injunction in U.S. District Court, eastern district of California (No. Civ. S-05-1633 FCD KJM) for failure of the USFS to prepare an EIS to address the concerns raised by the public and independent scientists.

We commented in detail on the FWS Draft Revised Recovery Plan for the Paiute cutthroat trout. Our comments were ignored in the final plan that was issued August 10, 2004.

Impacts of Rotenone Formulations on Non-Target Species

Aquatic Invertebrates:

We told CDFG (and the Lahontan RWQCB) as early as 1994 (Erman 1994) that they should conduct species-level inventories of aquatic invertebrates prior to poisoning lakes and streams. We reiterated the need for species inventories to the Agencies in 2002. We presented information during court proceedings on how this could be done reasonably. In the present document the Agencies claim that such species inventories are "infeasible" to conduct and anyway they know that no rare or endemic species have been found ("No benthic invertebrate species strictly endemic to the Silver King Creek Watershed have been identified." (5.1-26 2nd para. under Rare and Endemic species). So, in other words their logic is, "if we don't look for them, we won't find them and so, therefore, they don't exist."

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But in another part of the document we find this sentence: "In conclusion because the treatment could result in loss of rare or endemic species, this would be a significant and unavoidable impact" (p. 5.1-46). This conclusion seems strange in a project that is being proposed to "save" a "species" of fish. (In a later section we will discuss the use of "species" as it applies to the Paiute cutthroat trout.)

We contrast the statements in this document with earlier wording by CDFG in the Final Programmatic EIR (subsequent) for Rotenone Use for Fisheries Management, July 1994.

> "CDFG personnel are currently involved in a multi-year study of the effects of rotenone on macroinvertebrates from the Silver King Creek drainage (Alpine County). This study involves the identification of invertebrates at the species level prior to, during and for three years after scheduled treatments." (p. 103, Final Programmatic EIR (subsequent) on Rotenone Use. (July 1994). (Our emphasis added).

We later analyzed the data from the studies referred to above (Trumbo et al., 2000a and Trumbo et al., 2000b). We found that only larval specimens had been collected and that no species level studies had been done. The agencies have now had 19 years to do the species level studies they claimed they had been doing in the 1994 CDFG Programmatic EIR. That is more than enough time to do several species level studies in several watersheds.

Further, contrary to statements made by CDFG in correspondence with the Lahontan RWQCB, long-term significant impacts had occurred in aquatic invertebrate composition following poisoning of upper parts of the Silver King stream system from 1991 to 1993. We presented results of our analyses to the Lahontan RWQCB, State WRCB, USFS, FWS, the court, and more recently to the EPA. The findings are summarized in Erman and Erman 2006 (Exhibit A). We included in that summary the direct statements from the original Mangum Reports on Silver King Creek stating how many invertebrate taxa were still missing at the end of the study. We also included

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a literature review of other studies showing impacts to macroinvertebrates from rotenone poisoning.

The EPA (2006) corroborated our evidence of long-term impacts in their review of our material and that of others:

> "Despite the fact that invertebrates are less conspicuous members of the aquatic community, they are a major component of aquatic ecosystems and food webs. Any significant effects on invertebrates would most likely influence other components of the ecosystem. Effects may not be limited to merely a change in total biomass as a result of widespread mortality but any changes associated with differential sensitivity could bring about significant changes in the community structure, which could alter system function (p.5)."

> "The ecological risk assessment of rotenone states that aquatic macroinvertebrates exhibit roughly similar sensitivity to rotenone as do fish, that it is likely that most if not all fish and macroinvertebrates will be killed in the targeted treatment area, and that the entire aquatic food chain can be affected. The expectation is that treated streams/lakes will repopulate through immigration and/or restocking. Whether species density/richness is identical to pretreatment conditions is uncertain; however, EFED concurs with the Ermans that it is possible that more tolerant species can potentially displace those less tolerant to rotenone if rotenone is repeatedly applied (p. 6)."

> "Whether chemical means of manipulation should be used over other mechanical control measures or to what extent other species should be sacrificed to aid in the recovery of endangered species are important questions which the Ermans raise; however, the answers involve policy issues and are beyond the scope of screening-level risk assessment (p. 6)."

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"The chapter [on risk assessment] states that although the lowest toxicity value for freshwater invertebrates (48-hr EC50=3.7 µg/L) was chosen for risk assessment purposes, it is likely that more sensitive invertebrates could be found in the wild (p. 5)."

Dr. David Herbst had also reviewed the Trumbo et al. (2000 a, b) reports and found significant impacts to non-target invertebrates (Herbst 2002, Exhibit B).

The Lahontan RWQCB stated the need for a species inventory of non-target species prior to commencement of the project. They acknowledged and are aware that short- and long-term impacts occurred on the aquatic community composition during the last poisoning of the Silver King Creek basin (Harold Singer letter to Robert Williams, July 3, 2006, Exhibit C).

The Agencies have now had many years to conduct species level aquatic invertebrate studies. They are ambiguous in their responses to the issue: on one hand claiming that they are or have been conducting such studies; on the other hand claiming that it can not be done and is too difficult (5.1-26, 5.1 27). And further the EIS/EIR makes the argument that even if there were rare or endemic species present in the past, they may have already been lost because of previous poisonings (5.1-46). While we agree with this last possibility, it seems to us even more reason not to poison the remaining previously unpoisoned stream sections. We find it astonishing that the Agencies would use the possibility that they have already destroyed species in a Wilderness Area as an argument for further destruction.

We previously have explained in detail how and why adult invertebrate specimens must be collected to determine the species of most aquatic invertebrates. The confusion shown by the Agencies about what the term "species" means for the both fish and invertebrates is almost beyond belief. We assume they are purposely trying to confuse the issue to the public and other reviewers.

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The Mangum lab (Provo, Utah USFS lab, no longer in operation) identified larval forms, not adults. That government lab did not, in general deal with adult specimens that could be identified to the species level. It was a biomonitoring laboratory established to see patterns at more general taxonomic levels such as genus, family, order, and class. We note that the Vinson and Vinson (2007) study that was conducted on aquatic invertebrates from 2003 to 2006 was also a study of immature larval forms and more general taxonomic levels. Therefore, many of the statements made in the section of the EIS/EIR on special status macroinvertebrates and rare and endemic species must be disregarded.

For example, the statement that "Vinson and Vinson provide the species list for both historic and recent data"(EIS 5.1-27) is false. There is no species list for any of these studies. The Agencies know this and have stated it on the previous page (5.1-26). Vinson and Vinson acknowledge this in their report as follows: "The collection of adult insects would greatly facilitate our knowledge of species present in the Silver King Basin, which would assist in the routine identification of larval insects" (Vinson and Vinson 2007, p. 68).

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The Vinson and Vinson study includes a review of literature on rotenone impacts to non-target species. In their original report they conclude the following:

> "The results of three longer-term more intensively sampled studies in mountain streams suggest that common taxa will quickly recolonize treated areas and rarer taxa may be eradicated for a number of years or potentially forever."(Vinson and Vinson, Summary, p. x).
>
> They also state "This suggests that rotenone impacts to invertebrates will be greatest in mountain streams characterized by cold water and high oxygen levels as these streams are characteristically dominated by small gilled invertebrates, namely Ephemeroptera, Plecoptera, and Trichoptera" (p. 13,14).

The stated purpose of the Vinson and Vinson report was "to evaluate the effects of previous rotenone treatments on aquatic invertebrate

assemblages in the Silver King Basin." We, like Vinson and Vinson (p.xiii, #5), found the data unsuitable for such an evaluation. There were too many variables to make a comparison with the earlier studies (1990–1996). Samplers used were different (a modified Winget Surber sampler vs. a standard Surber sampler), mesh sizes were different (0.280mm vs. 0.5mm). The stations had been changed, the number of stations were not the same. The control stations were different. Thus, local stream conditions (microhabitats) could not be accounted for. Vinson and Vinson analyzed the data but apparently did not do the sampling. There was no information on who collected the samples. We assume the people doing the sampling were different in both studies and may have been different from one date to the next, thereby introducing another source of variation. Sampling protocols were different. Stratified random samples were collected in the 1991-96 study, while three samples in a single riffle were collected in the 2002-2006 study. And, finally, the samples were analyzed in different laboratories with different protocols. The Provo, Utah USFS lab subsampled in the laboratory; the Utah State BLM lab counted all individuals in the sample.

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No credible scientific comparison could or should be made between these studies. The first principle of replication of a study is to use the same methods.

In addition, we found some major errors in understanding what has and has not been poisoned previously in the Silver King watershed. The Agencies need to get their stories straight on this question. New information appears in the Vinson and Vinson report that claims Silver King Creek below Lewellyn Falls had been previously poisoned. This claim is contrary to information in the earlier EA and to testimony given before the Lahontan RWQCB. The information is attributed to Finlayson, personal communication (Table 3, p. 23, Vinson and Vinson 2007). Either the CDFG poisoned this stream section illegally or the Vinson and Vinson report has made an error that would invalidate the results of their analyses: What is a treatment and what is a control (i.e., non-poisoned) station?

7

Also, Vinson and Vinson state that one of the two stations on Bull Canyon Creek is a control station (Table 4, Vinson and Vinson 2007). This

station is clearly below the junction with the mouth of Whitecliff Lake which, according to Ryan and Nicola (1976) was poisoned to remove "heavily spotted trout" in an earlier project and was also poisoned in the 1991-93 project (Flint, et al., 1998). Again, if invertebrate sampling stations were not controls but were considered such, and visa versa, no data analyses would be valid.

7

It seems that Vinson and Vinson made a major error in data conversion of the earlier Mangum data. The Mangum data were already given in numbers/m^2 and Vinson and Vinson multiplied those numbers by 0.279 and presented them as m^2 in their tables.

The Vinson and Vinson analyses were made at so general a taxonomic level it would not be possible to see differences between treatments and controls. Our analyses of the Trumbo et al. (2000 a, b) reports found impacts to aquatic invertebrates three years after the final poisoning in Silver King Creek for a total of, at least, six years of impacts. Invertebrate sampling was discontinued by the Agencies three years following the poisoning in Silver King Creek. In another nearby watershed, Silver Creek, major impacts were evident two years following final poisoning for a total of five years of impact. It is unclear why the Lahontan RWQCB only required three years of follow-up study in the case of Silver King Creek and two years of follow-up study in Silver Creek. In both cases impacts were still evident at the time the studies were ended (Erman and Erman 2006, Exhibit A). Both studies showed significant long-term impacts to macroinvertebrates including decreases in species diversity, decreases in number of taxa, decreases in number of stoneflies and major reductions in the stonefly family Peltoperlidae, the most abundant stonefly group prior to poisoning.

8

In 2003, CDFG provided the Lahontan RWQCB staff the following statement: "No evidence of long-term impacts were found in either study" (Interagency Study Proposal, LRWQCB files, June 15, 2003, Evaluation of Rotenone use in Silver King Basin on Aquatic Macroinvertebrates, 2003-2007).

9

The Antidegradation Policy of the Clean Water Act states that "where high quality waters constitute an outstanding National resource, such as

waters of National and State parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected"(Code of Federal Regulations, Title 40, Sec. 131.12). The Lahontan RWQCB considers water quality of Silver King Creek to be "exceptional" (p. 5.4–3, EIS/EIR).

The Water Quality Standards Handbook (4.7) outlines specific requirements for ONRWs ((40 CFR 131.12(a)(3)). "ONRWs are provided the highest level of protection under the antidegradation policy." "The regulation requires water quality to be maintained and protected in ONRWs." "ONRWs are often regarded as the highest quality waters of the United States. The regulation "permits States to allow some limited activities that result in temporary and short-term changes in the water quality of ONRW. Such activities must not permanently degrade water quality or result in water quality lower than that necessary to protect the existing uses in the ONRW. It is difficult to give an exact definition of 'temporary' and 'short-term' because of the variety of activities that might be considered. However, in rather broad terms, EPA's view of temporary is weeks and months, not years." (Our emphasis added)

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The antidegradation policy further states for all water bodies, even those without ONRW status, that "species that are in the water body and which are consistent with the designated use (i.e., not aberrational) must be protected, even if not prevalent in number or importance. Nor can activity be allowed which would render the species unfit for maintaining the use. Water quality should be such that it results in no mortality and no significant growth or reproductive impairment of resident species" (Water Quality Standards Handbook, Appendix I-3, 4.9.2.2). And these protections hold for all existing aquatic life whether or not a water body supports fish.

In Chapter 5 the EIS/EIR states "Similarly, the Federal Antidegradation Policy, Title 40 C.F.R. section 131.12, dictates that water quality shall be preserved unless deterioration is necessary to accommodate important economic or social development." (p. 5.4-14) Federal policy, however, does not end with this paraphrase of the Antidegradation Policy. The next sentence from Title 40 CFR, section 131.12, part a (2) is "In allowing

such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully." (our emphasis added).

9

Food Web Impacts and Terrestrial and Aquatic Species:

The importance of aquatic invertebrates to the food webs of aquatic and riparian species in the Sierra Nevada was discussed in detail in Erman 1996. Insects are food for other larger insects, fish, and amphibians in the water, and emerging adult insects are a major source of food for many terrestrial insects, spiders, birds, amphibians, reptiles, and mammals including bats (e.g., Nakano and Murakami 2001; Sanzone, et al., 2003; Ballinger and Lake 2006; and Pope, et al., 2009). The loss of large portions of emerging insects for several years during and following poisoning of miles of stream and a lake would be a major impact to riparian animals.

No list of terrestrial species for the Silver King basin has been provided in the EIS/EIR, but species of concern (e.g., yellow warbler, willow flycatcher) are mentioned as feeding on emerging aquatic insects. The impacts of food loss to these species are dismissed, apparently with no data to support the opinion of the Agencies.

10

Major poisoning disturbances cause changes in quality and quantity of invertebrate assemblages. These changes in turn cause changes in the emergent insect food supply and alter available invertebrate food in not only the aquatic habitat but also the terrestrial environment. To reiterate an earlier EPA (2006) statement, "...any changes associated with differential sensitivity could bring about significant changes in the community structure, which could alter system function."

A particularly noticeable omission in the EIS and the FWS Revised Recovery Plan for the Paiute CT is that no food habit studies have been conducted for the fish. The Agencies do not know what invertebrates are the preferred food of the Paiute CT. Neverthless, they are planning to poison the food supply of the very fish they are attempting to "save."

Other considerations regarding aquatic invertebrates:

The Agencies have assumed that upstream species will recolonize downstream areas after poisoning events or that species will fly upstream (EIS, 5.1-19). While this may be true for some species, it will not be true for all or even most species. Macroinvertebrate species, as most animal species, occupy specific habitats. Some species have narrow habitat requirements and are locally distributed along a stream gradient. Other species are generalists and can live in a wide diversity of habitats.

In studies on small streams in the Sagehen Creek basin, eastern Sierra Nevada, similarity of caddisfly species composition was only 38% between the spring source and a site 270 meters downstream, and the species similarity at 470 meters downstream from the spring source had decreased to 20% (Erman 1996).

Species that are generalists, commonly called "weedy" species, may return in high numbers following a poisoning event. Dispersal mechanisms vary by species and some species actively disperse only a few meters (Erman 1984, Sode and Wiberg-Larsen 1993). More restricted species may never return to the area following poisoning. Studies in Denmark at the species level have found aquatic invertebrate species missing up to 40 years following poisoning with insecticides or severe organic pollution (Sode and Wiberg-Larsen 1993).

The Agencies have an incomplete and incorrect understanding of the "EPT index" that they like to use in biomonitoring. The absolute and relative abundance of mayflies, stoneflies and caddisflies do not necessarily mean a healthy stream system as implied in the EIS. For a discussion of the limitations and cautions of broad taxa monitoring see Erman 1996. High numbers of generalists (including species of EPT) can mean disturbed systems. Here, again, species identification can be critical.

11

Monitoring must answer the questions that are asked by the treatment. In the case of poisoning, the questions are how will poisoning change the non-target species assemblages and will species disappear or be reduced over the long-term. General indices like an EPT index, which is at the taxonomic level of order, can not answer the question. Some species will return after even the most drastic disturbances in aquatic systems. The question is not, will something return, or will the same orders of insects return, or will some class of invertebrates return; but rather, will the same species return in the same numbers and proportions? The gross level of analyses conducted by the Agencies did not ask or answer the relevant questions for this proposed project.

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Undisturbed streams in relatively pristine habitats show stability of macroinvertebrate populations from year to year making them excellent references for use in long-term biomonitoring programs (Erman 1989; Robinson et al., 2000).

Amphibians:

The mountain yellow-legged frog was present in abundance in the Silver King basin in 1993. Several thousand were seen along the shores of Whitecliff Lake. They were also found in Upper Fish Valley and near the confluence with Fly Valley Creek (USFS EA 2004). The present EIS/EIR states "although this species (yellow-legged frog) could occur in the proposed project area, it has not been documented in recent surveys (2001 to present); thus the potential for its occurrence would be low." But then it goes on to state that the Agencies have been relocating juvenile amphibians "to outside the proposed project area" (5.3-11, 12). When and for how long have the Agencies been relocating "juvenile amphibians?" Because it would be impossible to relocate all or even most of the tadpoles or frogs or toads in the area, this reason for claiming poisoning will not affect them is unacceptable. Poisoning their habitat will kill yellow-legged frogs, tadpoles and adults, and

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possibly immature Yosemite toads, and it will surely reduce and/or eliminate the food of adults.

As of October 16, 2008, the EPA has made a "May Affect" and "Likely to Adversely Affect" determination for the California red-legged frog (CRLF) from the use of rotenone as a piscicide. The EPA has also determined that there is the potential for modification of CRLF designated critical habitat from the use of rotenone as a piscicide. "Indirect effects to the CRLF may also occur through the loss of both vertebrate and invertebrate aquatic forage items." (EPA webite)

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The same impacts of rotenone would be expected to occur directly on the mountain yellow-legged frog and its food web.

Other Sensitive Fish in Silver King Creek:

The EIS/EIR has reported no sensitive species of fish other than Paiute CT in the proposed project area. We suggest the Agencies look more closely in the reach of Silver King Creek below Snodgrass Creek (the area within the travel time of potassium permanganate and residual rotenone). According to the California Natural Diversity Database list of Special Animals, the mountain sucker (*Catostomus platyrhynchus*) is on the list of sensitive fish species. Although not collected in the sample station immediately above Snodgrass Creek on Silver King Creek, the next station downstream is on the E. Fork Carson River just above the junction of Wolf Creek. This station does contain mountain sucker (Deinstadt et al. 2004). The EIS/EIR should also reveal that within the main project area, the poison will eliminate native Lahontan basin populations of Paiute sculpin (*Cottus beldingi*) and mountain whitefish (*Prosopium williamsoni*) known to exist in the reach above Snodgrass Creek (Deinstadt et al. 2004).

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Springs, Their Protection, and Implications of Climate Change

Our research has revealed rare, endemic, and relict species of invertebrates in many springs, seeps, and headwater streams in the Sierra Nevada (e.g., Erman, 1981, 1984, 1989, 1992, 1997, 1998; Erman and Erman 1990, 1995; Erman and Nagano 1992, Wiggins and Erman 1987). The constant temperature in many seeps and springs makes them habitats for species that were more widespread in the past during different climate conditions, some warmer, some colder. Springs, therefore, are refuges or repositories for species that may expand or shrink their ranges as temperatures change in the future. As such they should receive special protection from resource management agencies. But we find no such consideration for these habitats in this EIS.

The preferred alternative plans to poison springs and seeps (e.g., p. 3-3, 3-8, B-22, p. 5.3-1, p. 5.3-11, C-4), but the EIS (5.1-19) cites Erman (1996) for evidence of endemics in springs. And later, the EIS/EIR states "Endemic species are more likely to occur in small, isolated habitats, such as springs. However, no endemic macroinvertebrate species have been found to date in Silver King Creek Watershed (p. 5.1-21)." Again, we emphasize that no species level studies have been conducted by the Agencies in springs, seeps, or any other aquatic habitats in the Silver King basin, and so they have no scientific basis for this statement. And no studies of any kind have been done on aquatic invertebrates in springs, seeps, or Tamarack Lake so far as we are aware.

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A Memorandum of Understanding was signed in 1999 by the Bureau of Land Management, the FWS, the National Park Service, the U.S. Geological Survey, the USFS, the Smithsonian Institution, and the Nature Conservancy for conservation of springsnails and their habitats, to protect sites and avoid the need to list species of springsnails pursuant to the Endangered Species Act. How has that MOU been followed in this EIS?

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Inadequate Evaluation of Global Warming and Added Stress of Poisoning

Global warming is already causing changes in species composition of lakes and streams (e.g., Burgmer et al., 2007, Durance and Ormerod 2007). Experimental manipulation of first-order streams has shown varied and unpredictable responses in a suite of invertebrate taxa and species (Hogg and Williams 1996). In our studies of springs before, during, and following drought in the Sierra we found that springs with rising temperatures during droughts had lower numbers of Trichoptera species (Erman and Erman 1992, 1995). The added stress of poisoning can only exacerbate species losses and changes occurring at higher elevations because of climate change. 16

Absence of Impermeable Barrier to Upstream Movement of Non-native Fish

The existence of a natural, absolute barrier in the Silver King Creek Canyon is critical to the successful permanent removal of unwanted fish in Silver King Creek below Llewellyn Falls. No such barrier exists, in our opinion. The EIS/EIR cites Heise 2000 as the authority for their opinion that there is a real barrier (5.1-9). A reference to Heise is not present in the References cited at the end of this chapter. We assume this reference is to a memorandum that was produced by the Agencies during court proceedings in 2005 (Exhibit D). In this memo Mr. Heise gives his opinion on the falls in lower Silver King Canyon. He states that he only observed the area during low flow and that while he thinks it could be a barrier to fish migration there is a "remote chance" that it is not. He states, however that "a vertical fall of eight feet may be reduced to two or three feet when the stream rises to flood levels. Evidence of high flow at the subject barrier site suggests that the flood flows could be four to six feet or more in depth." 17

Rainbow/steelhead trout have the greatest capacity for leaping falls of any migratory salmonid. They can leap about 3.3 m (10.8 ft.) vertically or slightly less than 3 m (9.8 ft.) while extending about 3 m (9.8 ft) horizontally (Reiser et al., 2006). Thus, passing the vertical falls present in Silver King Canyon even at low flow seems within the range of large rainbow trout. It

seems likely that large Lahontan cutthroat trout could also pass these falls and may have in the past.

Without physical measurements, statements about barriers become merely subjective argument. Scientific judgement of potential barriers should be based on accurate data on

1) difference in surface elevation between the upstream water surface and the plunge pool,
2) the horizontal distance from the fall's crest to the plunge pool, and
3) the leaping characteristics of the pertinent fish species (Powers and Orsborn 1985, Reiser et al., 2006).

Further, these data should be obtained at a range of stream flows in order to establish a rating curve of changes in fall distance and other features (Reiser et al., 2006).

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Attached to the copy of the Heise memorandum was a handwritten sheet, titled Barrier Costs, calculating the cost of building fish barriers in the Kern River basin (for golden trout management) and in the Silver King Creek Canyon. It seems the CDFG suspected in 2000 that they may not have a natural barrier in Silver King Canyon. The sorry pattern of poisoning streams repeatedly and then learning that there is no barrier to upstream fish migration has already been tried in the Golden Trout Wilderness. Is it a contingency plan of the Agencies to begin poisoning and then argue for constuction of a barrier (estimated in this 2000 memo at a cost of 1.5 million dollars) later, in a Wilderness Area, as they have done in the Golden Trout Wilderness where so many costly mistakes have been made in fish management? The possible barrier construction discussed at p. 3-14 in the EIS does not sound like the same barrier Heise was referring to in his memo.

Fishing in Silver King Creek

The EIS/EIR has frequently raised the specter of someone moving hybrid or non-pure PCT above existing fish barriers, especially Llewellyn Falls. "Introduced trout pose the greatest risk to the species."and …."the threat of humans moving other trout species into these protected reaches

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continues. An ill intentioned angler could easily catch a rainbow trout and release it above Llewellyn Falls, involving a transport of the fish only a few hundred feet. This action would unravel decades of restoration efforts and place the populations of Paiute cutthroat trout in Upper Fish Valley and Four Mile Canyon Creeks at risk" (p. 5.1-11 EIS/EIR).

And further, "Llewellyn Falls is easily accessed by the public, which could lead to rogue or inadvertent transfer of hybridized fish to areas above the falls" (p. C-2).

If anglers are the problem, why has fishing been continued and promoted in Silver King Creek? Fishing was stimulated below the falls even during the period of the last poisoning project from 1991-1993, for example, the EIS states: "... during 1991, approximately 800 rainbow-Paiute cutthroat hybrids were collected by electrofishing and stocked into Lower Fish Valley and Tamarack Lake using a helicopter. These non-native trout hybrids provided good fishing for anglers during the early and mid-1990s" (p. 5.1-16). The section open to fishing extends upstream to Tamarack Lake Creek, above the junction of Coyote and Corral Creeks and their "secure" pure populations of Paiute cutthroat trout. Fishing was continued up to the last request for closure of Silver King Creek in 2005, and then the Agencies asked the California Fish and Game Commission to withdraw the closure in 2006 after the federal court blocked the project. Recently, the Agencies asked the Fish and Game Commission to increase the allowable daily take from 5 to 10 fish (p. 3-3). That request was finalized by the Commission on April 9, 2009. The request was made specifically to increase the removal of fish from the project area. These actions belie the Agencies' concerns for the threat of anglers moving fish.

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The other "most important" threat to continued survival of Paiute cutthroat trout is said to be the existing small, isolated fragmented populations. So, on one hand, isolated populations are a threat; yet on the other hand, they provide a margin of safety from "ill intentioned anglers" or

other "catastrophic events." However, if the proposed Action is conducted, the entire 11 miles of connected stream habitat would become fully exposed to "rogue transfer" from below Snodgrass Creek or to other, imagined catastrophes. In other words, expanding the population downstream in no way lessens the threat of "rogue transfer."

The Agencies are now trying to remove themselves from analysis of implications of a future fishery for Paiute CT as part of the Heritage Trout Fishing Program, claiming it is a decision for the California Fish and Game Commission (e.g., p. 5.1-30, 5.6-9) and "not part of the proposed Action (or its alternatives) which focuses on restoration of the species" (p. 5.1-30). Others in the CDFG, however, have written: "The planned addition of a catch-and-release Paiute cutthroat trout fishery below Llewellyn Falls, which is conditioned on removal of the existing trout population, will provide a unique opportunity" (p. 113, Deinstadt et al., 2004).

And earlier, "By the summer of 1973, following a year of discussions and meetings both within the Department of Fish and Game and between the Department and the U.S. Forest Service, it was finally decided that restoration of pure Paiute cutthroat in the mainstream above Llewellyn Falls would be attempted..." and "It was further decided that restoration of pure Paiute cutthroats would be extended to all of Silver King Creek and its tributaries above Silver King Canyon" (p. 38, Ryan and Nicola, 1976).

Nevertheless, in the 1985 FWS Recovery Plan (U.S. Fish and Wildlife Service 1985) the Paiute CT would be considered recovered "when a pure population of Paiute CT has been reestablished in Silver King Creek above Llewellyn Falls." That objective has been met.

The EIS/EIR is inadequate because it has highlighted the continuing threat from anglers moving fish, yet has not evaluated the sport fishery being planned to follow removal of hybrid fish from the proposed areas or the current newly expanded fishery above Silver King Creek canyon.

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Agencies Moving Hybrid Fish in Wilderness Areas

Prior to the 1991 poisoning of the Upper Silver King basin hybrid fish were captured and moved to other places in the Wilderness Area (Tamarack Lake and Poison Lake) and in the east Carson drainage (Ryan as cited in Schaffer 1992). Moving hybrid fish to other areas in the Wilderness Area was apparently still occurring as recently as 2004, according to the Trout Unlimited website, August 3, 2004. If the Agencies have so much trouble with hybrid fish polluting Lahontan CTs and Paiute CTs, why have they been expanding the populations of hybrid fish anywhere, let alone in a Wilderness Area and in the same major drainage, the East Carson River, where they think they have pure populations of Lahontan CTs and Paiute CTs? And why has it been CDFG policy for so long to move unwanted hybrid fish, or for that matter non-native fish of any kind, to other areas in a Wilderness Area without any environmental analysis or recognition that this is a form of biological pollution? "Ill-intentioned anglers" and "rogue transfer" of fish are not the only, or even the major agents, of non-native fish pollution in the Sierra. 19

We previously raised our concerns about the transport of salvaged hybrid fish into the Poison Creek drainage where pure Lahontan cutthroat trout were said to live (Deinstadt et al., 2004). In the EIS/EIR, a small tributary of Silver King Creek is now labeled "Poison Flat" (Fig. 1-1). Deinstadt et al. states, "Poison Flat Creek is a northern fork of Poison Creek and is not named on maps. Because of its close proximity to Poison Flat it is informally called Poison Flat Creek" (p. 109). Several references to the unnamed tributary of Silver King Creek refer in the EIS/EIR to Poison Flat (e.g., p. 3-4, 5.2-13, 5.4-1). We suggest that the EIS/EIR avoid references to the tributary of Silver King Creek in any way as "Poison Flat" so that confusion in future stocking, fishing, or surveys will be avoided.

Other Catastrophes

The EIS/EIR frequently mentions the risks of extinction from low frequency, large events, e.g., flood and fire. These risks are overblown. In one place (p. 5.1-2, EIS/EIR), occasional floods, forest fires, and drought help create a "...mosaic of patchy, dynamic habitats that support diverse and resilient communities of aquatic and terrestrial flora and fauna." But later in the EIS/EIR: "Due to the small and restricted populations that continue to face threats from catastrophic events such as floods, fire, and non-native fish populations..." (p. 5.1-8), and "...remaining Paiute cutthroat trout populations are vulnerable to extinction through stochastic factors such as ... catastrophic events such as floods and fire..." (p. 5.1-12).

The Paiute cutthroat survived, presumably, over the many years of its existence, in the face of naturally occurring fire and flood when it was confined to a much smaller habitat than it currently occupies. Fish surveyors in the Silver King Creek watershed point out that "Effects of the 1997 flood were not evident from the Four Mile Canyon Paiute cutthroat trout populations or our observations" (p. 108, Deinstadt et al. 2004). This flood was the largest in the 87 years of record for the closest USGS gaging station, the W. Carson River at Woodfords.

Other long-term studies in the eastern Sierra Nevada have shown the persistence and resilience of Lahontan Basin fishes under the natural regime of floods and drought (Erman 1986, Erman et al., 1988).

Risks of large fires are lowest at the highest elevations (such as the Silver King Creek basin) of the Sierra Nevada and especially so in remote locations where attempts at fire suppression and hence fuel build up are minimal (McKelvey et al., 1996).

Taxonomic status of Paiute Cuttroat Trout

For the first time, we learned in this EIS/EIR that the Paiute cutthroat trout, *Oncorhynchus clarki seleniris*, (Paiute CT) can not be separated visually in the hand from hybrids of it with rainbow trout, *Oncorhynchus mykiss;* golden trout, *Oncorhynchus mykiss aguabonita;* and Lahontan cutthroat trout, *Oncorhynchus clarki henshawi* (Lahontan CT). We also learned in the EIS that genetic markers have not yet been found to separate the Paiute CT from the Lahontan CT.

We commented previously on the subject of genetic composition of the fish in Silver King Creek and cautioned against moving or poisoning fish before key questions were resolved. Now, again, the Agencies want to push ahead with "restoration" before they know the answer to a fundamental question of the "purity" of Paiute cutthroat trout populations. Lahontan CT have been present in Silver King Creek prior to any attempts at Paiute CT recovery (Ryan and Nicola 1976). And yet, the Agencies still cannot say either that there is any genetic difference between a Lahontan cutthroat and a Paiute cutthroat or whether or not Paiute cutthroat populations are hybrids of the two. The final sentence from the paper by Cordes et al. (2004) is critical: "Additionally, the development of molecular markers that can distinguish between LCT and PCT would be important for determining their genetic relationship and investigating the possibility of introgressive hybridization between the two groups prior to any restorations." (p. 116, our emphasis added).

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More recent genetic studies (Finger et al., 2008) plus the summaries in the Draft EIS/EIR support our earlier misgivings about any project going forward. These findings are as follows:

1. In both a report to the USFS and CDFG (Israel et al., 2002) and the subsequent published paper (Cordes et al., 2004) researchers found no way to

separate Paiute cutthroat trout from Lahontan cutthroat trout by the means they used to identify hybrids.

2. The most recent genetic study by Finger et al. (2008) developed more methods of separating and distinguishing "pure" and hybrid trout from Silver King Creek. This study developed single nucleotide polymorphism markers (SNPs) that are said to be quick, inexpensive, and effective for characterizing introgressed populations and to improve on past molecular markers that "…are costly, time consuming, and often are not diagnostic for distinguishing between *O. mykiss* and *O. clarkii*."(Finger et al., 2008, p. 4). Nevertheless, although the new methods could distinguish between subspecies of *O. mykiss* (i.e., between rainbow and golden trout subspecies) and between rainbow and cutthroat trout, the SNPs could not separate or distinguish between subspecies of cutthroat trout (*O. clarkii*) (i.e., between Paiute and Lahontan cutthroat trout).

3. The Draft EIS/EIR points out in several places (e.g., p. 5.1-34, 5.1-48) that Paiute CTs cannot be distinguished from hybrids in the field: "There is no practical way to identify or separate, in situ, potentially pure Paiute cutthroat trout from hybrid individuals in treated areas."

We wonder, then, how Paiute CT can be separated and restocked after rainbows, Lahontans, and hybrids are removed from the area. We also wonder what the CDFG has been moving around and calling Paiute CT if they can not separate it visually.

The Agencies have moved Paiute CTs into several other areas where it was not native, and so there are now four or five other populations of it in other streamsheds. In the Silver King Creek basin there are now six separated populations of the Paiute CT in part because the Agencies purposely enhanced barriers on some of the smaller streams to separate the fish. Now they claim the isolated populations are a threat to the survival of the fish (see following section on Fragmentation).

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Furthermore, there are conflicting opinions among scientists in the published literature about the origin and age of this subspecies. Is it an old form (J. H. Ryan in Schaffer 1992, Nielsen and Sage 2002) or a relatively recent form (Behnke and Zarn 1976), in evolutionary terms? Or is it perhaps an even more recent color variation that developed in a population of Lahontan CT, that were moved over maybe the last 120 or fewer years?

Ryan reported that the native habitat of the Paiute CT was above Llewellyn Falls (J. H. Ryan in Schaffer 1992). The type locality for the subspecies is above Llewellyn Falls, that is, the location where the specimens were first collected and subsequently described by Snyder in 1933. The Agencies have rather recently decided, with no scientific evidence, that the native habitat was below Llewellyn Falls.

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Fragmentation of Existing Populations of Paiute CT

The EIS/EIR has built a case for expanding the range of PCT below Llewellyn Falls partly based on the fragmented character of existing populations within and outside the Silver King Creek basin. It cites references that claim minimum stream lengths needed to save a species. "Given the current literature in trout population ecology, the existing small isolated populations of Paiute cutthroat trout are not large enough to sustain the subspecies in the long term" (p. 5.1-12 EIS/EIR). The Agencies have not fully acknowledged (p. 5.1-2) that some of the present fragmentation in Silver King Creek is from their own actions and could be undone.

If more connectedness is important, the EIS/EIR should consider actions that would expand connectedness of existing populations in addition to moving fish among populations. Within the upper mainstem of Silver King Creek above Llewellyn Falls, there are now 2.7 miles of stream without barriers (Table 5.1-7). Prior to construction in 1972 of an artificial barrier by the Agencies (p. 5.1-2 EIS/EIR), Four Mile Canyon Creek (1.9 miles) had only a 2 ft falls that was not a fish barrier. "With the cooperation and assistance of

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the Toiyabe National Forest personnel, an artificial barrier was constructed in 1972 on a natural falls about 0.6 m (2 ft.) high, situated between several large granite boulders approximately 0.4 km (1/4 mi.) upstream from the mouth" (p. 36, Ryan and Nicola 1976).

In addition, the Agencies have likely enhanced or altered barriers on Bull Canyon Creek (0.6 miles). "The 1975 survey, however, revealed that heavily spotted fish were present upstream as far as the mouth of Whitecliff Lake Creek. An inspection of the barrier site revealed that the stream had bypassed the natural barrier" (p. 43, Ryan and Nicola 1976). Thus, it would be possible to redirect Bull Canyon Creek around the existing barrier as naturally occurred in the past and remove the artificial barrier on Four Mile Canyon Creek, thereby restoring an additional 2.5 miles to the existing 2.7 miles on Silver King Creek for a total of 5.2 miles. Removal of these artificial barriers would nearly double the distance of interconnected stream and restore the streams to a natural state.

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Missing basic life history information and characteristics of Paiute CT

For all of the Agencies' professed concerns for the threatened Paiute CT over the past more than 40 years, they have failed to obtain some of the most basic biological information about the fish. We brought to the attention of the FWS five years ago many gaps in data, and the information is still missing in the EIS as follows:

1. No data on food habits of fish from Silver King Creek, and yet, the Agencies are ready to poison out the native invertebrates in the "native" habitat of the fish.
2. No data on age and growth except from fish transplanted to the North Fork Cottonwood Creek a non-native habitat.
3. No data since 1956 when Ryan and Nicola (1976) reported on ages of 40 fish from Silver King Creek.

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4. No data in last 53 years on length at age for fish from Silver King Creek.
5. No data on length – frequency for populations in Silver King Creek.
6. No data on when fish reach sexual maturity in Silver King Creek and, therefore, whether 150 mm (the standard size CDFG considers "catchable" or adult trout) as the rule for "adult" makes any sense.
7. No data on fecundity of fish in Silver King Creek.
8. No data on any differences in age/growth/sexual maturity by sex (even though typically trout males mature a year earlier than females).
9. No data to support or refute that there are assumed (by FWS in Revised Recovery Plan) to be only three age classes of PCT in Silver King Creek.
10. No current field data on age class composition in the EIS/EIR although the Revised Recovery Plan said it would "now" (as of 2004) begin "to monitor abundance and age class composition." (Have they?)
11. No data on microhabitat (e.g., depth, velocity, substrate) preferences.
12. No data on meristic characteristics of PCT (e.g., pyloric ceaca, gill rakers, basibranchial teeth, scale counts) since Behnke and Zarn (1976) examined Snyder's original 1933 collections.
13. No data (as listed above) on any of the out-of-basin populations except NF Cottonwood Creek collected in the early 1970s.

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Errors in Estimate of Number of Fish

We think the values presented in the EIS/EIR (p. 5.1-9) for the number of fish in Upper Silver King Creek and the other tributaries are far too low. The EIS/EIR states: "Approximately 1,020 adult Paiute cutthroat trout reside in the Silver King Creek drainage, based on CDFG population assessments in 2001 (FWS 2004). CDFG estimated approximately 424 fish in Upper Silver King Creek above Llewellyn Falls, and an effective population size of 400-700 fish in Four Mile Canyon, Fly Valley and Corral Valley Creeks combined" (p. 5.1-9).

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Shown below are the values we computed from FWS (2004) data given as 2000 and 2001 CDFG estimates (which in nearly all cases were lower than the multi-year average). Data for Coyote Valley Creek are the mean of the two test sections. Data for Bull Canyon Creek are from Deinstadt et al. (2004).

Stream	Adult/mile	Habitat in Miles	Total Adults (> 150mm)
Upper Silver King Ck.	353	2.7	953
Four Mile Cyn. Ck.	126	1.9	239
Bull Canyon. Ck.	160	0.6	96
Fly Valley Ck.	190	1.1	209
Corral Ck.	95	2.2	209
Coyote Ck.	884.5	3.0	2,654
Total Adult Paiute Cutthroat			4,151

If the mean value for stations with many sample years is used, the total number of adult Paiute cutthroat trout is 4,726.

Clearly, if correct values for all the sections were used, there are four times as many adult Paiute cutthroat trout in the Silver King Creek drainage as reported in the EIS/EIR.

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Errors and Accidents in Rotenone Projects

We have previously documented many accidents that occurred in past rotenone applications (e.g., Exhibit A) Most problems were reported by Regional Water Quality Control Boards doing independent monitoring. Some were found in CDFG reports following rotenone projects. They illustrate the difficulty the Agencies have in executing aquatic poisoning projects without major incidents and unforeseen accidents.

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Hazards and Hazardous Materials

The EIS/EIR declares there is no need to consider Hazards and Hazardous Materials because "...The proposed Action and alternatives would not transport...or dispose of hazardous materials (p. 4-3)." How, then, can the Agencies get to Silver King Creek with 300-600 pounds of potassium

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permanganate and 20 (or 50, p. 3-9) gallons of rotenone fomulation? The project would involve hazardous materials and the EIS must deal with that fact. It must also analyze the poor record the Agencies have for conducting these poisoning projects responsibly and without accidents.

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Interactions of Rotenone With Other Pesticides

There is strong evidence that residues of common herbicides, insecticides and piperonyl butoxide (PBO) may remain in aquatic sediments (Woudneh and Oros 2006) or in the water, even in remote national parks (LeNoir et al., 1999, Angermann et al., 2002) and that they affect aquatic organisms (Relyea 2005).

With many toxins, such as rotenone, antimycin and other pesticides, the effect on the electron transport system in mitochondria is mediated by an organism's natural defenses. But when certain compounds are also present in the environment, toxicity is increased because the natural defense system (cytochrome P450) is reduced (Li et al., 2007). This result is well established for the role of PBO, a synergist in formulations of rotenone and other insecticides. However, it is also known that other pesticides themselves may function much like PBO (in blocking cytochrome P450) and, hence, increase substantially the toxicity of insecticides. The EPA is aware of these relationships, and in their rotenone risk assessment EPA cited the work by Bills et al., (1981), for example, that showed polychlorinated biphenyls (PCBs) multiplied the toxicity of rotenone to fish. There is other work that has established similar relationships among a range of pesticides and herbicides (e.g., Bielza, et al., 2007).

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It is likely that low level residues of pesticides are present now in many aquatic habitats and that PBO is present in sediments of Silver King Creek from earlier projects. We are unaware of any fish poisoning project that has analyzed water or sediments for low level pesticide residue prior to applying piscicides. The effects of rotenone formulations in these waters are

underestimated because of the possible presence of other pesticides already in the water.

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Rotenone and Parkinson's Disease

Prentiss Inc., Foreign Domestic Chemicals, and Tifia International LLC, manufacturers of rotenone in the U.S., have petitioned the EPA to remove rotenone from the list of pesticides for terrestrial use, but not (yet) for aquatic use (EPA wesite). We suspect, but do not know for sure, that this petition is because of the growing evidence of the connection between rotenone and Parkinson's disease.

The discussion in the EIS/EIR (p.5.3-9) of potential links between rotenone and Parkinson's disease (PD) is as incomplete as that given in the American Fisheries Society's Task Force on Fishery Chemicals (2000). Since the original article by Betarbet et al., 2000, many studies have been published in peer reviewed literature on this association. At latest count, there are 352 studies linking rotenone and PD in the Web of Science. In a recent review on the more general link between PD and many pesticides, including rotenone (Hatcher et al., 2008), the authors noted that "...rotenone is very hydrophobic and, thus, easily can cross biological membranes without the need for a transporter." They concluded "there is evidence of a role for rotenone in PD pathogenesis" although it is "unlikely a major contributor because of its limited commercial use, short half-life in the environment and low bioavailability." Similarly, Brown et al., (2006) concluded that sufficient data suggest rotenone affects development of PD. They, too, caution that although the weight of evidence is sufficient to conclude that a generic association between pesticide exposure and PD exists, more data are needed to prove conclusively cause-effect.

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Furthermore, rotenone testing for PD associations generally have not included other cube resins, especially deguelin and tephrosin (Fang and Casida 1999, Cabizza, et al., 2004), that are major components equal to or

greater in concentration than rotenone in the active ingredients of the proposed piscicide formulations. For example, in Nusyn-Noxfish the active ingredients are 2.5% rotenone, 2.5% piperonyl butoxide, and 5% other cube resins. These cube resins have been likewise shown to interfere with mitrochondial function in the same way as rotenone (Caboni et al., 2004).

Silver King Creek is in a remote area. The threat of exposure to rotenone and the threat of Parkinson's Disease would be primarily to the people applying the poisons and working along the stream during the project.

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Rotenone Concentrations

The EIS/EIR states that the proposed project would use lower rotenone concentrations than have been used in the past (e.g., p. 5.3-11). We find no basis for this statement. The proposed chemical formulations would all result in a target concentration of 25 μg/L of rotenone (Table 5.3-1). According to Trumbo et al. (2000a) this target concentration is exactly the same as that used from 1991 to 1993.

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Alternative 3, Combined Physical Removal of fish

Alternative 3 is dismissed by the Agencies as being too difficult and taking too long. We disagree. Mechanical removal of fish, using seines, blocking nets, and electrofishing equipment is possible and can be done in ways that would not greatly disturb the aquatic environment or species.

Thompson and Rahel (1996) found that with three-pass removal electofishing they were able to remove a high proportion of fish in 1 year. The lowest efficiency was for small (age-0) brook trout. However, because the remaining fish the next year were immatures, there was no reproduction and thus, "recruitment was virtually nonexistent following 1-2 years of

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population control." Therefore, once the large fish are taken, the problem gets easier.

The USFS is currently removing non-native fish in the Upper Truckee River as part of a Lahontan CT Trout restoration project, and they are doing it with a combination of electrofishing and gill netting (See attached Exhibit E). They tried poisoning with rotenone first to remove brook trout in Meiss Meadow and failed. They then switched to electrofishing and were successful as of 2007. They are continuing mechanical removal in the Upper Truckee River. The attached map in Exhibit E illustrates a complicated habitat.

In Sequoia-Kings Canyon National Parks, biologists recently have been successful in removing all fish from small lakes and feeder streams by entirely physical means (nets and electrofishing) (D. Boiano, NPS fishery biologist, pers. comm. 2005). Fish have been successfully removed from lakes using gill nets in other places (e.g., Knapp and Matthews 1998; Pope et al., 2009).

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In the Silver King Creek system electrofishers could begin at the upstream areas and move downstream so that downstream drift of fish would not be a problem. Block nets could be positioned to limit fish movement between upstream and downstream sections. Regular tending of nets to remove debris or maintain position should be possible, especially with volunteers. The Agencies can make little use of volunteers in the poisoning option, given the requirements of training, licensing, risk, and Personal Protective Equipment. But physical removal would be amenable to volunteer labor needed for the many tasks and could effectively reduce total project costs as well as enhance project efficiency (e.g., tending block nets, hauling supplies, refreshing workers, etc.).

An excessively high voltage is not necessary to collect fish, but fish would have to be killed and buried after they are collected. Moving non-native hybrid fish to other areas in the Wilderness Area and in the same East



Carson River drainage, as the Agencies have been doing, is unsound management that leads to more problems later and should be ceased immediately in all Wilderness Areas.

Conclusion

In conclusion, the single species management approach proposed in the preferred alternative is out-of-date. It should be rejected. Ecologists have known for decades that species are interwoven and interdependent. Applying non-specific poisons to whole communities for the goal of expanding the range of a single population of fish is unacceptable in modern ecology. The preferred alternative would cause long-term changes of at least 6 years to the structure and function of the biological community. Poisoning may eliminate some non-target species forever, as the Agencies admit in this EIS/EIR. The Clean Water Act requires that existing uses be protected in waters of exceptional quality. The Agencies have refused, again, to conduct a species level inventory of aquatic invertebrate species. An alternative management strategy exists and should be used if the agencies want to try to eliminate the non-native fish they have stocked in the stream system. But before even that alternative is contemplated, a critical question is whether or not an impermeable barrier to upstream fish movement exists. Further, scientists are unable at this time, to genetically differentiate between Lahontan cutthroat trout and Paiute cutthroat trout, and the Agencies cannot visually distinguish "pure" Paiute cutthroat trout from hybrids, thereby making management strategies unrealistic.

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Comments submitted by e-mail to: opp–docket@epa.gov. PLEASE CONFIRM RECEIPT. Document is 22 pages including 8 figures. Hard copy to follow by mail to:

Public Information and Records Integrity Branch (PIRIB) (7502C),
Office of Pesticide Programs (OPP),
Environmental Protection Agency,
1200 Pennsylvania Ave., NW, Washington, DC 20460-0001.
Docket ID No. OPP-EPA-HQ-2005-0494.

April 10, 2006.

To:
Environmental Protection Agency
Rotenone Risk Assessments
Attention Docket ID No. OPP-EPA-HQ-2005-0494

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We are aquatic ecologists who have reviewed over the past several years many of the rotenone poisoning projects conducted or proposed by the California Department of Fish and Game (CDFG) on streams and lakes on public land in California and by other state fish and game agencies, by the US Fish and Wildlife Service (FWS), and as permitted by the USDA Forest Service (US Forest Service) throughout the West. We are submitting these comments as private citizens in the public interest. We are commenting specifically on the effects of rotenone when used as a "piscicide" in the nation's streams, rivers, and lakes.

Rotenone versus synergized rotenone formulations:

The Environmental Protection Agency should recognize and distinguish among the many formulations of "rotenone." Pure rotenone is rarely used in fish poisoning operations. For example, the formulation of choice by CDFG in California over the past many years has been Nusyn-Noxfish, which contains other toxic cube resins, such as deguelin, and piperonyl butoxide in percentages equal to rotenone. Deguelin, tephrosin and other rotenoids have been shown in published reports to have the same properties as rotenone as an insecticide. Piperonyl butoxide is highly acutely toxic to aquatic macroinvertebrates (EPA, National Pesticide Telecommunications Network). These formulations also contain many other inert ingredients that are not desirable for release into natural waters.

Collateral damage to non-target species and aquatic communities from the application of rotenone formulations:

Rotenone formulations can not be referred to merely as "piscicides" (as this EPA announcement has) thereby implying that they kill only fish. In fact, rotenone formulations act as a poison on many non-target organisms and have major long-term impacts on aquatic invertebrates and on amphibians. Rotenone inhibits the ability of fish and other aquatic animals that obtain oxygen from water, to use oxygen.

The CDFG and the US Forest Service have recently been requesting rotenone projects of three years duration, with up to two applications per year, because they have had so little success in eliminating unwanted fish with one-year applications (e.g., US Forest Service Decision Notice 2004). And often these poisoning regimens have been repeated on approximately 10-year cycles in the same stream basins or lakes. The great majority of aquatic invertebrates have

one-year life cycles. A three-year project eliminates many invertebrates from the stream and riparian area for as long as four years and longer. Many terrestrial animals are dependent on the food source of emerging stream insects, amphibians, and fish and are put at risk from these projects because a major part of their food supply is eliminated for several years. This cascading effect in food webs is a major ecological disturbance.

The impacts of rotenone on aquatic invertebrates are well known, have been studied for many years and continue to be studied (e.g. Almquist 1959, Binns 1967, Meadows 1973, Helfrich 1978, Engstrom-Heg et al. 1978, Chandler 1982, Dudgeon 1990, Mangum and Madrigal 1999, Cerreto et al. 2003). The impacts are variable depending on the sensitivity of each species to rotenone. Some species may be eliminated or greatly reduced while more resistant species are increased after rotenone poisoning. Cosmopolitan or "weedy" colonizer species, relatively insensitive to rotenone, tend to replace more sensitive species and the overall species diversity decreases.

Most of the aquatic invertebrate studies have been short-term. Most have only identified larval aquatic insect forms and, therefore, have not determined the number of species affected or eliminated by rotenone. If a higher taxon than a single species is affected, one can assume that a higher number of species is being affected. For example, when a study reports that a genus, family, or order has disappeared or shown major stream drift, one must assume the taxon represents more than one, and perhaps many, species.

In a short-term study on a Pennsylvania stream, Helfrich (1978) found that all 4 major orders of macroinvertebrates in the study stream exhibited substantial decreases in numerical abundance 11 days after rotenone treatment. Populations of Plecoptera and Diptera were "nearly exterminated." Trichoptera and Ephemeroptera were reduced to 50% of the pretreatment levels.

A 5-year study on a river in Utah (Mangum and Madrigal 1999) found that "up to 100% of Ephemeroptera, Plecoptera, and Trichoptera [mayflies, stoneflies and caddisflies] were missing after the second rotenone application. Forty-six percent of the taxa recovered within one year, but 21% of the taxa were still missing after five years. At least 19 species were still missing five years after the rotenone treatments. (We say "at least" because some taxa were identified only to genus and may have included more than one species). It should be noted that the rotenone formulation that was used in the Mangum and Madrigal study was Noxfish, which does not contain the synergist piperonyl butoxide found in

Nusyn-Noxfish. We would expect even more toxic effects to macroinvertebrates from Nusyn-Noxfish.

The California Lahontan Regional Water Quality Control Board required that the CDFG conduct monitoring on aquatic macroinvertebrates before and after the application of Nusyn-Noxfish to several streams in the Lahontan region. We have obtained CDFG reports and data from two of those studies, one on Silver King Creek, 1990 through 1996 (Trumbo et al. 2000 a), and the other on Silver Creek, 1994 through 1998 (Trumbo et al. 2000 b), both in the Carson–Iceberg Wilderness Area, Humboldt-Toiyabe National Forest, CA. We also obtained most of the original data reports that were prepared by the USDA Forest Service, National Aquatic Ecosystem Monitoring Center Laboratory, Provo, Utah for these two CDFG reports.

F.A. Mangum of the National Aquatic Ecosystem Monitoring Center Laboratory, prepared the reports from data collected before and after the 1991-1993 poisoning of Silver King Creek above Llewellyn Falls. We found the following quotes in the data report submitted to the California Department of Fish and Game in 1997 from the USDA Forest Service, National Aquatic Ecosystem Monitoring Center Laboratory, Provo, Utah. (Mangum, F.A. 9 Jan. 1997. Aquatic Ecosystem Inventory - Macroinvertebrate Analysis Silver King Creek, 1996. USDA Forest Service, National Aquatic Ecosystem Monitoring Center Laboratory, Provo, Utah):

Station 1, Control Section, Four Mile Creek

"Many of the species missing in Silver King Creek following rotenone treatments were still found in Four Mile Creek." (p. 8)

Station 2, Silver King Creek

"16 taxa (33%) found in the pre-rotenone community were still missing;" (p. 14)

Station 3, Silver King Creek

"There were still 11 taxa or 28% of the pre-rotenone community still missing at this station;" (p. 15)

Station 6, Silver King Creek

"...there were still 17 taxa or 38% of the pre-rotenone community missing;" (p. 15)

Station 7, Silver King Creek

"...but 13 taxa (30%) were still missing from the pre-rotenone community at this station; see Table 4. Most of the missing taxa have been observed to be sensitive to rotenone." (p. 16)

Station 8, Silver King Creek

"There were still 14 taxa (30%) missing at this station compared to pre-rotenone samples;" (p. 17).

Our analysis of the same data indicates an even higher number of macroinvertebrate taxa missing three years after the last poisoning on Silver King Creek. The average percent missing taxa from the five treatment stations was 41.9%; the highest percent taxa missing from a single station was 46.7%.

Some of our analyses of these data are summarized in Figures 1 through 8. We found that macroinvertebrate diversity in Silver King Creek was significantly reduced two and three years (considered long-term in the Lahontan Basin Plan) following poisoning with Nusyn-Noxfish (Fig. 1) and that peltoperlid stoneflies were greatly reduced in the long-term (Figs. 2 and 3). Percentage of taxa that were still the same at the poisoned stations after they were poisoned compared to before was significantly lower than at the control station (Fig. 4). In Silver Creek (a different stream from Silver King Creek) the mean number of taxa were significantly reduced two years after the last poisoning (Figs. 5 and 6), stonefly abundance was greatly reduced (Fig. 7), and peltoperlid stoneflies had nearly disappeared two years after the last rotenone poisoning (Fig 8). The peltoperlid stoneflies had been the most abundant stonefly group prior to poisoning.

In 2003, CDFG provided the Lahontan Regional Water Quality Control Board (LRWQCB) staff misleading information when they claimed that "No evidence of long-term impacts were found in either study" (Interagency Study Proposal, LRWQCB files, June 15, 2003, Evaluation of Rotenone use in Silver King Basin on Aquatic Macroinvertebrates, 2003-2007). Our analysis of the data available in the reports showed otherwise.

Our analyses of these data will continue as agencies release the data to us. However, it has been extremely difficult to get all the data and the US Forest Service and CDFG failed to release a complete set of data from these two streams even to the Lahontan RWQCB after the Board formally requested it.

We know that an average of 41.9% of the broad taxa of macroinvertebrates were still missing from the Silver King Creek drainage as long as three years following the last rotenone treatment. We do not know how many species these

taxa represent. To our knowledge, neither the US Forest Service, CDFG, nor the USFWS have ever made an inventory of macroinvertebrate species prior to a stream or lake poisoning project in California. There is no way to know whether or not other rare and/or endemic macroinvertebrate species are in a project area prior to poisoning or whether or not any of the macroinvertebrate species ranked as endangered, restricted range, or rare in the California Natural Diversity Database are present. We think this lack of knowledge of aquatic species present prior to rotenone poisoning extends throughout the US.

Many of the stream poisoning projects now being carried out or proposed in the western US are in the most pristine and unspoiled streams and rivers of the country in designated Wilderness Areas and national parks. Many are in isolated headwater areas that have a high probability of containing other rare and endemic aquatic species, for the same reason that they have rare subspecies of fish. Our research has revealed rare and/or endemic species of invertebrates in many springs and headwater reaches in the Sierra (e.g., Erman and Erman 1990, 1995). We also have found that aquatic invertebrate species persist in undisturbed streams over many years. Other researchers also have found persistence of invertebrate taxa in undisturbed streams over many years (e.g., Robinson et al. 2000). These are the sites that should be most protected.

Studies of insect dispersal in Europe have found that biological recovery of aquatic insect communities following insecticide poison events or severe organic pollution may take decades (Sode and Wiberg-Larsen 1993).

The mountain yellow-legged frog and the Yosemite toad are both candidates for listing as endangered species and both are or were found in stream basins in the Sierra Nevada that are proposed for fish eradication or where fish eradication has been attempted for many decades. There is no time during the year that tadpoles of the mountain yellow-legged frog would not be in a stream in higher elevations because the mountain yellow-legged frog spends up to four years as a tadpole. Adult frogs are highly aquatic compared to other amphibian species (Dr. Kathleen Matthews, USDA Pacific Southwest Experiment Station 2003, High Sierra Ecosystems, Science Perspectives, USDA Pacific Southwest Experiment Station).

<u>Inability of fish and game departments to properly manage rotenone applications in the field:</u>

Use of rotenone as a fish poison requires that rotenone must be neutralized chemically in order to control its toxic effect downstream from treatment areas. This chemical neutralization is commonly attempted with potassium permanganate. Failure by the CDFG to achieve complete neutralization and to cause fish kills from the potassium permanganate itself is documented in California Regional Water Quality Control Board (RWQCB) files.

We have read reports from the Lahontan RWQCB files and from CDFG files. During rotenone poisoning of Silver King Creek, Mono County, 1992, approximately 1000 fish were killed downstream of the project area from the application of potassium permanganate (Lahontan RWQCB files). The following year, 1993, during a repeat poisoning of the same area, detoxification of the rotenone was chemically incomplete (Flint et al. 1998). The record shows that CDFG has difficulty managing the performance of potassium permanganate and detoxifying the rotenone.

In the Lahontan Region alone, 6 of 11 rotenone projects since 1988 have violated water quality standards. Rotenone, rotenolone, or naphthalene have been detected downstream or have persisted longer than limits established in Basin Plans (Lahontan RWQCB files).

During application of rotenone in Silver Creek, Mono County, in 1994, independent testing by the Regional Water Quality Control Board found carcinogenic compounds in water. In contrast, testing by CDFG at the same sites found no detectable carcinogenic compounds (Lahontan RWQCB files).

Rotenone was detected in sediment during a CDFG project in Silver Creek, Sept. 20, 1995. CDFG was well over their target application rate of rotenone, with data apparently missing at a critical period (Lahontan RWQCB files).

Rotenone and its breakdown products have persisted in water for long periods after CDFG poisoning projects (Lahontan RWQCB files).

Higher amounts of rotenone have been used than are recommended because of accidents (e.g., Flint et al. 1998). In Silver King Creek non-native fish in live cars (used to monitor effectiveness of the poison) escaped into the stream section being poisoned, not once but twice (Flint et al. 1998). As a result, "the creek was heavily doused with rotenone from backpack sprayers so that total concentrations peaked at 40 $\mu g/l$ at detox, about twice (sic) expected." Not all the escaped fish were found (Flint et al. 1998). Thus, even as CDFG was attempting to get rid of fish, they were accidentally introducing them.

Rotenone can not solve the problem of unwanted fish species

Until the responsible agencies recognize and acknowledge the underlying reasons for many of the unwanted species in the nation's waters and riparian zones, they will be unable to solve the problems with pesticides.

Non-native fish species have been and continue to be stocked by state fish and game agencies and by the US Fish and Wildlife Service. These species were/are stocked without environmental review and constitute a form of biological pollution. Perhaps the greatest threat of these stocking programs is the lesson they teach the public: it is a good idea to move fish around. For this reason and because of the continued official agency fish stocking, few fish eradication projects are successful in removing unwanted fish species over the long term (see for example, the decades-long records of poisoning streams and springs in the Golden Trout Wilderness and the Carson–Iceberg Wilderness, CA).

Rotenone formulations usually can not kill all the unwanted fish. An attempted fish eradication project in a reservoir, Lake Davis, CA, in the mid 1990s failed to eradicate the northern pike, poisoned a water supply for the town of Portola, and cost the state $15 million, some paid in reparations to the local community (Braxton-Little, Sacramento Bee, March 1, 2005). Components of the rotenone formulation, including piperonyl butoxide, persisted in the reservoir long after the poisoning was conducted. Portola has not used water from the reservoir since that time. The pike have been thriving in the intervening years, probably partly due to elimination of predators and competitors. The reservoir had been stocked with many non-native fish, but the northern pike was an illegal stocking, that is, a species not stocked by the CDFG. It is not easy for members of the public to understand why they can not stock the fish they want, if fish and game agencies can do it.

Freshwater habitats in the US are undergoing degradation and biological impoverishment from many sources (Erman 1996). It makes little sense to add poisons to streams and lakes in misguided attempts to save threatened and endangered fish without comprehensive understanding of why these fish species are endangered and with no concern for endangering other non-target species. It was never the intent of the Endangered Species Act to conduct recovery projects to increase single species that would put other species at risk of extinction.

Inadequate EPA review of connection between rotenone and Parkinson's Disease

The EPA rotenone risk assessment document has provided inadequate review and analysis of the connection between rotenone and Parkinson's Disease. In the various sections where the topic comes up, the EPA has repeated the statement "although several studies have linked sub-chronic rotenone exposure to Parkinson's disease-like symptoms in laboratory rats, the exposure methods used to obtain these results are not typically encountered through the current registered uses of rotenone." A critical analysis of the literature on this subject is restricted in the EPA document to the original study by Betarbet et al. (2000) and a paper on zebrafish by Bretaud et al. (2004). The Betarbet et al. study methods are critiqued and the findings judged of "uncertain relevancy" (p. 55 and elsewhere) as if this initial paper which first showed the connection between rotenone and Parkinson's disease is the sum total of current knowledge and technique. Such a review and analysis is insufficient for an EPA document of this importance.

The Web of Science presently lists 210 scientific papers connecting rotenone and Parkinson's disease. Many of these are extremely relevant to the EPA assessment, for example, Vanacore et al., 2002, have conducted a meta-analysis of all case control studies to the date of their work and are following the fate of a cohort of licensed pesticide users. More recently, Brown, T.P. et al., 2006, reviewed the extensive and growing literature on this subject and found "...a relatively consistent relationship between pesticide exposure and PD" and "...data suggest that paraquat and rotenone may have neurotoxic actions that potentially play a role in the development of PD..."

Inadequate EPA review of components of rotenone formulations

The EPA rotenone risk assessment document is incomplete in its treatment of ingredients associated with formulated end-products of rotenone. It has concluded that cube root resins do not contribute substantially to the toxicity of rotenone because technical grade rotenone is twice (at least) as toxic as the formulated end-product of rotenone. This conclusion is apparently based on the data reported in Table 3.17 for three formulations, Prentox Grass Carp Management Bait, Chem Sect Chem Fish Regular, and Chem Sect Cube Root Powder Toxicant.

However, the range of fomulations presented does not cover the range of actual formulations, associated products or potential toxicity. For example, work by Cabizza et al., 2004, found residues on olives of deguelin, tephrosin, and beta-rotenolone were very similar to rotenone and some data indicated similar acute toxicity values for deguelin and rotenone. The EPA and producers of rotenone products (e.g., Chem Sect Chem fish Regular, Table 3.17, and Nusyn-Noxfish and CFT Legumine) combine all such active compounds as "cube root resins" although their relative amounts and toxicities in end-product formulations are not equivalent. The limited data presented in Table 3.17 of the document support caution in making conclusions about toxicity of other cube resins. For example, Chem Sect Chem Fish Regular, 5% rotenone and 5% other cube resins, was 8 times more toxic to male rats than the other two products that contained no other cube resins. There are no data to reveal whether the other cube resins in Chem Sect Chem Fish Regular were rotenolone, tephrosin, deguelin or a mixture, or which was predominant.

Detailed work on extract from the source plant (*Lonchocarpus*) has found as many as 25 other minor rotenoids in cube resin (Fang andCasida 1999). Thus, other "cube root resins" is too broad a term for useful toxicity characterization and a more complete discussion and review is required than is in the EPA document.

Recommendations

We recommend 1) that the use of rotenone as an aquatic poison be halted in most cases in the US, 2) that its use should always require an NPDES permit [See earlier comments we submitted to the EPA, Attention Docket ID No. OW–2003–0063, April 1, 2005], and 3) that where it is permitted, application should be monitored and overseen by an independent, unbiased agency. The agencies promoting the use of rotenone in stream and lake poisoning can not be relied upon to also monitor and accurately report the effects of its use. We think that independent aquatic scientists, including macroinvertebrate and amphibian specialists, must be involved in the analysis of the impacts of rotenone on aquatic communities and species of non-target organisms.

Summary

To summarize, aquatic poisons rarely solve the problems for which they are used because the same fish and game agencies that promote them continue

to stock non-native fish. Members of the public learn from the example of the agencies and also move fish around. And fish poisoning often does not kill all the target fish.

The record is clear that the state and federal agencies using rotenone in California streams and lakes are incapable of applying the products without major problems.

We think the impacts of rotenone use in the streams and lakes of the US over the past 60 or 70 years has significantly reduced the diversity and changed the communities of aquatic macroinvertebrates and has probably eliminated some, perhaps many, non-target species. It has likely also had a major effect on some amphibians and has had a secondary food web effect on terrestrial animals that depend on fish, amphibians, and emerging aquatic insects for food. The effects of "piscicides" in general on non-target species have been understudied, poorly analyzed, and denied or ignored by some of the state and federal agencies involved in stream and lake poisoning.

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Explanation of figures:

Figure 1. Silver King Creek Macroinvertebrate Diversity Long-term Response to Nusyn-Noxfish (a rotenone poison).

Plot of the Margalev diversity index. Data is from Trumbo et al. (2000a) It compares the mean diversity index (± 1 standard error) for the control site (Station 1 in Trumbo et al. 2000a) and the sites eventually poisoned (Stations 2, 3, 6, 7, 8). The bars labeled "Before" are mean values for the two years before poisoning (1990 and 1991 before poison). The bars labeled "Long-term" are mean values for the two years, 1995 and 1996, following the last poisoning in 1993.

Figure 2. Silver King Peltoperlid Stoneflies.

Mean number of individuals (± 1 standard error) of the stonefly family Peltoperlidae, a taxon difficult to mistakenly identify. Data are from Trumbo et al. (2000a). Data in the Trumbo et al. (2000a) report are in tables of Plecoptera by taxon. Values for all taxa in the family Peltoperlidae (i.e., *Yoroperla brevis*, *Yoroperla* and Peltoperlidae) were summed for each date and station. "Before" on the x-axis means before poison and includes the samples from 1990 and 1991 (before poisoning). "During" includes the samples from 1991 after poisoning, 1992 before and after, 1993 before and after, and 1994 (one year after final poisoning). "Long-term" includes samples from 1995 and 1996, two and three years following the final poisoning.

Figure 3. Percentage of Peltoperlidae in Silver King Creek (of all Stoneflies).

This plot is of the same data and source as Fig. 2 except the number of individuals of Peltoperlidae from the poisoned stations (Stations 2, 3, 6, 7, 8) are

divided by the total number of individuals of all taxa and expressed as a percentage (± 1 standard error). The periods and samples are the same as in Fig. 2.

Figure 4. Percentage of taxa the same as those found before poisoning began, Silver King Creek.

The mean of 5 poison stations includes ± 1 SE. Data were not available for 1992 at the Control station. 1992 and 1993 include samples from before (b) and after (p) poison applied. Long-term results are considered those of 1995 and 1996 according to Lahonton Basin Plan. (Data from Mangum 1991, 1993-1996)

Figure 5. Silver Creek Number of Taxa.

Mean number of taxa (±1 standard error) from a study on Silver Creek (a different stream from Silver King Creek) reported in Trumbo et al. (2000 b. There was no control station in this study. The years are given under the periods used to calculate Before, During and Long-term. All four stations are used to calculate the mean for each bar.

Figure 6. Silver Creek Number of Taxa showing time of poison (Nusyn-Noxfish) application.

This is a plot of the mean number of taxa from Silver Creek based on the same data (Trumbo et al. 2000 b) shown in Fig. 4. The sample periods are given on the x-axis and vertical arrows indicate time of poisoning.

Figure 7. Silver Creek Stonefly abundance

Plot of mean (± 1 standard error) number of individuals (for all taxa in the Stonefly order) for Silver Creek based on data in Trumbo et al. (2000 b). Data are grouped as in Fig. 5. All four stations are used for each bar.

Figure 8. Silver Creek Peltoperlid Stonefly Abundance.

Mean number of individuals (± 1 standard error) of the family Peltoperlidae. The data are from the report by Trumbo et al. (2000 b). Times and stations are as in Fig. 6.

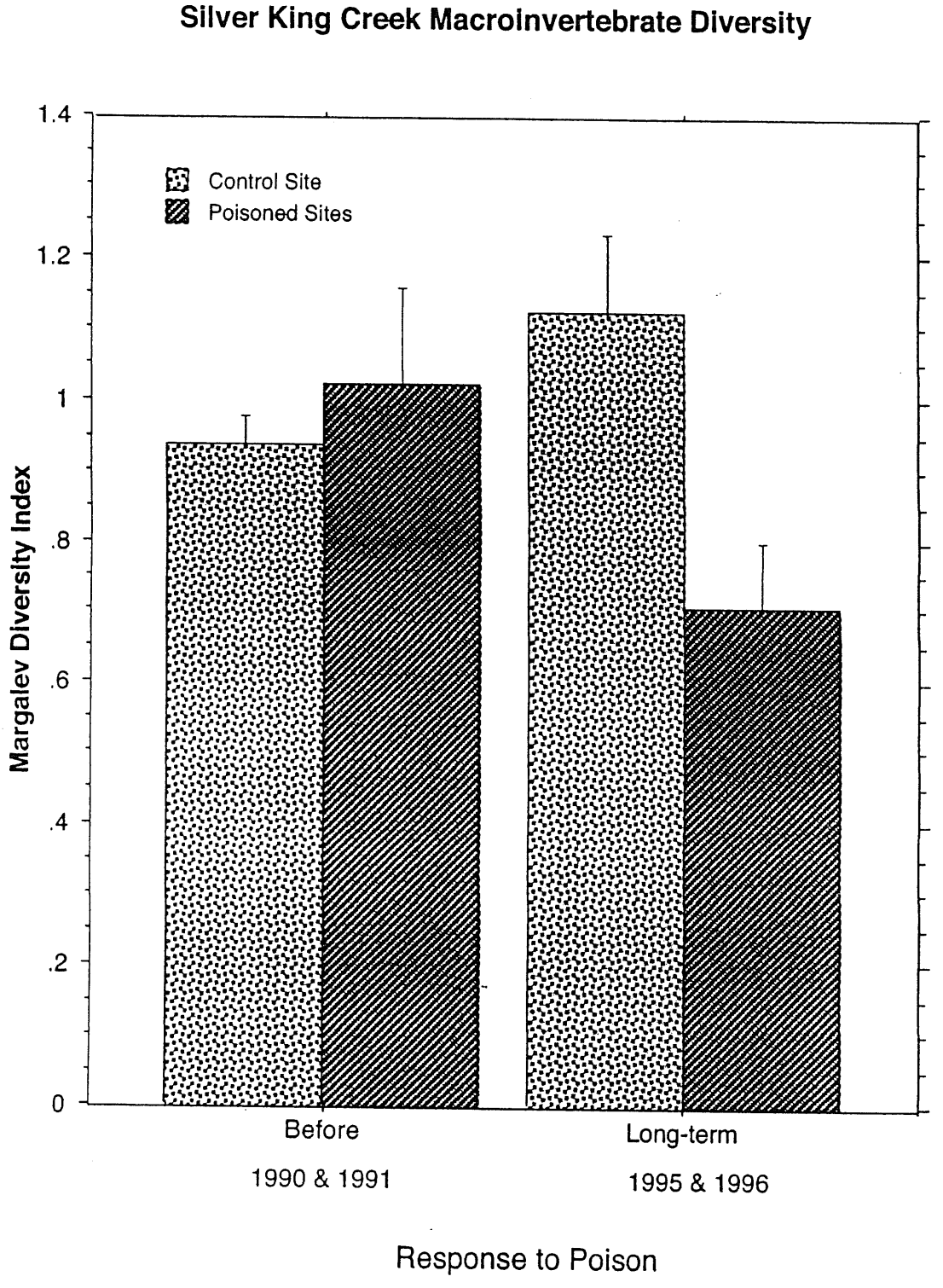


Figure 1. Silver King Creek macroinvertebrate diversity long-term response to Nusyn-Noxfish (a rotenone poison).

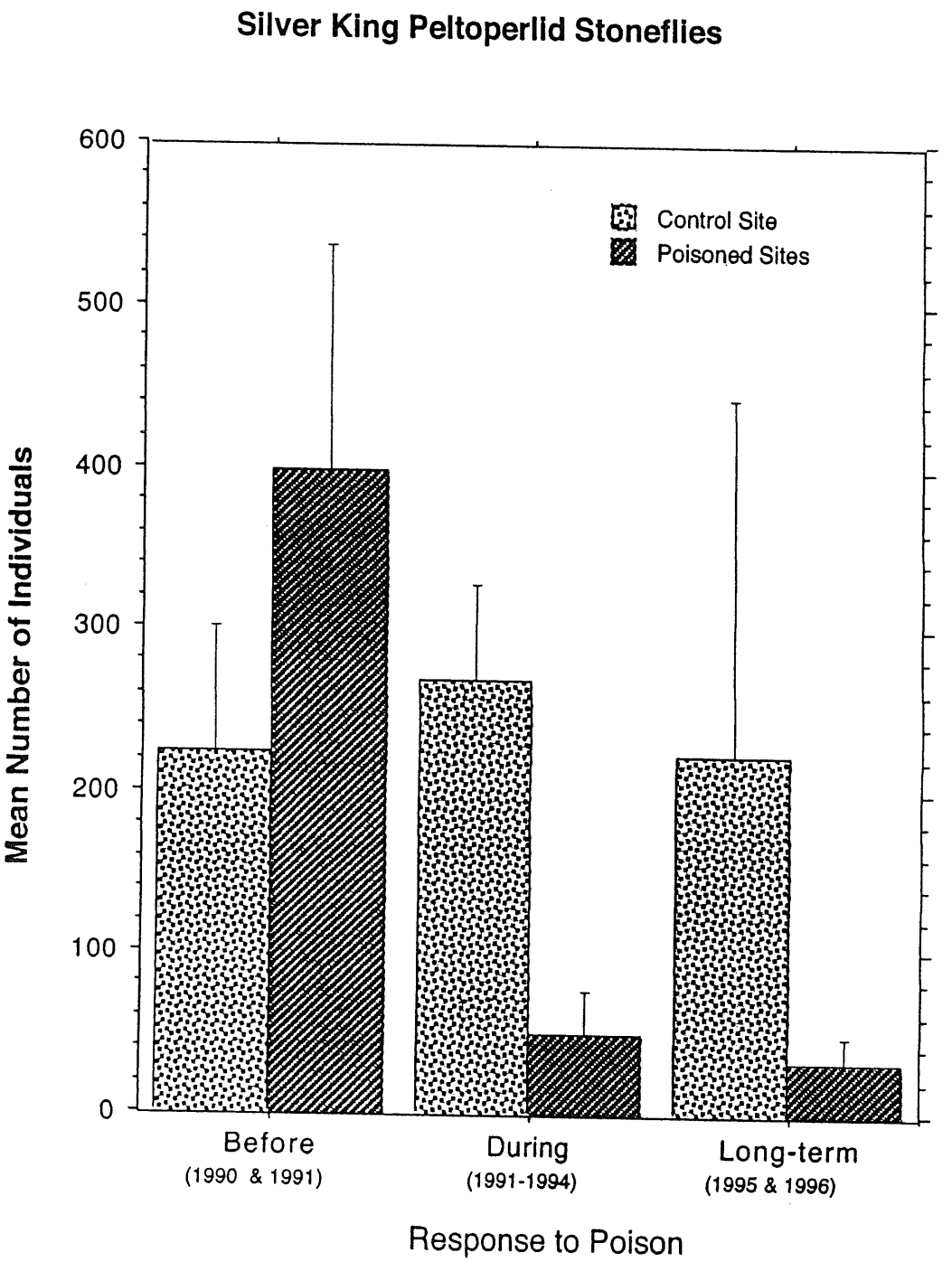


Figure 2. Silver King peltoperlid stoneflies.

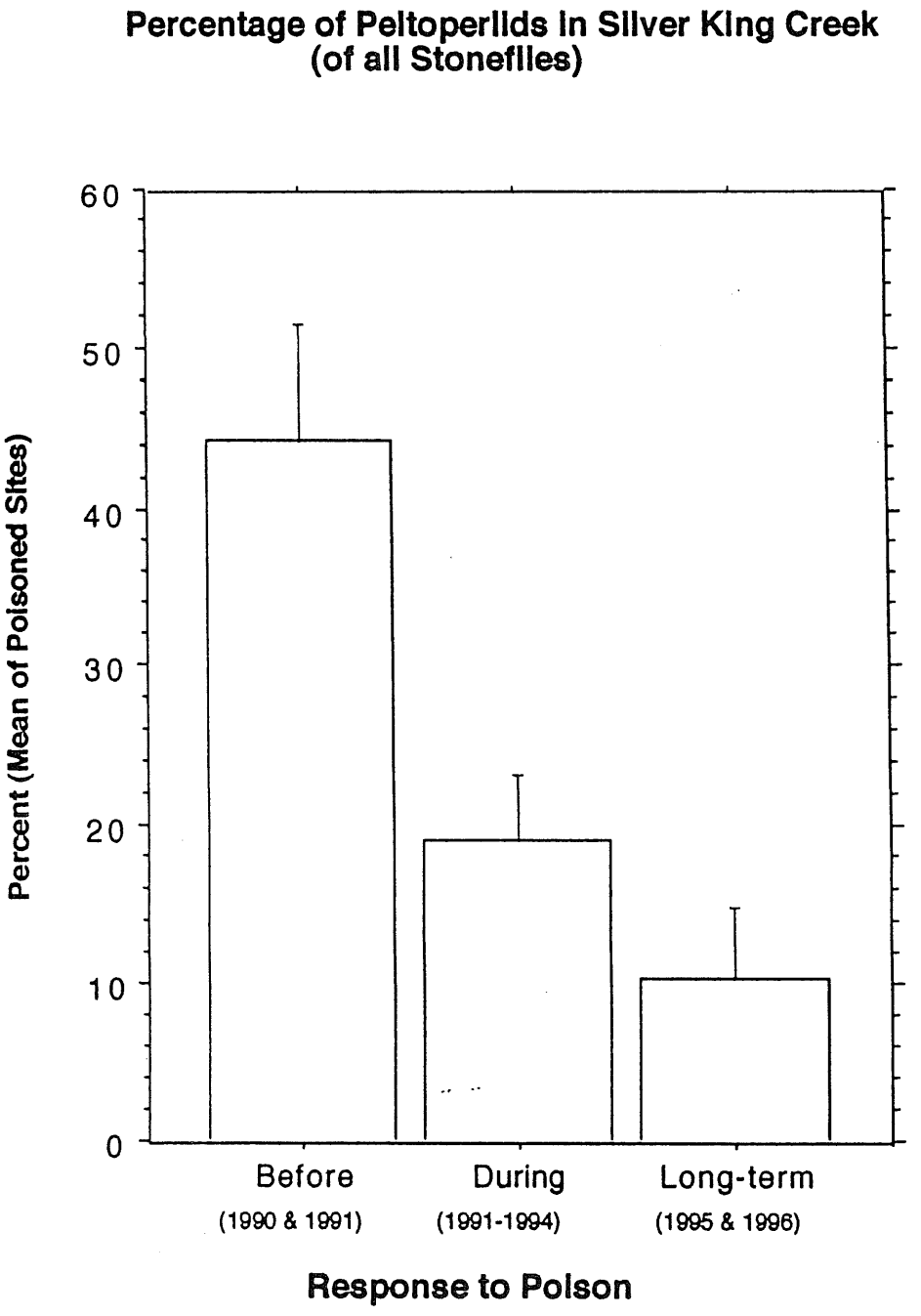


Figure 3. Percentage of peltoperlids in Silver King Creek (of all stoneflies).

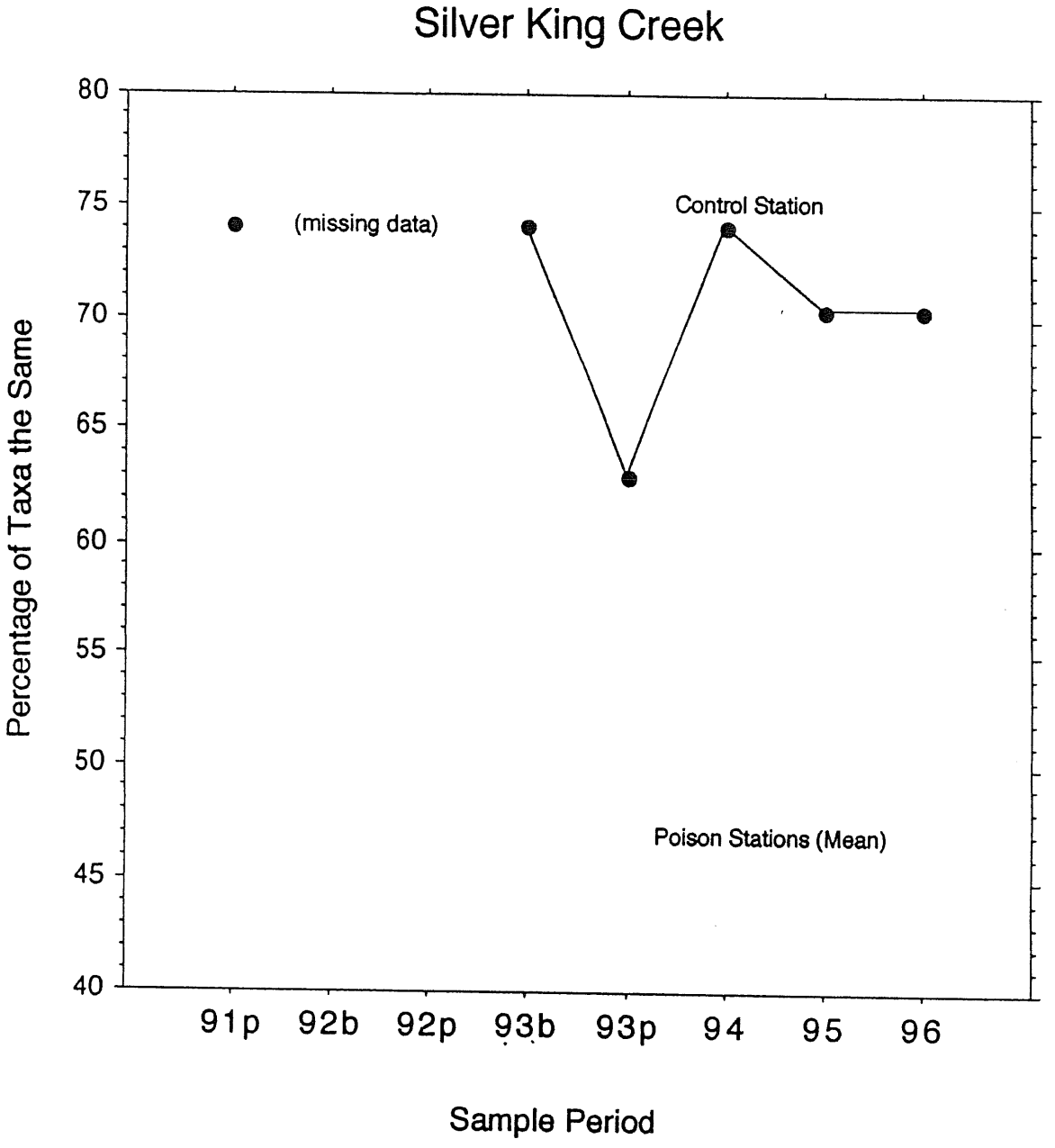


Figure 4. Percentage of taxa the same as those found before poisoning began.

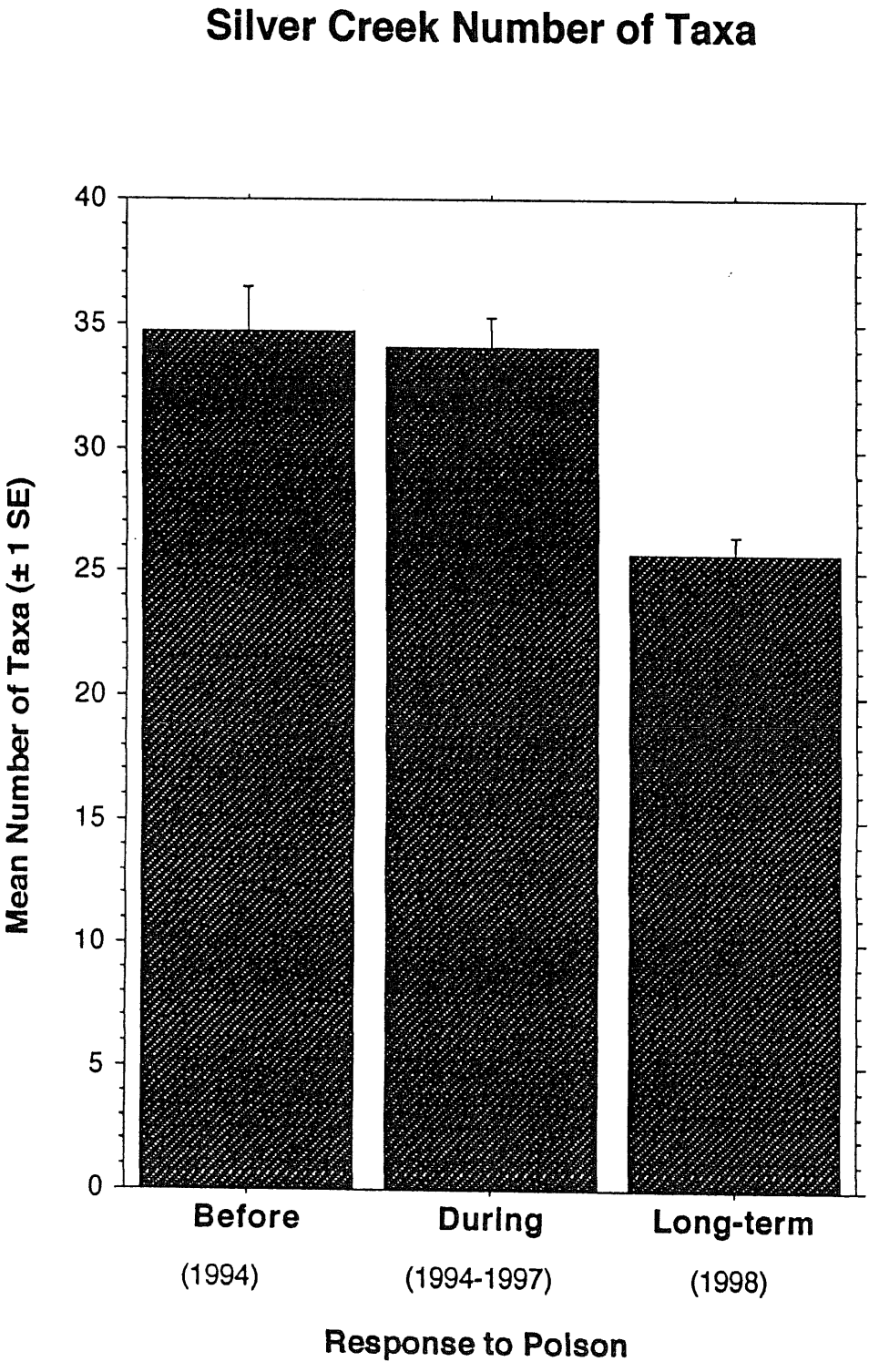


Figure 5. Silver Creek number of taxa.

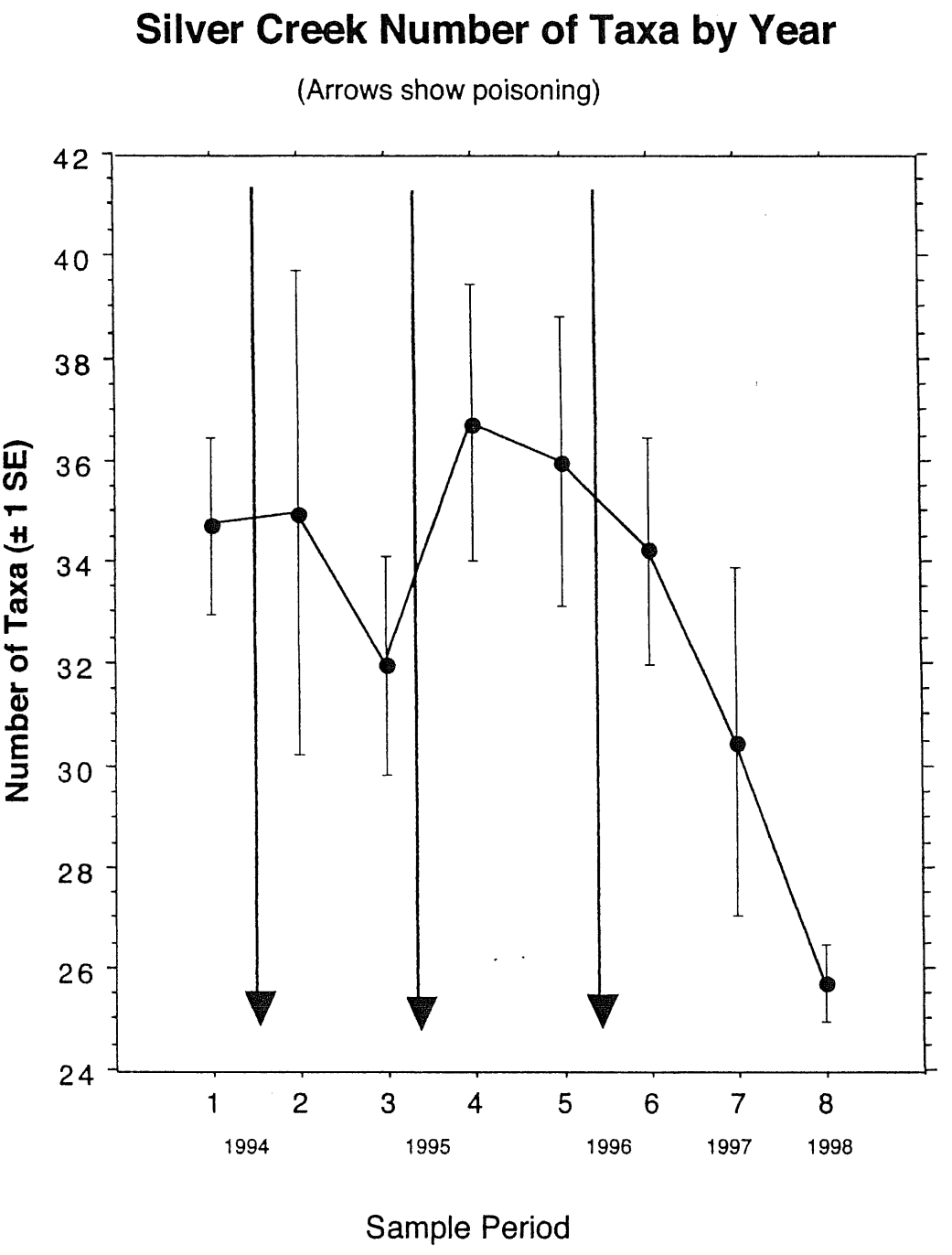


Figure 6. Silver Creek number of taxa showing time of poison (Nusyn-Noxfish) application.

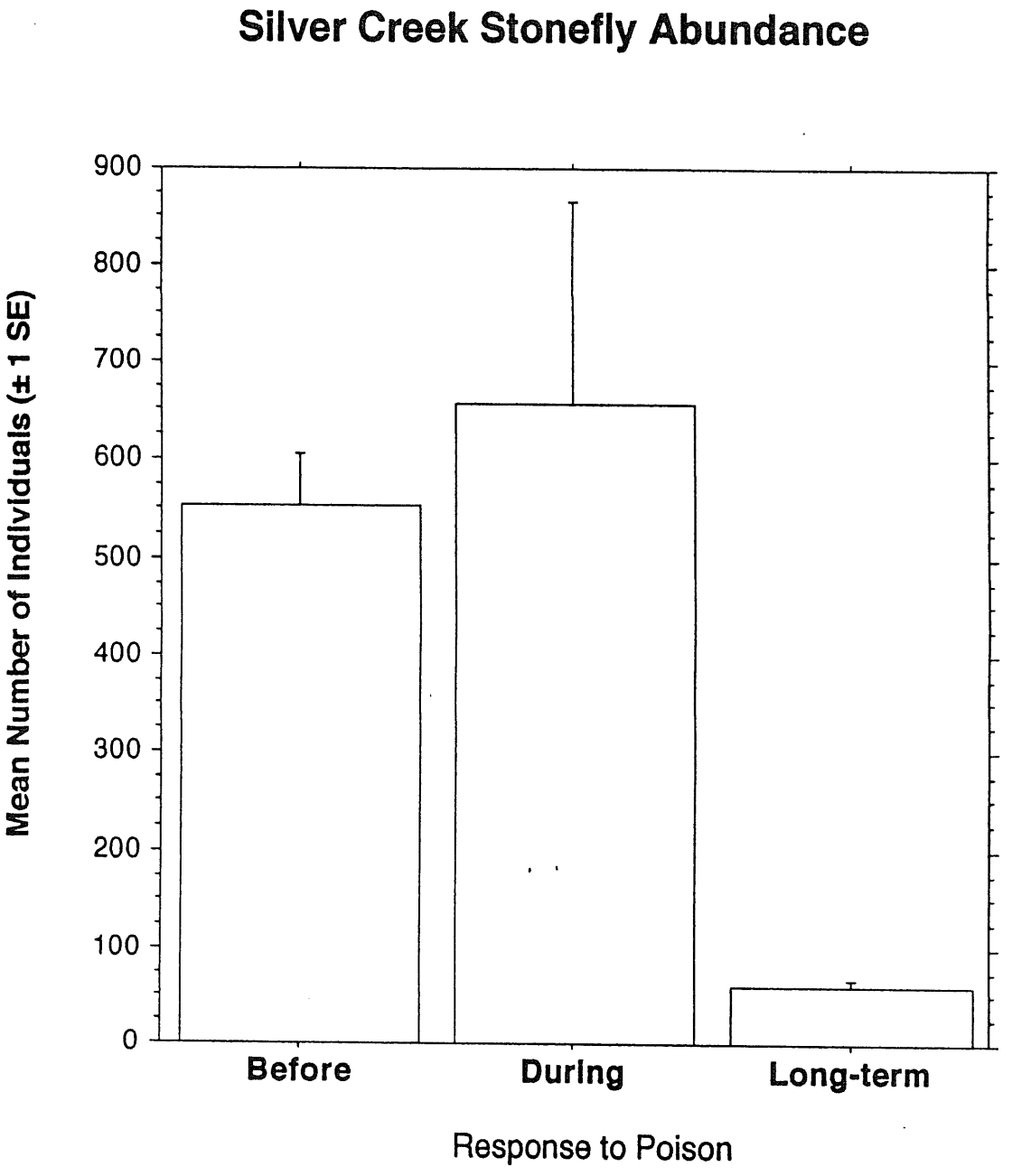


Figure 7. Silver Creek stonefly abundance.

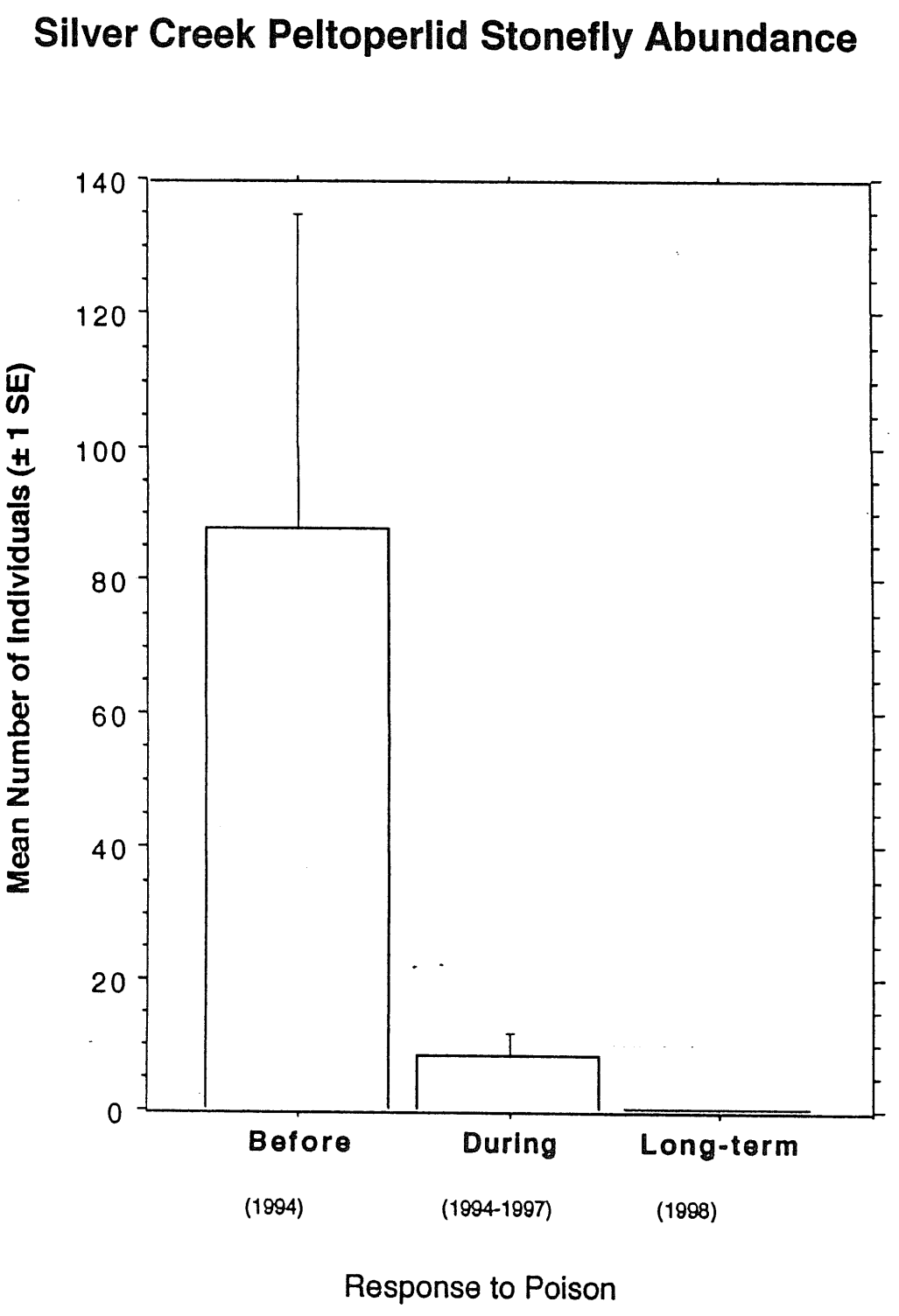


Figure 8. Silver Creek peltoperlid stonefly abundance.

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Ex. 5

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June 28, 2002

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SUBJECT: COMMENTS ON DRAFT NEGATIVE DECLARATION FOR PAIUTE CUTTHROAT TROUT HABITAT RESTORATION PROJECT, SCH# 2002052136

Dear State Clearinghouse,

I would like to take this opportunity to provide comments on CDFG's proposal to poison several miles of Silver King Creek and its tributary streams and lakes for the purpose of removing exotic trout (SCH# 2002052136).

I have reviewed several reports related to studies of aquatic invertebrate responses to rotenone treatment (Trumbo, Seipmann, Finlayson; on Silver King, and Silver Creek) and other background on potential problems with rotenone and wanted to share some of my thoughts as an aquatic entomologist and research scientist.

Though some data suggest recovery of invertebrate populations after rotenone treatment, these studies need to be examined carefully for design and responses measured. Aquatic invertebrate species are likely to have different colonizing abilities and will reoccupy treated streams on varied schedules. In addition, re-establishment of a stable community structure and trophic relationships are likely to differ from stream to stream, over elevation gradients, and to varying extents along the continuum of ecological conditions that exist from stream headwaters to lowland rivers. Given such variability, rotenone applications should be evaluated on a case by case basis. With regard to the studies cited by the Department of Fish and Game in their rotenone EIR (1985 and 1994) as evidence of low toxicity, I note that these included no controlled replicated field studies, were often conducted in pond habitats (standing water lentic environments, not lotic habitats), and most were over 20 years old. This is, in my opinion, inadequate data to determine whether the recovery of invertebrate communities after rotenone treatment of streams in the Eastern Sierra will take one year, two years, or longer. The studies

cited earlier are insufficient to arrive at an informed decision on a specific "timeline" for invertebrate re-establishment. The more recent monitoring studies on Silver King Creek and Silver Creek show mixed results. Although both studies concluded rotenone use did not affect macroinvertebrate abundance, there are other measures of community structure that indicated both short- and long-term affects of rotenone. At Silver King, for example, the data suggest that treatments produced (1) a persistent high level of community dominance (a sign of stress that one taxon comprised 60-75% of all organisms relative to the 20-35% before treatment), (2) transient loss of about 50% or more of EPT taxa (sensitive mayfly-stonefly-caddisfly taxa) during treatment years, followed by 3 years until levels had apparently recovered, and (3) persisting loss of stonefly taxa relative to pre-treatment levels, with an especially notable loss of the abundant Peltoperlid *Yoraperla* through the post-treatment period. Other indicators may have been more revealing, such as calculation of a biotic index (such as Hilsenhoff), and a community similarity index would have been most revealing ~~of~~ in distinguishing whether recovery or only replacement is occurring after treatment (i.e. do the same taxa return, or do "weedy" colonizers replace the original biota?). The single control site selected for contrast in this study does not appear to be a stream of similar size or order to Silver King and so is difficult to interpret. Multiple controls of similar size would provide a more realistic context for contrast. The Silver Creek study showed short-term affects of treatment but none long-term, though this design had no control sites. Both the study designs lacked much taxonomic resolution for some groups such as the Chironomidae, Diptera, and apparently others identified only to family level. This further limits the ability of these studies to detect changes in biological indicators.

Rotenone treatment of streams in this watershed is also troubling to me as an aquatic ecologist attempting to establish biological criteria for water quality in the region. Any impairment (short- or long-term) compromises the potential use of these streams as reference sites, the fundamental unit upon which biological criteria are based.

Other considerations in the use of rotenone:

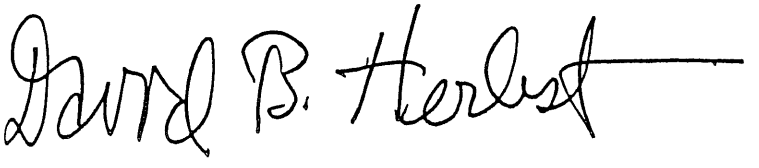
- Repeated rotenone treatments over consecutive years may pose an additional threat to stream ecosystem recovery because of uncertainty in the capacity of the resident invertebrate fauna to survive such prolonged exposures. The combined effects of other components of rotenone formulations (organic solvents, permanganate) in the environment should also be investigated.
- While application of rotenone from the headwaters of all drainages in a watershed may be necessary to eradicate unwanted fish, this practice may also ensure that any recolonization from drift (organisms floating downstream with the current) of resident invertebrates is

impossible. Elimination of this potential headwater refuge is likely to favor recolonization by "weedy" species, i.e. those that disperse and colonize rapidly by flight and thrive in disturbed habitats. Species that are less vagile and have restricted distributions are vulnerable to local extinction. The headwaters of streams may be reservoirs for rare and/or sensitive species of invertebrates (possibly undescribed species) and should be given special attention in pre-project surveys.

- Though bioassessment studies are useful for quantifying impacts if before/after comparisons are made (at impact and control sites), such monitoring alone does not address the fate of rare species, so complete invertebrate surveys should also be done.

The bottom line is that the potential for irreversible damage exists and recolonization of a rotenone-treated stream is at best uncertain. Such uncertainties argue that the practice of using rotenone to remove undesirable fish from streams should be undertaken only with great caution and with the benefit of pre-project surveys and pilot studies on treatment impacts and recolonization dynamics for the particular drainages under consideration. Management of streams for single species, whether listed or not, should not jeopardize the very ecosystems and biological communities into which such populations are being introduced. Aquatic habitat management needs to be sensitive to retaining or restoring multiple species and ecological function. Treatment of entire watersheds from headwaters sources should not be undertaken until pilot studies of recovery on smaller reaches have been done. This is needed to evaluate the "ecological safety" of the treatment and determine whether goals/objectives have been met. In conclusion, I believe that the Lahontan Basin Plan objective for species composition needs to be met to protect stream ecosystems, and feasibility studies, monitoring, and inventory should also be conducted to ensure compliance. Amendment of the objectives to allow longer recovery times may then be considered if the studies so warrant. This will ultimately assure that threatened fish species are established in viable natural ecosystems.

Yours Sincerely,



Linda S. Adams
Secretary for
Environmental Protection

California Regional Water Quality Control Board
Lahontan Region

Arnold Schwarzenegger
Governor

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EX. C

JUL 0 3 2006

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ROTENONE SCOPING COMMENTS FOR SILVER KING CREEK NEPA DOCUMENT

Thank you for the opportunity to provide scoping comments for the preparation of an Environmental Impact Statement (EIS) for the proposed Paiute Cutthroat Trout Restoration Project in the Carson-Iceberg Wilderness, Humboldt-Toiyabe National Forest, Alpine County, California. This project may have a significant effect on the environment and these effects both short term and long term must be analyzed in accordance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). This letter contains a number of enclosures containing evidence and concerns related to the potentially significant environmental impacts.

The Lahontan Regional Water Quality Control Board (Water Board) adopted a Water Quality Control Plan for the Lahontan Region (Basin Plan). The Basin Plan contains water quality objectives requiring that waters of the region shall not contain detectable levels of pesticides. The Basin Plan further provides for variances to be granted to the Department of Fish and Game for fish recovery projects if certain conditions can be met. Since the U.S. Fish and Wildlife Service (USFWS) is lead on this project, the Water Board may need to amend its Basin Plan to consider variance criteria for the USFWS for the proposed project. If Department of Fish and Game was the co-lead on the project, the Water Board may be able to use the existing criteria in the Basin Plan. Because the Water Board has to take discretionary action to grant a variance for the project, we need an environmental document that complies with the CEQA. A CEQA Lead Agency must still be identified. Because NEPA does not require separate discussion of mitigation measures, these points of analysis will need to be added, supplemented, or identified before the EIS can be used as an EIR. CEQA requires that the State Lead Agency shall consult as soon as possible with the Federal Lead Agency. We will need to meet with you and the Department of Fish and Game as soon as possible to discuss joint environmental document preparation.

Water Board staff has commented extensively on the 2002 Department of Fish and Game mitigated negative declaration (Kemper, 2002) and on the US Forest Service Environmental Assessment for this project (Churchill, 2002) and our comments are enclosed.

This project has been highly controversial and litigious. Most recently, the US District Court in Californians for Alternatives to Toxics v. US Forest Service on August 31, 2005 imposed an injunction. The proposed EIS must adequately address the issues raised in this lawsuit, our previous comments, and other comments on the proposed use of rotenone in the Silver King Creek watershed.

There are four issues requiring further evaluation in the EIS.

1. Rare, Unique, and Endemic Species: The primary issue in the most recent lawsuit and in the Water Board comments is the potential destruction of non-target rare and endemic species. Since many of these streams and headwater areas are isolated, there is the potential for rare and endemic species unique only to these waters. No evidence has been produced to date that any comprehensive biological survey has been done within the project area to assess whether any rare, unique and/or endemic species exists. Simply saying that they have not been observed, so they must not exist—as the defendant did in the above case—is not adequate, since if the project proponent is mistaken, an elimination of a unique species may occur from the rotenone application. At least two years of complete biological surveys to the species level should be conducted in these remote streams and headwater areas prior to commencement of any rotenone project. The draft EIS should provide a detailed survey plan and contingency measures to address protection of any rare species that could be adversely impacted from the rotenone treatment. This may require that alternatives to rotenone be considered for non-native fish species eradication in the areas that provide habitat for any rare or unique non-target species.

2. Short- and Long-Term Effects on Aquatic Community Composition: General toxic effects of rotenone are not strictly specific to fish, but all gill-breathing aquatic organisms. This includes juvenile species of amphibians and larval stages of insects—benthic macroinvertebrates. Studies on effects of rotenone on macroinvertebrates shows a consistent negative effect. Dr. David Herbst, an eminent aquatic biologist with the University of California at Santa Barbara, has the following to say about this regarding prior rotenone treatments and Silver King Creek:

   "Data suggest that (rotenone) treatments produced (1) a persistent high level of community dominance (a sign of stress at one taxon comprised 60-75% or more of all organisms relative to 20-35% before treatment), (2) transient loss of about 50% or more of EPT taxa (sensitive mayfly-stonefly-caddis taxa) during treatment years, followed by three years until levels had apparently recovered, and (3) persisting loss if stonefly taxa relative to pretreatment levels, with an

especially notable loss of the abundant Peltoperlid *Yoraperia* through the post-treatment period."

He summarizes that "the potential for irreversible damage exists and recolonization of a rotenone-treated stream is at best uncertain...Management of streams for single species, whether listed or not, should not jeopardize the very ecosystems and biological communities into which such populations are being introduced."

Furthermore, when comparing pre- and post-rotenone treatment macroinvertebrate data, reliance on some standard metrics may be misleading because they may not (a) account for re-colonization with the same species that were present before treatment—other similar species or even genera could substitute; and (b) total macroinvertebrate abundance does not measure community structure. Metrics such as biotic index or a community similarity index will provide better information regarding post-treatment effects. If headwater areas are treated, re-colonization from drift of indigenous invertebrates is eliminated, and the stream will be re-colonized by more opportunistic and vagile species (those that disperse and colonize rapidly by flight and compete well in disturbed habitats). See Enclosure 7 for complete copy of Dr. Herbst's comments.

3. Other Toxic Compounds in Rotenone Formulations: Commercially available rotenone also contains toxic cube resins such as deguelin, piperonyl butoxide, and/or other carcinogenic compounds (See table in Enclosure 1). These compounds have also been shown to be toxic to macroinvertebrates, and should likewise be assessed along with rotenone in any rotenone formulation studies involving toxicity to macroinvertebrates.

4. Alternatives to Rotenone, Both Chemical and Non-Chemical: A chemical alternative to rotenone is antimycin, which has a persistence in the environment of hours compared to days or weeks with rotenone. Additionally, macroinvertebrate recovery is apparently much more rapid after application and it is more species-specific than rotenone. Many Federal resource management agencies have taken to using antimycin for species reintroduction projects as a result.

   Electroshocking in combination with gill netting has been a very effective non-chemical method for removing fish from lakes. This has been used successfully in 22 lakes for non-native fish removal projects in Sierra Nevada Mountains (Knapp and Matthews, 1998; Beecher, 2005).

   Detonation cord has likewise been successful in a number of recent DFG trials in the Sierra Nevada mountains (D. Becker, Associate Biologist, DFG, personal communication, 2006).

Please carefully review and evaluate all of the enclosed materials for consideration in the Environmental Impact Statement for the proposed project. We request that you consider several alternatives including limited rotenone use coupled with other measures to remove non-target species, and no rotenone use. Project contacts for this project are Dr. Bruce Warden, Environmental Scientist at (530) 542-5416 and Lauri Kemper, Division Manager at (530) 542-5436.

Harold J. Singer
Executive Officer

Enclosures:
1. Table 1 - Expected Chemical Concentrations of Rotenone formulations
2. Erman, Nancy and Don, 2006. *Comments on EPA Rotenone Risk Assessment* to USEPA.
3. Singer, 2005. *Regional Board Comments on State Water Board draft Order..., SWRCB/OCCFileA-1669 and A-1699(a)*, to Debbie Irvin, Clerk to State Board.
4. Kemper, 2004. *Follow-up to National Pollutant Discharge Elimination System (NPDES) Permit Hearing for Silver King Creek Rotenone Project, Alpine County,* to Banky Curtis, Regional Manager, DFG.
5. Kemper, 2004. *Updated Project Information Needed for Proposed 2004 Rotenone Treatment, Silver King Paiute Cutthroat Restoration Project, Alpine County,* to Banky Curtis, DFG.
6. Churchill, 2004. *Comments on Draft Revised Recovery Plan for Paiute Cutthroat Trout, Silver King Creek Rotenone Treatment, Alpine County,* to Reno FWS.
7. Herbst, 2002. *Comments on Draft Negative Declaration for Paiute Cutthroat Trout Habitat Restoration Project*, to State Clearinghouse
8. Kemper, 2002. *Comments on Mitigated Negative Declaration, Paiute Cutthroat Trout Habitat Restoration Project, State Clearinghouse #2002052136* to William Somer, DFG.
9. Churchill, 2002. *Comments on New Environmental Assessment, Silver King Creek Paiute Cutthroat Trout Restoration Project/Rotenone Treatment, Alpine County* to Jim Harvey, USFS.
10. Knapp, R.A. and K.R. Matthews. 1998. Eradication of Nonnative Fish by Gill Netting from a Small Mountain Lake in California. *Restoration Ecology* 6(2):207-213.
11. Becher, B. 2005. Frogs Trump Fish. *Los Angeles Times*, August 16, 2005

cc: Neil Manji / California Department of Fish and Game, Rancho Cordova
Nancy Erman
Laurel Ames
Dave Herbst

BW/adw t:\ FWS Rotenone NEPA Scoping Comments.doc

Ex. D 141

Memorandum

To : Mr. William Somer
Wild Trout Biologist
Sacramento Valley - Central Sierra Region

Date : November 8, 2000

From : Department of Fish and Game : George Heise
Native Anadromous Fisheries and Watershed Branch

Subject : Fish Barrier Inspection - Silver King Creek, Alpine County

This memorandum documents my opinion on the competency of certain natural geologic streambed features in Silver King Creek to act as barriers to the upstream movement of trout. You and I visited the barrier site on September 27, 2000 and were accompanied by Mr. Richard Flint, Fisheries Biologist, Sacramento Valley - Central Sierra Region, Mr. Pat Shanley of the Forest Service, and Mr. Jim Harvey of the Fish and Wildlife Service.

The site in question is located on Silver King Creek, Alpine County, at GPS coordinates of N 38°- 31.27' and W119°- 35.68'. The stream reach in this vicinity passed through a narrow gorge and is characterized by a high gradient channel with large boulders and numerous vertical drops in excess of 5 feet. The primary feature of the barrier is a waterfall that has been created by a huge boulder (20 feet or more) that was deposited in the channel. The boulder is surrounded by other large boulder streambed features and bedrock canyon walls. The result is a complex waterfall which drops approximately10 feet vertically on the left side of the main boulder and cascades through a tightly spaced series of smaller drops around the right side of the boulder, over a distance of 20 to 30 feet. Two smaller, yet significant, falls/barriers are located down stream. These features correspond to barriers 1, 2, and 3 in your November 10, 1994 memo. You noted at the primary barrier that, when compared to your previous visits to this site, it appeared that the falls on the right side of the boulder have been degraded by the erosion and loss of bed materials from the top of the falls.

After viewing the primary falls barrier and the associated smaller barriers, it is my opinion that, in combination, these features most likely constitute a total battier to fish passage. I can not, however, say it does with absolute certainty.

In theory, a trout with a darting swim speed of 14 feet/second (fps) can only jump to a height of three feet. When the vertical velocity component of a standing wave from which a fish might leap is added to the darting speed of the fish, the jump will be somewhat higher, perhaps as much as five feet for an exit velocity of 18 fps. Six vertical feet is generally assumed to be a total barrier to trout passage. These theoretical jumping limits are based on ideal hydraulic conditions, such as, a simple fall into a deep pool with a large volume for dissipating the energy of the falling water.

An important aspect to consider when evaluating potential barriers during low flow conditions is what effect high runoff conditions will have on the magnitude of the barrier. A vertical fall of eight feet may be reduced to two or three feet when the stream rises to flood levels. Evidence of high flow at the subject barrier site suggests that the flood flows could be four to six feet, or more, in depth. This could reduce the fall height at the barriers to a height that could conceivably be jumped under ideal conditions.

Another important consideration when evaluating the integrity of a barrier is the level of air entrainment and turbulence that is being generated by the falling water. Air entrainment reduces the apparent density of the water which, intern, reduces the fishes locomotive ability. Excessive turbulence in the flowing water will keep a fish disoriented and prevent it from setting up for a jump.

It is my opinion that under low flow conditions, the vertical magnitude of the individual barriers will prevent the upstream movement of the resident fish. Under high flow conditions, the vertical magnitude of the barriers is reduced, but, due to the narrowness of the gorge and the steepness of the stream channel, it is my opinion that the excessive air entrainment and turbulence in the flowing stream will continue to prevent fish from moving upstream through the barrier reach.

Since the barriers in question on Silver King Creek are within a vertical magnitude that could conceivably pass trout under ideal conditions, and since they have multiple flow paths and I have only viewed them under low flow conditions, I have to acknowledge that there may be a remote chance that the right fish, at the right place, at the right flow, might get lucky and pick it's way upstream. But I think this would be a very remote chance.

Please give me a call at (916) 653-2189 if I can be of additional assistance..

George Heise
Senior Hydraulic Engineer

cc: Mr. Patrick O'Brien - SVCSR
Mr. Richard Flint - SVCSR
Mr. Chuck Knutson - FPB

BARRIER COSTS

Kern, King, Schafer } 1.6 million - Dur - out to bid

contingency 150 - 300 K

Kern River Basin - Templeton

220,000 - direct costs

$400,000 w/ DLG Personnel

COST OF A TREATMENT MAY FALL WITHIN THE CONTINGENCY COST OF A BARRIER PROJECT

A BARRIER IN THE SILVER KING GORGE MAY COST 1.5 MILLION

EX. E

Lahontan Cutthroat Trout Restoration Project – Upper Truckee River

Project Proponent: US Forest Service; Lake Tahoe Basin Management Unit

Project Leader: Richard Vacirca; Forest Fishery Biologist
rvacirca@fs.fed.us/530-543-2768

Background

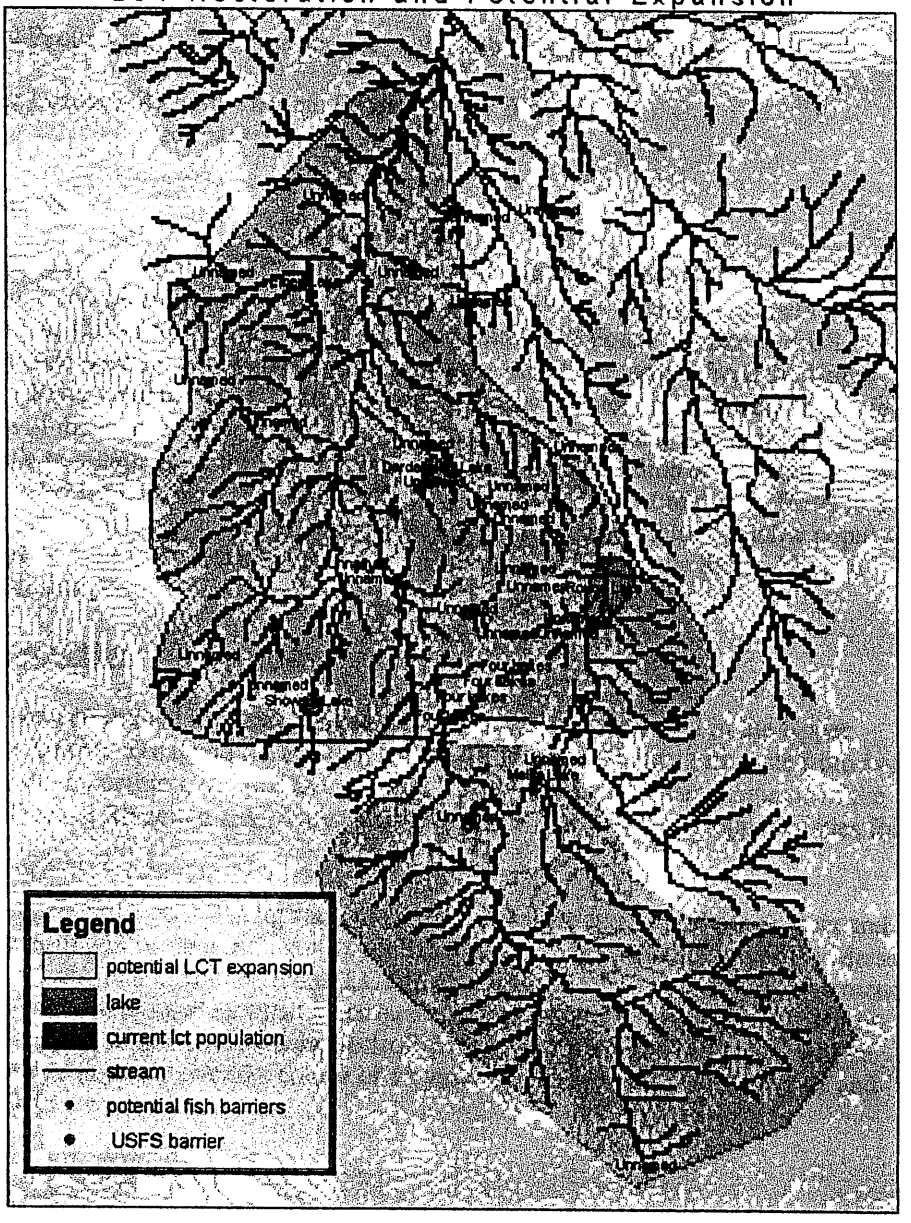
Lahontan cutthroat trout (LCT) were introduced to the headwaters of the Upper Truckee River in Meiss Meadows in the late 1980's and early 1990's through a cooperative effort between the California Department of Fish and Game, US Forest Service and US Fish and Wildlife Service. Non-native brook trout were initially removed from the Upper Truckee River prior to the LCT introduction by means of rotenone application. However, because of the extensive wet meadow conditions throughout the Meiss area, brook trout were able to escape from the initial removal effort. Since that time brook trout removal has occurred by utilizing manual electrofishing methods. Recent removal efforts in 2007 discovered brook trout were no longer in the headwaters. The Meiss Meadow population is one of the only high-elevation meadow populations of LCT in the Sierra-Nevada Mountain Range.

Proposed Action

It has been determined important to continue the brook trout removal in the Upper Truckee River to a) expand the existing LCT population by reducing impacts from non-native fish competition, b) provide a source LCT population to lower segments of the Upper Truckee River and Lake Tahoe and c) enhance native fisheries opportunities for anglers.

A combination of electrofishing and gill netting to remove introduced brook trout and rainbow trout will occur within the Upper Truckee River from the bottom of the Meiss Meadows Lahontan Cutthroat Trout (LCT) reclamation reach to the natural fall structure in section 19 and associated small lakes (see attached map). Gill netting will occur in small lakes and stream pools where electrofishing is not feasible. The project will be implemented annually over the course of 15 years by utilizing US Forest Service and CAFG field crews.

LCT Restoration and Potential Expansion



From: "Nancy A. Erman" <naerman@ucdavis.edu>
To: <bwarden@waterboards.ca.gov>
Date: 3/4/2010 11:40 AM
Subject: Silver King Creek poisoning project

Bruce,

Don Erman and I raised many issues about the this project in our EIR/ EIS comments that I sent to you in April '09. I first spoke to the Lahontan RWQCB about the problems and impacts of fish stocking and stream/lake poisoning by CDFG in 2000. I have corresponded with the Lahontan Board and staff on the proposed Silver King project since June 13, 2002. As we discussed previously, I am requesting that, in preparing your responses for the draft NPDES permit, you review and include responses to all past relevant issues and questions that we and others have raised on this project, either verbally at Board meetings or in writing, over the past eight years. Some of these relevant issues were discussed in a letter from Harold Singer to Robert Williams, U.S. FWS, July 3, 2006.

30

The proposed project has changed little since 2002.

Thank you for your attention to this matter.

Nancy Erman

JJC Copy

43200 East Oakside Place
Davis, CA 95616
e-mail: naerman@ucdavis.edu
July 8, 2004

Eric Sandel, Chair
Lahontan Regional Water Quality Control Board
2501 Lake Tahoe Boulevard
South Lake Tahoe
California 96150

Dear Chair Sandel and Members of the Lahontan Regional Water Quality Control Board:

In his letter to me of June 3, 2004, Harold Singer responded to my e-mail to him of March 17, 2004, regarding the current status of the proposed rotenone poisoning of Silver King Creek in the Carson-Iceberg Wilderness Area. Mr. Singer states that the proposed project does not have an NPDES permit. He recognizes that the earlier poisoning of the upper reaches of Silver King Creek, 1991-93, did not meet current Basin Plan objectives because the invertebrate community and species composition had not returned to pre-project conditions several years after the poisoning. He also recognizes that it is unlikely that the proposed project will meet Basin Plan objectives.

His solution seems to be to ask you to grant an NPDES permit and allow yet another poisoning of the stream with a better monitoring plan and, then, to change the Basin Plan objectives later to something the California Department of Fish and Game (CDFG) feels it can meet. With all due respect to your staff, I think this course of action is incorrect. The purpose of the Basin Plan is to protect water quality and beneficial uses of water. The Lahontan Board sets the Basin Plan objectives, not the CDFG. A better monitoring plan after the poisoning will only more clearly show the impacts to the aquatic invertebrate community resulting from another three-year poisoning project. It will not prevent the damage that will occur or mitigate failure to meet Basin Plan objectives.

Further, if CDFG cannot meet Basin Plan objectives, an NPDES permit cannot be issued. It is my understanding that changing a Basin Plan requires public and peer reviews. That process would have to occur prior to issuing an NPDES permit.

Rotenone projects to restore native fish species are often unsuccessful in the long term because the same fish and game agencies that propose the projects, continue to teach the public by example that stocking and moving non-native fish is a good idea. Sooner or later some well-meaning person moves unwanted fish back into the area. Until the cause of the problem has been comprehensively analyzed by state and federal agencies and the

public, the desired outcome of even the fish restoration objectives of aquatic poisoning projects will be elusive. It must be kept in mind that these poisoning projects come at great expense to non-target species and to communities and food webs.

The project is highly controversial. The need for the project has been questioned by the Alpine County Board of Supervisors, by university and independent scientists, by some fishing organizations, by several non-governmental organizations, and by other individuals.

The CDFG has a rather long and well-documented history of water quality violations as a result of its rotenone projects, and many of these examples are in the Lahontan Region.

I have recently supplied your staff with the information they requested regarding the likelihood of endemic species of aquatic invertebrates existing in the Silver King Creek basin. I will be glad to answer other questions or supply information to your Board concerning freshwater invertebrates and aquatic ecology. Please keep me informed of your intentions toward changing the Basin Plan and of adopting or denying an NPDES permit for this project. Your staff has assured me that they will notify me of any opportunity for comment. Thank you for your attention to this matter.

Sincerely,

Nancy A. Erman

Nancy A. Erman
Specialist Emeritus, Aquatic ecology/
freshwater invertebrates
University of California

Cc: Harold Singer, Executive Officer
Julia Olson, Attorney at Law

From: "Nancy A. Erman" <naerman@ucdavis.edu>
To: Harold Singer <HSinger@rb6s.swrcb.ca.gov>, Jason Churchill <JChurchill@rb6s.swrcb.ca.gov>
Date: Wed, Jun 30, 2004 3:35 PM
Subject: Endemic aquatic invertebrates/Sierra stream basins

June 30, 2004

To:
Harold Singer
Jason Churchill

From:
Nancy A Erman

Harold and Jason,

In your letter to me of June 3, 2004, regarding the proposed rotenone poisoning of Silver King Creek, you asked for information to support my contention that "In a drainage this size in a Wilderness Area (that should be relatively undisturbed), we might expectŠseveral endemic species (Erman 1996)."

The reference that I cited (Erman 1996) was the chapter I wrote, Status of Aquatic Invertebrates, for the Sierra Nevada Ecosystem Project (SNEP), Final Report to Congress. I will re-cap briefly here the evidence supplied in that publication and add a few additional details. The information on endemicity is scattered throughout the literature of many taxonomic groups of aquatic invertebrates in the Sierra. We can make estimates from the few stream basins and taxonomic groups that have been well-studied.

Many endemic and/or rare species have been found in Sierra spring systems where such systems have been studied. Examples are flatworms (Kenk 1970, 1972; Kenk and Hampton 1982; Hampton 1988), amphipods (Holsinger 1974), stoneflies (Surdick 1981, Szczytko and Bottorff 1987), caddisflies (Erman 1981, 1984, 1997; Erman and Erman 1990; Wiggins 1973, Wiggins and Erman 1987), and springsnails (Hershler 1994, 1995). This list is far from complete and is given for examples only.

The Sierra-Cascade system and the Appalachian system are considered the "two great centers of endemicity" for the North American Plecoptera (stoneflies). About 25 genera are thought to have evolved in each area (Stewart and Stark 1988). Plecoptera is one of the better known orders of freshwater invertebrates in California. It is also a small group (based on number of species) compared with the Trichoptera (caddisflies) or Diptera (true flies). At present, 167 species are known in the state; 122

of these are present in the Sierra and 31 are endemic to the Sierra (unpublished list by R. L. Bottorff, R. Baumann, B. P. Stark, and N. A. Erman).

One of the better-studied stream basins is Sagehen Creek on the east side of the Sierra, north of Truckee, where the University of California has operated a field station on the Tahoe National Forest since 1951. Aquatic habitats surveyed have included Sagehen Creek (a second-order stream), springs, spring streams, temporary streams, temporary ponds, and peatlands.

Stoneflies were comprehensively surveyed in 1967 (Sheldon and Jewett) and the list was revised and updated by R. Baumann, W. Shepard, B. Stark, and S. Szczytko for the first North American Plecoptera Conference in 1985 (unpublished data available from N. A. Erman and Sagehen Creek files).

Thirty-eight species of stoneflies have been identified in the stream system of the Sagehen Basin; six of these are endemic to the Sierra.

Of the 199 Trichoptera (caddisflies) species known from the Sierra, 37 are endemic to the Sierra (Morse 1993; John C. Morse, Clemson University, personal database of published literature; N. A. Erman, personal database. Estimates made for the SNEP report, Erman 1996).

Seventy-seven species of Trichoptera (caddisflies) have been identified from the Sagehen Creek basin (Erman 1989). Eleven of these are thought to be endemic to the Sierra.

In a review of caddisfly species listed as candidates for the Federal Endangered and Threatened list (Erman and Nagano 1992), we noted that most of the species and several genera listed for California and Oregon were restricted to upper watershed streams and were found in clear, cold, rapidly moving water or in small spring streams, habitats that are under increasing threat of disturbance.

In recent years several new species of spring snails have been described in the Sierra. Pyrgulopsis is the second most diverse genus of freshwater snails. Seventy-two species were known and considered valid as of 1995 and eight of those are considered endemic to the Sierra study area (as defined by the SNEP) and are present in only a few spring systems (Hershler 1994, 1995).

Further information is available on other limited.taxonomic groups in Erman, 1996. The order Diptera probably has by far the largest number of endemic species because it is the most diverse of the aquatic groups, but it has been poorly studied in the Sierra.

Some species are extremely limited in distribution, based on current knowledge. For example, one caddisfly species endemic to the SagehenCreek basin has been found in only one small spring. Of the 77 caddisfly species in the Sagehen basin, 26 species were restricted to small water bodies (spring sources, seeps, spring streams, temporary ponds or intermittent streams).

Species assemblages can change rapidly along small spring streams (Erman and Erman 1990, Erman 1992). In one stream in the Sagehen basin, Trichoptera species similarity (Jaccard's index) was 38% between the spring source and a site 270 m downstream and only 20% between the spring source and a site 450 m downstream where the stream ended in a peatland.

In a second spring-fed stream, larger than the first, species similarities with the spring source were 40% at 1 km downstream and 22% at 1.8 km downstream just above the confluence of the spring stream with a larger second-order stream. In both streams species were both replaced and added to, along the stream gradient (Erman and Erman 1990, Erman 1992).

If I can be of further help, feel free to call me.

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August 5, 2004

To: Harold Singer, Executive Officer
Lahontan Regional Water Quality Control Board
2501 Lake Tahoe Boulevard,
South Lake Tahoe
CA 96150

From: Nancy A. Erman
Specialist emeritus, aquatic ecology/freshwater invertebrates, University of California.

Don C. Erman
Professor emeritus, aquatic ecology/fish biology, University of California.

43200 E. Oakside Place
Davis, CA 95616
naerman@ucdavis.edu

We are submitting these comments as private citizens, in the public interest.

Re: Draft NPDES permit for rotenone poisoning of Silver King Creek, Carson-Iceberg Wilderness

This draft NPDES permit on the proposed rotenone poisoning of Silver King Creek

1) fails to take into consideration or disclose for the Board and public the significant adverse effects of past poisoning projects,
2) fails to mention that experts in the field of stream ecology (ourselves and Dr David Herbst at UC-SNARL) have expressed serious concerns and opposition to the project and
3) fails to mention public opposition to the project.

As written the draft will, in our opinion, mislead your Board and the public regarding the impacts of both this project and of the last poisoning in the Silver King drainage, 1991-93. One of us (NAE) has communicated with the Board extensively over the past two years and has submitted evidence and analysis previously that show past, long-term impacts to non-target species from the earlier poisoning, a violation of the Basin Plan. We hereby incorporate by reference our previous comments to the Lahontan Board on this proposal (dated 6-13-02, 6-18-02, 9-10-02, 10-11-02, 8-15-03, 8-18-03, 8-20-03, 3-17-04, 3-18-04, 3-26-04, 6-30-04, 7-8-04).

This draft NPDES permit contradicts your letter to us of June 3, 2004 in which you state "we agree that the CDFG's data suggest short-term impacts may last several years, and that longer-term effects may also occur." In your letter you have re-defined what "short-term impacts" are. The Basin Plan states that impacts that last 2 to 6 years are long-term (4.9-24). In any case, there is no indication in this NPDES permit that you know the impacts from the last poisoning were long-term (more than 2 years). Nor is there evidence that you know that the California Department of Fish and Game (CDFG) provided you with misleading information when they claimed that "No evidence of long-term impacts were found in either study" (Attachment 2, Interagency Study Proposal, June 15, 2003, Evaluation of Rotenone use in Silver King Basin on Aquatic Macroinvertebrates, 2003-2007).

Neither is there any recognition that the monitoring being done and that you have approved is incapable of answering the question of whether or not non-target species are being eliminated. No species inventory has ever been made for the basin. No knowledge, therefore, exists to determine whether or not rare invertebrate species are in the basin. A condition of beneficial uses of Silver King Creek is the maintenance and protection of rare species.

Ten years have elapsed since the last poisoning project in the basin and since the rotenone requirement was added to the Basin Plan. Ten years was more than enough time to inventory the adult stages of the aquatic invertebrates at the

species level. It could probably have been done for $50,000 to $75,000 over a period of three years. The cost is a small fraction of the cost of this proposed rotenone project. The Paiute cutthroat trout restoration plan has been in effect for almost 20 years and poisoning in parts of this basin have gone on for about 40 years. It is beginning to seem as if the agencies involved are afraid of what they might learn if they actually made an inventory of the species in the stream basin.

The draft permit fails to take into consideration or disclose for the Board and public, the significant adverse effects of past poisoning projects. As detailed previously, and as detailed in the CDFG and US Forest Service (USFS) records for this planning process, which your staff and Board should review carefully before considering any approvals, rotenone use has been shown to have both short-term and long-term adverse effects on non-target instream communities. The CDFG never disclosed these impacts when it prepared its programmatic EIR in 1994, its site-specific Negative Declaration, or in proceedings before the Lahontan Regional Water Quality Control Board (Lahontan Board or RWQCB) when the Lahontan Basin Plan was amended to allow rotenone use. In short, the CDFG has misled this Board and the public about the significant impacts of rotenone on non-target species, and now that your staff has the evidence, you are ignoring it. Our detailed analyses are in Exhibits b, d, j, and k. and have been submitted to the Lahontan Board previously.

The draft permit fails to mention that experts in the field of stream ecology (i.e., Dr. David Herbst and we) have expressed serious concerns and opposition to the project. We are aware that Dr. Herbst assisted the Lahontan Board staff in reviewing CDFG's monitoring plan, and one of us (NAE) has discussed it with him in some detail. Nevertheless, he remains opposed to the project as his letters have shown. Dr. Herbst is on record as opposing this project, due to his concerns that poisoning will have long-term impacts on non-target instream communities. His letters to the CA State Clearinghouse and to the USFS (2002–2004) regarding the Silver King Creek poisoning are incorporated here by reference.

A monitoring plan is not mitigation or justification for loss of species and long-term changes in aquatic communities.

The draft fails to mention public opposition to the project. Many people oppose this project, as evidenced by comments submitted to the CDFG, USFS and FWS during their environmental reviews and to the State Water Board during its recent review of aquatic poisons.

We are requesting that you provide us with the list of Interested Parties to whom this draft was sent. It will be fairly easy to compare it to the list of commenters on the CDFG Negative Declaration, the first and second USFS EAs, the Fish and Wildlife Service (FWS) Draft Recovery Plan for the Paiute Cutthroat Trout, and to the appellants of the Forest Service 2004 Decision Notice and Finding.

At this date the Forest Service has not made a determination on the Appeals and the FWS has not submitted a Final Recovery Plan.

The staggered, piecemeal reviews of this project by two federal agencies and two state agencies and the failure of these agencies to prepare a combined EIR/EIS has resulted in contradictions of process, status, and fact.

Attached are our comments to the CDFG, the USFS, the FWS, and the State Water Board over the past two years. You have received some of these previously. (Exhibits a–l).

As the agency responsible for the NPDES permit, the Lahontan Board may be especially interested in the claims made in the 2004 USFS EA and the Decision Notice and Finding, 4-30-04, that the project already has an NPDES permit (see Exhibit l). In other words, the USFS decided to allow the project because CDFG claimed it had an NPDES permit from the RWQCB, and the RWQCB is now proposing to allow the project by granting an NPDES permit because CDFG has an approval from the USFS. All of the agencies are hiding behind each other, and

none to date have been willing to provide an honest analysis of the environmental consequences. We expect more of this RWQCB.

When Thomas Suk of the Lahontan RWQCB staff was working on this project, we presented the evidence to him, and he acknowledged that the evidence indicated significant adverse impacts (both short-term and long-term) to non-target instream organisms. In addition, Laurie Kemper sent a detailed memorandum to CDFG, June 27, 2002, outlining many concerns that the Lahontan Board had regarding impacts to non-target species (incorporated here by reference). Yet the new staff seem incapable of arriving at the same conclusion or of even reviewing and including the published literature on rotenone impacts to non-target species. Perhaps you need to put more experienced people on the project.

Because the Programmatic Environmental Impact Report (Subsequent), Rotenone Use for Fisheries Management, January 1994, prepared by CDFG has been used in this NPDES permit as a justification for the project, we are incorporating here by reference all letters of comment received by CDFG on the Draft and Final Programmatic EIR.

The Board must enforce its regulations equitably across jurisdictions, agencies and ownerships. How would the Board react to a private company that wanted to cause a disturbance to 11 miles of stream, knowing in advance that it would result in long-term impacts and possible elimination of some species? The species composition objective occurs throughout the Basin Plan. If you undermine it here, you undermine it everywhere.

The Nondegradation Objective (Chapter 3, p. 13-14). should be considered in the interpretation of the Basin Plan in reviewing this latest request by CDFG and has not been in this NPDES permit.

The federal antidegradation policy enforced by the Board "requires that any reductions in water quality be consistent with the three-part test" as

summarized in the Plan. These parts clearly apply to the waters of Silver King Creek in the Carson-Iceberg Wilderness Area.

In Part One, Instream Uses, the policy states "Reductions in water quality should not be permitted if the change in water quality would seriously harm any species found in the water (other than an aberrational species)." In Part Two, Public Interest Balancing, the policy states that water quality may be lowered so long as "beneficial uses are protected." And Part Three, Outstanding National Resource Waters (ONRWs) the policy states "No permanent or long-term reduction in water quality is allowable in areas given special protection as Outstanding National Resource Waters..." and later "It is important to note that even if no formal designation has been made, lowering of water quality should not be allowed for waters which, because of their exceptional recreational and/or ecological significance, should be given the special protection assigned to ONRWs."

The current proposed project (as well as a number of previous projects) fails to meet the three-part test necessary to be in compliance with the nondegradation objective of the Plan.

In your letter of June 3, 2004, you state that you "cannot address resource management issues regarding the need for or anticipated effectiveness of the proposed project." Other reasons have been given for this project in other agency documents. You have an obligation to determine whether or not this project is necessary in Outstanding National Resource Waters, which surely the streams, lakes, springs, and seeps of a Wilderness Area are. If the reason cited in this NPDES permit were the real reason for the project, CDFG would have closed the Silver King basin to fishing long ago and would not be proposing allowing fishing for Paiute cutthroat trout in the area above Llewellyn Falls during the poisoning project. We have discussed the logic of the project in detail in Exhibits j and k.

Contrary to the statement on p. 3, this permit would violate the Basin Plan, not "implement" it.

It is clear from the statements in the FS EA (p. 40) that CDFG **plans** to have potassium permanganate residual at detectable levels (1 mg/L) at the downstream boundary of the project (i.e., the location 30 minutes travel-time below the detoxification point on Silver King Creek). The claim is that 1 mg/L is non-lethal and, therefore, acceptable.

As we discussed in our comments to the State Water Resources Board (Exhibit i), Nusyn-Noxfish and other rotenone formulations (including the new form of Noxfish, CFG legumine) contain as much or more other cube resins or "rotenoids" as rotenone. Such rotenoids are part of the plants used to create the pesticide. Such rotenoids as deguelin, tephrosin and others have been shown in published reports to have the same properties as rotenone as an insecticide. Analytic separation and identification are possible but have not been carried out by CDFG. Therefore, when concentrations of toxicant are given for rotenone/rotenolone, the actual active ingredients for invertebrates are at least twice the concentrations reported.

Furthermore, the proposed "new" formulation of Nusyn-Noxfish for use in Silver King Creek in 2004 now contains piperonyl butoxide as a synergist. This compound was developed specifically for many insecticides because it **increases the lethality** of the active ingredients.

Different dates are given in different places in this permit for the last poisoning of Silver King Creek.

No explanation is given for the inclusion of Appendix 1, Attachment 2, Interagency Study Proposal. The table listing aquatic organisms is uninterpretable and requires explanation that states what the taxonomic resolution of each group will be. It is not possible to make species determinations

from the larval forms of most aquatic invertebrates, if that's what the table is implying.

There is little reason to continue the fiction that the rotenone formulations being used in these stream poisoning project are "natural" (para. 3, p.2). Nor should you attempt to downplay the impacts to non-target species by saying that rotenone is "especially toxic to fish." Rotenone in water is harmful to all organisms that obtain oxygen from water. Nowhere in this NPDES can the public see the chemical formulations of the products being used. And since when are solvents, dispersants and emulsifiers, etc. (unspecified) "inert" ingredients in clean water, so far as the aquatic organisms are concerned?

Amphibians have been omitted in the list of animals for which rotenone formulations will be toxic on p. 2, para. 4, but are included later on p. 4-5. Dr. Kathleen Matthews, USDA Pacific Southwest Experiment Station, who has studied mountain yellow-legged frogs in the Sierra for many years has stated that "unlike many frog species whose tadpole stages last but a few months, the mountain yellow-legged frog spends up to four years as a tadpole." She also said that even adults are highly aquatic compared to other amphibian species (2003, High Sierra Ecosystems, Science Perspectives, USDA Pacific Southwest Experiment Station). The claim that adult frogs "are not expected to be affected by the rotenone treatment" seems no more than a false hope.

The plan to capture by net and relocate amphibians in the project area is extremely unlikely to protect the amphibians. The CDFG claims it can not physically catch and remove even the fish it no longer wants. And there are far more proven methods for catching and removing fish than for adult frogs and tadpoles.

The mountain yellow-legged frog has been proposed for listing as an endangered species. It is present in the Silver King basin as are the Yosemite toad (also a candidate for listing) and the western toad (U.S. Fish and Wildlife Service, Draft Revised Recovery Plan for the Paiute Cutthroat Trout).

Other government documents concerning this project (all of which are incorporated here by reference) have stated that two treatments/year may be necessary, contrary to the statement on p. 3, para. 5.

Some of the past violations and human error on rotenone projects in the Lahontan Region over the past 15 or so years are summarized in exhibits a and i and were submitted to the Lahontan staff previously. They are from Lahontan Board files and from CDFG reports.

In conclusion, the Lahontan Board should **not** approve this permit. The Lahontan Board should instead instruct its staff to carefully analyze and present the evidence of adverse impacts in an open, honest, public forum, so that this Board can reconsider its earlier decision to allow rotenone use in the Lahontan Region. This Board and the public have been misled by CDFG. The impacts of rotenone are significant.

List of Exhibits:

Exhibit a. **May 29, 2002,** To: Erick Walker, Project Coordinator, Humbolt-Toiyabe National Forest, Carson Ranger District, Paiute Cutthroat Trout Recovery Project/ poisoning parts of Silver King Creek and Tamarack Lake/ Carson-Iceberg Wilderness: **Scoping comments.**

Exhibit b. **June 12, 2002.** To: Dr. Sonke Mastrup, Deputy Director, Department of Fish and Game. Comments on CA Department of Fish and Game (CDFG) **Negative Declaration and Request for information under the CA Public Records Act**: Paiute Cutthroat Trout Recovery Project/Rotenone poisoning/ Silver King Creek, its tributaries, and Tamarack Lake/ Carson-Iceberg Wilderness/ Humboldt-Toiyabe National Forest. (Exhibits included except where they overlap with other exhibits already in the record.)

Exhibit c. **June 13, 2002.** To: Laurie Sada, U. S. Fish and Wildlife Service, **Transmittal letter to FWS** of comments to CDFG.

Exhibit d. **August 31, 2002.** To: Gary Schiff, District Ranger, Carson Ranger District, Humboldt-Toiyabe National Forest. Paiute Cutthroat Trout Recovery Project/ poisoning parts of Silver King Creek and Tamarack Lake/ Carson-Iceberg Wilderness: **Comments on Environmental Assessment** (Exhibits included except where they overlap with other exhibits already in the record.)

Exhibit e. **September 2, 2002**. To: Gary Schiff, District Ranger, Carson Ranger District, Humboldt-Toiyabe National Forest. **Transmittal letter and request for information.**

Exhibit f. **September 2003, Lawsuit** filed in US District Court to force US Forest Service to complete an EA on Silver King poisoning. Center for Biological Diversity and Nancy A. Erman, Plaintiffs. Jack Troyer and Gary Schiff, USDA Forest Service, Defendents. Julia A. Olson and Melissa Powers, attorneys. Case No.: Civ-S-03-1756 GEB (PAN) **All documents incorporated here by reference.**

Exhibit g. **January 7, 2004**, To: Jim Harvey, Project Coordinator, Humboldt-Toiyabe National Forest. **Letter requesting information on Scoping status of 2004 EA** and new issues raised.

Exhibit h. **February 23, 2004**, To: Supervisor Robert L. Vaught, Humboldt-Toiyabe National Forest. **Letter protesting lack of date specified for comments on EA.**

Exhibit i. **March 10, 2004**. To: Jarma Bennett, Division of Water Quality, State Water Resources Control Board. **Comments: Draft Statewide General National Pollutant Discharge Elimination System (NPDES) Permit** for the Discharge of Aquatic Pesticides for Aquatic Weed and Pest Control in Waters of the United States.

Exhibit j. **March 12, 2004**. To: Jim Harvey, Humboldt-Toiyabe National Forest. Paiute Cutthroat Trout Recovery Project/ poisoning parts of Silver King Creek and Tamarack Lake in the Carson-Iceberg Wilderness Area, Alpine County, CA: **Comments on Environmental Assessment.** (Exhibits included except where they overlap with other exhibits already in the record.)

Exhibit k. **March 20, 2004**. To: Robert Williams, Field Supervisor, Nevada Fish and Wildlife Office, U.S. **Fish and Wildlife Service. Comments on the Draft Revised Recovery Plan** for the Paiute Cutthroat Trout (*Oncorynchus clarki seleniris*).

Exhibit l. **June 19, 2004**. To: Appeal Deciding Officer, Chief of the Forest Service, USDA Forest Service. **Appeal of the Decision Notice and Finding of No Significant Impact** for the Paiute Cutthroat Trout Recovery Project in Silver King Creek on the Humboldt-Toiyabe National Forest, Carson Ranger District, USDA Forest Service, Alpine County, California. (Exhibits included except where they overlap with other exhibits already in the record.)

Notice

Submittal of Written Material for Regional Board Consideration:

In order to ensure that the State of California Lahontan Regional Water Quality Control Board has the opportunity to fully study and consider written material, it is necessary to submit it at least ten (10) days before the Regional Board Meeting. Pursuant to Title 23 of the California Code of Regulations, Section 648.2, the Regional Board may refuse to admit written testimony into evidence unless the proponent can demonstrate why he or she was unable to submit the material on time or that compliance with the deadline would otherwise create a hardship. If any other party demonstrates prejudice resulting from admission of the written testimony, the Regional Board may refuse to admit it.

COMPLETE FORM AND RETURN

TO: CA Regional Water Quality Control Board, Lahontan Region (Jason Churchill)
2501 Lake Tahoe Blvd.
South Lake Tahoe, CA 96150

SUBJECT: Comments on tentative NPDES Permit for **SILVER KING CREEK PAIUTE CUTTHROAT TROUT RESTORATION PROJECT, ROTENONE TREATMENT**

*Comments & exhibits were mailed separately to Harold Singer

_____ We concur with proposed requirements

_____ We concur; comments attached

__✓__ We do not concur; comments attached*

Nancy A Simon, Don C Erman (Sign)

_____ (Type or print name)

_____ (Organization)

43200 E. Oakside Pl. (Address)

Davis, CA 95616 (City and State)

530/ 758-1206 (Telephone)

JJC/dcT: rotenone tent ltr

~~Exhibit A~~

To: Erick Walker, Project Coordinator
Carson Ranger District
1536 S. Carson Street
Carson City, NV 89701

May 29, 2002

Exhibit a
for Lahontan
RWQCB
Aug. 5, 04

From:
Nancy A. Erman Nancy A Erman
Specialist emeritus: aquatic ecology/freshwater invertebrates
University of California
43200 E. Oakside Place
Davis, CA 95616
naerman@ucdavis.edu

Re: Paiute Cutthroat Trout Recovery Project/ poisoning parts of Silver King Creek and Tamarack Lake/ Carson-Iceberg Wilderness: Scoping comments

Please add my name to all further environmental documents concerning this proposal to poison Silver King Creek and tributaries in an effort to expand the range of Paiute cutthroat trout. I had been assured by the California Department of Fish and Game (CDFG) that I would be notified when the scoping process began this spring (Exhibit 1). I have received no notice from CDFG. It appears from the US Forest Service (USFS) scoping document dated April 30, 2002, that public scoping meetings involving three agencies — CDFG, USFS, and US Fish and Wildlife Service (USFWS) — have already occurred. I learned by accident that this USFS scoping document had been released. I contacted the USFS by e-mail on May 21, 2002, and learned that comments were due to be postmarked by May 30, 2002.

Why is the CDFG preparing a CEQA document separate from the NEPA document of the USFS? The issues of agency responsibilities are too intertwined to be dealt with separately. One agency is responsible for a recovery plan under the Endangered Species Act (USFWS), another agency is responsible for the habitat under consideration (USFS), a third agency is responsible for the poison application and the fish, and a fourth agency is responsible for water quality (Lahontan Regional Water Quality Control Board (Lahontan RWQCB).

An joint environmental impact statement/environmental impact report (EIS/EIR) should be prepared for this project for the following reasons:

1) Rotenone kills all gill-breathing animals, not just fish. Studies have shown that some invertebrate taxa are eliminated permanently from an area after applications of rotenone and other piscicides. An area in which an endemic species of fish has evolved is also an area in which other endemic species would have been likely to evolve. Headwater tributaries have a high probability of containing endemic invertebrate and amphibian species. The

USFS has an obligation to protect all native species and especially in wilderness areas.

Without a pre-project inventory at the species level it is impossible to know what species may be at risk from piscicide treatments. It is missing the point to use the Endangered Species Act in efforts to restore one species while putting other species at risk of extinction.

An EIS/EIR should review all published literature and unpublished agency reports that show evidence of loss of non-target organisms from piscicide treatments. New information exists that was either not used or was not known at the time the Programmatic EIR on Rotenone Use for Fisheries Management (State of California) was written by the CDFG in 1994.

2) Rotenone applications can be unpredictable and there are known and potentially significant environmental risks and impacts (for an example, see Exhibit 2).

3) In the Lahontan Region, 6 of 11 projects since 1988 have violated water quality standards (Exhibit 3). Rotenone, rotenolone, or naphthalene have been detected downstream or have persisted longer than limits established in Basin Plans; and in one case an unexpected fish kill, believed due to potassium permanganate toxicity, occurred below project boundaries.

4) During application of rotenone in Silver Creek, Mono County, in 1994, independent testing by the Regional Water Quality Control Board found carcinogenic compounds in water (Exhibit 4). In contrast, testing by CDFG at the same sites found no detectable carcinogenic compounds.

5) Rotenone was detected in sediment during a CDFG project in Silver Creek, Sept., 20, 1995 (Exhibit 5). CDFG was well over their target application rate of rotenone, with data apparently missing at a critical period (Exhibit 5, Table 1).

6) Rotenone and its breakdown products have persisted in water for long periods after CDFG poisoning projects (Exhibits 6 and 7).

7) In a previous rotenone poisoning of Silver King Creek by CDFG in 1992, approximately 1000 fish were inadvertently killed below the project boundary (Exhibit 8). Potassium permanganate used to detoxify rotenone and application of rotenone in water that was too cold were thought to be major reasons for fish kills. The EIS/EIR should discuss temperature criteria to be used for this project.

8) An EIS/EIR should discuss the history of rotenone poisoning in Silver King Creek, its successes and failures.

9) CDFG staff have apparently tried to prevent water quality monitoring by other agencies on past occasions (Exhibit 8). This history does not bode well for a project that is supposed to be cooperative.

What are the plans for water quality monitoring by an independent agency for this project? Will the Lahontan RWQCB be involved in monitoring?

10) A Memorandum of Understanding is supposed to exist between the CDFG and the Lahontan RWQCB that would require CDFG to submit certification of restoration of beneficial uses for completed rotenone projects, among other things. According to a memo dated June 17, 1998, the CDFG had not lived up to its part of the agreement for several rotenone projects done in the 1990s (Exhibit 9). The USFS should review the current status of that agreement as part of the EIS process. If the CDFG has not lived up to past agreements, how can the USFS rely on assurances of monitoring and mitigation from that agency? How could the Lahontan RWQCB approve this project if the MOU has not been fulfilled?

11) An EIS/EIR should re-draw the map given at the end of the scoping document. The new map should note exact sections to be poisoned and where rotenone will be applied. The present map is not easily understood. Indicate present Paiute cutthroat occurrence and potential habitat. The new map should indicate parts of the watershed that have been poisoned by past CDFG projects.

12) An EIS/EIR should include the Technical/Agency Draft Revision of the Recovery Plan currently under internal USFWS review that is discussed on page 1 of the USFS scoping document.

13) One of the three objectives of the Recovery plan as stated in the scoping document is to assure "the integrity of the habitats in the Silver King Creek drainage, Cottonwood Creek, and Stairway Creek has been secured and maintained over a consecutive five-year period."

An EIS/EIR should discuss why it is considered good management to plant the Paiute cutthroat trout in non-native habitat (North Fork of Cottonwood Creek, Inyo National Forest and Stairway and Sharktooth Creeks, Sierra National Forest). What other species, including species other than fish, are being threatened in these habitats just as rainbow trout and Lahontan cutthroat trout threaten Paiute cutthroat trout in its native habitat? How can the "integrity of habitat" be assured if a non-native fish has been planted there? Habitat for whom, for what species?

14) An EIS/EIR should review the literature, both published and unpublished agency reports, that indicate that non-native fish are a threat to other species of organisms such as amphibians and invertebrates.

15) An EIS/EIR should discuss how the agencies involved intend to prevent the re-introduction of non-native fish species after the poisoning has been completed.

Education occurs by example. For decades, the CDFG and USFWS have been teaching the public that fish planting of non-native species is a good thing. What are the plans to re-educate the public now?

How will you teach why it's legal for CDFG to poison streams and plant non-native species, but not legal for the public to do it?

The CDFG runs public outreach programs that provide schools and other groups with fish eggs to rear and plant in streams. The recent letter, enclosed here as Exhibit 10, documents the legitimate (I assume) planting of fish hatchery eggs by well-meaning citizens in a Wild Trout-designated section of the North Yuba River. What is to prevent people from obtaining fish eggs and planting them in Silver King Creek following the rotenone poisoning?

16) I have heard recently from CDFG staff that CDFG may use a new, experimental formulation of rotenone in future projects. Is that true in this case? If so, an EIS/EIR would be required to discuss this untested formula.

17) Recent studies (November 2000) have shown that rotenone is linked to Parkinson's disease (Exhibit 11). An EIS/EIR should discuss this new information.

18) The statement in the scoping document that "the project will be relatively short in duration, lasting less than one week" is incorrect not only in the context of the document itself which states elsewhere that poisoning will be repeated for three years and that poisoning may occur more than once in Tamarack Lake, but also in light of the many possible longer-term impacts evident from similar past projects listed above.

Further, changes in quality and quantity of non-target species will occur because of the poisoning. These losses will also lead to changes in food supply for other species, both aquatic and terrestrial. If non-target, endemic species become extinct because of the project, the impacts will be permanent.

19) There appear to be at least four different state and federal agencies preparing documents for this project. At this stage it is impossible to tell how or if agencies are co-ordinating their efforts. There are too many issues here with possible far-reaching impacts to be dealt with in this piecemeal fashion. A combined EIS/EIR should be prepared.

State of California - The Resources Agency
GRAY DAVIS, *Governor*

DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

(916) 653-4207

Exhibit 1

March 21, 2002

Ms. Nancy A. Erman
43200 East Oakside Place
Davis, California 95616

Dear Ms. Erman:

Mr. Robert Hight, the Director of the Department of Fish and Game (Department), forwarded your recent letter to me for a response. This response is in addition to the one you received from our Office of the General Counsel.

Your letter invokes Public Resources Code section 21092.2, and requests notice under the California Environmental Quality Act ("CEQA") of all projects currently underway or those planned during the next five years that use rotenone or other piscicides in streams or lakes. You specifically seek such notice for projects in the Golden Trout Wilderness and Silver King Creek.

The Department has not approved and is not presently carrying out any project in California that involves the application of rotenone or other piscicides in a lake or stream. The Department is, however, in the preliminary stages of evaluating a possible chemical treatment in a limited reach of Silver King Creek in Alpine County to protect and restore a population of Paiute cutthroat trout. This project is currently in the planning and environmental documentation phase by staff in our Sacramento-Central Sierra Region, which is headquartered in Rancho Cordova. We understand that Regional staff anticipate holding public meetings later this Spring, with the treatment planned for this Fall, at the earliest. Pursuant to your letter, we will add your name to the CEQA mailing list for this project.

In closing, we appreciate your continued interest in the Department's efforts to restore native trout populations in California, as well as your concerns regarding the appropriate use of chemical treatments to further that goal. In that regard, if you have any questions or need additional information on this issue, please contact Mr. Gene Fleming, Chief of the Department's Fisheries Programs Branch, at the letterhead address.

Sincerely,

Sonke Mastrup

Sonke Mastrup
Deputy Director

cc: Mr. Banky Curtis, Regional Manager
Sacramento-Central Sierra Region

Conserving California's Wildlife Since 1870

Exhibit 2

Rare native fish found in Utah, then poisoned by mistake

A project launched by the Utah Division of Wildlife Resources to protect a recently discovered population of rare native trout killed almost every fish in the stream instead. The fish, located in Parley's Creek close to Salt Lake City, were believed to be pure Bonneville cutthroat trout, one of only two varieties of trout native to Utah, and candidates for listing under the Endangered Species Act.

Wildlife officials were attempting to rid a creek upstream of introduced rainbow trout by poisoning the water with rotenone. Rainbows and other non-native trout interbreed with Bonneville cutthroats and are the chief reason the native now occupies less than 1 percent of its former range.

Division staffers were unaware that anything had gone wrong until they were informed by a member of a local fishing club. Paul Dremann, conservation chairman of the Stonefly Society, went to the site Nov. 1 to check on the project.

"The whole stretch was strewn with dead fish," says Dremann. "My reaction was dismay and tremendous anger." Dremann then informed Charlie Thompson, a state fisheries biologist in charge of the project.

"I feel pretty bad about it," says Thompson. "They were really pretty fish."

Thompson says cold weather may have caused the rotenone to maintain its toxicity longer than expected. He also says other chemicals used to neutralize the rotenone may have killed the fish.

"I don't know what could have been done differently," Thompson says. Levels of the poison were kept far below recommended doses, and monitoring stations were carefully watched, he adds. "We worked so darn hard to make sure everything went right."

Critics say that is precisely the problem. Even with the best-laid plans, rotenone can be unpredictable. "It's a crap shoot," says Dremann. "This is a glaring example of how you can plan carefully and it can still go wrong."

Rotenone has killed the wrong fish before. A project on Utah's Fremont River in 1991 killed aquatic life along a 35-mile stretch of the river, including sections that flowed through Capitol Reef National Park. In 1990, 18,000 fish were killed in streams leading to Idaho's Salmon River. Perhaps the most infamous case of rotenone gone wrong occurred in 1962 when 430 miles of the Green River were poisoned, including sections in Dinosaur National Monument.

Rotenone kills fish as well as macro invertebrate species such as caddis flies and stoneflies. It can also kill amphibians in early stages of development. Since the Parley's Creek fish kill, Zach Frankel, director of the Utah Rivers Conservation Council, thinks a moratorium on using rotenone makes sense because the poison is unpredictable. Utah officials acknowledge the problems but say it is the most effective tool they have to control non-native fish. "There's no other way," says Thompson, since alternatives such as electroshocking are ineffective, time-consuming and expensive.

Discovery of the Parley's Creek cutthroats last year had astonished state biologists. They believed that most of Utah's native fish were holding out in remote streams, but the creek winds through a golf course and is not far from Interstate 80, just a 10-minute drive from Salt Lake City.

Two days after the discovery of the accident, wildlife officials found one small Bonneville cutthroat still alive in Parley's Creek. They hope it indicates more fish may have survived.

—Jeff Rice

The writer works out of Salt Lake City, Utah.

Exhibit 3

Recent rotenone treatments in the Lahontan Region

1988 Upper Truckee River (Alpine Co.), **rotenolone persistence in Meiss Lake**

1988 Mill Creek (Mono Co.), no problems detected

1989 Upper Truckee River, **rotenone detected downstream of project** (4.5, 6.8, 8.6 ppb) DFG proposed 4 measures to prevent future occurrences (1. detox staffed at all times 24 hrs after rotenone, 2. detox at first sign of stress, 3. detox min. 24 hrs past cessation of stress for 4 hr period, 4. cages @ detox, 15 & 30 min travel time to judge need for detox)

1989 Mill Cr., no problems detected

1990 Basin Plan amendments and MOU (6/90)

1990 Upper Truckee River, **rotenone detected downstream of project** (2.0, 2.5 ppb); DFG proposed (12/14/90) to use dye to indicate need to begin detox

1991 Wolf Cr. (Mono Co.), **rotenone and rotenolone detected inside project boundaries after two-week limit established in Basin Plan** (treatment date = 8/26/91; on 9/10/91 rotenone = 9.3 ppb, rotenolone = 17.0 ppb); DFG proposed to conduct any future lake treatments earlier in the summer when water temperatures are higher

1991 Silver King Cr. (Alpine Co.), no problems detected

1992 Wolf Cr., no problems detected

1992 Silver King Cr., **unexpected fish kill below project boundary** (DFG estimated 600 fish larger than 6 inches; USFS estimated at least 1,000 fish total); DFG believed fish kill due to potassium permanganate toxicity and proposed to: (1) restrict back-to-back treatments, (2) monitor permanganate residuals, (3) treat as early in year as possible, and (4) to keep written records of formula and flows

1993 Silver King Cr., **rotenone detected downstream of project** (2.2, 3.4, 4.0, 6.6, and 21 ppb); **naphthalene detected downstream of project at concentrations exceeding Basin Plan objective of 25 ug/L** (36 ppb); DFG believes problems due to low water temperatures and proposed to conduct flowing water treatments only when water temperature exceeds 5°C

1994 Silver Creek (Mono County), no problems detected

State of California -2- Exhibit 4

Memorandum

Date: November 8, 1994

To: Brian Finlayson, Chief
Pesticide Investigations Unit
California Department of Fish and Game
1701 Nimbus Road, Suite F
Rancho Cordova, CA 95670

Ranjit S. Gill

Ranjit S. Gill, Ph.D., Chief
Planning and Toxics Unit

From: *California Regional Water Quality Control Board*
Lahontan Region
2092 Lake Tahoe Boulevard
South Lake Tahoe, California 96150
(916) 542-5400 Fax (916) 544-2271

Subject: RESULTS OF RWQCB MONITORING DURING CDFG ROTENONE APPLICATION AT SILVER CREEK (MONO COUNTY), AUGUST 1994

This memo transmits the results of our water quality monitoring during the above-referenced project. All samples were collected on August 23, 1994. Enclosed are copies of the laboratory data sheets. Below is a summary of the results. Please call Tom Suk at (916) 542-5419 if you have any questions regarding this information.

Samples analyzed for rotenone

1. At CDFG monitoring station #104, 12:20 hrs
   rotenone = ND

2. At downstream project boundary (30-min. travel time), 14:50 hrs
   rotenone = ND

3. Method/travel blank, 15:15 hrs
   rotenone = ND

4. At downstream project boundary (30-min. travel time), 19:10 hrs
   rotenone = ND

Samples analyzed for volatile organic compounds

1. Travel blanks
   ND for all EPA 601/602 compounds

2. At approx. 20 feet downstream of drip station #5.5, 13:05 hrs
   trichloroethene (TCE) = 0.90 ug/l, (duplicate = 0.77 ug/l)
   xylenes = 1.4 ug/l, (duplicate = 1.3 ug/l)
   (Note: CDFG duplicate was ND for all EPA 601/602 compounds.)

3. At approx. 150 feet downstream of drip station #5.5, 13:20 hrs
   xylenes = 0.88 ug/l, (duplicate = 0.62 ug/l)
   (Note: CDFG duplicate was ND for all EPA 601/602 compounds.)

4. At downstream project boundary (30-min. travel time), 14:55 hrs
   ND for all EPA 601/602 compounds

5. At Silver Cr. just above confluence w/ West Walker River, 19:00 hrs
   ND for all EPA 601/602 compounds

TS/sh8-finlaysn

Exhibit 5

STATE OF CALIFORNIA
DEPARTMENT OF FISH AND GAME

PESTICIDE LABORATORY REPORT

1701 Nimbus Road, Suite F
Rancho Cordova, California 95670

Lab No. P-1760

E.P. No. _____

Date Received Sept. 1995
Sample water, sediment

To : Mr. Tom Suk
California Regional Water Quality Control Board: Lahontan Region
ADDRESS: 2092 Lake Tahoe Blvd. #2
South Lake Tahoe, California 96150-6405

Report Date 11/16/95

Remarks

Results of surface water and sediment monitoring for residues of rotenone, rotenolone and other organic compounds in Silver Creek and the West Walker River, Mono County, California.

RESULTS OF EXAMINATION

Background

Silver Creek and its minor tributaries were treated with Nusyn-Noxfish®, a commercial formulation of rotenone, by drip stations and hand spraying on September 20, 1995. Approximately 6.5 gallons of the rotenone product was applied to the creek system during the entire project. The target application rate was 1.0 mg/L Nusyn-Noxfish®.

On September 20, 1000 hours, the application of rotenone was initiated in the stream system. The rotenone application continued until 1330 hours, September 20. The potassium permanganate detoxification station was operational by 0900 hours. The location of the detoxification station was upstream of the Highway 108 overcrossing. Caged bioassay fish placed immediately upstream of the detoxification station did not show signs of rotenone toxicity until 1215 hours. Potassium permanganate was metered into the creek at a resultant concentration of 3 mg/L beginning at 1000 hours September 20.

continued

PESTICIDE INVESTIGATIONS UNIT
ENVIRONMENTAL SERVICES DIVISION

By _____
Joel Trumbo
Environmental Specialist

Detoxification was begun after conductivity readings detected the presence of salt that was put into the stream at the drip station site upstream ofthe detoxification site. The salt had been put into the creek approximately one hour prior to the introduction of rotenone into the creek at that drip station. Detoxification was continued until 1545 hours September 21. Detoxification was stopped after two flow thru times for the entire project area had elapsed. The potassium permanganate flow into the creek was checked every two hours during the detoxification process.

Monitoring Results

1) Water Quality:

Water temperatures in the drainage varied from 9 to 16°C daily. The pH, taken at four locations along the creek, varied from 7.32 to 7.62. Alkalinity varied from 16 to 31 mg/L $CaCO_3$.

2) Rotenone and Rotenolone Residues At Sites 102, 101 and 100

Table 1 lists the concentrations of rotenone and its primary breakdown product, rotenolone, that were detected in surface water at one sampling site (Site 102) located upstream of the potassium permanganate detoxification station and two other sampling sites (Sites 101 and 100) located downstream of the potassium permanganate detoxification station. Samples were taken before, during and after the application of Nusyn-Noxfish^R. (For a description of these sampling sites and a map of the project area, please refer to Appendices A and B).

No rotenone or rotenolone residues were detected in water or sediment downstream of the detoxification station at Sites 101 and 100 (Table 1). Rotenone concentrations as high as 44.0 µg/L were detected upstream of the detoxification station at Site 102 (Table 1). Residues of rotenolone, the primary breakdown product of rotenone, ranged from <2.0 to 8.80 µg/L at Site 102.

A sample for rotenone/rotenolone analysis was taken at Site 102 at 1645 hours, September 21 (one hour after detoxification with potassium permanganate had been discontinued). A rotenone residue of 2.20 µg/L was detected in this sample; residues of rotenolone were not detected. A sample was taken at Site 100 (downstream of the detoxification station) at 1800 hours (one hour and 15 minutes after detoxification had been discontinued). Analyses of this sample revealed no detectable residues of rotenone or rotenolone (minimum detection limit = 2.0 µg/L).

Analyses of water samples taken on September 28 (7 days after treatment) revealed no residues of rotenone or rotenolone (minimum detection limit = 2.0 µg/L) at any sampling site.

3) Rotenone and Rotenolone at Site 103

Table 2 lists the concentrations of rotenone and rotenolone that were detected in surface water samples that were taken at Site 103. These samples were taken in order to determine if the target concentration of 25.0 µg/L rotenone (1.0 mg/L Nusyn-Noxfish®) had been achieved within the project area. Analysis of the samples taken at Site 103 indicate that an average concentration of 30.75 µg/L rotenone was maintained for more than 6.5 hours on September 20.

4) Rotenone and Rotenolone in Silver Creek Sediment:

Sediment samples were taken upstream (Site 102) and downstream (Site 100) of the potassium permanganate detoxification station before and after the application of Nusyn-Noxfish®. Analysis of a post-treatment sample taken upstream of the detoxification station at Site 102 on September 21 detected a rotenone residue of 37.0 µg/Kg (Table 1). No rotenone or rotenolone residues were detected in sediment samples taken downstream of the detoxification station at Site 100. No rotenone or rotenolone residues were detected in sediment samples taken from Sites 102 and 100 on September 28, one week following the application date.

5) Other Organic Compounds in Silver Creek:

Surface water samples were taken to determine the concentration of the non-rotenoid, organic constituents of Nusyn-Noxfish® present in Silver Creek. These compounds include: naphthalene, methyl naphthalene, xylene and trichloroethylene. Water samples were taken before, during and after the treatment period. Samples were analyzed for volatile and semivolatile organic compounds (Table 3).

Analysis revealed no detectable residues of xylene and trichloroethylene at sampling sites upstream (Site 102) or downstream (Site 100) of the potassium permanganate detoxification station.

Naphthalene was detected downstream of the detoxification station (Site 100) at a concentration of 1.2 µg/L. However, a duplicate sample analyzed by a different, and more sensitive, analytical method failed to confirm the presence of this compound. (Please see the conclusions section for more information regarding this issue.) A second detection of naphthalene was found upstream of the detoxification station (Site 102) at a concentration of 9.2 µg/L. This detection was also unconfirmed by duplicate analysis using a more sensitive method. Both of these naphthalene detections occurred during the application period. Naphthalene was not detected at Site 102 or 100 after the application.

Methyl naphthalene was detected in one sample taken upstream of the detoxification station (Site 102) during the application period. Analysis of this sample revealed a concentration of 5.1 µg/L methyl naphthalene. Methyl naphthalene was not detected at Sites 102 or 100 after the application.

Please see Table 4 for a listing of the minimum detection limits for the analyses performed to detect naphthalene, methyl naphthalene, xylene and trichloroethylene in water.

Other organic compounds were detected in Silver Creek surface water. These compounds and their detected concentrations are as follows: anthracene (0.20 µg/L), benzo(a)anthracene (1.1 µg/L), chrysene (0.42 µg/L), fluorene (0.11 µg/L) and phenanthrene (0.84 µg/L). These compounds were all recovered from the same water sample that was collected on September 20 at Site 102. None of these compounds are known to be constituents of the Nusyn-Noxfish^{R} formulation. Subsequent samples taken at Site 102 on September 21 and 28 failed to detect the presence of these compounds. Please see Table 4 for a listing of the minimum detection limits for these compounds in water.

6) Other Organic Compounds in Silver Creek Sediment

No residues of naphthalene, methyl naphthalene, xylene or trichloroethylene~~xylene~~ were detected in sediment samples taken prior to and after the treatment period (Table 3). Please see Table 5 for a listing of the minimum detection limits for these compounds in sediment.

Analysis of a pretreatment sediment sample taken on September 11 detected 1,4-Dichlorobenzene at Site 102. This compound was detected at a concentration of 13.0 µg/Kg. This compound is not known to be a constituent of the Nusyn-Noxfish^{R} formulation. Subsequent samples taken at Site 102 failed to detect the compound.

Conclusions

1. Water sample analyses indicated that the target application rate of 25 µg/L rotenone was attained for this project. Analysis of samples taken at Site 103 revealed an average concentration of 30.75 µg/L for a 6.5 hour time period.

2. No rotenone or rotenolone residues were detected in water or sediment below the project boundary (Site 100) before, during or after the treatment.

3. Rotenone was detected in the final water sample taken at Site 102 at 1645 hours, September 21 (one hour after the discontinuation of potassium permanganate detoxification).

The low level of rotenone (2.2 µg/L) detected after the cessation of detoxification did not represent a biologically significant event.

The flow-thru time for the entire project area was measured at 12.5 hours. Using this 12.5 hour value, rotenone residues could have been eliminated from the project area as early as 0200 hours, September 21. Caged bioassay fish placed immediately upstream of the detoxification station, however, continued to show signs of stress until approximately 1400 hours. Detoxification remained in operation until 1545 hours, September 21. By 1545 hours, potassium permanganate had been applied into Silver Creek for more than two complete flow-thru periods.

A water sample was taken at Site 102 at 2220 hours, September 21 (more than six hours after the cessation of detoxification). No residues of rotenone or rotenolone were detected in this sample.

4. Concentrations of the non-rotenoid, organic constituents of Nusyn-Noxfish® (naphthalene, methyl naphthalene, xylene and trichloroethylene) in water and sediment were either below the level of detection or were below expected concentrations based on dilution.

Naphthalene was detected downstream of the project boundary (Site 100) on the day of application (September 20). EPA analytical method 502.2 was used in the analysis of this sample. The minimum detection limit (MDL) for naphthalene using method 502.2 is 0.5 µg/L. A duplicate sample was analyzed using EPA method 8310 (MDL 0.1 µg/L). The presence of naphthalene detected using EPA 502.2 could not be confirmed by this more sensitive analytical method.

5. Analysis of water and sediment samples taken seven days after the rotenone application, detected no residues of rotenone, rotenolone or any other formulation constituents of Nusyn-Noxfish®.

Table 1. Concentrations of rotenone/rotenolone detected in surface waters (ug/L) and sediment (mg/Kg, dry weight) of Silver Creek before, during, and after the application of Nusyn-Noxfish[R]. Nusyn-Noxfish[R] was applied on September 20, 1995. Silver Creek Rotenone Project 1995.

	SITE CODES		
COLLECTION DATE AND TIME[A]	100	101	102
9/11/95 (1530-1745)	ND[B]/ND SND[C]/SND	ND/ND	ND/ND SND/SND
9/20/95 (1200-1235)	ND/ND	ND/ND	7.9/ND
9/20/95 (1300-1320)	NS[D]	ND/ND	26.0/5.0
9/20/95 (1400-1420)	NS	ND/ND	ND/ND
9/20/95 (1500-1530)	ND/ND	ND/ND	44.0/8.8
9/20/95 (1600-1645)	ND/ND	ND/ND	32.0/6.4
9/20/95 (1700-1720)	NS	ND/ND	24.0/7.7
9/20/95 (1800-1820)	NS	ND/ND	18.0/5.2
9/20/95 (1900-1920)	NS	ND/ND	15.0/3.5
9/20/95 (2000-2030)	ND/ND	ND/ND	10.0/3.1
9/20/95 (2100-2125)	NS	ND/ND	7.9/ND
9/20/95 (2200)	NS	NS	12.0/5.0

Table 1: page 2.

COLLECTION DATE AND TIME	SITE CODES 100	101	102
9/21/95 (1330)	NS	NS	ND/ND
9/21/95 (1645-1800)	ND/ND SND/SND	NS	2.2/ND 37.0/SND
9/21/95 (2200)	NS	ND/ND	NS
9/28/95 (1600-1620)	ND/ND SND/SND	ND/ND	ND/ND SND/SND

[A] Collection time is indicated in parentheses

[B] ND indicates no residues detected ≥2.0 ug/L.

[C] When sediment samples were taken, the results of the analysis appear beneath the surface water results. For sediment samples, SND denotes that no residue ≥30 ug/Kg (dry weight) was detected.

[D] NS indicates that no water sample was taken.

Table 2: Concentrations of rotenone and rotenolone detected at Site 103 in surface waters on September 20, 1995 in Silver Creek. Nusyn-Noxfish® was applied on September 20, 1995. Silver Creek Rotenone Project 1995.

SAMPLING TIME	ROTENONE µg/L	ROTENOLONE µg/L
1130	17.0	2.1
1200	21.0	4.0
1230	33.0	4.8
1300	35.0	5.7
1330	34.0	4.8
1430	34.0	4.8
1530	26.0	4.3
1600	28.0	7.3
1630	33.0	8.4
1700	31.0	7.3
1730	43.0	10.0
1800	34.0	8.8

Table 3: Sample locations, collection dates and times, analysis type and concentrations of organic compounds[A]. Silver Creek Rotenone Project 1995.

COLLECTION DATE	TIME	TYPE[B]	NAPHTHALENE	METHYL NAPHTHALENE	XYLENE	TRICHLOROETHENE
SAMPLE LOCATION 100						
09/11/95	1745	SV	ND[C]	ND	ND	ND
09/11/95	1745	V	ND	ND	ND	ND
09/11/95	1745	S	ND[D]	ND	ND	ND
09/20/95	1645	V	1.2	ND	ND	ND
09/20/95	1645	SV	ND	ND	ND	ND
09/21/95	1800	V	ND	ND	ND	ND
09/21/95	1800	S	ND	ND	ND	ND
09/28/95	1620	SV	ND	ND	ND	ND
09/28/95	1620	V	ND	ND	ND	ND
09/28/95	1620	SV	ND	ND	ND	ND
SAMPLE LOCATION 102						
09/11/95	1700	SV	ND	ND	ND	ND
09/11/95	1700	V	ND	ND	ND	ND
09/11/95	1700	S	ND	ND	ND	ND
09/20/95	1715	SV	ND	5.1	ND	ND
09/20/95	1715	V	9.2	ND	ND	ND
09/21/95	1675	SV	ND	ND	ND	ND
09/21/95	1675	V	ND	ND	ND	ND

TABLE 3. PAGE 2.

COLLECTION DATE	TIME	TYPE[B]	NAPHTHALENE	METHYL NAPHTHALENE	XYLENE	TRICHLOROETHENE
SAMPLE LOCATION 102 (continued)						
09/28/95	1600	S	ND	ND	ND	ND
09/28/95	1600	SV	ND	ND	ND	ND
09/28/95	1600	V	ND	ND	ND	ND

[A] Analyses were focused on the detection of four organic compounds that are known constituents of the Nusyn-Noxfish[R] formulation; naphthalene, methyl naphthalene, xylene and trichloroethylene.

[B] Three types of analyses were performed: V = volatile, EPA Method 502.2; SV = semi-volatile, EPA Method 8310; S = sediment, EPA Methods 8010, 8020, and 8310.

[C] For volatile (V) and semi-volatile (SV) samples, ND denotes a sample where residues were less than 0.5 ug/L naphthalene, 0.2 ug/L xylene, 0.2 ug/L trichloroethylene and 2.0 ug/L methyl naphthalene.

[D] For sediment (S) samples, ND denotes a dry weight sample where residues were less than 20.0 µg/Kg naphthalene, 20.0 µg/Kg methyl naphthalene, 20.0 µg/Kg trichloroethylene and 10.0 µg/Kg xylene.

Table 4. Minimum detection limits (MDL) for organic compounds analyzed using E.P.A. Method 502.2 and 8310 for water. Silver Creek Rotenone Project, September, 1995.

EPA Method 502.2

CONSTITUENT	SAMPLE MDL (ug/L)
Benzene	0.5
Bromobenzene	0.5
Bromochloromethane	0.5
Bromodichloromethane	0.5
Bromoform	1.0
Bromomethane	4.0
n-Butylbenzene	0.5
sec-Butylbenzene	0.5
tert-Butylbenzene	0.5
Carbon tetrachloride	0.5
Chlorobenzene	0.5
Chloroethane	4.0
2-Chlorotoluene	0.5
4-Chlorotoluene	0.5
Dibromochloromethane	1.0
1,2-Dibromo-3-chloropropane	2.0
1,2-Dibromoethane	1.0
Dibromomethane	2.0
1,2-Dichlorobenzene	0.5
1,3-Dichlorobenzene	0.5
1,4-Dichlorobenzene	0.5
Dichlorodifluoromethane	8.0
1,1-Dichloroethene	0.5
1,2-Dichloroethane	0.5
cis-1,2-Dichloroethene	0.5
trans-1,2-Dichloroethene	0.5
1,2-Dichloropropane	0.5
1,3-Dichloropropane	0.5
2,2-Dichloropropane	1.0
1,1-Dichloropropene	0.5
Ethylbenzene	0.5
Hexachlorobutadiene	2.0
Isopropyltoluene	0.1
p-Isopropyltoluene	0.5
Methyl chloride	10
Napthalene	0.5
n-Propylbenzene	0.5
Styrene	0.5
1,1,1,2-Tetrachloroethane	0.5
Toluene	0.5
1,2,3-Trichlorobenzene	0.5

Table 4. page 2.

EPA METHOD 502.2

CONSTITUENT	SAMPLE MDL (ug/L)
1,2,4-Trichlorobenzene	0.5
1,1,1-Trichloroethane	0.5
1,1,2-Trichloroethane	0.5
Trichloroethane	0.5
Toluene	0.5
1,2,3-Trichloroethane	0.5
1,2,4-Trichlorobenzene	0.5
1,1,1-Trichloroethane	0.5
1,1,2-Trichloroethane	0.5
Trichloroethylene	0.2
Trichlorofluoromethane	0.5
1,2,3-Trichloropropane	0.5
1,2,4-Trimethylbenzene	0.5
1,3,5-Trimethylbenzene	0.5
Vinyl Chloride	0.5
1,3-Xylene	0.2
1,4-Xylene	0.2
1,2-Xylene	0.2
cis-1,3-dichloroproplene	0.5
trans-1,3-dichloroproplene	0.5

EPA METHOD 8310

CONSTITUENT	SAMPLE MDL (ug/L)
Acenaphthene	0.2
Acenaphthylene	0.2
Anthracene	0.1
Benzo(a)anthracene	0.1
Benzo(a)pyrene	1.0
Benzo(b)fluoranthene	0.2
Benzo(g,h,i)perylene	0.1
Benzo(k)fluoranthene	1.0
Chrysene	0.1
Dibenzo(a,h)anthracene	0.5
Fluoranthene	0.1
Fluorene	0.1
Indeno(1,2,3-c,d)pyrene	0.1
Napthalene	0.1
Phenanthrene	0.1
Pyrene	0.1
2-Methylnaphthalene	2.0
1-Methylnaphthalene	2.0

Table 5. Minimum detection limits (MDL) for organic compounds analyzed using E.P.A. methods 8010, 8020, and 8310 for sediment. Silver Creek Rotenone Project, September, 1995.

EPA METHOD 8010

CONSTITUENT	SAMPLE MDL (ug/Kg)
Bromodichloromethane	10
Bromoform	20
Bromomethane	100
Carbon tetrachloride	10
Chlorobenzene	10
Chloroethane	100
Chloroform	10
Chloromethane	100
Dibromochloromethane	20
1,2-Dichlorobenzene	10
1,3-Dichlorobenzene	10
1,4-Dichlorobenzene	10
1,1-Dichloroethane	10
1,2-Dichloroethane	10
1,1-Dichloroethylene	10
trans-1,2-Dichloroethylene	10
Dichloromethane	1
1,2-Dichloropropane	10
cis-1,3-Dichloropropylene	10
trans-1,3-Dichloropropylene	10
Methylene chloride	250
1,1,2,2-Tetrachloroethane	20
Tetrachloroethane	10
1,1,1-Trichloroethane	10
1,1,2-Trichloroethane	10
Trichloroethylene	10
Vinyl chloride	20
Trichlorofluoromethane	10

EPA METHOD 8020

CONSTITUENT	SAMPLE MDL (ug/Kg)
Benzene	10
Chlorobenzene	10
1,2-Dichlorobenzene	10
1,3-Dichlorobenzene	10
1,4-Dichlorobenzene	10
Ethyl benzene	10
Toluene	10
Xylenes	10

Table 5. page 2.

CONSTITUENT	SAMPLE MDL (ug/Kg)
Acenaphthene	40
Acenaphthylene	40
Anthracene	20
Benzo(b)anthracene	20
Benzo(a)pyrene	20
Benzo(b)fluoranthene	40
Benzo(g,h,i)perylene	20
Benzo(k)fluoranthene	40
Chrysene	20
Dibenzo(a,h)anthracene	20
Fluoranthene	20
Fluorene	20
Indeno(1,2,3-c,d)pyrene	20
Naphthalene	20
Phenanthrene	20
Pyrene	20
2-Methylnaphthalene	20
1-Methylnaphthalene	20

Appendix A: Site codes, location descriptions and sample types for monitoring sites for the Silver Creek Rotenone Project, Mono County California, 1995.

Site Code	Location Description	Sample Type
100	West Walker River at the 30 minute travel time mark downstream of the detox station	water, sediment and toxicity
101	Silver Creek immediately upstream of the confluence of the West Walker River at the 15 minute travel time mark downstream of the detox station	water
102	Silver Creek immediately upstream of the detox station	water, sediment and toxicity
103	Silver Creek at "cabin" meadow approximately 2.0 miles upstream of detox station	water

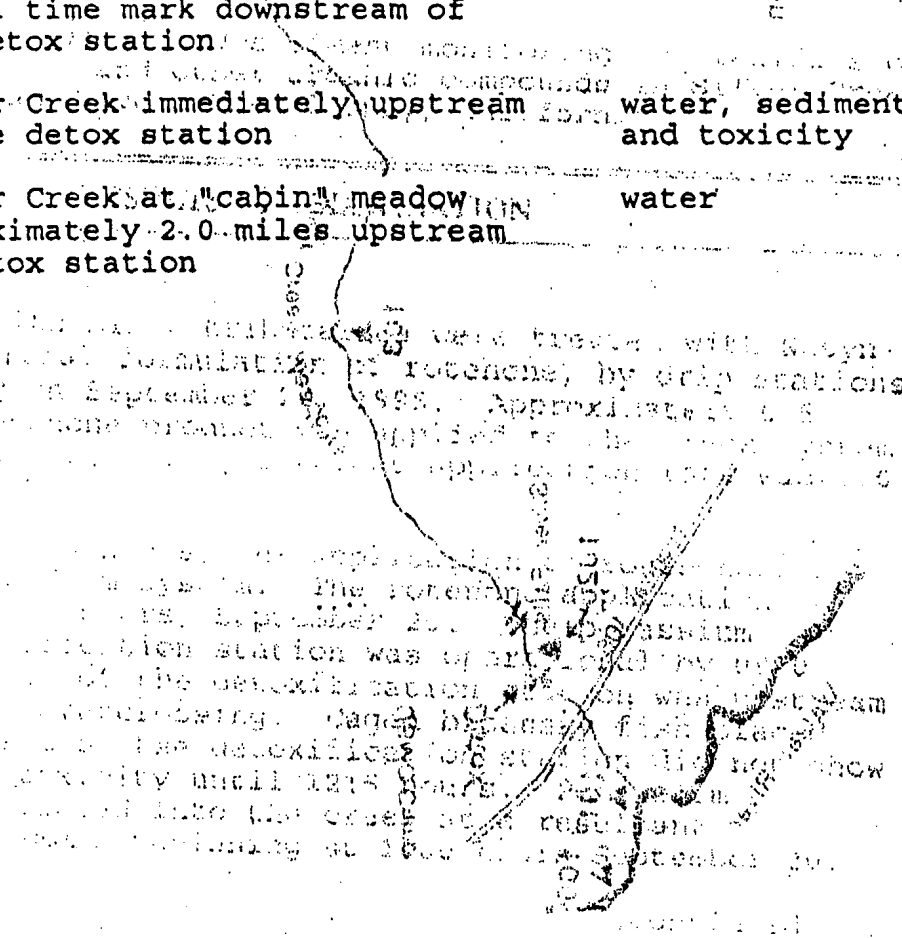
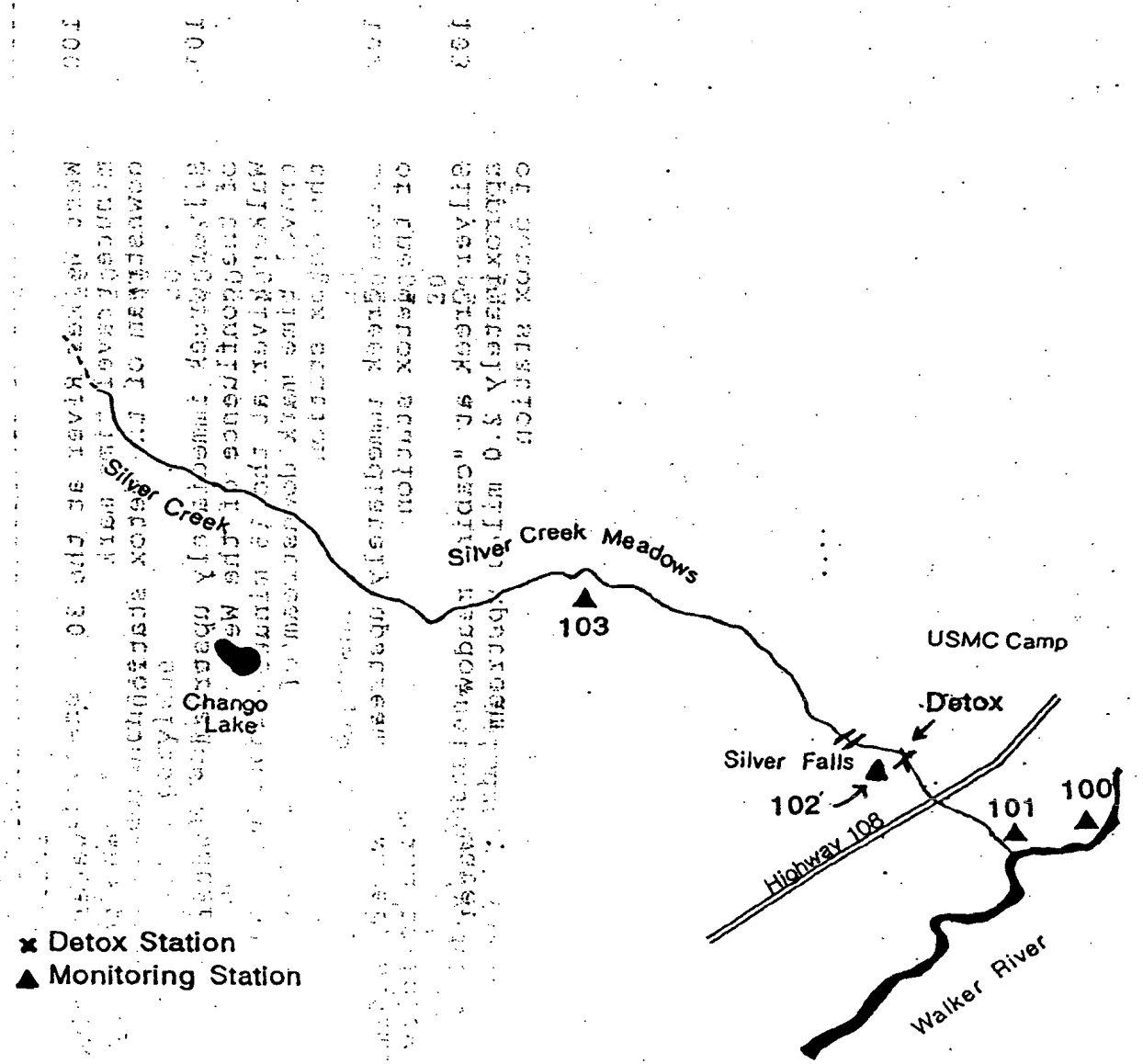


Figure 1. Monitoring locations for rotenone application to Silver Creek, Mono County, California.



State of California

Exhibit 6

Memorandum

To : Pete Bontadelli, Director
Department of Fish and Game
1416 Ninth St.
Sacramento, CA 95814

Date: October 21, 1991

Harold J. Singer

HAROLD J. SINGER
EXECUTIVE OFFICER

From : California Regional Water Quality Control Board
Lahontan Region
2092 Lake Tahoe Boulevard, Suite 2
South Lake Tahoe, California 96150
(916) 544-3481 FAX (916) 544-2271

Subject: PERSISTENCE OF ROTENOLONE AT WOLF CREEK LAKE FOLLOWING 1991 TREATMENT

The California Department of Fish and Game conducted a rotenone treatment of Wolf Creek, Mono County, on September 4, 1991. Monitoring results show that rotenolone is still persisting in Wolf Creek Lake at concentrations that are lethal to fish. Because rotenolone does not decompose readily in cold conditions, it is unlikely that this compound will dissipate during the coming cold season, and it will probably persist until next summer.

Wolf Creek Lake is at the headwaters of this watershed, which is a tributary to the West Walker River. We are therefore concerned about the possibility that rotenolone could be flushed out of the Lake and ultimately into the West Walker River during the Spring high flow period.

The persistence of rotenolone in Wolf Creek Lake is in violation of water quality objectives contained in the Lahontan Basin Plans. The objectives state that "after a two week period has elapsed from the date on which application [of rotenone] was completed, no chemical residues resulting from the treatment shall be detectable...".

DFG staff has raised the idea of detoxifying the rotenolone in the lake by addition of potassium permanganate. However, it is not clear that this approach would be effective, since we are not convinced that the permanganate can be well mixed into the lake. We are also concerned about the possibility of discoloration resulting from addition of permanganate. Obviously, if permanganate is applied, its use would need to be carefully moderated.

Wolf Creek Lake shall be brought into compliance as soon as possible. In order to assess the situation, we will need DFG to address the following questions:

1. What alternative measures can be taken to bring Wolf Creek Lake into compliance?

2. What assurances can DFG give that these measures will be effective, and will not create water quality problems of their own?

3. If no action is taken at this time, what is the likelihood that rotenolone will reach the West Walker River in the Spring? What would be the expected concentration? What impacts would result for such an occurrence?

4. Given the alternatives as discussed in the answers to the previous three questions, what course of action does DFG propose, and in what timeframe?

DFG shall submit the answers to these questions, and the basis for each response, within 10 calendar days of receipt of this memorandum. In addition, DFG shall submit a report within 60 days, that shall address the possible factors that contributed to this problem. This report shall also propose measures that can be taken to prevent a recurrence of this problem in future years and at other treatment sites.

Please call me or Robert S. Dodds at (916) 544-3481 if you have any questions.

cc: Ann Malcolm/DFG Legal Office
Bryan Finlayson/DFG Pesticides Investigation Unit

JCC/dm

State of California

Exhibit 7

Memorandum

To : Mr. Harold Singer, Executive Officer
California Regional Water Quality
Control Board
Lahonton Region
2092 Lake Tahoe Boulevard
South Lake Tahoe, California 95729

Date : November 13, 1991

From : Department of Fish and Game

Subject: Rotenolone in Wolf Creek Lake and Continued Monitoring

We concur with your November 1, 1991, request for continued monitoring of Wolf Creek Lake, Wolf Creek, and the West Fork of the Walker River. We are confident that Wolf Creek Lake will not spill until Spring 1992. We will begin the monthly monitoring on November 25, 1991.

As you are aware, rotenolone persisted for three weeks during 1988 in Meiss Lake. We believe rotenolone has a tendency to persist in cool (<50 degree F) alpine waters which contain little or no dissolved solids or nutrients. We suspect that rotenone is susceptible to photolysis but rotenolone is not. Some alpine waters such as Wolf Creek Lake may never be warm enough in some years to allow for the hydrolysis of rotenolone. Chemical detoxification with permanganate may be the only reliable, feasible alternative available in these waters. In the future, we may want to add permanganate several days after the rotenone treatment as a precaution. Fortunately, the number of such lakes requiring treatment is small.

We appreciate the assistance you and your staff have provided in resolving this matter. We, as you, don't wish to alter water quality for longer than is necessary.

Please call Mr. Brian Finlayson, Department of Fish and Game, Supervisor of the Pesticide Investigation Unit, 1701 Nimbus Road, Rancho Cordova, California 95670, telephone (916) 355-0136, if you need additional information, or clarification.

Howard A Sarasohn for
Pete Bontadelli
Director

cc: Mr. Brian Finlayson, PIU
Department of Fish and Game

Exhibit 8

MEMORANDUM

Cal/EPA

Lahontan Regional Water Quality Control Board

South Lake Tahoe Office

2501 Lake Tahoe Blvd.
South Lake Tahoe, CA
96150
(916) 542-5400

Pete Wilson
Governor

TO: James C. Pedri
Assistant Executive Officer

FROM: Ranjit S. Gill, Ph.D.
Chief, Planning and Toxics Unit
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—LAHONTAN REGION

DATE: December 1, 1997

SUBJECT: ROTENONE USE BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME—EXPERIENCES IN THE LAHONTAN REGION

Staff of the Lahontan RWQCB have been monitoring the use of rotenone by the California Department of Fish and Game (CDFG) since 1988. In 1990, our Board adopted amendments to the Water Quality Control Plan for the Lahontan Region ("Basin Plan") specific to rotenone use by CDFG. The most significant problem we have experienced due to rotenone use by CDFG was an unexpected fish kill at Silver King Creek in 1992.

It has been our experience that problems associated with rotenone use are related to two primary factors: (1) the use of potassium permanganate to detoxify rotenone, and (2) the application of rotenone when water temperatures are low.

Rotenone detoxification with permanganate. During the 1992 rotenone application at Silver King Creek (Alpine County), approximately 1,000 fish were inadvertently killed downstream of the CDFG's project area. After investigating the incident, CDFG staff concluded, and we concurred, that the fish kill was caused primarily by potassium permanganate ($KMnO_4$), a strong oxidant used to detoxify rotenone.

In response to the fish kill in 1992, CDFG staff began working on a colorimetric method to monitor $KMnO_4$ concentrations, so that the detoxicant residuals could be measured and $KMnO_4$ metered into creeks at levels calculated to prevent exceedances of target concentrations in downstream receiving waters. Mr. Brian Finlayson of CDFG informed us in early 1993 that CDFG would use this method to monitor $KMnO_4$ residuals for all future rotenone projects within the Lahontan Region.

My staff first observed the $KMnO_4$ monitoring method in use during a CDFG rotenone application at Silver King Creek (Alpine County) in 1993. Mr. Robert Fujimura of CDFG, under the direct supervision of Mr. Brian Finlayson, had developed and refined the method. During our conversations with Mr. Fujimura in 1993, he indicated that the method was working well, and that it was being used to adjust $KMnO_4$ application rates to achieve target concentrations.

CDFG staff have used the $KMnO_4$ monitoring methodology during all rotenone applications in our region since 1993, and CDFG staff have published a paper reporting on the successful development and refinement of the method (Parmenter and Fujimura 1995).

During the 1993 rotenone treatment at Silver King Creek (Alpine County), Mr. Brian Finlayson of CDFG objected to my staff being present and monitoring CDFG activities within the project area (public lands administered by the U.S. Forest Service). Mr. Finlayson went so far as to threaten the use of force to prevent members of my staff from conducting assigned water sampling duties. Although my staff's monitoring activities in no way interfered with CDFG's operations, Mr. Finlayson nonetheless summoned an armed warden in an attempt to forcibly remove my staff from the area. Fortunately, common sense prevailed, and the warden called to the scene informed Mr. Finlayson that there were no grounds upon which to take action against my staff, who had every right to be present and collect water samples within the project area. However, in view of such a stance by Mr. Finlayson, and because our Board had specifically requested that RWQCB staff monitor rotenone applications by the CDFG, both myself and our Executive Officer, Mr. Harold Singer, accompanied our technical staff during CDFG's 1994 rotenone project at Silver Creek (Mono County).

During the 1994 project, I personally observed the $KMnO_4$ monitoring method in use by staff from CDFG's Bishop office. We have an excellent working relationship with CDFG's Bishop staff, and they informed me that the $KMnO_4$ monitoring method seemed to be working very well. Again in 1995 my staff observed the $KMnO_4$ monitoring method in use by CDFG staff during a second rotenone application at Silver Creek. No problems were observed during our 1994-95 inspections, and all water quality samples collected during both the 1994 and 1995 treatments indicated that compliance with all water quality objectives had been achieved. CDFG again treated Silver Creek in 1996, however, due to other pressing priorities, my staff were not able to observe or monitor that project. Monitoring reports submitted by CDFG indicate that no problems occurred during the 1996 treatment.

Water temperature. Our monitoring of the CDFG's 1993 rotenone application at Silver King Creek detected two violations of our Basin Plan's objectives. Rotenone was detected downstream of project boundaries (the Basin Plan requires that rotenone be non-detectable below the 30-minute travel time), and naphthalene was detected at concentrations exceeding the Basin Plan's objective of 25 ug/L. CDFG staff concluded that those violations were due to low water temperatures, which can inhibit the degradation of rotenone as well as interfere with the oxidation of rotenone by $KMnO_4$. In response to these findings, Mr. Brian Finlayson agreed in a letter to me dated March 28, 1994 (copy enclosed) that CDFG would not apply rotenone to surface waters when the pesticide may reach streams that have a temperature at or below 5°C.

I hope that this information is helpful to you. Please call me at (530) 542-5426 if we can be of further assistance.

References

Parmenter, S.C., and R.W. Fujimura. 1995. Application and regulation of potassium permanganate to detoxify rotenone in streams. *Proc. of the Desert Fishes Council* 24:62-67.

State of California

Memorandum

MEMORANDUM

To : Ranjit S. Gill, Ph.D., Chief
Planning and Toxics Section
California Regional Water Quality Control Board
Lahontan Region
2092 Lake Tahoe Boulevard
South Lake Tahoe, California 96150

Date : March 28, 1994

From : Department of Fish and Game

Subject : Review and Comments on CDFG Pesticide Laboratory Report P-1638, dated February 1, 1994

Thank you for your correspondence dated March 11, 1994. Your staff's observations were discussed at our meeting in Sacramento on March 4, 1994. Our responses are enumerated according to your March 11, 1994, correspondence:

1. Rotenone was not applied on September 22, 1993, before the detoxification station was operational. The time given in our laboratory report for beginning the rotenone drip station at SK7 was in error. It was difficult to remember all of the activities which occurred six months before on September 22, 1993, but my field notes show that dye was added at approximately 0835 hours and the rotenone drip began at approximately 0845 hours at SK7 (however, rotenone application was planned to begin at 0800 hours). On that morning, we radioed to the detoxification station at approximately 0800 hours to determine if the station was operational. The staff at the detoxification station first radioed that it was operational and then, a few minutes later, radioed that the delivery system was not operational. I held up the addition of the dye until the detoxification station was operational. I added the dye myself at SK7, and I witnessed Mr. Pat O'Brien start the rotenone drip at SK7. An independent log kept at the detoxification station shows that the dye passed the station at approximately 0935 hours and that permanganate drip of 2.0 ppm rate was begun at approximately 0940 hours. This corresponds with my notes because the travel time between the two locations was about 0.9 hours. I wish your staff had brought this to my attention on September 22, 1993, so it could have been resolved at that time.

2. See answer to 1 above. We had the delivery system covered in a tent of aluminum foil and heated with a gasoline lantern to keep it operational during the nights of September 22 and 23, 1994.

Peter M. Rooney
Secretary for Environmental Protection

California Regional Water Quality Control Board
Lahontan Region

2501 Lake Tahoe Boulevard, South Lake Tahoe, California 96150
Phone (530) 542-5400 • FAX (530) 544-2271

Pete Wilson
Governor

Exhibit 9

TO: John Turner
California Department of Fish and Game
Office of Oil Spill Prevention & Response
P.O. Box 944209
Sacramento, CA 94244-2090

Harold

FROM: HAROLD J. SINGER
EXECUTIVE OFFICER
LAHONTAN REGIONAL WATER QUALITY CONTROL BOARD

DATE: June 17, 1998

SUBJECT: USE OF THE AQUATIC PESTICIDE ROTENONE IN THE LAHONTAN REGION

This memorandum is a followup to our June 12, 1998 phone conversation regarding deficiencies in the California Department of Fish and Game (DFG) commitments pursuant to the Memorandum of Understanding (MOU) between our agencies regarding use of the fish toxicant rotenone. Specifically, this office has not received required submittals regarding: (1) certification of restoration of beneficial uses for completed projects, and (2) DFG's efforts to promote reformulation of liquid rotenone products.

Certification of restoration of beneficial uses

Regarding the certification of restoration of beneficial uses for rotenone-treated water bodies, the Basin Plan states (in part):

> "Within two years of the last treatment for a specific project, a fisheries biologist or related specialist from the DFG must assess the restoration of applicable beneficial uses to the treated waters, and certify in writing that those beneficial uses have been restored. A project will be considered to have been completed upon written acceptance by the Regional Board's Executive Officer of such certification."

The MOU contains a similar requirement, which states:

> "Within two years of the last treatment date for a given project, the Department will send a qualified biologist to the project site to assess the condition of the treated waters and the condition of fish and invertebrate populations in those waters, and certify that beneficial uses have been restored."

A review of our files indicates that, to date, we have not received certifications of restoration of beneficial uses (or supporting documentation) for the following DFG rotenone projects within the Lahontan Region:

(1) Upper Truckee River, Alpine County (1988-90)
(2) Wolf Creek, Mono County (1991-92)
(3) Silver King Creek, Alpine County (1991-93)
(4) Silver Creek, Mono County (1994-96)

DFG efforts to promote reformulation of rotenone-containing pesticides

Regarding the requirement for DFG to actively promote reformulation of rotenone products, and to submit progress reports to the RWQCB, the Basin Plan states:

> "In addition to the active ingredient, liquid rotenone formulations also contain 'inert' ingredients (e.g., carriers, solvents, dispersants, emulsifiers), and may also contain, in trace amounts, organic contaminants. Such 'inert' ingredients and contaminants may include naphthalene, methylnaphthalene, xylene, acetone, trichloroethylene (TCE), benzene, and ethylbenzene...
>
> Benzene is a known human carcinogen. TCE is a known animal carcinogen, and a suspected human carcinogen. Concentrations of these compounds in rotenone-treated waters are expected to meet current drinking water standards. However, the Regional Board expects the DFG to make every reasonable effort to encourage the development of rotenone formulations containing less objectionable compounds, and to prepare annual progress reports...
>
> The Regional Board recognizes that allowing rotenone use may have unavoidable adverse impacts. Some of these impacts could be mitigated in the long-term through the discovery or development of formulations whose 'inert' ingredients (i.e., carriers, solvents, dispersants, and emulsifiers) have less objectionable properties, and which are free of objectionable contaminants. The DFG shall: (1) make every reasonable effort to encourage the development of such formulations, and (2) provide annual updates to the Regional Board (by December 31 of each calendar year) detailing DFG's progress and obstacles encountered during reformulation efforts."

The MOU contains a similar requirement, which states:

> "The Department will work with the U.S. Fish and Wildlife Service in developing more effective rotenone formulations will less objectionable 'inert' ingredients. The Department will provide annual updates to the Regional Board on these developments."

A review of our files indicates that we have not received the required annual progress reports for the last several years. Specifically, our review indicates that we have not received a report from DFG regarding its reformulation efforts since 1994.

Pete Wilson

I am concerned about the failure of your Department to submit technical information and progress reports required by the Basin Plan and MOU. The decision of the Lahontan RWQCB in 1990 to waive the requirement for submittals of reports of waste discharge and issuance of waste discharge requirements for DFG rotenone projects was based in part on DFG's commitment to submit the reports and certifications discussed above. I expect to receive the required submittals in a timely manner, without having to remind DFG staff of the provisions of the Basin Plan and MOU related to rotenone. I request that your Department submit all overdue submittals within thirty days, and that you direct your staff to provide future submittals in a timely fashion. I would appreciate a reply at your earliest opportunity.

Please call me at (530) 542-5412, or Tom Suk of my staff at (530) 542-5419, if you have any questions regarding this letter.

TS/shT:rotenone
[General: Rotenone]

Exhibit 10

Attaboy, Fish Folk

Editor:

On April 10, the Sierra County Fish and Game Commission obtained 25,000 Whitney Strain Rainbow Trout from the Mt. Whitney fish hatchery through the California Department of Fish and Game. These trout eggs were picked by Pete Bovinich and brought to Sierra City. The next day, several volunteers placed the eggs in special eggs boxes and planted the boxes in the river system between Sierra City and Downieville.

Those involved with the planting were; Dean Fischer, Mark Flatter, Tom Hunt, Terry Nuebert, Lowell Banks, Bill Reece, Ross Gordon, Russ Seavers, Fred Holmes and Duffy Dufrey. (Hopefully, we got everybody!)

The labors of the trout egg planting program have been evident in the Yuba River. The hearty strains of trout that have been planted by eggs are able to inhabit and survive in the North Yuba, and as bonus, are able to reproduce on there own. If you take the time to stand next to the waters edge, you will see the fingerlings (3/4" to 2" baby trout) swimming about in shallow water feeding on items in the water that we cannot see!

For all the effort, we say thanks to all the volunteers!

Sierra County F&G Commission

Research links organic pesticide, P

[redacted]andra Blakeslee
New York Times

NEW ORLEANS – An organic pesticide widely used on homegrown fruits and vegetables and for killing unwanted fish in the nation's lakes and rivers produces all the classic symptoms of Parkinson's disease in rats that receive steady amounts of the chemical in their bloodstreams, scientists said on Saturday.

While it is much too soon to say that the pesticide, rotenone, causes or contributes to Parkinson's disease in humans, the scientists said the finding was the best evidence thus far that chemicals in the environment may be factors in the devastating disease.

Their study, the first to implicate rotenone in Parkinson's disease, was described here on Saturday at a workshop on the neurobiology of disease, held in conjunction with the annual meeting of the Society for Neuroscience, the [redacted]n's largest gathering of brain [redacted]archers. The workshop, sponsored by the National Institute of Neurological Disorders and Stroke, involved work carried out by Dr. Timothy Greenamyre and colleagues at Emory University in Atlanta. The results of the study will be published in the December issue of the journal Nature Neuroscience.

"This is a very important new study," said Dr. William Langston, president of the Parkinson's Institute, a leading center for research and treatment of the disease in Sunnyvale. "It is the next major step in Parkinson's disease research."

Dr. John Q. Trojanowski, an expert on neurodegenerative diseases at the University of Pennsylvania School of Medicine in Philadelphia and the moderator of the workshop, said, "This is the best model we have ever had for this disease being associated with an environmental agent."

But he cautioned that the findings may not represent what anyone would experience in the real world." For one thing, the rats in the study were exposed to the chemical through their jugular veins, so it was not broken down or metabolized in the digestive system. Nor is it clear how much rotenone is required to produce disease.

The rats in the study received a dose of rotenone that is similar to the amount that people would receive if they ate a diet containing 10 to 20 parts per million of rotenone, a level that is commonly found on fruits and vegetables. But it is not known how much rotenone is required to produce disease in humans.

Moreover, the rats in the study received rotenone every day, while people would probably receive it only occasionally. Rotenone is rapidly broken down in the environment, and it is not known how much is required to produce disease in humans.

Nevertheless, the study is the first to show that rotenone can produce the disease in animals, and it is the first to show that rotenone can produce the disease in animals that develop in Parkinson's disease.

"When we examined their brains we saw that they had a progressive degeneration of the dopamine system that goes awry in Parkinson's," Greenamyre said. "It was extremely specific." And for the first time, scientists observed evidence of Lewy bodies.

But it remains to be seen if rotenone is a factor in human d[redacted]ease. Not everyone who uses [redacted]gets the disease.

It may be one of many toxi[redacted] that have to work in concert [redacted]fore Parkinson's develops in t[redacted] brain; rotenone alone may be re[redacted]tively harmless for people.

Moreover, people may vary [redacted] their susceptibility to roteno[redacted] and similar chemicals, s[redacted] Greenamyre.

Exhibit 11

H

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Not everyone who uses it
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Parkinson's develops in the
ı; rotenone alone may be rela-
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ıreover, people may vary in
susceptibility to rotenone
similar chemicals, said
namyre.

> "It is the next major step in Parkinson's disease research."
>
> Dr. William Langston
> president of the Parkinson's Institute, a leading center for treatment and research in Sunnyvale

results are "a major breakthrough" and "prompt us to look at how a lifetime exposure" to a chemical or combination of chemicals might actually lead to Parkinson's disease.

Rotenone is extracted f[redacted]he dried roots, seeds and l[redacted] of various tropical plants, including the Jewel vine, derris, custard apple and hoary pea. Like many plants that produce what are in effect their own pesticides, these plants apparently evolved to produce the compound as a way of warding off insects and other pests.

Rotenone is found in 680 compounds marketed as organic garden pesticides and flea powders, said Dr. Caroline Tanner, director of clinical research at the Parkinson's Institute. It is often sold as a white powder that is dusted onto roses, tomatoes, pears, apples and African violets, and even on household pets. It kills fire ants.

Because rotenone is naturally occurring, it is advertised as being safer than synthetic pesticides, she said. In addition, unlike many artificial pesticides, which linger in the environment, rotenone breaks down in five to six days of spring sunlight or two to three days of summer sunlight.

Rotenone is also widely [redacted]in liquid form by fishery managers to destroy pest species. The chemical is added to lakes and reservoirs, where it kills all the fish by inhibiting their ability to use oxygen. Once it has degraded, the water is restocked with the desired fish species.

Parkinson's disease is one of the most common neurodegenerative diseases, affecting nearly 1 million Americans over the age of 50. The disease is caused by the steady loss of cells, in a tiny region of the brain called the substantia nigra, that produce a chemical, dopamine, which is crucial for movement and cognition.

Patients develop jerky, tremulous movements that get worse with time. Eventually they become entirely rigid. A hallmark of the disease is that dopamine cells in the substantia nigra become clogged with tiny clumps of abnormal protein called Lewy bodies.

Scientists have suspected s[redacted]e the middle of the 19th c[redacted]y that an environmental [redacted]n might be involved in Parkinson's disease, Tanner said. Moreover, people who work on farms or live in the countryside have as much as seven times as much risk of de-

Exhibit B

43200 East Oakside Place
Davis, CA 95616
e-mail: naerman@ucdavis.edu
June 12, 2002

Exhibit 6
for RWQCB
Aug. 5, 04

Dr. Sonke Mastrup
Deputy Director
Department of Fish and Game
1416 Ninth Street
Sacramento, CA 95814

Re: Comments on CA Department of Fish and Game (CDFG) Negative Declaration and Request for information under the CA Public Records Act: Paiute Cutthroat Trout Recovery Project/Rotenone poisoning/ Silver King Creek, its tributaries, and Tamarack Lake/ Carson-Iceberg Wilderness/ Humboldt-Toiyabe National Forest.

Dear Dr. Mastrup:

I received from the CDFG the Environmental Document and Proposed Negative Declaration for the Paiute Cutthroat Trout Habitat Restoration Project dated May 28, 2002, on May 31, 2002. I was not notified of the scoping period or given an opportunity to comment to your agency during the scoping period. No letter of transmittal was included with the Environmental Document informing me of the comment period on this proposed Negative Declaration.

This is the only copy of my comments that I am sending to the CDFG. I am sending them to you because you responded to my earlier letter to Director Hight when I requested notification of all environmental review steps in this project. Please see that these comments are sent to the proper reviewers within the CDFG.

Included here are the comments and 11 exhibits I filed with the U.S. Forest Service (USFS) on May 29, 2002. Please consider them part of my comments on the CDFG Negative Declaration. The Forest Service scoping period ended two days after the CDFG filed a proposed Negative Declaration.

These staggered, separate reviews by several state and federal agencies are unacceptable on a project this complicated with such a long a history and so many potentially significant environmental and cumulative impacts.

For example, the USFS scoping document did not include the information that Silver King Creek is included in the range of the mountain yellow-legged frog, a species proposed for federal listing as endangered. It omitted reference to aquatic invertebrate studies that CDFG has completed. It did not include the information that Silver King Creek basin has been poisoned with rotenone on seven different occasions since 1964. I have discussed in the enclosed comments to the USFS why I am asking for the preparation of a joint EIS/EIR with the USFS, the US Fish and Wildlife Service and the CDFG.

In 1994 I filed extensive comments on the Draft Programmatic EIR (subsequent) on Rotenone Use prepared by CDFG. In response to one of my comments about the need for species-level invertebrate studies to determine species losses from poisoning, the CDFG responded as follows: "CDFG personnel are currently involved in a multi-year study of the effects of rotenone on macroinvertebrates from the Silver King Creek drainage (Alpine County). This study involves the identification of invertebrates at the species level prior to, during and for three years after scheduled treatments. " (p. 103, Final Programmatic EIR (subsequent) on Rotenone Use..., July 1994). Sometime after reading this, I phoned Jim Harrington who was in charge of the CDFG invertebrate monitoring program, and learned that only larval forms had been collected; and no identification to species could, therefore, be made for most organisms. The present document states that "the information collected during this study [of Silver King Creek before, during and after 1991 to 1993] suggests that macroinvertebrate abundance is not greatly affected by rotenone concentrations that result from the use of the chemical to kill fish in streams" (Trumbo, Siepmann, and Finlayson 2000a) And further, "both of these studies [Trumbo, Siepmann, and Finlayson 2000a, 2000b] suggested that rotenone may have short-term impacts to sensitive aquatic invertebrates including mayflies, caddisflies, and stoneflies." No data are presented in the Environmental Document and Proposed Negative Declaration to support this claim.

It sounds as if the CDFG has not investigated the question of whether or not invertebrate species are being eliminated by rotenone poisoning. How was macroinvertebrate "abundance" measured? How were short-term impacts as opposed to long-term (permanent?) established? Under the California Public Records Act, I am requesting copies of the two studies (Trumbo, Siepmann, and Finlayson 2000a, 2000b) cited in the Environmental Document/Negative Dec. If they have been published in the scientific literature, as was stated in the 1994 Final EIR they would be, I would like a copy of that publication as well. I could not find these studies in the University of California library. These data should be part of an EIS/EIR.

Several studies have now shown significant, long term effects of rotenone on aquatic invertebrates. These studies were not reviewed in the CDFG Environmental Document/Negative Dec.

A 5-year study on a river in Utah (Mangum and Madrigal 1999) found that "up to 100% of Ephemeroptera, Plecoptera, and Trichoptera [mayflies, stoneflies and caddisflies] were missing after the second rotenone application. Forty-six percent of the taxa recovered within one year, but 21% of the taxa were still missing after five years. They further found that at least 19 species were still missing five years after the rotenone treatments. (I say "at least" because some taxa were identified only to genus and may have included more than one species). This publication is new information since the Final Programmatic EIR (subsequent) on Rotenone Use prepared by CDFG in 1994.

In a short-term study on a Pennsylvania stream, Helfrich (1978) found that all 4 major orders of macroinvertebrates in the study stream exhibited substantial decreases in numerical abundance 11 days after rotenone treatment. Populations of Plecoptera and Diptera were "nearly exterminated." Trichoptera and Ephemeroptera were reduced to 50% of the pretreatment levels.

Several other studies have found variation in the tolerances of aquatic invertebrate taxa to rotenone (for example, Cook and Moore 1969, Engstrom-Heg, et al. 1978, Meadows 1972, Maslin et al. 1988). Most field studies have not

identified invertebrates to the species level. These are examples only; I am not including here a complete review of the literature on rotenone impacts to invertebrates. The EIS/EIR should include a review of the literature on the impacts of rotenone on non-target species.

The above studies belie the information given to the public in the Information Leaflet for Public Meetings on this proposed project which is included in the CDFG environmental document. There are several other incorrect statements made in that document as well. In this regard, other articles included with the environmental document and Negative Declaration are more propaganda pieces than "information." Further, the sign to be posted regarding drinking water states that "this water will be restocked" but fails to say that it will not be restocked for three or four years.

The project has a potentially significant indirect impact on the food supply of other aquatic and terrestrial animals in the area that will lose the aquatic invertebrate food supply, both aquatic and emerging terrestrial forms, from 11 miles of stream for a 3 or 4 year period. Most freshwater invertebrates have a one-year life cycle. This proposal has the possibility of eliminating three or four generations of many invertebrate species and of causing the extinction of some non-target species. The repercussions of stream poisoning may be expressed throughout the food chain and lead to simplification of species diversity and ecological instability (Becker 1975). Impacts on food chains and food webs must be considered in an EIS/EIR.

An EIS/EIR should include a cumulative impact analysis on the effects of repeated poisoning since 1964 on the invertebrate populations of this watershed.

The project may have potentially significant impacts to the mountain yellow-legged frog, a species proposed for federal listing under the Endangered Species Act. The survey methods used thus far and the planned removal and transplant methods should be discussed in a joint EIR/EIS. The literature on success of transplant of this species should be reviewed in the document. The document is not clear about where mountain yellow-legged frogs are known to occur in the watershed. The cumulative impacts to

mountain yellow-legged frog of all past stream and lake poisoning projects (including piscicides other than rotenone) in its habitat in this vicinity and throughout the Sierra should be analyzed in the EIS/EIR. No cumulative impacts of rotenone projects have been analyzed in this document.

The project has a potentially significant impact to degrade the quality of the environment, substantially reduce the habitat of invertebrate and/or amphibian species, cause invertebrate populations to drop below self-sustaining levels, threaten or eliminate parts of the invertebrate/amphibian community, reduce the number or restrict the range of rare or endangered invertebrates and amphibians. Without species-level inventory prior to stream poisoning there is no way to know for certain what species are threatened.

The project has a potentially significant impact for being "cumulatively considerable" in connection with past rotenone (and other piscicide projects) in this area and across the Sierra. Projects in California are always done without pre-project aquatic invertebrate surveys at the species level. Most projects now being carried out in California are done in upper watershed streams and in small feeder streams going into reservoirs and lakes. These upper watershed streams and lakes and seeps are the habitats that are most likely to have endemic and rare invertebrate species with narrow habitat requirements (Erman and Nagano 1992, Erman 1996).

Aquatic invertebrate species in upper watershed streams often have limited downstream distribution of only a few meters or a few hundred meters (Erman and Erman 1990). Invertebrate species lower in a watershed (along a stream gradient) can not always be restocked by species higher in a watershed and vice-versa.

CDFG has had numerous opportunities over the last 60 or more years of poisoning California streams to conduct a species-level study on the impacts of rotenone on invertebrate species. It is not reasonable to keep justifying rotenone projects by claiming that this next time a study on species will be conducted as mitigation. I think I read that when the Stefferud study (1977) was done on the effects of antimycin in the South Fork Kern River, it was

supposed to be a long-term study of impacts on invertebrates (a mitigation), but the follow-up study was never funded.

Rotenone has been used in Silver King Creek on seven different occasions since 1964. Why should we think this three-year poisoning will be the last? If fish were planted in the watershed in 1912 and in the 1920's and in 1949, why shouldn't we expect that rainbow trout or other species will be planted again following this next watershed poisoning? Reinvasion of non-native fish species, by whatever means, is highly likely. CDFG, as discussed in my USFS comments, has long been teaching the public the wrong lesson through its own fish planting program.

A EIS/EIR should develop alternatives to rotenone for restoring Paiute cutthroat trout. These should include mechanical, species-specific removal methods in both streams and the lake. Smaller scale projects should be considered. More of the same mass poisoning has a slim chance of succeeding based on the past record. CDFG should by now recognize that control of undesirable species is a long-term, continuous activity. Looked at from this more realistic perspective, CDFG will see that yearly mechanical removal of rainbow and cutthroat trout can be as effective as poisoning and is much less damaging to the ecosytem.

The project has potentially significant impact of violating water quality and waste disharge requirements (Exhibits 3, 4, 5, 6, 7, 8, 9 in my attached comments to the USFS) based on recent, documented projects. The CDFG has a poor record of carrying out required and agreed-upon mitigation. For example, previous projects have caused substantial fish mortality outside project boundaries by excess potassium permanganate. In the current proposal, there is no discussion of how CDFG would deal with that possibility.

The project has a potentially significant impact to public health. New information on health risks should be reviewed as discussed in my comments to the USFS. In light of the documented exhibits enclosed therein, the CDFG has a rather poor record of execution and compliance in recent rotenone projects. The proposal is also to poison seeps (i.e., springs). These

would be the places where backpackers, hikers and fishermen would likely get their water. Therefore, the public must be excluded from the entire project boundary because all water is potentially contaminated and unsuitable for drinking.

An EIS/EIR should discuss why sport fishing of a threatened species would not be considered a "taking" under the Endangered Species Act. An EIS/EIR should discuss the mortality rate of catch and release fishing. The catch and release area will be subject to greater fishing pressure because it will be the only place people can fish in the watershed.

In the environmental checklist of impacts, recreation has not been checked as a concern but it clearly is a concern to packers and fishermen.

Noise and transportation and traffic have also not been checked even though the document states that a helicopter will be used in this Wilderness Area to poison Tamarack Lake on one or more occasions.

The project has many potentially significant impacts that should trigger a full joint EIR/EIS with the USFS and the US Fish and Wildlife Service.

Thank you for your attention to this matter.

Sincerely,

Nancy A. Erman

Nancy A. Erman
Specialist Emeritus, Aquatic ecology/
Freshwater Invertebrates
University of California

Literature Cited:

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Erick Walker/R4/USDAFS,8/21/2 9:28 AM,2nd copy/request/Silver King Creek 1

To: "Erick Walker/R4/USDAFS" <ewalker02@fs.fed.us>
From: "Nancy A. Erman" <naerman@ucdavis.edu>
Subject: 2nd copy/request/Silver King Creek
Cc:
Bcc:
X-Attachments:

Exhibit C

August 21, 2002

>>Erick,
>> I received the EA for the Silver King Creek Project on Tuesday,
>>August 6; it was postmarked August 2 and the letter of transmittal was
>>dated July 31.
>> The letter says only that comments are due within 30 days of the
>>publication of the legal notice in the Reno Gazette-Journal, Nevada Appeal,
>>Record-Courier, and the Tahoe Daily Tribune.
>> I receive none of these local newspapers and even if I did, I might
>>miss the announcement. Could you please tell me the exact date that
>>comments are due?
>> I also have a few other questions and requests:
>>
>> Have you seen the comments submitted to the CDFG by me, by Dr. David Herbst and by the Lahontan Regional Water Quality Control Board staff on this
>>project? In other words, has CDFG shared with you all the comments
>>submitted on this project?
>>
>> Would you please send me copies of all the comments you receive on
>>the project?
>>
>>Thank you for your attention to these requests.
>>
>>Nancy A. Erman

Erick Walker/R4/USDAFS,8/22/2 9:59 AM,Re: 2nd copy/request/Silver King Cr 1

X-POP3-Rcpt: naerman@ike
Subject: Re: 2nd copy/request/Silver King Creek
To: "Nancy A. Erman" <naerman@ucdavis.edu>
Cc: "Rita Suminski/R4/USDAFS" <rsuminski@fs.fed.us>
From: "Erick Walker/R4/USDAFS" <ewalker02@fs.fed.us>
Date: Thu, 22 Aug 2002 10:59:48 -0700
X-MIMETrack: Serialize by Router on ENTR4A/E/USDAFS(Release 5.0.8 |June 18, 2001) at 08/22/2002 11:58:02 AM
MIME-Version: 1.0
Apparently-To: <naerman@ucdavis.edu>

Nancy, comments are to be postmarked by September 3rd. However, we will consider all comments that are submitted as long as we have not moved on to the next phase of the planning process. I have not seen comments provided to CDFG by you and others. In regards to your request for comments provided to us; I spoke with our NEPA Coordinator, Rita Suminski, and she said that you would need to formally request that information through the Freedom of Information Act. You can reach Rita at (775) 331-6444 or via email at rsuminski@fs.fed.us. If you need anything else, please feel free to contact me.

Thank you for your interest in this project, Erick

****
Erick Walker
Natural Resource Officer
Carson RD, Humboldt-Toiyabe NF
(775) 882-2766 ext. 120
from IBM: ewalker02@fsnotes
from Internet: ewalker02@fs.fed.us

To: "Rita Suminski/R4/USDAFS" <rsuminski@fs.fed.us>
From: "Nancy A. Erman" <naerman@ucdavis.edu>
Subject: NEPA regulations/Silver King Creek project
Cc:
Bcc:
X-Attachments:

Rita,

I think I understood what you said on the phone, but it still doesn't seem to me that a F.O.I.A. request should be necessary to receive part of a public NEPA document, in this case, letters written to the Forest Service as part of the scoping process and the EA on the Silver King Creek proposed rotenone project. However, I am sending an amended request to you in a separate e-mail.

On another matter concerning NEPA and this project, I am concerned that the vagueness of the cover letter that was sent out by Gary Schiff with the EA may confuse people about what the deadlines are for comment on this project. As you may or may not know, I had to make a request twice, by e-mail, to get the exact date that comments are due and only learned on August 22 that they are due to be postmarked on September 3. It seems to me that if the Forest Service requires the public to follow the letter of the law, the agency must not seem to be purposely vague about important details like deadlines for comments.

Thank you, again, for your attention and explanations on the phone.

Nancy Erman

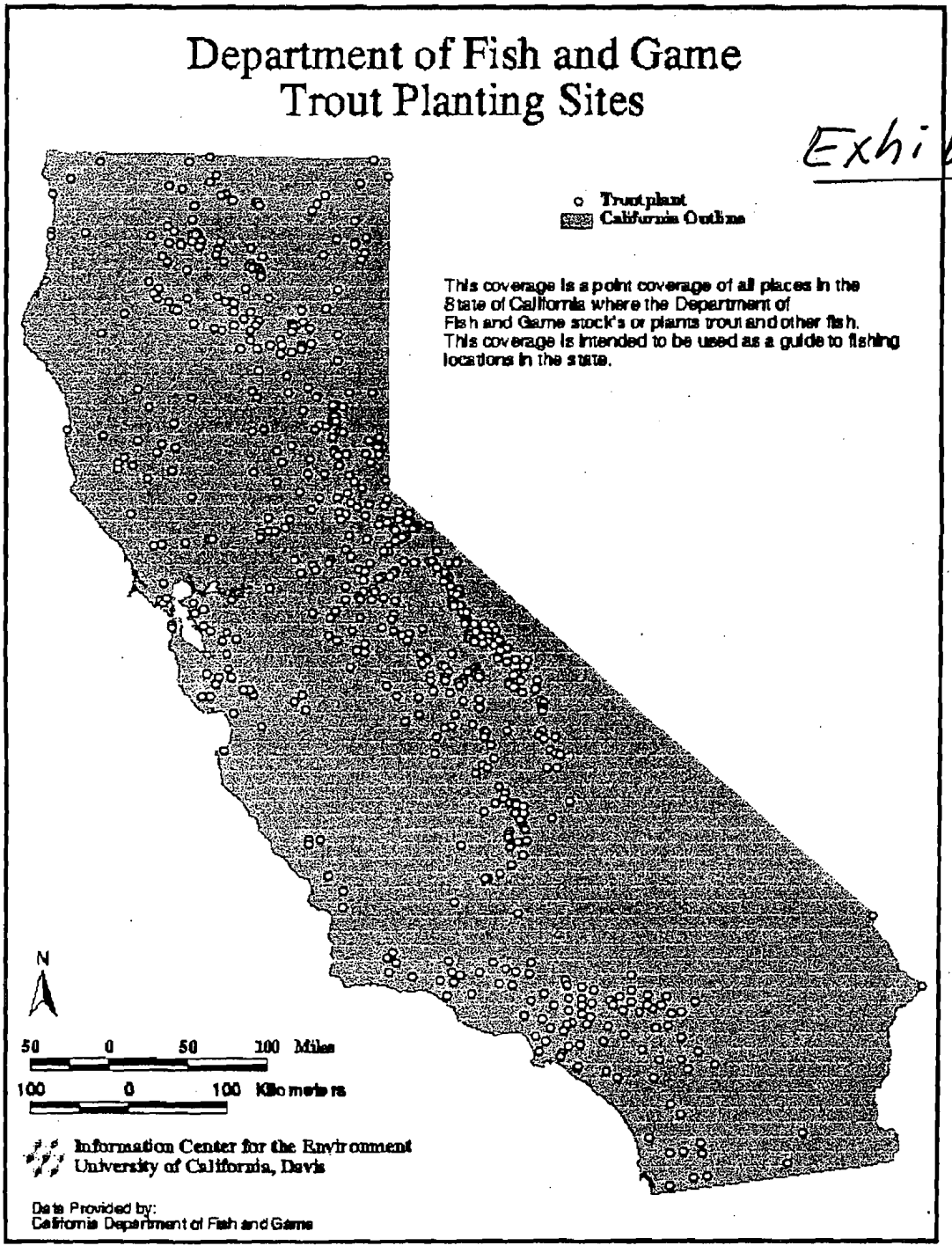
Exhibit D

Information Center for the Environment

Close-up Map Not Necessary | Metadata for the Fish Planting Sites Coverage | Download this Data (un-compressed size: .19 Mb) (compressed size: 41 Kb)

Back to the WITS Maps, Metadata, and Spatial Data Page

Exhibit E



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David B. Herbst, Ph.D.
Sierra Nevada Aquatic Research Laboratory
University of California
Route 1, Box 198
Mammoth Lakes, CA 93546
herbst@lifesci.ucsb.edu

June 28, 2002

Exhibit F

State Clearinghouse
1400 Tenth Street
Sacramento, CA 95814
Fax 916-323-3018

SUBJECT: COMMENTS ON DRAFT NEGATIVE DECLARATION FOR PAIUTE CUTTHROAT TROUT HABITAT RESTORATION PROJECT, SCH# 2002052136

Dear State Clearinghouse,

I would like to take this opportunity to provide comments on CDFG's proposal to poison several miles of Silver King Creek and its tributary streams and lakes for the purpose of removing exotic trout (SCH# 2002052136).

I have reviewed several reports related to studies of aquatic invertebrate responses to rotenone treatment (Trumbo, Seipmann, Finlayson; on Silver King, and Silver Creek) and other background on potential problems with rotenone and wanted to share some of my thoughts as an aquatic entomologist and research scientist.

Though some data suggest recovery of invertebrate populations after rotenone treatment, these studies need to be examined carefully for design and responses measured. Aquatic invertebrate species are likely to have different colonizing abilities and will reoccupy treated streams on varied schedules. In addition, re-establishment of a stable community structure and trophic relationships are likely to differ from stream to stream, over elevation gradients, and to varying extents along the continuum of ecological conditions that exist from stream headwaters to lowland rivers. Given such variability, rotenone applications should be evaluated on a case by case basis. With regard to the studies cited by the Department of Fish and Game in their rotenone EIR (1985 and 1994) as evidence of low toxicity, I note that these included no controlled replicated field studies, were often conducted in pond habitats (standing water lentic environments, not lotic habitats), and most were over 20 years old. This is, in my opinion, inadequate data to determine whether the recovery of invertebrate communities after rotenone treatment of streams in the Eastern Sierra will take one year, two years, or longer. The studies

cited earlier are insufficient to arrive at an informed decision on a specific "timeline" for invertebrate re-establishment. The more recent monitoring studies on Silver King Creek and Silver Creek show mixed results. Although both studies concluded rotenone use did not affect macroinvertebrate abundance, there are other measures of community structure that indicated both short- and long-term affects of rotenone. At Silver King, for example, the data suggest that treatments produced (1) a persistent high level of community dominance (a sign of stress that one taxon comprised 60-75% of all organisms relative to the 20-35% before treatment), (2) transient loss of about 50% or more of EPT taxa (sensitive mayfly-stonefly-caddisfly taxa) during treatment years, followed by 3 years until levels had apparently recovered, and (3) persisting loss of stonefly taxa relative to pre-treatment levels, with an especially notable loss of the abundant Peltoperlid *Yoraperla* through the post-treatment period. Other indicators may have been more revealing, such as calculation of a biotic index (such as Hilsenhoff), and a community similarity index would have been most revealing ~~of~~ in distinguishing whether recovery or only replacement is occurring after treatment (i.e. do the same taxa return, or do "weedy" colonizers replace the original biota?). The single control site selected for contrast in this study does not appear to be a stream of similar size or order to Silver King and so is difficult to interpret. Multiple controls of similar size would provide a more realistic context for contrast. The Silver Creek study showed short-term affects of treatment but none long-term, though this design had no control sites. Both the study designs lacked much taxonomic resolution for some groups such as the Chironomidae, Diptera, and apparently others identified only to family level. This further limits the ability of these studies to detect changes in biological indicators.

Rotenone treatment of streams in this watershed is also troubling to me as an aquatic ecologist attempting to establish biological criteria for water quality in the region. Any impairment (short- or long-term) compromises the potential use of these streams as reference sites, the fundamental unit upon which biological criteria are based.

Other considerations in the use of rotenone:

- Repeated rotenone treatments over consecutive years may pose an additional threat to stream ecosystem recovery because of uncertainty in the capacity of the resident invertebrate fauna to survive such prolonged exposures. The combined effects of other components of rotenone formulations (organic solvents, permanganate) in the environment should also be investigated.
- While application of rotenone from the headwaters of all drainages in a watershed may be necessary to eradicate unwanted fish, this practice may also ensure that any recolonization from drift (organisms floating downstream with the current) of resident invertebrates is

impossible. Elimination of this potential headwater refuge is likely to favor recolonization by "weedy" species, i.e. those that disperse and colonize rapidly by flight and thrive in disturbed habitats. Species that are less vagile and have restricted distributions are vulnerable to local extinction. The headwaters of streams may be reservoirs for rare and/or sensitive species of invertebrates (possibly undescribed species) and should be given special attention in pre-project surveys.

- Though bioassessment studies are useful for quantifying impacts if before/after comparisons are made (at impact and control sites), such monitoring alone does not address the fate of rare species, so complete invertebrate surveys should also be done.

The bottom line is that the potential for irreversible damage exists and recolonization of a rotenone-treated stream is at best uncertain. Such uncertainties argue that the practice of using rotenone to remove undesirable fish from streams should be undertaken only with great caution and with the benefit of pre-project surveys and pilot studies on treatment impacts and recolonization dynamics for the particular drainages under consideration. Management of streams for single species, whether listed or not, should not jeopardize the very ecosystems and biological communities into which such populations are being introduced. Aquatic habitat management needs to be sensitive to retaining or restoring multiple species and ecological function. Treatment of entire watersheds from headwaters sources should not be undertaken until pilot studies of recovery on smaller reaches have been done. This is needed to evaluate the "ecological safety" of the treatment and determine whether goals/objectives have been met. In conclusion, I believe that the Lahontan Basin Plan objective for species composition needs to be met to protect stream ecosystems, and feasibility studies, monitoring, and inventory should also be conducted to ensure compliance. Amendment of the objectives to allow longer recovery times may then be considered if the studies so warrant. This will ultimately assure that threatened fish species are established in viable natural ecosystems.

Yours Sincerely,

David B. Herlist

Winston H. Hickox
Secretary for Environmental Protection

California Regional Water Quality Control Board

Lahontan Region

Gray Davis
Governor

2501 Lake Tahoe Boulevard, South Lake Tahoe, California 96150
Phone (530) 542-5400 • FAX (530) 544-2271
Internet: http://www.swrcb.ca.gov/rwqcb6

Exhibit G

MEMORANDUM

TO: William Somer, Senior Fisheries Biologist
California Department of Fish and Game
1701 Nimbus Rd., Suite A
Rancho Cordova, CA 95670

FROM: Lauri Kemper, Division Manager
Northern Watersheds Division

DATE: June 27, 2002

SUBJECT: **COMMENTS ON MITIGATED NEGATIVE DECLARATION, PAIUTE CUTTHROAT TROUT HABITAT RESTORATION PROJECT, STATE CLEARINGHOUSE #2002052136**

Regional Board staff has reviewed the above-referenced document. We appreciate the opportunity to provide comments and appreciate efforts the Department of Fish and Game (CDFG) is making to work cooperatively with our staff during the project's planning process. We recognize the value of restoring the threatened Paiute Cutthroat, the considerable efforts that the CDFG has invested, and the success of its past efforts towards achieving that goal.

Our comments are as follows:

1. A concern with the draft Negative Declaration is that it does not fully evaluate and disclose the known and potential impacts of rotenone use on non-target organisms. A comprehensive evaluation should be made, and if it is determined that there is potential for significant long-term impacts to non-target organisms that cannot be mitigated, the CDFG should prepare an EIR for this project.

2. The "Discussion of Environmental Evaluation," Section IV (Biological Resources), states that "...the CDFG conducted extensive invertebrate monitoring in Silver King Creek." Then, on the basis of two studies conducted at Silver King Creek and Silver Creek, concludes that the proposed rotenone treatment should not have significant long-term impacts on macroinvertebrate abundance. It does not elaborate further on the studies, or on potential

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impacts to macroinvertebrates. However, "abundance" is only one of several important characteristics of macroinvertebrate populations, and it is widely accepted that organism abundance cannot be relied on as a definitive indicator of impacts. Other indicators/metrics, such as diversity, presence or absence of indicator taxa, dominance of functional groups, biotic index, etc., are usually much more informative. A number of other indicators were evaluated in the two studies cited, but were not discussed in the draft Negative Declaration. The specific findings of those studies should be elaborated upon in the environmental document.

3. The macroinvertebrate study cited for Silver King Creek (Trumbo, Siepmann, Finalyson 2000a) has deficiencies in several key respects that should be addressed. Although the draft Negative Declaration reports that the study involved "extensive" monitoring, "control" data was only collected at a single site. Data from that single control site was compared to data representing an average of five rotenone-treated sites. Based on our staff's observations of the project area, we assert that at least some of the treated sampling sites are so dissimilar to the control site in terms of stream morphology and discharge that comparison with the single control site is inappropriate. The study does not present stream morphology or discharge information to allow us to adequately determine which sites would be most appropriately compared to the control site. It appears that one appropriate comparison might be between the control site and Site #2 (similar elevation and stream order). When this comparison is made, the data suggest that adverse impacts to the benthic community at the rotenone-treated site may be significant compared to the control. (See, for examples, the data for total number of stonefly taxa, total number of stoneflies, EPT index, total taxa, etc., for the control site vs. site #2.) For these reasons, the cited study does not appear to substantiate CDFG's conclusion that impacts on non-target macroinvertebrate communities will be insignificant.

   The second study cited in this section of the Negative Declaration (i.e., Trumbo, Siepmann, Finalyson 2000b) concluded that rotenone caused short-term but no long-term effects to non-target benthic communities. It is impossible to draw firm conclusions from this study report because there were no control sites to assess natural variability. The study design is simply not capable of detecting long-term impacts.

   The draft Negative Declaration does not adequately describe the study findings, or recognize the limitations in study scope and methodology. In our opinion, the cited studies do not convincingly demonstrate that the proposed project will have no significant adverse impacts on non-target benthic communities.

4. The *Water Quality Control Plan for the Lahontan Region* (Basin Plan) contains water quality objectives for the East Fork Carson River Hydrologic Unit requiring that, "Species composition shall not be altered to the extent that such alterations are discernible at the 10 percent significance level." The Basin Plan also contains water quality objectives for rotenone use stipulating that, "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." The draft Negative Declaration does not appear to address whether this objective can be met, or how

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compliance with this objective will be monitored. As discussed in Comment 3 above, past CDFG macroinvertebrate monitoring at Silver King Creek suggests that this objective may not have been met following earlier treatments, potentially indicating a significant impact. The Negative Declaration should require that the CDFG establish a monitoring program capable of verifying compliance with this objective, as a condition of project approval. Such a program should involve a statistical analysis to determine the minimum number of treatment and control sites necessary to evaluate the data at the 10 percent significance level. The monitoring program should also describe how monitoring sites will be selected to assure that comparisons are made only between sites of sufficiently similar characteristics, such as stream morphology and discharge (see Comment 3, above).

5. The draft Negative Declaration cites and relies on the previous analyses and conclusions contained in the July 1994 CDFG Final Programmatic Environmental Impact Report for Rotenone Use ("1994 Rotenone EIR") to support its conclusion of "no impact" to non-target communities. That 1994 Rotenone EIR, based on the information available at that time, states (p. 74-76) that sensitive non-target organisms "will soon be replenished" and that it takes only two to six months for sensitive macroinvertebrate communities to "reestablish to original abundance and species diversity." That conclusion of the 1994 Rotenone EIR has since been shown to be very questionable, and should not be relied on for this project. For example, CDFG management stated after the Rotenone EIR was adopted (August 12, 1994 letter from John Turner to Regional Board Executive Officer Harold Singer) that it may take at least two years for non-target communities to recover. U.S. Fish and Wildlife Service staff have stated that it may take at least "three or four" years for non-target communities to recover following rotenone treatments (personal communication cited in October 7, 1994 Regional Board Internal Memo). CDFG's Silver King Creek macroinvertebrate monitoring also indicates that non-target communities may not be fully recovering after rotenone treatments (see Comments 3 and 4, above). The draft Negative Declaration should incorporate the best scientific information available on this topic, and evaluate whether the project can meet the Basin Plan requirement that species composition objectives for non-target organisms be met within one year following the last treatment. The draft Negative Declaration should also consider the feasibility of mitigation measures (such as transplanting benthic invertebrates from untreated areas) to hasten recovery.

6. The draft Negative Declaration does not discuss the possibility that populations of rare or endemic species of macroinvertebrates could be present that might be impacted by rotenone treatment. Although macroinvertebrate monitoring in parts of the Silver King Creek watershed was conducted as part of the earlier treatments, the degree to which the type of monitoring performed is capable of detecting rare or endemic species is not clear. The draft Negative Declaration should address this issue. If the CDFG cannot give reasonable assurance that rare or endemic species are not present or would not be significantly impacted by rotenone use, additional surveys may be an appropriate mitigation measure to require prior to treatment.

7. The mountain yellow-legged frog (MYLF) is considered a species of concern. The U.S. Fish and Wildlife Service has been petitioned to list the frog under the federal Endangered Species

Act. The draft Negative Declaration states, in the "Discussion of Environmental Evaluation," Section IV (Biological Resources) that MYLF has not been observed in the proposed treatment area during recent surveys. It also proposes a pre-treatment survey, and states that any MYLF (all life stages) found during the proposed pre-treatment survey will be relocated out of the project area. But it provides almost no details about how the pre-treatment search for MYLF will be conducted, what level of effort will be made, how effective these efforts are expected to be in finding and collecting frogs if present, or how frogs would be relocated. We suggest that a Pre-treatment Survey Plan addressing these details be developed and included as a required mitigation measure.

8. In the Environmental Checklist, Item IV(b), "Biological Resources," has been checked as "no impact." The CDFG should reconsider this finding in light of Comments 1 through 7 above, and provide additional information and/or mitigation requirements to support the finding.

9. In the Environmental Checklist, Item XIV, "Recreation," has been checked as "no impact." However, elsewhere the draft Negative Declaration acknowledges the impact to the existing fishery in the area proposed for treatment, and it is clear that other recreational opportunities will be temporarily impacted in the treatment area during the treatment period, and until chemical residues and permanganate discoloration have dissipated. For example, the designated recreational beneficial uses of these waters will be impaired as long as the taste, odor, and discoloration created by chemical applications persist. The CDFG should reconsider this finding, and provide additional information about the expected impacts to beneficial uses of water, and adopt mitigation requirements to address those impacts.

10. In the Environmental Checklist, Item XVII, "Mandatory Findings of Significance," has been checked as "no impact" for all categories. This is inconsistent to the extent that the CDFG has acknowledged potentially significant environmental impacts for other items in the Environmental Checklist, or not addressed potentially significant impacts discussed in this memorandum.

11. Some mitigation measures in the "Discussion of Environmental Evaluation" section are not described in the "Mitigation Measures" section. Since the draft Negative Declaration concludes that all adverse impacts can be mitigated to a less-than-significant level, we recommend listing all mitigation measures together for easy reference (perhaps in the "Mitigation Measures" section).

12. Regional Board monitoring of the CDFG's 1993 rotenone application at Silver King Creek detected rotenone downstream of project boundaries, and naphthalene at a concentration greater than 25 ug/L, in violation of Basin Plan objectives. The CDFG attributed the persistence of these chemicals to low water temperature. In response to these findings, the CDFG agreed (in a March 28, 1994 letter) not to apply rotenone to surface waters when the pesticide may reach streams that have a temperature at or below 5°C. The CDFG should affirm its commitment to that policy by including it as a mandatory mitigation measure in the Negative Declaration, and adequately monitor water temperatures in the treatment areas.

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13. At Silver King Creek, the CDFG has proposed testing, on a limited experimental basis, a new rotenone formulation (PW Rotenone) that reportedly contains potentially less-objectionable inert ingredients. Although the draft Negative Declaration mentions this product by name, it does not discuss the rationale behind its use, or whether there could be any potentially significant impacts as a result of its use. A discussion of this alternative formulation and plans for its use should be included in the draft Negative Declaration. The discussion should explain the objectives of using this alternative formulation, compare ingredients (where such information is not proprietary), describe and identify chemical constituents that will monitored, and evaluate any potential for adverse impacts.

14. The Monitoring Plan (Appendix A) does not adequately describe how Tamarack Lake will be sampled. It appears that only a single monitoring station in the Lake is planned, but the specific location of that site is not defined (for example, mid-lake, or at the outlet). Basin Plan objectives require that no chemical residues from rotenone treatment persist beyond two weeks following treatment. In order to evaluate compliance with the objectives, at least two monitoring stations in the Lake would be desirable (one in the deepest part, and another at the Lake's outlet). For an in-lake monitoring station, it may be necessary to sample from more than one discrete depth if the lake is thermally and/or oxygen stratified. If the Lake is well-mixed, one sample at mid-depth might be sufficient. The Monitoring Plan should be modified to clarify how sampling at Tamarack Lake will be conducted.

We can provide additional assistance in identifying or evaluating potential mitigation measures should you request it. If you have questions or wish to discuss this matter further, please contact Jason Churchill, Environmental Scientist at (530) 542-5571, or Alan Miller, Chief, Carson/Walker Watersheds Unit, at (530) 542-5430.

cc: State Clearinghouse
Regional Board members

JC/carT:rotenone negdec comments
[General Files, Rotenone—Silver King Creek]

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Exhibit C
for RWQCB
Aug. 5, 04

43200 East Oakside Place
Davis, CA 95616
e-mail: naerman@ucdavis.edu
June 13, 2002

Laurie Sada
U. S. Fish and Wildlife Service
1340 Financial Boulevard
Suite 324
Reno, NV 89502

Dear Laurie,

Please consider these as official comments on the proposal to poison Silver King Creek in the Carson-Iceberg Wilderness. I'm sending this to you because I don't know who else is involved within the Fish and Wildlife Service, and I remembered that we discussed this proposed project at dinner in Las Vegas during the springs conference. Some of my comments pertain directly to the Fish and Wildife Service, as well as to the CA Department of Fish and Game and the US Forest Service.

Please see that these get to the appropriate people in your agency.

Thank you.

Sincerely,

N Erman

Nancy A. Erman
Specialist Emeritus, Aquatic ecology/
freshwater invertebrates
University of California

To: Gary Schiff, District Ranger
Carson Ranger District
Humboldt-Toiyabe National Forest
1536 S. Carson Street
Carson City, NV 89701

August 31, 2002

Exhibit d
for RWQCB
Aug. 5, '04

Note:
Exhibits a & b
include all the
exhibits submitted
with this document

From:
Nancy A. Erman
Specialist emeritus: aquatic ecology/freshwater invertebrates
University of California
43200 E. Oakside Place
Davis, CA 95616
naerman@ucdavis.edu
530/758-1206

Re: Paiute Cutthroat Trout Recovery Project/ poisoning parts of Silver King Creek and Tamarack Lake/ Carson-Iceberg Wilderness: Comments on Environmental Assessment

I am a retired professional aquatic ecologist with a specialty in freshwater invertebrates. I am filing comments on this Environmental Assessment (EA) as a private citizen, in the public interest. I reviewed the scoping document on this project and filed comments with Humboldt-Toiyabe National Forest, May 29, 2002 (Exhibit A). I reviewed the Negative Declaration documents of the California Department of Fish and Game (CDFG) and filed comments with the CDFG, June 12, 2002 (Exhibit B). I have read and analyzed the two reports on impacts of rotenone conducted by CDFG on Silver King Creek and on Silver Creek (Trumbo et al. 2000a, 2000b). In 1994 I reviewed and filed comments on the Draft Programmatic EIR (subsequent) on Rotenone Use prepared by CDFG. In addition, I have reviewed numerous published papers on the impacts of rotenone on non-target species.

I participated, as a scientist, in the Sierra Nevada Ecosystem Project (SNEP) and wrote chapter 35 in the Final Report to Congress, *Status of Aquatic Invertebrates* .

Need for a joint EIS/EIR

I strongly urge the Humboldt-Toiyabe National Forest (HTNF) to prepare an EIS/EIR jointly with the agencies involved in this effort to restore the Paiute cutthroat trout. These staggered, separate reviews by several state and federal agencies are unacceptable on a project this complicated with such a long history and so many potentially significant environmental and cumulative impacts. A Technical/Agency Draft Revision of the Paiute Cutthroat Trout Recovery Plan is undergoing internal US Fish and Wildlife Service (USFWS) review and is not available yet for public review (EA, p. 2). The Biological Assessment/Evaluation for threatened, endangered and proposed species has not been completed (EA, p.17). It is premature to approve this proposed project before those documents are completed and publicly reviewed. The Forest Service scoping period ended two days after the CDFG filed a proposed Negative Declaration. The Lahontan Regional Water Quality Control Board (LRWQCB) has filed extensive comments on the CDFG document and those have apparently not been seen by the HTNS (Exhibit C). Nor have the comments filed by Dr. David Herbst on the studies conducted by CDFG (Trumbo et al. 2000a, 2000b) been seen by the HTNS in preparing this EA (Exhibit C). There is no evidence that the comments I filed during the HTNS scoping period have been considered in this EA nor has the HTNS seen the comments that I filed with the CDFG (Exhibit C).

The earlier HTNS scoping document did not include the information that Silver King Creek is included in the range of the mountain yellow-legged frog, a species proposed for federal listing as endangered. It omitted reference to aquatic invertebrate studies that CDFG has completed. It did not include the information that Silver King Creek basin has been poisoned with rotenone on many (five to seven or more?) different occasions since 1964.

There is no one place where members of the public can get all the information on this project. Nor is there a single agency that has all the details of the project. And yet, several agencies (at least five) have separate or interconnected or overlapping responsibilities for the project (Lahontan Regional Water Quality Control Board, USDA Forest Service, CDFG, USFWS, California Department of Pesticide Regulation.)

In addition, it has been difficult for members of the public to learn about the proposed project. I have described in Exhibits A, B, C, and D some of the problems I have had in being notified of the project by CDFG and in

determining deadlines for comments on this EA. Further, it took the CDFG over two months to mail me the two public reports, fundamental to judging impacts, that I requested on June 12, 2002. And, by not preparing an EIS/EIR on this project, the US Forest Service will not be required to circulate the EA through the State Clearinghouse for a full 30-day review, and so it will be seen by fewer people.

The Forest Service is responsible for all species on Forest Service land, not just a few selected game species. "We don't want to dump poisons into a stream in a wilderness area unless we fully understand all the effects. We don't want to get so focused on one species of trout that we overlook the effects on other organisms, down to microorganisms." (Matt Mathes, a Forest Service spokesman in California in Braxton-Little, J. 2000.)

This EA has not reviewed the known effects of rotenone on non-target species. Most of the references listed under the section titled Literature Cited in the EA have, in fact, not been reviewed or even referred to in the EA, that is, have not been cited. New information on impacts of rotenone to non-target species, not reviewed in the 1994 Draft Programmatic EIR (subsequent) on Rotenone Use prepared by CDFG, has been published but is not reviewed or considered in this EA. And the two studies done by CDFG show significant impacts to non-target species, contrary to the conclusions of CDFG and this EA (to be discussed later).

As nearly as I can tell approximately 18 papers are listed under Literature Cited (EA), but no reference to them appears in the document. Several of these studies have shown significant impacts of rotenone to non-target species (discussed below).

And conversely, other citations are made in the body of the EA, but do not appear in the Literature Cited section where the full reference should be given.

No detailed species-specific alternative to the use of rotenone has been developed in this EA. Two rotenone poisoning alternatives, one motorized and one non-motorized, and one no-project alternative are the only options discussed. A joint EIS/EIR should develop a species-specific mechanical removal option that will have no or far fewer impacts on non-target species than a rotenone alternative.

No cumulative impact analysis has been made of the impacts of continued planting of non-native fish by CDFG throughout the Sierra and

what the effects of that program are on the likelihood of unwanted fish species getting back into Silver King Creek shortly after the creek, lake, springs, and seeps have been poisoned.

No cumulative impact analysis has been made of this stream/lake/spring poisoning project on the range of the mountain yellow-legged frog in light of 70 years of poisoning streams and lakes in their habitat throughout the Sierra. The record of poisoning streams and lakes, including dates and locations, should be reconstructed as part of the cumulative impact analysis.

No scientific evidence is provided to suggest that amphibians can be successfully moved from the project area with likelihood of survival in a new area.

No cumulative impact analysis has been made of the effects of repeated poisoning since 1964 and potential future poisoning on the invertebrate populations of this watershed.

No study has been made on the impacts of rotenone on invertebrates at the species level in Silver King Creek or in any other stream or lake in California (Erman 1996). In other words, after 70 years of poisoning streams and lakes in California with rotenone, neither CDFG nor the Forest Service know what species or how many have been eliminated.

No pre-project species surveys of aquatic invertebrates have been made in the specific areas proposed for poisoning.

No review or study of spring species has been made. The plan is to poison springs and seeps which have a high probability of containing endemic and rare invertebrate species (Erman and Erman 1990, 1995).

No review of new information on the connections between rotenone and Parkinson's disease has been made (submitted as exhibit 11 in my scoping comments [Exhibit A]).

No studies on the effects of the two new formulations of rotenone from Finland, to be used in this project, have been done in California. Use of a new, untested, experimental formulation points to the need for a joint EIS/EIR. No reasons are presented for using new formulations of rotenone.

No map or detailed description of location and dates of the past rotenone poisonings (since 1964) of this stream system is shown, nor is that information given in the EA.

No convincing reasons for why three or more additional poisonings of this stream system will save the Paiute cutthroat trout are presented, and apparently there is no other plan for preserving the species in the future except to keep poisoning this stream basin should non-native trout get back into the system again.

No analysis has been included about other land uses in the basin that may be affecting Paiute cutthroat habitat, but a reference is made to impacts of land use practices in the project area in the CDFG study (Trumbo et al. 2000a). The issue of watershed and habitat recovery measures was raised during the scoping period by members of the public and was discounted by the CDFG as beyond the scope of the project (CDFG Negative Declaration, incorporated here by reference).

The paiute cutthroat trout evolved in a specific habitat and community. In the long run, restoration of a single species depends on restoration and conservation of the whole ecosystem and biological community in which it evolved.

For all of the above reasons, the Forest Service needs to participate in a joint EIS/EIR.

Likelihood of non-native trout reinhabiting Silver King Creek

The CDFG plants trout throughout the Sierra (Exhibit E). The CDFG has no control over where other people and groups plant trout (discussed in Exhibit A and A-10). The CDFG has run an outreach program in schools and with public groups for many years extolling the virtues of fish planting, providing fish eggs to schools and other groups and generally teaching the public that fish planting is a good thing. In 1991, the same year that the CDFG began yet another poisoning of the Silver King Creek basin, they planted non-native trout in Tamarack Lake where HTNF and CDFG now propose using rotenone to eliminate the fish that CDFG put there not many years ago (EA, p. 6).

The explanation for why this poisoning will work is questionable. The impassable waterfalls are only 4 to 8 feet high (EA, Appendix D, Preproject Rotenone Use Analysis, E#2). Were these low, summer water or early spring, high water measurements? The biological evidence provided for arguing that trout will not get back upstream is doubtful. The absence of brown trout,

whitefish, mountain sucker, Lahontan redside, Paiute sculpin, and speckled dace in upper Silver King Creek is provided as proof that other trout will not migrate back upstream ("The fish barrier theory is also supported by biological evidence that brown trout, whitefish, mountain sucker, Lahontan redside, Paiute sculpin, and speckled dace occur in the Carson River drainage, but only Paiute cutthroat and the introduced exotic trout occur above the Silver King Canyon" (EA, Appendix D, E#2). But these species, with the exception of Paiute sculpin, are known to live in warmer downstream water and would not select cold, upstream water as a habitat (Erman 1986). The non-native trout crosses, on the other hand, thrive in cold, upstream water and will seek it out as preferred habitat. Trout jump waterfalls during high water runoff. In this proposed project, exotic trout will be moved downstream of the project area and no doubt will continue to be planted there as well.

Contradictory statements appear in Appendix D, E#4, 5. "During 1991 to 1993 approximately 9 miles of Silver King Creek were treated using a back-to-back application method which resulted in the successful eradication of hybrid rainbow x Paiute cutthroat trout from above Llewellyn Falls." But just prior to that statement it said "Should these hybrid trout be introduced above Llewellyn Falls, 50 years of restoration effort could be unravelled." And later "Chemical treatments conducted during 1964 and 1977 were unsuccessful because they were single year treatments,..." (But see Gerstung 1997, [included in CDFG Negative Dec. and incorporated here by reference] who refers to a rotenone poisoning in 1976) It sounds as if nothing in the way of Paiute cutthroat restoration had really been achieved until about 9 years ago in spite of several previous stream poisonings over several decades.

Were there ever Paiute sculpin in the natural Paiute cutthroat range and if so, what happened to them?

Information about fish planting in the Silver King system is conflicting. The EA (Appendix D) states that rainbow, cutthroat and golden trout were introduced in the 1920's and an unauthorized introduction occurred in 1949. Gerstung (1997, included in CDFG Negative Dec. and incorporated here by reference), however, refers to several unauthorized introductions including some by CDFG employees.

Impacts of rotenone on invertebrates

The EA states that "direct effects of rotenone are expected to occur following treatment applications of rotenone. However, these effects are expected to be temporary and not have long-term effects on population viability of macroinvertebrates."

The published literature does not support this expectation. A recent study has shown significant, long-term effects of rotenone on aquatic invertebrates. This information was not reviewed in either the CDFG Environmental Document/Negative Dec. or in this EA.

A 5-year study on a river in Utah (Mangum and Madrigal 1999) found that "up to 100% of Ephemeroptera, Plecoptera, and Trichoptera [mayflies, stoneflies and caddisflies] were missing after the second rotenone application. Forty-six percent of the taxa recovered within one year, but 21% of the taxa were still missing after five years. They further found that at least 19 species were still missing five years after the rotenone treatments. (I say "at least" because some taxa were identified only to genus and may have included more than one species). This publication is new information since the Final Programmatic EIR (subsequent) on Rotenone Use prepared by CDFG in 1994, and it is new information not discussed in this EA.

In a short-term study on a Pennsylvania stream, Helfrich (1978) found that all 4 major orders of macroinvertebrates in the study stream exhibited substantial decreases in numerical abundance 11 days after rotenone treatment. Populations of Plecoptera and Diptera were "nearly exterminated." Trichoptera and Ephemeroptera were reduced to 50% of the pretreatment levels.

Several other studies have found variation in the tolerances of aquatic invertebrate taxa to rotenone (for example, Cook and Moore 1969, Engstrom-Heg, et al. 1978, Meadows 1972, Maslin et al. 1988). Most field studies have not identified invertebrates to the species level. And as discussed earlier, no study in California to date has identified most invertebrates to the species level before and after rotenone treatments.

In his review of the Trumbo, et al. (2000a, 2000b incorporated here by reference) studies (Exhibit F), Dr. David Herbst discussed in some detail the difference between quantitative (abundance of individuals) and qualitative (number of taxa or species) studies of invertebrates and why a disturbed

habitat would have high abundance of some cosmopolitan species (referred to as "weedy" colonizers) after a disturbance like the application of rotenone. The same issues were reviewed in Erman (1996.)

Further, the studies on which CDFG and the HTNF EA have relied (Trumbo et al. 2000a, 2000b) show long-term effects on macroinvertebrates. In fact, those studies, taken at face value, show significant changes in the species composition of macroinvertebrates based on the only detailed raw data presented, those of the stoneflies (Plecoptera.) The data in the report are contrary to the conclusion in this EA. Even the summary of the study on Silver King Creek (Trumbo et al. 2000a) contains the following statement: "Finally, there are some indications that both short-term and long term impacts might be occurring with the BCI (Biotic Condition Index)."

The EA stated that "extensive inventory of the aquatic invertebrate community in Silver King Creek, CA before and after application of rotenone applied in 1993, revealed that impacts to number of taxa and biomass occurred over the short term, but that recovery of the community occurred within three years after the final chemical treatment" (EA, p. 22). First, this study was not an "extensive inventory." Only a few organisms were even identified to species and the only raw data presented are for the stoneflies. For the most part, it is not possible to identify species from aquatic larval forms of insects. Second, rotenone was applied to the system for three consecutive years from 1991 to 1993, so the difference between 1993 and the end of the study is not the question. The question is, or should have been, how did the species composition and abundance change from the pre-project inventory to the last post-project inventory, 1996 in this case. And, third, in analyzing the only detailed taxa data presented in the report, it is clear that the stonefly taxa are different in composition, and many stoneflies identified to the genus or species level before the project were not present three years after the project.

We compared the pre-project stoneflies (1990+pre-1991) at each station with the post project stoneflies (1996) at each station. We compared the sites by how much overlap of taxa below the family level (genus and species) existed pre-and post-project. Because so few stonefly species can be identified at the species level in the larval form, these are primarily common species, not the rarest. The rare species were probably lumped at the family or order level. There was no explanation in the study for the lack of finer

identification. We counted only genera unless two species in the same genus were clearly identified.

The results were as follows for the stoneflies:

Site 1 (Control): 3 of the 4 taxa found in 1996 were the same as the 7 taxa found in 90-91. (a loss of 3 of 7 stonefly taxa, 3 were the same taxa as preproject).

Site 2: 2 of 5, 1996, same as 9 found in 90-91 (a loss of 4 of 9 taxa, two were the same taxa as preproject.)

Site 3: 0 of 0, 1996, same as 7 found in 90-91 (a loss of all taxa by post-project.)

Site 6: 1 of 3, 1996, same as 5 found in 90-91 (a loss 2 of 5 taxa, one was the same as preproject.)

Site 7: 2 of 3, 1996, same as 6 found in 90-91 (a loss of half the taxa, two were the same as preproject.)

Site 8: 0 of 3, 1996, same as 10 found in 90-91 (a loss of 7 of 10 taxa, none were the same from pre-project to post-project.)

As can be seen, these results are different from those reported in this EA and show consistent decreases in taxa in common and number of taxa at the sites between pre- and post-project samples. Recovery had not occurred within the three years between the end of the poisoning and the last data set collected.

Looking at the data another way, we calculated a stonefly index of diversity using the Margalef diversity index, $M_{DIV} = S\text{-}1/\text{Log}_e N$, where S= number of Plecoptera taxa and N is the total number of individuals. These data came from Trumbo et al. (2000a), Appendix H and I. We used all numbers and all taxa categories in those tables for 1990 and pre-1991 (before treatment) and 1996 (three years after treatment). We calculated a diversity index for both 1990 and pre-1991 data and then averaged the two indices for the before-treatment values. The control site (C) showed an increase in diversity over that period, as did treatment site 6 (Figure 1, p. 9a). Large decreases in diversity were seen at sites 2, 3, and 8 and a small decrease was evident at site 7 three years following the end of the rotenone applications.

These analyses used the data at face value with the recognition that these sites may have been poisoned by rotenone in earlier years, that no real control site existed that was comparable to the treatment sites, that there were odd differences in the way data were presented from the 1990 samples to the end

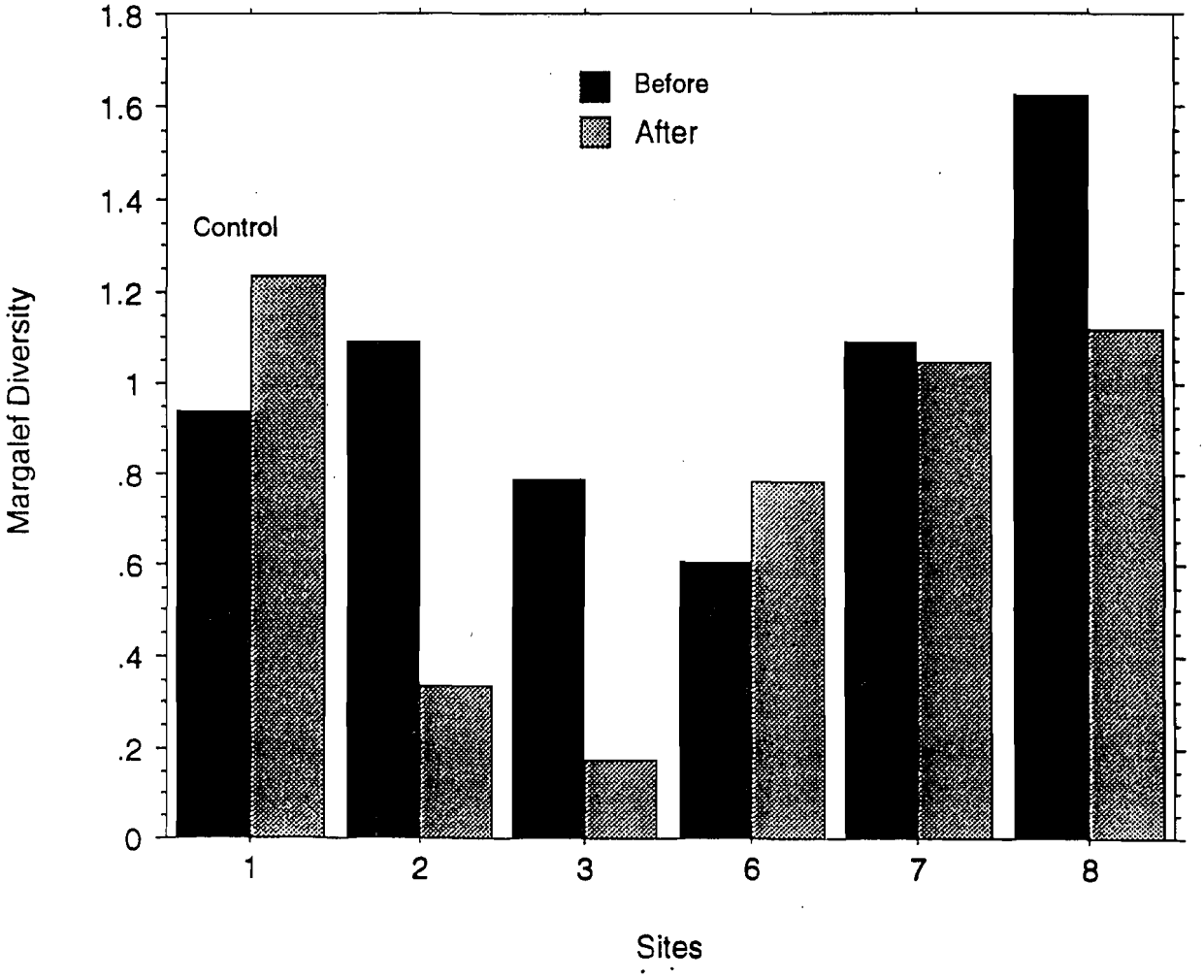


Figure 1. Comparison of Margalef diversity based on stonefly data before (average of 1990 and pre-1991) and after (1996) rotenone applications in Silver King Creek.

of the project, that there was no explanation for the lumping of taxa groups in the later samples and no explanation for the missing sites 4 and 5.

The EA continues (p. 22), "During sampling during the 1991-1993 treatment no unique species were identified (Finlayson CDFG, pers. comm.)." First, the time to identify species would have been from the preproject, 1990-91 data. Second, every species is unique, by definition. Third, what is the implication of saying they were not identified? Does this mean that no species were found or that it was not possible to identify the specimens that were collected or that the specimens were not identified for other reasons? I think the statement was meant to convey the impression that no endemic or rare species were found, but because no taxonomic work was done at the level that can make species identifications, the statement is meaningless.

Species of macroinvertebrates were not identified, for the most part, during any of this study as already discussed. The sampling that was done could not have made species determinations because few, if any, adult forms of invertebrates were collected. Further, in many cases the adults must be males and careful dissection is needed to determine species. Samples were taken at only one time during each year and would not collect many species that were either not in the water at that time or were too small to be collected.

A major error in assumption occurs in the remainder of the paragraph on macroinvertebrates (EA, p. 22): "Furthermore, sufficient source populations of macroinvertebrates are present upstream and in nearby untreated streams to allow recovery of populations of macroinvertebrates in post-treated waters. Approximately 17 miles of untreated stream will serve as a source to re-colonize the treatment area. " This is a common misunderstanding about stream macroinvertebrate species that, instead, often have restricted distributions along a stream gradient. Except for some cosmopolitan species that are found over a wide diversity of habitats, most invertebrates are able to exist only in fairly narrow zones and microhabitats along a stream gradient. In studies done on undisturbed Sierra streams, caddisfly species similarity fell by more than half within 886 feet and were reduced to only 20% within 1,476 feet in a small spring stream. In another larger spring stream, species similarity of the caddisfly component was reduced to 22% in 1.1 mile downstream (Erman and Erman 1990, Erman 1992). Just as some fish cannot survive in upstream or downstream areas

(discussed earlier), invertebrates are unable to repopulate stream sections to which they are not adapted.

In addition, the Trumbo et al. (2000a) study provides some evidence of the same result. Only two stonefly taxa identified to genus or species were found at all six sites in the 1990 preproject data, suggesting large differences in stream habitat in that study area. Comments provided to CDFG by the Lahontan Regional Water Quality Control Board (LRWQCB) staff, June 27, 2002 (Exhibit G) discussed in some detail the differences between the control site and the treatment sites in the Trumbo et al. (2000a) study.

In a project like the one proposed, not only will many headwater species probably be eliminated, possibly permanently, but some are almost surely endemic species because as the EA and CDFG Negative Dec. have pointed out, this area is so isolated that an endemic species of fish evolved here.

The plans to poison the springs make permanent species losses even more likely. Endemic species are often present in springs (Erman and Erman 1990, 1995). Springs are quite dissimilar even within the same stream basin (Erman and Erman 1990). It seems an abuse of the Endangered Species Act to use methods to restore a single species that put other native species at risk of extinction.

The possibility of eliminating rare and endemic species was also raised by the LRWQCB staff (Exhibit G). That document indicated that additional surveys at the species level should be done prior to further use of rotenone to give reasonable assurance that rare or endemic species are not present.

It sounds as if the CDFG and HTNF are expecting invertebrates from stream areas that were poisoned in 1991 to 1993 to repopulate areas poisoned in this project, but those areas may not have recovered or regained the species that were present prior to the last poisoning.

The LRWQCB stated that "In our opinion the cited studies do not convincingly demonstrate that the proposed project will have no significant adverse impacts on non-target benthic communities" (Exhibit G).

Effects on other species

Many terrestrial species, as well as aquatic, rely on emerging aquatic insect adults as a food source. In a discussion on Forest Sensitive species the EA states that "it is expected that the effects to bats would be temporary due to

the rapid life cycles of insects and the relatively low numbers of insects the rotenone treatment would affect" (EA, p. 20) Rotenone poisonings are done in the fall of the year when the new generations (early instars) of most insect species are in the water. Most insects have a one-year life cycle. Three years of poisoning could reduce four years of insect generations of many species. Over eleven miles of stream with questionable recovery for several more years would be a substantial reduction in many insect species. In addition, size of species is important for food supply of other species. Studies have shown that large-sized organisms are often replaced by small-sized organisms when a disturbance occurs in stream systems (reviewed in Erman 1996). The potential for severe reductions in food supply to such animals as bats, flycatchers, warblers, amphibians, and fish have not been adequately addressed in this EA.

Past problems with CDFG rotenone projects in the Lahontan Region

In Exhibits A, 2–9, already submitted to the HTNF during the scoping period, I outlined many past problems with CDFG rotenone projects in the Lahontan region over the past decade or so. These documents came from agency files. Based on this record, there is little reason to assume that the proposed CDFG project will be conducted without incidence of unintended fish kills or persistence of toxic substances in the stream system and lake. The record documents non-compliance by CDFG with other agencies' requirements. The EA provides no recognition of these past problems or how they can be prevented in the future.

Considerations of additional rotenone problems not discussed in the EA

It is unclear, when the Ea refers to values for rotenone, whether it is always referring just to rotenone or rotenone plus the related compound (of equal toxicity, as stated in the EA) rotenelone.

Values of concentrations of rotenone given in the EA are misleading. Stating a target concentration of Nusyn-Noxfish or rotenone may have little to do with actual in-stream concentrations. For example, according to Table 1 in the Trumbo et al. (2000b) report the 1995, 24-hr mean concentration of rotenone/rotenolone was 17.9 µg/L while the target for this project was 25

µg/L rotenone (as in the current project EA). Examination of the monitoring report (Exhibit A-5), filed separately for Silver Creek project, shows that this value only corresponded to station 102 at the downstream end of the treated reach. At station 103, midway in the treatment reach, the mean 24-hr concentration of rotenone plus rotenolone was 36.8 µg/L. Rotenolone consistently made up more than 16% of the toxic components. Similar differences from station 102 likely applied to station 103 in 1994 and 1996 thus rendering the conclusion reached in the Trumbo et al. (2000b) report ..."the rotenone concentrations applied in Silver Creek (24-hr average ≈11µg/L)..." is incorrect by a large degree. The actual concentrations were at least three times the average reported for 1995 in the middle of the treatment reach and certainly much higher than 11µg/L for the other years. Similar conclusions would apply to the proposed project considered under this EA, and therefore statements that the toxicant will be well below (known) lethal concentrations to invertebrates is incorrect.

The Trumbo et al. (2000a, 2000b) reports of rotenone effects on invertebrates have been selective in reporting results from the studies they have cited on toxicity. The work by Chandler and Marking (1982) cited in monitoring studies of Silver King Creek and Silver Creek included the response of the aquatic crustacean (Ostracoda: Cypridopsis) to an older formulation of Noxfish. Trumbo et al. (2000a, 2000b) reported the results for a caddisfly from this paper, but failed to report the results for ostracods. Ostracods are common and abundant species in small Sierra Nevada streams, seeps and springs (personal observation and sampling). Results from the toxicity bioassay for Cypridopsis conducted by Chandler and Marking show a 24-hr LD50 that easily lies within the expected (and past observed) range for rotenone application. Calculation of expected incipient lethal level of rotenone for Cypridopsis (0.5 of the 24-hr LD50 as per Trumbo et al. (2000a, 2000b) is 12.25 µg/L. The "target dose" of rotenone for the current proposed project is 25 µg/L.

The formulation of Nusyn-Noxfish includes 2.5% piperonyl butoxide. No references or review of the implications of this compound have been provided by either CDFG or USFS. Piperonyl butoxide (POB) has a long history as a synergist in insecticides and other pesticides which is probably the reason for its inclusion in Nusyn-Noxfish. The conclusions from related research on this compound shows that

• there is greater than additive toxicity when insects are treated with organic pesticides that include POB (Usmani and Knowles, 2001),

• there is evidence that when POB is added to plant-derived poisons, there is greater mortality as well as impaired reproduction in molluscs (Singh and Singh 2000, 2001), and

• in many other common insecticides the effective dose is much less when POB is included (Usmani and Knowles 2001, Stuijfzand et al. 2000).

Inferences of what may constitute lethal concentrations of rotenone for aquatic insects is weak and may have no relevance to POB enhanced formulations.

The bioassay literature for stream organisms is extremely limited. Tests that are restricted to one sex, one life stage or one instar within a life stage of insects do not represent the possible lethal dose of a poison (Stuijfzand et al. 2000, Noess 1991, Salehzadeh et al. 2002). In one study, the effect of a pesticide with POB had a 96-hr LD 50 of 29 µg/L for a fifth instar of a caddisfly larva but 1.3 µg/L for a first instar (Stuijfzand et al. 2000).

Similar concerns arise with potential use of a new, untested formulation of rotenone that includes ethylene glycol. Ethylene glycol is a known preservative of high toxicity to invertebrates.

Thus the conclusions in the EA, based on CDFG reports, studies and communication, are not based on recent literature and misrepresent the likely impact of rotenone application on aquatic invertebrates from cited literature.

The EA has concluded that rotenone application to Tamarack Lake will not require detoxification as photolysis is sufficient. In previous treatments of a lake, the state determined that rotenolone persisted long after treatment. Response from the Director of CDFG (Bontadelli 1991, exhibit A-7) to the Regional Water Quality Control Board stated "We suspect that rotenone is susceptible to photolysis but rotenolone is not."

Detoxification of the detoxicant potassium permanganate has not been considered in the EA. In previous fish poisoning operations there have been documented cases of potassium permanganate causing fish kills outside the project area when it was applied in excess of the rotenone concentration (Exhibit A). The plan has only considered monitoring of permanganate levels. Although (depending on frequency) monitoring may detect the

problem and lead to adjustment in application rates, it will do nothing to neutralize a lethal dose of permanganate passing the monitoring station below the treatment zone.

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Exhibit e

for RWQCB

Aug. 5, '04

43200 East Oakside Place
Davis, CA 95616
e-mail: naerman@ucdavis.edu
September 2, 2002

Gary Schiff, District Ranger
Carson Ranger District
Humboldt-Toiyabe National Forest
1536 S. Carson Street
Carson City, NV 89701

Dear Mr. Schiff:

Enclosed are my comments on the EA for the Paiute Cutthroat Trout Recovery Project/ poisoning parts of Silver King Creek and Tamarack Lake/ Carson-Iceberg Wilderness. Would you please inform me of your decision on this project when you have made it?

Would you also please send me the the Biological Assessment/Evaluations for threatened, endangered and proposed species that may be affected by the project when they have been completed?

Thank you for your attention to these matters.

Sincerely,

Nancy A. Erman

Nancy A. Erman
Specialist Emeritus, Aquatic ecology/
freshwater invertebrates
University of California

Exhibit F. **September 2003, Lawsuit** filed in US District Court to force US Forest Service to complete an EA on Silver King poisoning. Center for Biological Diversity and Nancy A. Erman, Plaintiffs. Jack Troyer and Gary Schiff, USDA Forest Service, Defendents. Julia A. Olson and Melissa Powers, attorneys. Case No.: Civ-S-03-1756 GEB (PAN) **All documents incorporated here by reference.**

Exhibit f
for RWQCB
Aug. 5, '04
incorporated
by reference

43200 East Oakside Place
Davis, CA 95616
e-mail: naerman@ucdavis.edu
January 7, 2004

Exhibit g
fo RWQCB
Aug. 5, '04

Jim Harvey, Project Coordinator
Humboldt-Toiyabe National Forest
1200 Franklin Way
Sparks, NV 89431-6432

Dear Mr. Harvey:

I have received your letter of Dec 22, 2003, asking for public comments on the Paiute Cutthroat Trout Restoration Project in the Carson-Iceberg Wilderness. The legal settlement that the Center for Biological Diversity and I reached with the Forest Service stated that written notice to us "shall be provided simultaneously with the initiation of scoping for public comments on the EA or EIS...." Is your letter of Dec.22 a Scoping Letter? If so, why is it not labelled as such, and why was the period for comments so short and over a holiday? Where have you posted the public notification?

The comments that I have already made on this proposed project are incorporated here by reference. They include my comments of August 31, 2002 including Exhibits A through G. My earlier comments contained new information that neither the Forest Service nor the California Department of Fish and Game has yet responded to.

My understanding is that you will include all comments that were filed in 2002 on the earlier project in preparing the new NEPA document.

Your recent letter raises several issues and questions that will not be resolved by an EA. Again, therefore, I am requesting that all state and federal agencies involved in this proposed project prepare a joint EIR/EIS.

Until we are able to review the Revised Recovery Plan for the Paiute Cutthroat Trout currently being prepared by the U.S. Fish and Wildlife Service, we cannot evaluate the logic of expanding the Paiute Cutthroat beyond its historical range. Nor can we evaluate the feasibility of developing a Paiute Cutthroat Trout sport fishery. The U.S. Fish and Wildlife report, according to

your recent letter, will not be released until July 2004. An EA, therefore, is premature and a waste of public funds at this time. Alternatives to the use of poison in streams, springs and a lake in a Wilderness Area should be developed after the Revised Recovery Plan is issued. The poisoning project has potential for significant, permanent environmental impact to non-target species and to the aquatic community in a Wilderness Area. And there is little or no evidence to suggest that the project will succeed in benefitting the target species.

The historical range of the Paiute Cutthroat Trout is in question. Please cite references for the historical range of the Paiute Cutthroat Trout in your new NEPA document.

What evidence do you have that fish are in Tamarack Lake? And if there are, why couldn't they be removed by mechanical means? Does the lake have a permanent outlet? The environmental document should discuss the long-term persistence of toxic chemicals in lakes. Persistence of toxic chemicals would violate the provisions of the Lahontan Basin Plan.

Please specify precisely where you will get pure strains of Paiute Cutthroat to restock the poisoned areas.

Please indicate on the map all springs and spring streams and any other first-order streams that would be poisoned as part of this project.

Your environmental document should develop a non-poison alternative that includes prevention of future contamination of the pure cutthroat strains by ending non-native fish stocking in Wilderness Areas, improvement of habitat and mechanical removal of formerly stocked, non-native fish.

Thank you for the opportunity to comment on your letter. Please keep me informed of all decisions regarding this proposal.

Sincerely,

Nancy A Erman

Nancy A. Erman
Specialist Emeritus,
Aquatic ecology/ freshwater invertebrate
University of California

43200 East Oakside Place
Davis, CA 95616
e-mail: naerman@ucdavis.edu
February 23, 2004

Exhibit h
for RWQCB
Aug. 5. '04

Supervisor Robert L. Vaught
Humboldt-Toiyabe National Forest
1200 Franklin Way
Sparks, NV 89431-6432

Dear Supervisor Vaught:

In your recent transmittal letter accompanying the EA for the Silver King Creek stream poisoning project in the Carson–Iceberg Wilderness Area you failed to give an exact date that public comments must be postmarked. I have since conversed with Jim Harvey by phone on February 18, and he has established that the date comments must be postmarked is March 14, 2004.

This is the second time I am objecting to the way the Humboldt-Toiyabe Forest publishes public comment deadlines under NEPA. I am sure the Forest does not want to give the impression that it is trying to be evasive or discouraging to the public, but unfortunately, that is exactly what is happening. A letter that says comments are due 30 days after the publication in some local newspaper is not specific about dates or postmarks. I urge you to please state in writing the date that comment letters must be postmarked, and please make this a directive to your entire forest.

Thank you for your attention to these details.

Sincerely,

Nancy A. Erman

To: bennj@dwq.swrcb.ca.gov
From: "Nancy A. Erman" <naerman@ucdavis.edu>
Subject: Comments:Draft NPDES Permit
Cc:
Bcc:
Attachments: Comments_Rotenone_SWRCB_permit.

To Jarma Bennett:

Attached are our comments regarding a General NPDES Permit for rotenone.
Please confirm receipt of this e-mail. Hard copy to follow. Thank you.
Nancy A. Erman
Don C. Erman

Exhibit i
for RWQCB
Aug. 5, 04

Comments submitted by e-mail to bennj@dwq.swrcb.ca.gov. March 10, 2004. Please confirm receipt. Hard copy to follow by mail.

To:
Jarma Bennett
Division of Water Quality
State Water Resources Control Board
P.O. Box 100
Sacramento. CA 95812-0100

From:
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and

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Re: Comments: Draft Statewide General National Pollutant Discharge Elimination System (NPDES) Permit for the Discharge of Aquatic Pesticides for Aquatic Weed and Pest Control in Waters of the United States

We have reviewed the Draft NPDES permit for the discharge of aquatic pesticides and are submitting these comments as private citizens in the public interest. We have reviewed over the past several years many of the rotenone poisoning projects being conducted by the California Department of Fish and Game (CDFG) on public land in the Sierra Nevada. We have reviewed the Programmatic EIR (subsequent) on Rotenone Use prepared by CDFG, July 1994.

It is our opinion that rotenone should not be included in this general NPDES permit for the following reasons:

1) Fact Sheet, p. 13. The second sentence under the heading "Rotenone" should be modified to read: "Rotenone inhibits the ability of fish **and other aquatic animals that obtain oxygen from water** to use oxygen."

Favorable conditions of flow can not be met when rotenone and other piscicides are applied to California waters. Rotenone is not species specific, nor is it merely a piscicide; but rather, it kills many non-target species including aquatic invertebrates and amphibians.

The impacts of rotenone on aquatic invertebrates are well known, have been studied for many years and continue to be studied (e.g. Almquist 1959, Binns 1967, Meadows 1973, Helfrich 1978, Engstrom-Heg et al. 1978, Chandler 1982, Dudgeon 1990, Mangum and Madrigal 1999, Cerreto et al. 2003). The impacts are variable depending on the sensitivity of each species to rotenone. Some species may be eliminated or greatly reduced while the resistent species are increased after rotenone poisoning. Cosmopolitan or "weedy" colonizer species, relatively insensitive to rotenone, tend to replace more sensitive species and the overall species diversity decreases.

Most of the aquatic invertebrate studies have been short-term. Most have only identified larval aquatic insect forms and, therefore, have not determined the number of species affected or eliminated by rotenone. If a higher taxon than a single species is affected, one can assume that a higher number of species is being affected. For example, when a study reports that a genus, family, or order has disappeared or shown major stream drift, one must assume the taxon represents more than one, and perhaps many, species.

Long-term studies have shown that invertebrates did not return to pre-rotenone status even after five years (Mangum and Madrigal 1999). Our own analysis of CDFG field data on macroinvertebrates from a 1991–1993 rotenone poisoning of Silver King Creek, Alpine County, showed that major changes in taxa had occurred following the poisoning. Taxa had not returned to pre-project composition three years after the poisoning.

CDFG is now requesting rotenone projects of three years duration, with one or two applications a year, because they have had so little success in eliminating unwanted fish

with one-year applications. The great majority of aquatic invertebrates have one-year life cycles. A three-year project eliminates many invertebrates from the stream and riparian area for as long as four years. Many terrestrial animals are dependent on the food source of emerging stream insects and fish and are put at risk from these projects because a major part of their food supply is eliminated for several years. This cascading effect in food webs is a major ecological disturbance.

The monitoring studies currently conducted by the agencies in California use immature aquatic insect forms, only. Studies at this level of taxonomy are not capable of identifying most aquatic invertebrates to species. While other aquatic invertebrates, besides insects, could be identified to species, most are not, in State agency studies.

Current bioassessment studies conducted by the State are inadequate and do not answer the question of what species and how many are being lost or affected by poisoning. Studies are needed specifically for each project with rigorous research design and valid controls.

The Programmatic EIR (subsequent) on Rotenone Use prepared by CDFG, July 1994, failed to review the impacts on non-target species that were known at that time. Further, substantial new evidence of impacts to non-target species has not been evaluated in an EIR.

Rotenone poisoning has a high likelihood of causing significant long-term, major effects in aquatic/riparian ecosystems.

2) Item 17, Draft General Permit, p. 3: The language of this section clearly states that the General Permit applies when "...aquatic pesticide discharges require minimal or no treatment systems to meet limits and pose no significant threat to water quality."

Use of rotenone as a fish poison requires that rotenone must be neutralized chemically in order to control its toxic effect downstream from treatment areas. This chemical neutralization is commonly attempted with potassium permanganate. Failure by the California Department of Fish and Game (CDFG) to achieve complete neutralization or to cause fish kills from the potassium permanganate itself is documented in Regional Water Quality Control Board files.

Therefore, the Board should review if the pesticide rotenone can be granted a General Permit under the terms proposed and if it is eligible for Category 3 in section 2200(b)(9) of Title 23, California Code of Regulations (CCR).

We have read reports from the Lahontan RWQCB files and from CDFG files. During rotenone poisoning of Silver King Creek, Mono County, 1992, approximately 1000 fish were killed downstream of the project area from the application of potassium permanganate (Lahontan RWQCB files). The following year, 1993, during a repeat poisoning of the same area, detoxification of the rotenone was chemically incomplete (Flint et al. 1998). The record shows that CDFG has difficulty managing the performance

of potassium permanganate and detoxifying the rotenone. This demonstrates that rotenone does not meet the test of "minimal or no treatment system to meet limits..."

In the Lahontan Region alone, 6 of 11 rotenone projects since 1988 have violated water quality standards. Rotenone, rotenolone, or naphthalene have been detected downstream or have persisted longer than limits established in Basin Plans (Lahontan RWQCB files).

During application of rotenone in Silver Creek, Mono County, in 1994, independent testing by the Regional Water Quality Control Board found carcinogenic compounds in water. In contrast, testing by CDFG at the same sites found no detectable carcinogenic compounds (Lahontan RWQCB files).

Rotenone was detected in sediment during a CDFG project in Silver Creek, Sept., 20, 1995. CDFG was well over their target application rate of rotenone, with data apparently missing at a critical period (Lahontan RWQCB files).

Rotenone and its breakdown products have persisted in water for long periods after CDFG poisoning projects (Lahontan RWQCB files).

Higher amounts of rotenone are being used than are recommended because of accidents (e.g., Flint et al. 1998).

Reporting to RWQCBs from CDFG has not been timely. The Flint et al. 1998 Administrative Report, for example, was not submitted until 5 years after the project was completed.

We further recommend that all rotenone projects conducted on public lands or on streams or rivers in the state should be monitored independently by RWQCB staff. All rotenone projects should be monitored, not merely the 20 percent recommended on p.16, Fact Sheet.

3) The Board has restricted its discussion to the term rotenone in this Draft. Before final approval, the Board should review literature on other active compounds included in various formulations of rotenone-based pesticides. For example, most fish poisons based on rotenone formulations (e.g., Nusyn Noxfish, Noxfish) include other cube resins in the formulation. Nusyn Noxfish has 2.5% rotenone and 2.5% other cube resins, and Noxfish has 5% and 5% respectively. These other "cube resins" or "rotenoids" are part of the plants used to create the pesticide. They include cube resins such as deguelin, tephrosin and others, which in themselves have properties similar to rotenone and can be separated analytically (Cabizza et al., 2004; Draper, et al, 1999). Further, some formulations that include "cube resins other than rotenone" have been withdrawn from approval by the US EPA(see EPA-Pesticides-Restricted Use Products (RUP) Report).

The Board should add language that expands the meaning of rotenone to include "rotenoids" and other toxic additives, or list actual technical terms for such chemicals.

4) The intent of chronic toxicity testing should be to **prevent** damage to beneficial uses (Section C, p.3, Monitoring and Reporting Program.) As outlined in the Draft the testing procedure comes only **after** a pesticide is applied. Short-term tests (Section C.1.a.) should be required in a "screening period" **before** field application of the pesticide. The test organisms should be exposed to the specific pesticide formulation(s), water quality conditions of the project (e.g., hardness, temperature), and expected concentrations as a means of making a preliminary judgement on whether beneficial uses likely will be affected.

Therefore, The Board should consider requiring the "screening period" chronic testing **prior to** field application of a pesticide formulation.

No Experimental Use Permits should be allowed for field application of new formulations of rotenone.

5) The information on possible human effects of rotenone based on animal studies is unclear. The California Environmental Protection Agency, Department of Pesticide Regulation, Medical Toxicology Branch has conduced reviews and prepared a summary of toxicology data gaps for rotenone (see CAL EPA web site). The latest update is indicated as 2/18/97. For the eleven categories of toxicity, one (neurotoxicity) was "not required at this time". For the remaining ten categories, all were judged "Data gap, inadequate studies." However, for these ten categories, three had "no adverse effect indicated" and seven had "possible adverse effect indicated" in the summary.

Substantial new information is available on the connection between rotenone and Parkinson's Disease (e.g., Greenamyre et al. 2003, Hirsch et al. 2003, Gao et al. 2003). A Web of Science search revealed 110 papers on the subject, many of them published in the last four years. The CAL EPA, therefore, may be remiss in not requiring reviews of the "neurotoxicity" category.

These data make it difficult to conclude anything regarding the adequacy of testing to determine possible toxicity of rotenone. Footnotes to the CAL EPA report seem limited to the adequacy of meeting the requirements of SB950 of 1984. Reference doses calculated as safe exposure levels in this Draft General Permit are not reassuring given the above CAL EPA Summary.

In summary, there is a high likelihood that rotenone will cause significant, long-term effects on non-target organisms. Substantial new information was not evaluated in the Programmatic EIR (subsequent) on Rotenone Use prepared by CDFG ten years ago. Rotenone should not be included in this general NPDES permit. Individual, project-specific permits should be required by the RWQCBs for every rotenone project. If rotenone is to be included in this General Permit, a full EIR should be prepared.

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To: Jim Harvey
Humboldt-Toiyabe National Forest
1200 Franklin Way
Sparks, NV 89431-6432

March 12, 2004

Exhibit j
for Lahontan
RWQCB
Aug. 5, 04

From:
Nancy A. Erman
Specialist emeritus: aquatic ecology/freshwater invertebrates
University of California
43200 E. Oakside Place
Davis, CA 95616
naerman@ucdavis.edu
530/758-1206

Re: Paiute Cutthroat Trout Recovery Project/ poisoning parts of Silver King Creek and Tamarack Lake in the Carson-Iceberg Wilderness Area, Alpine County, CA: Comments on Environmental Assessment

I am a retired professional aquatic ecologist with a specialty in freshwater invertebrates. I am filing comments on this Environmental Assessment (EA) as a private citizen, in the public interest. I filed comments, January 7, 2004, on the letter sent to the Public from Supervisor Vaught, Dec. 22, 2003. I reviewed the scoping document and EA on the earlier proposed project and filed comments with Humboldt-Toiyabe National Forest, May 29, 2002 and Aug. 31, 2002. I reviewed the Negative Declaration documents of the California Department of Fish and Game (CDFG) and filed comments with the CDFG, June 12, 2002. Those four sets of comments are included here as Exhibit I.

I participated, as a scientist, in the Sierra Nevada Ecosystem Project (SNEP) and wrote chapter 35 in the Final Report to Congress, *Status of Aquatic Invertebrates*.

Need for a joint EIS/EIR

This new EA and the U.S Fish and Wildlife Service (USFWS) Draft Revised Recovery Plan for the Paiute Cutthroat Trout, 2003 (Draft Recovery Plan) indicate a clear need for a joint EIS/EIR to be prepared by all state and federal agencies involved in this proposal for stream poisoning.

The EA indicates that a significant effect upon the environment and on non-target species is likely if poisoning of Silver King Creek and other water bodies in the watershed are carried out. An EIS, therefore, is required.

The USDA Forest Service (FS) is responsible for all species on FS land, not just a few selected game species. "We don't want to dump poisons into a stream in a wilderness area unless we fully understand all the effects. We don't want to get so focused on one species of trout that we overlook the effects on other organisms, down to microorganisms." (Matt Mathes, a Forest Service spokesman in California in Braxton-Little, J. 2000.)

There are discrepancies among this EA, the USFWS Draft Recovery Plan, the published scientific literature and other reports upon which the Draft Recovery Plan relies (to be discussed).

No cumulative effects analysis of all the past poisoning in this watershed has been conducted, in spite of clear evidence that aquatic invertebrates had not recovered several years after the last poisoning in 1991–93.

The EA fails to evaluate the cumulative impacts of fish planting by the CDFG throughout the Sierra and in this drainage.

USFWS Draft Recovery Plan is only a draft and will likely require significant revision. None of the three action alternatives in this EA (2, 3, or 4) should be decided or conducted before that document has been completed and accepted.

These several staggered, separate reviews by state and federal agencies are unacceptable on a project this controversial in a Wilderness Area and with such a long history of agency management and so many potentially significant environmental and cumulative impacts.

There is no one place where members of the public can get all the information on this project. Nor is there a single agency that has all the details of the project. And yet, several agencies (at least five) have separate or interconnected or overlapping responsibilities for the project (Lahontan Regional Water Quality Control Board, the FS, CDFG, USFWS, and the California Department of Pesticide Regulation.)

It required a court action by members of the public to force the FS to conduct the required NEPA process on this project and prepare this EA, complete with non-poison alternatives, a fact that has been omitted and misrepresented in the EA. (p. 7).

<u>No Need for Project</u>

A need for the project has not been demonstrated by either the EA or the USFWS Draft Recovery Plan. The No Action Alternative 1, therefore, is the logical option (but see discussion of Alternative 3 below). The No Action Alternative may also provide more protection for the Paiute cutthroat trout over the long term than either of the poisoning alternatives. The Paiute cutthroat trout (a subspecies of the subspecies Lahontan cutthroat trout) is presently restored to more stream miles (11.5) within its presumed native habitat of the Silver King Creek watershed than the 9.1 miles it is believed to have inhabited originally (USFWS Draft Recovery Plan). It is restored to its type locality, that location above Llewellyn Falls where it was first collected and described by Snyder in 1933. According to the 1985 USFWS Recovery Plan, the objective of restoration was to restore the fish in Silver King Creek above Llewellyn Falls. That objective has been met.

In addition, the subspecies has been transplanted by CDFG and secured in four additional isolated streams. It now inhabits over twice as many total stream miles as it did originally (20.4). It is, of course, a non-native fish in these other four habitats outside the Silver King basin.

There is no scientific evidence and no new evidence to support the new contention of the FS and the USFWS that the historic native habitat was below Llewellyn Falls. This fact is finally admitted in the USFWS Draft Recovery Plan (p. 15, para. 2) after three and half pages of "scenarios" based on anecdotal, varying stories involving a sheepherder whose brother was contacted by a rancher who answered a letter from a Fish and Game employee 30 years or so after some boys or men carried fish in a can and released them above Llewellyn Falls before or after fish did or did not exist there. The presence or absence of fish in a stream must be established by sampling using either an electric shocker or a seine and following a scientific protocol. No such sampling was done above Llewellyn Falls prior to the discovery of the new subspecies in 1933. No new evidence has emerged in the last 20 years to establish the historic distribution of Paiute cutthroat trout (PCT). The same stories have been repeated in several published papers and unpublished reports (e.g., Israel et al. 2002, Behnke 1992, Behnke and Zarn 1976, Ryan and Nicola 1976)

Ryan and Nicola (1976) concluded, after reviewing the stories in great detail, that the exact native habitat of PCT in the Silver King drainage will remain unknown.

PCT exist now in the stream section below Llewellyn Falls because some fish go over the falls and the barrier on Coyote Valley Creek and Corral Valley Creek and are available for anglers to catch in the lower section of Silver King Creek below Llewellyn Falls which is presently open to angling. The unique experience of catching Paiute cutthroat trout in their native drainage is provided currently, contrary to the misstatement on p. 14, (alternative 1, No Action, Issues 4 and 5).

The PCT will be no more secure or safer from hybridization if restored as a monospecific population below the falls than they are now. The sad truth is that the CDFG and the USFWS have been teaching people for a hundred years or more that moving fish from one place to another is a good thing. The stream could be poisoned for three years, eliminating and reducing non-target species and causing massive changes in food webs, and still, a well-meaning fisherman who wants to fish for rainbow trout could undo the effort with one bucket of fish. Or the other fish species may just move back upstream over the "barriers."

The EA fails to evaluate the cumulative impacts of fish planting by the CDFG throughout the Sierra and in this drainage. The EA fails to understand how moving fish outside their native range ultimately affects all native fish populations, amphibians and native invertebrate species and assemblages and teaches the public the wrong lesson. Recent studies have shown that stocking fish in formerly fishless areas has had a negative effect on endemic and rare invertebrates in Sierra streams (Herbst et al, 2003) and on amphibians (Knapp 1996, Knapp and Matthews 2000).

The CDFG has planted most of the fish it later wants to poison. Prior to the 1991 stream poisoning project above Llewellyn Falls, approximately 800 fish were moved below the falls into the area the FS, CDFG, and USFWS (the agencies) now want to poison (Flint and Trumbo. 1998, p. 8). Also in 1991, CDFG, planted non-native trout in Tamarack Lake where the agencies now propose poisoning to eliminate unwanted fish. "In 2003, approximately 500 hybridized trout were removed from Silver King Creek and stocked in suitable waters outside the project area" (FS EA, p. 6). The EA is silent about what those "suitable waters" were, but the Trout Unlimited website says the hybrids were moved to high mountain lakes (Exhibit II).

One might almost think that the agencies first ensure that unwanted fish are present and then advocate poisoning the area. It seems that as long as the agencies have the tool of poisoning watersheds at their disposal, they will

continue to stock fish, even hybrids, wherever it seems convenient, giving little thought to the impacts on non-target species and biodiversity.

An American Fisheries Society Policy Statement (#29–Biodiversity) documents, with numerous scientific references, the long, sorry record of the impacts of fisheries management on the loss of diversity (Exhibit III). "Fisheries management agencies have contributed to the loss of diversity. Conventional natural resources management tends to reduce diversity through simplification, fragmentation, and selective destruction. Often management strives for the immediate benefit of a few desirable species..." (American Fisheries Society Policy Statement #29 – AFS website). "If there is a public bias against cold-blooded vertebrate animals such as fish, there is certainly a general lack of awareness of the importance of invertebrate life forms and their interactions in biodiversity." (American Fisheries Society Policy Statement #29 – AFS website).

There is no fish eradication method that is a final solution, guaranteed to remove all fish forever. Until and unless the agencies review and assess their own actions and complicity in the spread of non-native species, there is no way to guarantee success in any fish restoration effort. The CDFG fish stocking program has a categorical exemption from the California Environmental Quality Act, and so, has no required public review. Examples of CDFG public education programs that encourage the planting of fish and fish eggs were given previously in Exhibit I.

Angling should stay closed above Llewellyn Falls if the PCT is to remain in its currently stable state. An objective of the preferred alternative 2 and alternative 4 is to open fishing above Llewellyn Falls (EA, Table 1). There is no evidence that opening the secured area above the falls would in any way help this subspecies. Opening the area above Llewellyn Falls will make it more likely that non-native fish will be transported into the area. Alternatives 2 and 4 would put the PCT at greater risk than it is now. The primary objective of the agencies seems to be to expand the fishing miles for the PCT and has little or nothing to do with protecting the PCT and the many other non-target species that will be put at risk by three years of poisoning.

It seems odd given the concern the agencies profess for this subspecies that they have never conducted or commissioned a study on the biology of the PCT in its native range. The only life history studies completed were on the introduced population in the North Fork Cottonwood Creek, Mono County, CA (USFWS 2003). Such basic information as how long individuals live in their native

drainage is unknown. In spite of all the PCT that have been caught, collected, moved or poisoned in the Silver King drainage over 70 some years, no age and growth study based on fish scales has been done on pure PCT. One limited report of 40 trout collected in 1956 in Silver King looked at age based on fish scales, but those may have been hybrid trout (Ryan and Nicola 1976).

Equally strange is the lack of any habitat condition assessment in the last 14 years. The last assessment showed well over half the PCT habitat in the Silver King drainage in poor or fair condition (USFWS Draft Recovery Plan). Habitat was a key criterion to recovery of the PCT. "Habitat and population trends will be closely monitored" (Management condition #4–Paiute Cutthroat Trout Recovery Plan, USFWS, 1985).

The EA does not deal with the fact that the "refuge" populations of the PCT are evolving rapidly to be different from each other and must be mixed to retain their genetic likeness (Israel et al. 2002). The so-called refuge populations outside the drainage (and maybe inside) are not really the same fish anymore. In fact, when one reads the whole confusing picture of how this fish has been moved around and retrieved again and again, it is difficult to know what the real PCT is. Is it an early form of the subspecies Lahontan CT (Nielsen and Sage 2002), or is it a relatively recent subspecies of the Lahontan CT (Israel et al. 2002). And if recent, how recent?

The first requirement for compliance with the Wilderness Act, as stated in the EA (p. 43) is that "the restoration work has a reasonable chance for success." This "restoration" project has little chance of long-term success.

Impacts on Non-Target Species

The impacts to aquatic invertebrates were discussed in detail in my earlier comments (Exhibit I). Most of these comments and the literature that I cited showing impacts to aquatic invertebrates have been ignored in this EA. "A letter from Robert Vaught to Interested Public, Dec. 22, 2003, stated that "All comments received during the 2002 scoping and EA comment period will be considered in the development of the new EA."

The studies on which the CDFG and FS have relied (Trumbo et al. 2000a, 2000b) in fact show long-term effects on aquatic invertebrates and significant changes in composition of macroinvertebrates in the Silver King drainage as a result of past poisoning. These studies provide clear evidence of the potential for significant and long-term impacts to non-target instream communities, as

previously discussed (Exhibit I). A plot of even the crude BCI ratings given for aquatic samples in the EA (p. 64) shows that aquatic invertebrates had not recovered to pre-project conditions three years following the last poisoning in 1993 (~~Table~~ Fig. 1). The Water Quality Control Plan for the Lahontan Basin (Basin Plan) requires that species composition objectives "shall be met for all non-target aquatic organisms within one year following treatment." And the relevant species composition objective states:"Species composition shall not be altered to the extent that such alterations are discernible at the 10 percent significance level" (see Lahontan Basin Plan requirements for the East Fork Carson River Hydrologic Unit). The data indicate that the 1991-1993 poisoning did not meet these objectives, and it is highly unlikely that the proposed project can meet these objectives. In sum, the data from the 1991-93 rotenone project and other published literature indicate that the proposed project would violate the Lahontan Basin Plan's requirements that non-target organisms shall recover within one year following stream poisoning with rotenone.

The impacts of rotenone on aquatic invertebrates are well known, have been studied for many years and continue to be studied (e.g., Almquist 1959, Binns 1967, Meadows 1973, Helfrich 1978, Chandler 1982, Dudgeon 1990, Mangum and Madrigal 1999, Cerreto et al. 2003). The impacts are variable depending on the sensitivity of each species to rotenone. Some species may be eliminated or greatly reduced while other species are increased after rotenone poisoning. As discussed by Dr. David Herbst in his earlier comments on this project (Exhibit I), cosmopolitan or "weedy "colonizer species, relatively insensitive to rotenone, will be expected to replace more sensitive species and the overall species diversity will decrease.

Most of the aquatic invertebrate studies have been short-term. Most have only identified larval aquatic insect forms and, therefore, have not determined the number of species affected or eliminated by rotenone. If a higher taxon than a single species is affected, one can assume that a higher number of species are being affected. For example, when a study reports that a genus, family, or order has disappeared or shown major stream drift, one must assume the taxon represents more than one, and perhaps many, species.

The studies currently being conducted by the agencies in California are on immature aquatic insect forms, only, and are not capable of identifying most species, except in rare instances where a genus includes only one or two species, or where a larval form has characteristics so unusual that the species can be

determined. Taxonomic insect keys are written primarily for adult males. **To claim that no rare or endemic taxa have been found in the Silver King drainage (EA p. 33), therefore, is a significant misrepresentation because no study has been conducted or designed to make that determination.** While some of the non-insect invertebrates could have been identified to species, none have, according to the taxa list provided in the EA.

The taxonomic list provided in the EA is low in numbers of invertebrate taxa and represents a highly disturbed watershed, a poorly designed study or negligent analysis or all three. In a drainage of this size in a Wilderness Area (that should be relatively undisturbed), we might expect somewhere between 200 and 400 species of aquatic invertebrates, or more, and several endemic species (Erman 1996). This drainage however has undergone extreme disturbance in the form of repeated stream poisonings, extensive livestock grazing, and stocking of non-native fish species.

The Sierra Nevada has a high number of endemic, locally distributed aquatic invertebrates of evolutionary importance (Erman 1996). It is unfortunate that agencies that should be concerned about maintaining this biodiversity, particularly in Wilderness Areas, are so focussed on single species management that they put many other species at risk.

The plans to poison springs make permanent species losses even more likely. Endemic species are often present in springs (Erman and Erman 1990, 1995). Springs are quite dissimilar even within the same stream basin (Erman and Erman 1990). It seems an abuse of the Endangered Species Act and the California Wilderness Act to use methods to restore a single species that put other native species at risk of extinction.

The following statement is a myth that persists in the agencies: "Macroinvertebrates from untreated upstream reaches and seeps and springs can also help repopulate downstream treated areas" (EA, p. 34). Macroinvertebrates in general are distributed in rather narrow sections along a stream gradient. Only the most cosmopolitan species could survive downstream from upper reaches, seeps and springs (Erman 1989, 1992). This issue was discussed earlier in detail in Exhibit I.

The EA has omitted the information (EA p. 23) that the great majority of aquatic invertebrate are insects, most of which emerge as adults into the terrestrial environment where they are an abundant and important food source for a wide variety of birds, amphibians, reptiles, mammals, and fish.

There is no reason for the agencies to expect "full recovery of macroinvertebrate populations and taxa" following three years of poisoning 11 or so miles of streams, springs, and a high mountain lake (EA, p. 34). The FS seems to feel that repeating this statement will make it so, in spite of much evidence to the contrary. In fact, there are many reasons not to expect full recovery based on current scientific knowledge and results from the previous 1991–93 poisoning.

Invertebrate study design

Another poorly understood, inadequately designed invertebrate study, conducted after the fact, will do nothing to undo the expected damage that this poisoning project will likely cause. The study outlined in the EA is not designed to answer the question of whether species are being lost due to stream poisoning.

"The general lack of knowledge concerning the variability of the metrics" is given as a reason for the impacts found in the earlier study by Trumbo et al. 2000 (EA p. 32). Is this an admission that the authors had a general lack of knowledge about the analyses they were using, or that they used analyses that were known to be inadequate? And if this statement is true, how will another study change the outcome?

Impacts to Other Species

The "let them eat cake" attitude toward the diets of the willow flycatcher and the yellow warbler, two bird species heavily dependent on emerging aquatic insects for their diet, shows how far the FS will go to favor one species over another. Reducing or eliminating the food of a species is a major alteration and disturbance of its habitat. Food is an essential component of "habitat." The rotenone project should be expected to have major impacts on these two declining bird species, contrary to the statements in this EA (p. 31, 36)

As previously discussed in Exhibit I, emerging aquatic insects can be expected to be significantly reduced for at least four years if this poisoning project is carried out. The great majority of aquatic insects have one-year life cycles (contrary to the "rapid life cycles "statement on p. 36) and some species have life cycles of two or more years. Eggs of most species at this high elevation are laid in the late summer and early fall. A late summer-early fall poisoning

would significantly reduce species emergence for the following year and would reduce fall emergence for the year of poisoning.

The discussion of mountain yellow-legged frogs misrepresents the information from the studies by Knapp (1996) and Knapp and Matthews (2000) to make it seem as if native species of fish (i.e., fish species in their native habitat) have no impact on amphibian populations. The Knapp and Matthews studies were concerned with the impacts to amphibians by fish that have been stocked in formerly fishless areas. The EA states that "effects from PCT to MYLF have not been reported." Have they been studied? If so, please list the literature or study citation. If not, omit the sentence.

What happened to the "several thousand mountain yellow-legged frogs" that were observed (when, what date?) along the shores of Whitecliff Lake as recently as 1993 (EA, p. 24)? What is the complete poisoning history of Whitecliff Lake and Bull Canyon Creek (error in EA–see below)? How close to Whitecliff Lake was the 91–93 poisoning? The EA states that mountain yellow-legged frogs "have been recently found" near the confluence of Fly Valley Creek. Isn't that the only creek section in the watershed that has never been poisoned? How many frogs were found and on what date?

This proposed further poisoning of streams in the Carson Iceberg Wilderness Area does not "aid in achieving the goal of preserving the wilderness character of the area", a goal from the California Wilderness Act of 1984 as stated in the introduction of the EA. In contrast, it would diminish the wilderness character by altering natural processes (i.e., poisoning surface waters thereby killing native wildlife) and diminishing solitude (i.e., gasoline powered pumps, a powered auger, and large crews discharging brightly-colored chemicals to streams).

Tamarack Lake

What evidence exists that fish are still in Tamarack Lake? If they are, they can be removed by mechanical means, even if it takes longer. But first, the FS needs to establish, by gill netting, that fish are still in the lake. The CDFG and FS have had the last 11 years to gill net the fish out of this lake. There is obviously no immediate need to get rid of the fish or the agencies would have been working on it.

The environmental document should discuss the long-term persistence of toxic chemicals in lakes. Toxic degradation products of rotenone have persisted in lakes after similar projects (see, for example, letter from Harold Singer, Executive Officer, Lahontan RWQCB to Pete Bontadelli, Director CDFG, October 21, 1991: Persistence of rotenolone at Wolf Creek Lake following 1991 treatment. Included in Exhibit I). Persistence of toxic chemicals would violate the provisions of the State's Lahontan Basin Plan and should be considered a significant effect under NEPA.

Conflicting and Missing Information

In several places in the EA and the FWS Draft Recovery Plan reference is made to barriers with implications for both removing them and building them, but it is not clear what is really planned in these Wilderness Area streams, and the agency documents vary. Nor is it clear what stream-disturbing activities have been conducted in the past regarding the streams of the drainage. The FWS document mentions fish habitat improvement structures and bank protection projects that were constructed in 1988. One document mentions artifical stream channels that were constructed in the Wilderness Area. When and where did this occur?

The planning documents vary significantly among the agencies. Each agency has used a different map with barriers missing or in different places. Height of barriers has changed in the EA from 2002 to this 2004 document.

Whether or not barriers to fish migration really exist is critical to this whole plan. The inconsistencies among the agencies' stories raise substantial questions. No detailed description of the supposed "barrier" on lower Silver King Creek is presented.

The information regarding past poisoning and where it occurred varies among the documents and published reports. The FS EA says that headwater areas in Silver King Creek, Bull Canyon Creek and Four Mile Canyon Creek have never been treated with rotenone. But Ryan and Nicola (1976) report that all of Bull Canyon Creek and Whitecliff Lake were poisoned in 1964. Please include in the EIS a chart or map with dates of all past rotenone projects in this drainage. Include also a map showing specifically which fishless headwater areas would not be treated above barriers, as stated on p. 9 (EA).

The EIS should include a summary of the findings of the BAs that were completed for the Lahontan cutthroat trout and the bald eagle. These are noticeable omissions in this document where summaries are given for several other sensitive species but not for Federally listed Threatened, Endangered and Proposed species.

The methods to be used for rotenone application should be described in the EIS. Referring to a general journal paper, as the EA has (EA, p. 9), does not delineate how rotenone will be applied in this specific case.

Past Mistakes and Unintentional Fish Kills

Included in my 2002 scoping comments are several reports from the Lahontan Regional Water Quality Control Board files documenting past mistakes and accidental fish kills that occurred outside the treatment area during CDFG poisoning projects (Exhibit I). Six of 11 poisoning projects between 1988 and 1994, in the Lahontan Region, alone, have violated water quality standards. In Silver King Creek during the 1992 rotenone project, 1000 fish were inadvertently killed downstream of the project area by potassium permanganate, a strong oxidant used to detoxify rotenone (Exhibit I). The high rate of past problems and water quality violations at similar projects point to the potential for significant effects and the need for an EIS.

In addition to errors with rotenone and potassium permanganate, non-native fish in live cars (used to monitor effectiveness of the poison) escaped into the stream section being poisoned, not once but twice (Flint et al. 1998). As a result, "the creek was heavily doused with rotenone from backpack sprayers so that total concentrations peaked at 40 μg/l at detox, about twice (sic) expected." Not all the escaped fish were found (Flint et al. 1998). Thus, even as CDFG was attempting to get rid of fish, they were accidentally introducing them.

The issue of non-native fish in the live cars has not been resolved in this EA.

The administrative report (Flint et al. 1998) on the 1991–93 poisoning of streams in Silver King Creek was not submitted until 5 years after the poisoning was conducted. Nor was it included or reviewed in this EA or in the FWS Draft Recovery Plan.

What reason does the public have to believe that anything will be different the next time?

Alternative 3

This alternative seems a reasonable, though unnecessary (as discussed above), compromise project that could reduce the number of non-native fish below Llewellyn Falls and perhaps make the habitat better for PCT. It is clear that many volunteers are available to do the fish shocking removal (see below). Alternative 3 is described with a foregone conclusion that it will be a failure, but it sounds more as if it will be sabotaged and guaranteed to fail. There is no particular reason that it couldn't accomplish many of the objectives of fish removal with far fewer impacts to non-target species, if the agencies had the will to make it succeed. "The CDFG would likely allow hybrid fish to repopulate the project area after years of attempting fish removal" (EA p. 46). Yes, and likely that will happen whether the fish are removed by poison or by fish shocking.

The published accounts of PCT describe it as an easily caught fish. It is likely not much of a game fish and the thrill of catching a small, spotless fish may not last long with dedicated fisher folk. The plan is to "substantially reduce the existing recreational fishery" (EA p. 46) whether by poison or by fish shocking. The only alternative that preserves the "existing recreational fishery" is alternative 1.

Role of Non-Governmental Fishing Organizations

"Trout Unlimited continues to spearhead the work on Silver King Creek while relying on the cooperative agencies for scientific and logistical support. We are planning the next phase of the project in conjunction with agencies and will provide an abundance of volunteer labor as well as funding for equipment, materials, and transportation." (Trout Unlimited website regarding PCT in Silver King Creek—Exhibit II).

A Rotenone Stewardship Program, funded partially by the Foreign Domestic Chemicals Corporation and Prentiss Incorporated, whose products are promoted in the website advice column, is part of the American Fisheries Society Fish Management Chemicals Subcommittee (AFS website).

Rotenone and Parkinson's Disease

Substantial new information is available on the connection between rotenone and Parkinson's Disease (e.g., Greenamyre et al. 2003, Hirsch et al. 2003, Gao et al. 2003). A Web of Science search revealed 110 papers on the

subject, many of them published in the last four years (Exhibit IV). This new information should be included in the EIS. The risk of exposure would be greatest to those handling the rotenone. The FS should rely on the research papers published in medical journals rather than on a paper in a fisheries journal that promotes the use of rotenone (EA p. 39).

Difficulty of Getting Public NEPA/CEQA Documents and Comment Deadlines

In contrast to the preferential treatment being given to some special interest groups (documented above), I have had problems getting information on this project from both the CDFG and the FS in the past (Exhibit I). The deadline for comments to be postmarked was not included in the transmittal letter for this EA, and it required phone calls and e-mails to get a final postmark date of March 15 established for comments on this EA (Exhibit V). Nor was the date available at the FS website that has the EA. In addition we are being told that letters that are part of this public NEPA process and document will require a Freedom of Information Act request if we want to see them.

Surely the Forest Service does not want to give the impression that it is uncooperative with the Public, or that the Wilderness Area is being managed for special interest groups, and so, I recommend that you make some changes in the way you are dealing with the Public regarding NEPA.

Summary and Conclusions

The proposed project clearly poses the potential to result in significant adverse effects to non-target species, and an EIS should therefore be prepared. The proposed project is also highly controversial (these comments and comments from Dr. David Herbst) also indicating the need for an EIS. The proposed project would also adversely affect the wilderness character, which is not permitted by the Wilderness Act when alternatives are available.

Please select the No Action alternative, or proceed to prepare a full EIS that evaluates the issues raised in these and my previous comments, which are incorporated by reference.

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Exhibit II

TU Conservation Projects

California Water

North Coast Coho

California Golden

Lahontan Cutthroat

Paiute Cutthroat: Silver King Creek

So CA Steelhead: San Mateo Ck



Paiute Cutthroat in Silver King Creek

Paiute Cutthroat Trout have survived for thousands of years exclusively in the watershed of Silver King Creek and its isolated tributaries in Alpine County. By the early 1970's, Paiute cutthroat trout had reached such low population levels that they were near extinction. The US Fish and Wildlife Service determined that the Paiute cutthroat trout be placed on the Federal Endangered Species list.

The main causes of the Paiute's demise were; hybridization, competition with introduced trout species, and habitat degradation caused by poor range management. The introduction of rainbow trout to Silver King Creek by unnamed sources in the 1950's and 60's had caused hybridization and the loss of important pure Paiute cutthroat genetics. Small tributaries to Silver King Creek still hold a pure strain of Paiute cutthroat trout. Hybridization can be a double- edged sword, by not only losing important genetics, but also the competition for valuable food sources.

Sheepherders have utilized Silver King Creek since the late 1800's and cattle grazing began in the 1950's. However, poor range management has led to extensive habitat degradation.

Finally, in 1985, the United States Forest Service (USFS) developed a Paiute Cutthroat Trout Recovery Plan that involved the California Department of Fish and Game, and Trout Unlimited volunteers, spearheaded by the North Bay Chapter. The plan focused on habitat restoration above Llewellyn Falls at Silver King Creek. From 1986 to 1993, over 400 TU volunteers worked tirelessly on restoration projects to improve the Paiute habitat. In-stream log structures were installed in the creek to stabilize the bank and reduce siltation, and solar powered exclusionary fencing was erected to prevent further habitat degradation from grazing. The majority of hybridized fish in the area above the falls were removed through electro-shocking and transported to high mountain lakes. Almost ten years later, all the hard work resulted in an increased population of only pure strain Paiute Cutthroat trout above Llewellyn Falls.

Trout Unlimited continues to spearhead the work on Silver King Creek while relying on the cooperative agencies for scientific and logistical support. We are planning the next phase of the project in conjunction with the agencies and will provide an abundance of volunteer labor as well as funding for equipment, materials, and transportation. The



of stream. Healthy Paiute trout will then be reintroduced to their original habitat. A successful reintroduction of the Paiute Cutthroat Trout to the entire length of Silver King Creek could ultimately result in the Paiute Cutthroat being the first fish species removed from the Federal Endangered Species List.

Video, photos, and printed word in the local news media will document the project, and press releases will be sent to the larger regional media. Our membership will be kept abreast of plans and progress in "Trout Tactics", our chapter newsletter. Articles will appear in the Trout Unlimited of California state newsletter, *California Cast*, as well as in *Trout*, TU National's magazine that has a circulation of over 125,000 nationwide. With the involvement of members of the local community and the continuing cooperation with governmental agencies and the scientific community, the news of our efforts will spread.

Above all, the greatest benefit will be to the survival of the Paiute Cutthroat trout by restoring the species to their native runs and ultimately being de-listed from the Endangered Species List, a first in fisheries.

Detailed Project Scope

The Paiute Trout recovery project has taken many years and much dedicated hard work by Trout Unlimited volunteers and cooperative agencies to successfully reintroduce the Paiute to a *portion* of their native range in the Sierras. The California Department of Fish and Game and the U.S. Fish and Wildlife Service has invited the North Bay Chapter of Trout Unlimited to resume the project's final phase in late summer. The target date is August 23 and 24, 2003.

The project site is located in a remote wilderness area where vehicles are prohibited. Logistically, this means that a local pack station, experienced in the Silver King Creek wilderness area, will be contracted to transport all the necessary equipment, gear, and supplies to and from the site by pack horses. Completion of the project will take two full work days by 30 Trout Unlimited volunteers and 10 agency and support staff.

To limit human impact in this pristine area, the Forest Service limits the number of volunteers to 30. Hearty meals and refreshments were provided on both days.

All work parties will assemble on Friday afternoon at the designated pack station. The volunteers will hike over seven miles of rugged terrain into Silver King Creek to set up camp, followed by the pack train, comprised of two strings of pack horses, each horse carrying a maximum 150 pound load.

Early each morning, the project will commence with electro-shocking of the hybridized non-native fish in the designated six-mile section of Silver King Creek that starts at a natural fish barrier and extends upstream to Llewellyn Falls. There will be two fish removal teams starting downstream. Each team consists of two shockers (this process is done by trained professionals only), six netters and eight baggers. The crew, wearing protective waders, creates a net-enclosed area in a portion of the creek to be electro-shocked. The electro-shocker is a backpack device that sends a small current of electricity through a hoop placed in the water, which stun the fish long enough to be captured by nets. The netting crew captures the fish and places them in

their eventual de-lising as an endangered species.

From its very inception, the North Bay Chapter has been committed to grassroots volunteer projects that have produced strong public support over the past four decades. Our mission to protect, conserve, and restore native fish habitat and their watersheds has been a proven success.

Article and photos courtesy of the North Bay Chapter.

See also The Fish>Paiute Cutthroat Trout

Exhibit III

AFS Policy Statement #29:
Biodiversity
(Full Text)

By Brian D. Winter and Robert M. Hughes

This position statement is the outcome of several years of preparation and review within the American Fisheries Society (AFS). In 1991, the AFS Executive Committee (Excom) directed the Environmental Concerns Committee [ECC; later to become the Resource Policy Committee (RPC)] to initiate development of an AFS position statement on biodiversity. ECC Chair Hal Tyus assigned this task to Co-chair Brian Winter, who developed a draft statement. The draft was reviewed by the RPC and members of the AFS Endangered Species Committee. At this point, Robert Hughes was added as co-author because of his expertise. The comments received were incorporated in a new draft, which was then reviewed by a second RPC. The draft statement was again modified and returned to the RPC, which then forwarded it to the Excom for review. The Excom approved the draft statement at the 1994 AFS annual meeting for publishing in Fisheries for membership comment; it was included in the April 1995 (Vol. 20, No. 4) issue. Eight AFS member comment letters were received within a 90-day period, and the statement was revised accordingly. The Governing Board approved the revised statement on 27 August 1996. All AFS position statements are intended to reflect the diversity and geographical scope of the AFS membership. Every effort is made to ensure that each position statement is acceptable to most AFS members.

Master (1990) found that 65% and 73% of crayfishes and unionid mussels, respectively, are now extinct or at risk. Other invertebrate groups also may be endangered, but they are less studied so their status is unknown. In addition, a reduction in the diversity of marine species is occurring but is more difficult to measure (Upton 1992) because remote marine habitats are difficult to monitor (Cairns and Lackey 1992). Nevertheless, of the 236 commercially harvested marine fish stocks assessed by the National Marine Fisheries Service, 67 (28%) of them were determined to be overutilized (NMFS 1992). In addition to the overexploitation of target species, several billion pounds of nontarget species are taken as bycatch. Bycatch is defined as "the catch of any species, regardless of sex or size, which is unintentionally harvested and which is subsequently retained or discarded because of relatively low market value or legal requirements" (Upton 1992). Fish discarded as bycatch are often dead. Overfishing and high bycatch levels can result in vast changes in marine community structure.

Assemblage. When studied at the assemblage level, fishes appear to be in even more serious trouble. The Ohio Environmental Protection Agency (1988) estimated that 64%-80% of the sites sampled had impaired biological integrity; only 5% were considered exceptional. In the Great Lakes, the commercial catch of native salmonids went from 82% of total catch to 0.2% between 1900 and 1966 (Smith 1968). Judy et al. (1984) estimated that 81% of fish assemblages in the conterminous United States are harmed by limiting factors, particularly agriculture.

Ecosystem. Only 2% of streams in the conterminous United States are worthy of scenic river status (Benke 1990), indicating only 2% near-pristine ecosystem condition, while only 25%-46% of riparian plant communities remain in near-natural condition (Swift 1984). In a northeast U.S. pilot study, Larsen et al. (1994) estimated that 9%-33% of lakes between 1 ha and

2,000 ha were eutrophic; 24%-82% of the lakes were eutrophic in ecoregions most heavily settled by humans. Macauley et al. (1994) reported that 27%±10% of estuarine areas along the Gulf of Mexico coast had impaired biological integrity; 90%±22% of large tidal river areas in the region were degraded.

Landscape. Perhaps the most telling example of landscape-level losses in biodiversity and integrity is the estimate of Vitousek et al. (1986) that humans co-opt 25% of potential global net primary production and 40% of potential terrestrial net primary production. A similar estimate is derived from land use: Houghton (1994) estimates that 32% of the Earth's land surface is devoted to cropland, and half these croplands were added this century, despite 10,000 years of settled agriculture. Old-growth forests and native prairies occur only in remnant plots in the conterminous United States, but regions with extensive and intensive agriculture, silviculture, urbanization, industrialization, mining, and water projects can be detected from space. Like the microbes that transformed the planet's original atmosphere, we may be changing our soils, climate, and stratosphere on a global scale as a result of those activities.

Fisheries management agencies have contributed to the loss of biodiversity. Conventional natural resources management tends to reduce diversity through simplification, fragmentation, and selective destruction (Sheldon 1988; Norse et al. 1986). Often, management strives for the immediate benefit of a few desirable species [e.g., rainbow trout (*Oncorhynchus mykiss*) or bass (*Micropterus spp.*)], thereby contributing to a loss of biodiversity (Cairns and Lackey 1992). The eradication of some fishes, such as gars (*Lepisosteus spp.*) bowfins (*Amia calva*), white sucker (*Catastomus commersoni*), and northern squawfish (*Ptychocheilus oregonensis*) has been pursued to increase game-fish catches or improve survival of selected species to the potential detriment of

ecosystem resiliency and function (Scarnecchia 1992). Rather than limiting catches and restoring natural production, many fishery agencies subsidize overharvested sport fisheries with genetically damaging hatchery species and stocks, including nonnative transplants (Nehlsen et al. 1991; Evans and Wilcox 1991).

As much as 25%-50% of the freshwater fishes caught by anglers in the continental United States are from populations established through introductions (Moyle et al. 1986). Introduced species and stocks are major threats to native fishes (Miller et al. 1989; Nehlsen et al. 1991) by way of predation, competition, introduction of diseases and parasites for which native species lack resistance, environmental modification, inhibition of reproduction, hybridization (Moyle et al. 1986), and stimulating exploitation (Evans and Wilcox 1991). Miller et al. (1989) reported that introduced species contributed to the extinction of 68% of the North American fish species lost in the past century. Native brook trout (*Salvelinius fontinalis*) have been replaced by introduced rainbow trout in many Appalachian streams and by brown trout (*Salmo trutto*) in northeastern and midwestern streams (Kelly et al. 1980; Fausch and White 1981; Waters 1983). Unintentional nonnative introductions also threaten native fauna. More than 100 aquatic species have been introduced in the Great Lakes basin, most of them accidentally, drastically altering the functioning of the aquatic system (Radonski and Loftus 1993). Biological invasions also have disrupted estuarine and marine ecosystems. John Chapman (pers. comm., Oregon State University, Newport, Oregon) recently found that 50% of the benthic taxa are exotic in an Oregon estuary used as a harbor. Two introduced species of ascidians (sea squirts) are profoundly changing the composition of fouling communities (e.g., attached organisms such as barnacles, anenomes, mollusks, and algae) along the New England coast (Carlton 1989).

Losses of biodiversity in aquatic ecosystems may be

abetted by a public bias against cold-blooded animals resulting from the terrestrial orientation of humans (Hughes and Noss 1992). This bias may be the principal factor responsible for the lack of scientific and public awareness of the importance of biodiversity of small, cold-blooded, and largely unobserved aquatic organisms as compared with the large, warm-blooded animals that live on land with humans (McClanahan 1990). Consequently, much of the public and traditional fishery managers view fishes as a recreational or commercial commodity, or as organisms without intrinsic value. Some species (e.g., some sharks) are lawfully hunted to near-extinction because they pose a perceived threat to human life (Hughes and Noss 1992). The removal of "the big things that run the world" can have unknown and far-reaching impacts on entire ecosystems (Terborgh 1988; McClanahan 1990). For example, the extinction of sea otters in local areas resulted in increased sea urchin populations, reductions in kelp forests, and alterations in nearshore communities (Estes et al. 1989).

If there is a public bias against cold-blooded vertebrate animals such as fish, there is certainly a general lack of awareness of the importance of invertebrate life forms and their interactions in biodiversity. Although fish are the best-known species of aquatic organisms, microorganisms, small algae and invertebrates account for the greatest number of aquatic organisms (Cairns and Lackey 1992). The United States is home for an estimated 500,000 species of plants and animals, of which small organisms such as arthropods and microbes make up the vast majority (Knutson 1989). These small organisms are as important to the maintenance of ecosystems as the more visible large animals (Wilson 1987). Microcrustaceans (zooplankton) and insects are food for most species of fishes and birds and some species of mammals (Janzen 1987; Wilson 1987). Many of these organisms are as vulnerable to extinction as larger plants and animals (Dourojeanni 1990).

The alteration of a food web at the primary or secondary level can have devastating impacts to the ecosystem. For example, the introduction of a freshwater shrimp in the Flathead Lake-River ecosystem (Montana), for the purpose of enhancing the rainbow trout (*Oncorhynchus mykiss*) population, resulted in the dramatic decline of zooplankton, the collapse of the kokanee salmon (*O. nerka*) population (itself introduced), and the displacement of birds and mammals that fed on the spawning kokanee (Spencer et al. 1991). In another example, at least 22 species of birds and mammals feed on salmon carcasses on the Olympic Peninsula, Washington (Cederholm et al. 1989). Bilby et al. (1996) determined that salmon carcasses are major sources of carbon and nitrogen for aquatic and terrestrial organisms in systems with healthy salmon runs. Willson and Halupka (1995) found that Pacific salmon in all life history stages are keystone species in southeast Alaska vertebrate assemblages. Thus, the removal or diminution of salmon cascades throughout the terrestrial and aquatic ecosystems, making the concept of "excess production" meaningless.

The United Nations Convention on Biological Diversity was negotiated in 1992 because of international recognition of the global impact of declining biodiversity. Although no U.S. policy to conserve biodiversity exists as of this writing, concerns for biodiversity are inherent in at least 29 federal laws (OTA 1987). However, the federal "effort" to preserve biodiversity is piecemeal at best. The National Environmental Policy Act requires an impact assessment of proposed federal actions, but it is procedural in nature and does not result in redirection of those actions; the Endangered Species Act does not protect species until they are at extreme risk, which may be too late; the Marine Mammal Protection Act regulates the take of marine mammals but does not broadly protect habitat or the prey base; and the Clean Water Act is directed toward water quality which is only one of many habitat concerns

(Blockstein 1992). Contrary to the United States, both Canada and Mexico have directly faced the threats of declining biodiversity.

In response to the United Nations Convention, Canada developed a Canadian Biodiversity Strategy to (1) conserve biodiversity and to use biological resources in a sustainable manner, (2) improve understanding of ecosystems and increase resource management capabilities, (3) promote understanding of the need to conserve biodiversity and sustainable rates of bioresource use, (4) maintain or develop incentives for the above, and (5) work with other countries to conserve biodiversity, to use bioresources in a sustainable manner, and to equitably share the benefits of using genetic resources. Initial implementation steps include reporting on policies, plans, and activities for implementing the strategy; coordinating strategy implementation; encouraging nongovernmental participation; and reporting on biodiversity status.

In 1992, the president of Mexico convened an international biodiversity meeting that resulted in the creation of CONABIO (National Commission for the Knowledge and Use of Biodiversity). CONABIO has a staff of 50 and an average annual budget of US$3 million. Almost 80% of these funds support biodiversity projects such as atlases, databases, and public awareness television programs.

Efforts to protect or restore biodiversity in the United States, while laudable, are limited in scope. One example is Bring Back the Natives, a cooperative state-federal program coordinated by the National Fish and Wildlife Foundation to restore the health of riverine systems and the associated native species on lands administered by the U.S. Forest Service and Bureau of Land Management. In another example, five state agencies and four federal land management agencies in California have agreed to make "the maintenance and enhancement of biological diversity

Exhibit IV

Easy Search Results--Summary

TS=rotenone AND parkinson's
Database(s)=SCI-EXPANDED; Timespan=1975-2004; (sorted by latest date)

SUBMIT MARKS | UNMARK PAGE | MARK ALL

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[1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10]

Use the checkboxes to add individual articles to the Marked List. Be sure to click SUBMIT MARKS button before leaving page.

☑ Sakka N, Sawada H, Izumi Y, et al.
Dopamine is involved in selectivity of dopaminergic neuronal death by **rotenone**
NEUROREPORT 14 (18): 2425-2428 DEC 19 2003

☑ He Y, Imam SZ, Dong ZJ, et al.
Role of nitric oxide in **rotenone**-induced nigro-striatal injury
J NEUROCHEM 86 (6): 1338-1345 SEP 2003

☑ Saravanan KS, Sindhu KM, Mohanakumar KP
L-deprenyl attenuates the **rotenone**-induced dopaminergic neurotoxicity: experimental evidences in rats
J NEUROCHEM 87: 106-106 Suppl. 1 DEC 2003

☑ Sindhu KM, Banerjee R, Saravanan KS, et al.
Involvement of apoptosis in **rotenone**-mediated nigral toxicity
J NEUROCHEM 87: 136-136 Suppl. 1 DEC 2003

☑ Sherer TB, Betarbet R, Testa CM, et al.
Mechanism of toxicity in **rotenone** models of **Parkinson's** disease
J NEUROSCI 23 (34): 10756-10764 NOV 26 2003

☑ Kotake Y, Ohta S
MPP plus analogs acting on mitochondria and inducing neuro-degeneration
CURR MED CHEM 10 (23): 2507-2516 DEC 2003

☑ Shamoto-Nagai M, Maruyama W, Kato Y, et al.
An inhibitor of mitochondrial complex I, **rotenone**, inactivates proteasome by oxidative modification and induces aggregation of oxidized proteins in SH-SY5Y cells
J NEUROSCI RES 74 (4): 589-597 NOV 15 2003

☑ Tada-Oikawa S, Hiraku Y, Kawanishi M, et al.
Mechanism for generation of hydrogen peroxide and change of mitochondrial membrane potential during **rotenone**-induced apoptosis
LIFE SCI 73 (25): 3277-3288 NOV 7 2003

☑ Ahmadi FA, Linseman DA, Grammatopoulos TN, et al.

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Article 16 of 110
MARK
PREVIOUS NEXT SUMMARY

The rotenone model of Parkinson's disease: genes, environment and mitochondria

Greenamyre JT, Betarbet R, Sherer TB

PARKINSONISM & RELATED DISORDERS
9: S59-S64 Suppl. 2 AUG 2003

Document type: Article | Language: English | Cited References: 66 | Times Cited: 0 | FIND RELATED RECORDS | Explanati

Abstract:
Parkinson's disease (PD) is occasionally caused by single gene mutations or by single toxic exposures, but most cases of PD are probably caused by some combination of genetic susceptibility and environmental exposure. Using **rotenone** as a prototype for an environmental toxicant, we argue here that genetic and environmental causes of PD converge on common pathogenic mechanisms. If so, protective strategies devised for one type of PD may be broadly useful for other forms of the disease. (C) 2003 Published by Elsevier Ltd.

Author Keywords:
Parkinson's disease, Lewy bodies, pathogenesis

KeyWords Plus:
ELECTRON-TRANSPORT CHAIN, NADH-UBIQUINONE REDUCTASE, UBIQUITIN-PROTEIN LIGASE, COMPLEX-I DEFECT, ALPHA-SYNUCLEIN, LEWY BODIES, BRAIN MITOCHONDRIA, SUBSTANTIA-NIGRA, OXIDATIVE DAMAGE, PESTICIDES

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Greenamyre JT, Emory Univ, Ctr Neurodegenerat Dis, 615 Michael St,Room 505M, Atlanta, GA 30322 USA
Emory Univ, Ctr Neurodegenerat Dis, Atlanta, GA 30322 USA

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Article 17 of 110

MARK PREVIOUS NEXT SUMMARY

Animal models of Parkinson's disease in rodents induced by toxins: an update

Hirsch EC, Hoglinger G, Rousselet E, Breidert T, Parain K, Feger J, Ruberg M, Prigent A, Cohen-Salmon C, Launay JM

JOURNAL OF NEURAL TRANSMISSION-SUPPLEMENT
(65): 89-100 2003

Document type: Article **Language:** English Cited References: 78 Times Cited: 1

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Abstract:
The development of animal models of **Parkinson's** disease is of great importance in order to test substitutive or neuroprotective strategies for **Parkinson's** disease. Such models should reproduce the main characteristics of the disease, such as a selective lesion of dopaminergic neurons that evolves over time and the presence of neuronal inclusions known as Lewy bodies. Optimally, such models should also reproduce the lesion of non-dopaminergic neurons observed in a great majority of patients with **Parkinson's** disease. From a behavioral point of view, a parkinsonian syndrome should be observed, ideally with akinesia, rigidity and rest tremor. These symptoms should be alleviated by dopamine replacement therapy, which may in turn lead to side effects such as dyskinesia. In this review, we analyze the main characteristics of experimental models of **Parkinson's** disease induced by neurotoxic compounds such as 6-hydroxydopamine, MPTP and **rotenone**. We show that, whereas MPTP and 6-hydroxydopamine induce a selective loss of catecholaminergic neurons that in most cases evolves over a short period of time, **rotenone** infusion by osmotic pumps can induce a chronically progressive degeneration of dopaminergic neurons and also of non-dopaminergic neurons in both the basal ganglia and the brainstem.

KeyWords Plus:
MESOCORTICAL DOPAMINERGIC SYSTEM, PROGRESSIVE SUPRANUCLEAR PALSY, CENTRAL CATECHOLAMINE NEURONS, NITRIC-OXIDE SYNTHASE, COMPLEX I DEFICIENCY, SUBSTANTIA-NIGRA, LOCOMOTOR-ACTIVITY, MOUSE MODEL, 1-METHYL-4-PHENYL-1,2,3,6-TETRAHYDROPYRIDINE MPTP, INDUCED DEGENERATION

Addresses:
Hirsch EC, Hop La Pitie Salpetriere, INSERM, U289, 47 Blvd Hop, F-75651 Paris 13, France
Hop La Pitie Salpetriere, INSERM, U289, F-75651 Paris 13, France

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Article 35 of 110

MARK PREVIOUS NEXT SUMMARY

Synergistic dopaminergic neurotoxicity of the pesticide rotenone and inflammogen lipopolysaccharide: Relevance to the etiology of Parkinson's disease

Gao HM, Hong JS, Zhang WQ, Liu B

JOURNAL OF NEUROSCIENCE
23 (4): 1228-1236 FEB 15 2003

Document type: Article Language: English Cited References: 41 Times Cited: 8

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Abstract:
Parkinson's disease (PD) is characterized by a progressive degeneration of the nigrostriatal dopaminergic pathway resulting in movement disorders. Although its etiology remains unknown, PD may be the final outcome of interactions among multiple factors, including exposure to environmental toxins and the occurrence of inflammation in the brain. In this study, using primary mesencephalic cultures, we observed that nontoxic or minimally toxic concentrations of the pesticide **rotenone** (0.5 nM) and the inflammogen lipopolysaccharide (LPS) (0.5 ng/ml) synergistically induced dopaminergic neurodegeneration. The synergistic neurotoxicity of **rotenone** and LPS was observed when the two agents were applied either simultaneously or in tandem. Mechanistically, microglial NADPH oxidase-mediated generation of reactive oxygen species appeared to be a key contributor to the synergistic dopaminergic neurotoxicity. This conclusion was based on the following observations. First, inhibition of NADPH oxidase or scavenging of free radicals afforded significant neuroprotection. Second, **rotenone** and LPS synergistically stimulated the NADPH oxidase-mediated release of the superoxide free radical. Third and most importantly, **rotenone** and LPS failed to induce the synergistic neurotoxicity as well as the production of superoxide in cultures from NADPH oxidase-deficient animals. This is the first demonstration that low concentrations of a pesticide and an inflammogen work in synergy to induce a selective degeneration of dopaminergic neurons. Findings from this study may be highly relevant to the elucidation of the multifactorial etiology of PD and the discovery of effective therapeutic agents for the treatment of the disease.

Author Keywords:
pesticide, inflammation, microglia, NADPH oxidase, **Parkinson's** disease, synergistic neurotoxicity

KeyWords Plus:

To: Jim Harvey <jimharvey@fs.fed.us>
From: "Nancy A. Erman" <naerman@ucdavis.edu>
Subject: Re: Comments due date/Silver King project
Cc:
Bcc:
Attachments:

Exhibit V

Nancy
Those dates are correct. The legal notice appeared in the Reno Gazette Journal on February 13, 2004. March 14, 2004 is the end of the 30-day comment period, which is a Sunday. However, because the last day falls on a Sunday we will consider written correspondence postmarked on the 15th as received within the 30-day comment period.
Thanks
Jim

"Nancy A. Erman" <naerman@ucdavis.edu> 02/23/2004 12:05 PM
To: jimharvey@fs.fed.us, comments-intermtn-humboldt-toiyabe@fs.fed.us
cc: JAOEarth@aol.com
Subject: Comments due date/Silver King project

Feb. 23, 2004. Hard copy to follow.

To Jim Harvey:

This letter is to confirm our phone conversation of February 18, 2004, when you told me that the date that comments on the EA for the Silver King Creek stream poisoning project must be postmarked is March 14, 2004. That will be 30 days after the publication of the legal notice in the Reno Gazette Journal which you said was February 13, 2004.

The letter from Supervisor Vaught that accompanied the EA was not explicit about the exact date for comments. It is unfortunate that the Humboldt-Toiyabe Forest continues to send transmittal letters that do not state dates for comments to be postmarked. I have written to the Forest on this issue in the past and was given the impression that it would not continue. It appears to the public that the Forest is trying to be discouraging and evasive. I am sure that is not the intent of the Forest Service and urge you to change your NEPA transmittal letters to the form more commonly used by other Forests.

Thank you for your attention to this matter.

Nancy A. Erman

cc: Julia Olson

Exhibit k
for RWQCB
Aug. 5, '04

To:
Robert Williams
Field Supervisor
Nevada Fish and Wildlife Office
U.S. Fish and Wildlife Service
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Reno, Nevada, 89502

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530/758-1206

March 20, 2004

Re: Comments on the Draft Revised Recovery Plan for the Paiute Cutthroat Trout (*Oncorynchus clarki seleniris*).

We are filing these comments on this Draft Revised Recovery Plan (Draft Plan) as private citizens, in the public interest.

We have reviewed and one of us (NAE) has filed comments on the CDFG Negative Declaration for the Silver King rotenone project, on the first aborted 2002 Forest Service Environmental Assessment (EA) for the rotenone project, and on the second on-going 2004 Forest Service EA. We have also reviewed extensive correspondence and agreements between the staff of the Lahontan Regional Water Quality Control Board and the California Department of Fish and Game (CDFG) regarding this proposed project and other similar, past projects. These

staggered, piecemeal environmental reviews on a large, controversial stream and lake poisoning project in a Wilderness Area are unacceptable and make it extremely difficult for the public to get all the relevant information. All state and federal agencies involved in this project should prepare a joint EIS/EIR under NEPA.

This Draft Plan represents a major change in management direction of the Paiute cutthroat trout (PCT) in Silver King Creek from the 1985 Recovery Plan. The 1985 Plan assumed that the native habitat of the PCT was above Llewellyn Falls in Silver King Creek because that is the type locality for the subspecies, i.e., that location where the subspecies was first collected and subsequently described by Snyder in 1933.

The 1985 Plan, currently in effect, says on the first page "1. At what point or condition can the species be considered recovered? The question posed is then answered as follows: "When a pure population of Paiute cutthroat trout has been reestablished in Silver King Creek **above** Llewellyn Falls, and the integrity of the habitats in Silver King Creek, Cottonwood Creek, and Stairway Creek has been secured and maintained over a consecutive five-year period with stable or increasing overwintering populations of 500 or more adult fish in each of these streams" (Our emphasis added). Those conditions have been met.

The Draft Plan claims that four pieces of new information and completed tasks have made this revised plan necessary (p. 2). The four issues are illogical and contradictory as presented. The Draft Plan is an attempt to justify another large stream poisoning project in a Wilderness Area for the purpose of establishing a monospecific sportfishery for PCT that will be part of a CDFG angling contest for "heritage" trout. The Draft Plan fails to show why poisoning 11 miles of streams, springs, and a lake would benefit either the PCT or the many other non-target species that would be affected and endangered by this project. Nor do the poisoning plan and re-stocking and the subsequent sport fishery offer any new protections for the PCT.

Fundamental to the Draft Plan is a claim, now, that the historic habitat of the PCT is Silver King Creek **below** Llewellyn Falls. The evidence for this highly speculative claim is based on hearsay and anecdote. The evidence is also variable and contradictory in the original sources (Ryan and Nicola 1976, Vestal 1947) and

the CDFG and FWS seem to have picked and chosen the stories they want to use to match their hypothesis. We have explored these sources in some detail. Great stock has been put on the recollections and stories of a sheep rancher named Connell while equally plausible stories have been discounted. There is no new evidence regarding the historic range of the PCT. More importantly, there were no scientific studies or fish sampling to determine where fish were in Silver King Creek prior to loggers and sheep herders moving fish of one kind and another around the basin at the end of the 1800s and the beginning of the 1900s.

There is no reason and no new scientific information to alter the conclusion given in the 1985 Recovery Plan that stated "The issue of what constitutes the native range is complicated by the paucity of early collection records and the conflicting recollections of early observers." (1985 Recovery Plan, p.7). Therefore, the type locality above Llewellyn Falls must be accepted as the historic range of the PCT.

Fish barriers

The first of the four pieces of "new information" is said to be the discovery of fish barriers downstream of Llewellyn Falls (Draft Plan, p.2, para 3). No explanation is given for why these barriers were not "discovered" before the 1985 Plan was written. But even assuming that no field work was conducted prior to writing that plan, and barriers really have been discovered recently, the information only raises more questions about the proposal. These barriers, so crucial to the story being told in this Draft Plan, are described as a "series of falls" upstream of Snodgrass Creek (Draft Plan, p. 29) and also as "six **potential** fish barriers" in the Silver King Canyon, the two highest being 8 and 10 feet in two separate channels (p. 12) (Our emphasis added). Eight and ten feet are not especially high barriers to fish migration under high water flow. In addition, on p. 49 it says "Reinvasion of Paiute cutthroat trout habitat by non-native trout should be prevented by monitoring or establishing instream barriers..." (Draft Plan, B. Recovery Strategy p. 49, para. 1) and on p. 58, item 4.3.3, "...inspect all fish barriers in the Silver King drainage to ascertain their effectiveness in preventing other fish species from invading Paiute cutthroat trout habitats."

Either there are barriers to fish migration or there are not. Permanent barriers of some kind would have been necessary for the genetic isolation of the

precursor of the PCT. Once isolated, the PCT evolved. The barriers in Silver King Canyon are apparently not large enough for this original isolation or the FWS would not be recommending that they be inspected and reinforced to prevent upstream migration of other non-native fish. From the information given, we must assume that there are not barriers to fish migration below Llewellyn Falls, in which case the stream section below Llewellyn Falls is likely not the historic habitat of the PCT. Further, attempts to isolate PCT in the lower section of Silver King Creek would require major construction in a Wilderness Area stream.

Threats to PCT populations

The second objective from the four pieces of "new information and completed tasks" is a goal to eliminate and reduce threats to existing populations (Draft Plan, p.2, para 3). Three points are raised for the reasons why removal of fish and restocking is required. The first, and "primary", is that the population of Paiute cutthroat now occupies "an extremely limited range." In fact, the fish now occupies more range than it is believed ever to have occupied before documented disturbance. The Draft Plan claims that because of this "limited range" existing populations are vulnerable to extinction because of "catastrophic events" which may occur within any of the five drainages. Raising the threat of "catastrophy" is currently a popular method of using some unknown, unspecified terrible thing that could happen if the action wanted is not taken. Catastrophy, however, flies in the face of what the Draft Plan concludes is the history of the fish. How could the PCT have existed in such a limited length of stream for perhaps thousands of years; but now, occupying twice as much stream and in five times as many drainages, it is at risk from catastrophic events?

The second point to justify action below Llewellyn Falls is the loss of genetic distinctiveness from introgression. This risk is and always will be present regardless of Paiute introduction into the reach below Llewellyn Falls. One can more convincingly make the argument that by bringing more anglers to the easily fished areas of Lower Fish Valley, the risks for "unauthorized" salmonid introductions would increase. The only known mechanism of entry of unwanted fish into the Silver King drainage has always been human action. Later in the Plan, it is clear that increasing the attraction of a basin or stimulating too much

fishing is a clear risk ("Directing large numbers of recreation users to North Fork of Cottonwood Creek would inevitably stimulate unauthorized angling for Paiute cutthroat trout" Draft Plan, p. 54, Sec. 3.2.4.) If it is clear that this problem exists for Cottonwood Creek, the same logic must apply to all populations. The Plan then argues the issue the other way by suggesting an "opportunity for a highly regulated and special designated fishery **above** Llewellyn Falls should be explored..."(p. 57, Sec. 4.2) The FWS is well aware that CDFG has already embarked upon a program (The California Heritage Trout Challenge—www.dfg.ca.gov/fishing) intended to stimulate and even reward fishing for PCT "in its native range".

Opening the stream above Llewellyn Falls to angling, now closed, will increase the risk to the PCT of hybridization. PCT exist now in the stream section below Llewellyn Falls because some fish go over the falls and the barrier on Coyote Valley Creek and Corral Valley Creek and are available for anglers to catch in the lower section of Silver King Creek below Llewellyn Falls which is presently open to angling. The unique experience of catching Paiute cutthroat trout in their native drainage is provided currently.

As the Draft Plan discusses, PCT are less wary than other trouts making them highly vulnerable to angling. "Significant population declines have been noted in waters that are exposed to moderate or even light fishing pressure." (Draft Plan, p. 11). Does the FWS see no contradiction in recommending fishing above Llewellyn Falls where the population is claimed to be finally secured?

In addition, if the stream reach below Llewellyn Falls is converted to a monospecific population of PCT, it will always be at risk of introductions of non-native fish into any of the tributaries above Llewellyn Falls or into Corral Valley or CoyoteValley Creeks anyway. There is no reason to assume that non-native fish could only be introduced into the most accessible area.

The third reason in the Draft Plan for action below Llewellyn Falls is the risk of genetic bottlenecks. These bottlenecks in PCT populations are already present. Analyses of PCT genetic markers all concluded that bottlenecks are present in the remaining populations (Israel et al. 2002, Nielsen and Sage 2002).

There is confusion in the Draft Plan about hybrid crosses between PCT and rainbow trout versus PCT and Lahontan CT. On p. 45 of the Draft Plan it says

"...genetic analysis indicates that Corral Valley Creek now contains pure Paiute cutthroat trout." The statement is credited to Israel et al., 2002. But the Israel et al., 2002, report says: "None of the loci screened showed fixed differences between Paiute and Lahontan cutthroat trout." And in the Summary of the Israel et al., report we read: "Additionally, molecular markers that can distinguish Lahontan and Paiute cutthroat trout would provide another tool for determining this important relationship." Clearly the Israel et al., 2002, study did not separate Lahontan CT from PCT.

And, further, the Israel et al., 2002, study even casts doubt on the genetic separation of PCT from rainbow trout: "Upon examination of the SCN evidence it does not appear that any population has undergone recent hybridization with rainbow trout; however, introgression from past hybridization events may be difficult to detect when relying on a single genetic marker."

The Draft Plan concludes that reintroduction to "native habitat" (below Llewellyn Falls) will somehow "substantially reduce these extinction threats." This reasoning is flawed and is constructed merely to justify another poisoning project in Silver King Creek for other purposes. Reducing future bottlenecks, as the Draft Plan acknowledges (and Israel et al. 2002 have recommended), will require purposeful mixing of stocks from among the many, isolated locations.

Life history and Population Sizes

The third objective from the four pieces of "new information and completed tasks" is a goal to develop increased knowledge about PCT population dynamics based on long-term trend data (Draft Plan, p.2, para 3). We feel this work should have been accomplished decades ago. It seems odd, given the concern the agencies profess for this subspecies, that they have never conducted or commissioned a study on the biology of the PCT in its native range. The only life history studies completed were on the introduced population in the North Fork Cottonwood Creek, Mono County, CA. Such basic information as how long individuals live in their native drainage is unknown. In spite of all the PCT that have been caught, collected, moved or poisoned in the Silver King drainage over 70 some years, no age and growth study based on fish scales has been done on pure PCT. One limited report of 40 trout collected in 1956 in Silver King looked

at age based on fish scales, but those may have been hybrid trout (Ryan and Nicola 1976).

The discussion of fish abundance in Upper Fish Valley is confusing (and mostly redundant with a later section). The section (Draft Plan, p. 3) should be clarified so that a reader knows whether numbers apply to a section, a reach of stream, a unit length of stream, one year or the average for all observations. Reference to fish "observed" and "estimated" as given, are confusing. If the FWS is implying that estimates have variability ("may be as high as"), then data should be given somewhere with the error terms or confidence levels for the estimates. Data are more consistently presented for other streams than for Upper Fish Valley. The concluding sentence of this section — that adding the reach of Silver King Creek below Llewellyn Falls would double the stream length of occupied habitat — is unconnected to this passage or to the need for this expansion of habitat.

If the purpose of citing the various numbers of fish is to build a case for some "needed" number of fish, then the values presented are misleading. The Draft Plan leaves it to the reader to add up miles of stream, numbers of fish per mile, mean number of fish, and locations. Much later (p. 49), the Draft Plan presents the goal of recovery in terms of an "effective population", which is defined as 1) a population that is stable or increasing in size, 2) a population that has at least 3 age classes (and survives for at least 5 years), and 3) a population of at least 2,500 fish >75 mm (p. 49).

We examined these issues in order as follows:

1) A stable or increasing population.

The data for Upper Fish Valley and Four Mile Creek are of long duration and show how populations fluctuate. In particular, the Draft Plan (p. 19) notes for Four Mile Creek that juvenile fish numbers are quite variable. Comparison of Figures 4 and 5 in the Draft Plan show that juveniles have been just as variable for Upper Fish Valley. Several reasons for variation in fish abundance are implied or found scattered throughout the draft including a) beaver presence, beaver removal, then dam obliteration, then habitat modifications, b) periodic poisoning (approximately 7 or 8 times?—numbers vary among government documents), then restocking with small numbers of new fish, c) selective

removal of suspect hybrid fish (Ryan and Nicola 1976, p. 39), d) intensive poaching, and e) fluctuations in juvenile recruitment in response to floods.

We can partially examine one of these sources of variability—variation in juvenile abundance in response to floods—a well-known and natural phenomenon for stream salmonids. The Draft Plan, Figure 4, Upper Fish Valley, includes a note (W. Somer, unpubl. data) that 1982, 1986, and 1998 were years of heavy runoff. Is this statement based on stream discharge measurements for Silver King Creek or just personal observation of high water? The closest USGS gage with a long-term record (86 years) is for West Fork Carson River near Woodfords. The record shows that floods of 1982, 1986, and 1998 were among the ten highest peak discharge events. This stream probably tracks at least the peak flows that would occur in Silver King Creek. We used this gage record to further explore the relationship of peak flow (using the W.F. Carson River as a proxy for Silver King Creek) to Paiute cutthroat populations (Draft Plan, Fig. 4) in Upper Fish Valley. Our analysis showed that juvenile PCT abundance in Upper Fish Valley decreased significantly as peak discharge increased (Figure 1). The regression plot (logarithmic for both axes) is significant (P=0.006) although the amount of variation explained in the abundance estimates is low (~30%), as might be expected, given the other sources of variation listed above for the years of data.

Without criteria for the meaning of "stable", the goal is meaningless. In the case of this fish, with primarily a 2-year life cycle dominated by fluctuations in juvenile abundance, a "stability" goal has little utility. These populations are most probably highly variable naturally and will remain so. And why would the FWS select a goal or assumption that PCT numbers will increase indefinitely? In later sections the Draft Plan states (p. 19) the 2001 estimates of fish in Upper Fish Valley "were within the range of its historical abundance, suggesting that the population may still be expanding." The 2001 estimate shown in Fig. 4 is the second largest of the 28 years that populations were estimated over the time period shown, and it exceeds any value estimated over the 10 years following poisoning in 1964. There are enough data points from these two stream sections to consider, for example, that a population is stable if it is within ±2 standard

deviations or the 95% confidence interval of the long-term mean. Based on any reasonable criterion, the existing populations are "stable."

2) A population that has at least 3 age classes.

In spite of the long time the FWS and CDFG have been "managing" fish in the Silver King basin, handling perhaps thousands of PCT, nearly the only reported data on age and growth is from studies done in the N.F. Cottonwood Creek, where the PCT is a non-native, introduced fish. We could not find a single published report even of a size frequency distribution for this fish in Silver King Creek. As previously discussed, the only other reported data on age was from Ryan and Nicola (1976) who reported that PCT in Silver King Creek had much different age-at-length than those in N. F. Cottonwood; and in the sample, they found only two age classes (1+ and 2+). We presume that age 0 (young-of-the-year) were excluded or not collected and would make up the "third" age class. Is that the meaning of the FWS goal? The FWS has failed to provide any useful data to evaluate this 3-age class criterion. It is highly likely that all three age classes (0, 1+, and 2+) exist now in Silver King Creek and its tributaries: the populations have persisted except when poisoned out. The FWS and CDFG have no data on number of age classes, yet the FWS has selected a rule for judging recovery based on age classes.

The FWS has recognized, again, that it is necessary to "monitor abundance and age class composition" (Draft Plan, p. 58, Sec. 4.3.1). The same recommendation was made in the 1985 Recovery Plan (p.29, section 1121). Nineteen years later it has not been accomplished.

3) A population of at least 2,500 fish >75 mm in length.

The definition of this goal is for a size category (>75 mm) which has not been separately reported for any population in Silver King drainage, and no rationale has been presented for its choice. We assume this size is based on the general recommendation in Hilderbrand and Kershner (2000) for cutthroat trout in the Rocky Mountains. As the PCT is thought to be smaller than other cutthroats, a slightly smaller size category might be more appropriate; but in the absence of data, we won't speculate. There are no data in the Draft Plan or in available documents presented on the size distribution of fish in Silver King Creek. To date, beginning with the report of Ryan and Nicola (1976), populations

have been segregated as adult and juvenile. An adult fish has been equated with a "catchable" fish that was defined as 150 mm and greater in length, and all others are lumped as juveniles. (Unfortunately, even this consistency is lost, as fish in Stairway Creek (p. 49) are defined as adults if they are 137 mm.) A complete evaluation is difficult for this goal, given the lack of any data on size frequency or ages in Silver King Creek.

It is also difficult to tell if the FWS population goal of at least 2,500 fish applies to the total of the separate populations in the Silver King drainage or to each of the separate populations (Draft Plan, p. 49). Separate populations in Silver King are not defined and appear not to be isolated from each other in some cases. We assume the 2,500 fish goal is for the whole drainage.

But what do the data that are presented in the Draft say that relates to goal 3? According to the Draft Plan, there are "1020 adult fish ... in 6 stream populations" (p. 19) in the Silver King drainage. The estimates given for Upper Fish Valley are apparently only for the test reach ("the population could consist of as many as 424 adult fish, which is the average number of adults for this 1,900-meter...reach."). To examine this question further we prepared the following (Table 1) from data given in the Draft Plan beginning on p. 19.

Table 1. Estimates of mean total fish >150 mm in Silver King Creek and tributaries within the basin.

Stream	Mean Number of "adult" fish/unit length	Total length of stream(km)	Total mean population in stream
Upper Fish Valley	424/1.9 km	4.3	960
Four Mile Ck	133/km	3.0	399
Fly Valley Ck	221/km	1.8	398
Corral Valley Ck	148/km	3.6	533
CoyoteValley-Up -Down.	528/km 444/km		
Coyote Valley-All	Mean 502/km	4.9	2457
Total all streams		17.6	4747

Thus, even with a definition of "adult" fish given as 150 mm, the average adult population in the Silver King drainage is nearly twice the size (4,747), on average, needed to meet the goal of an "effective" population. If "juveniles" >75 mm and <150 mm are included in the estimate, then the "effective" population is more likely four times greater than 2,500 fish.

Note also that the actual sum of stream kilometers in Table 1, taken from the data summaries listed in the Draft Plan, p 19–23, is 1 km less than the total given (18.6) on p. 19. Apparently, fish in 1 km of Bull Canyon Creek were not counted, making the average population of fish even greater than we have calculated.

Therefore, the current existing populations of PCT in the Silver King drainage exceed by a wide margin the goal of obtaining an "effective population." Their populations are as stable as can be expected for a species with a short life cycle and high variability in juvenile recruitment, and as much "management" as these populations have had. The number of age classes is probably three because the FWS and others have assumed that reproduction occurs at age two, and populations have grown in size after transplants.

The FWS should declare victory and concentrate on the other elements of improving habitat and protecting the existing populations in order to protect the PCT.

Habitat conditions

The lack of any habitat condition assessment for the last 14 years belies any genuine agency interest in this subspecies. The last assessment showed 12 out of 20 habitat assessment sites of PCT habitat in the Silver King drainage in poor or fair condition (Draft Plan, Table 3, p. 30). The number of sites in the table differ from the number given in the text on p. 29.

Habitat was a key criterion to recovery of the PCT. "Habitat and population trends will be closely monitored" (Management condition #4–Paiute Cutthroat Trout Recovery Plan, USFWS, 1985). But even this critical management goal seems to have been abandoned.

Nor is there any recognition in this Draft Plan that poisoning is a major habitat disturbance that can have long-reaching and permanent effects on non-target species and food supplies which are a component of "habitat."

Impacts on Non-Target Species

The impacts of rotenone on aquatic invertebrates are well known, have been studied for many years and continue to be studied (e.g., Almquist 1959, Binns 1967, Meadows 1973, Helfrich 1978, Chandler 1982, Dudgeon 1990, Mangum and Madrigal 1999, Cerreto et al. 2003). The impacts are variable depending on the sensitivity of each species to rotenone. Some species may be eliminated or greatly reduced while other species are increased after rotenone poisoning. Cosmopolitan or "weedy "colonizer species, relatively insensitive to rotenone, will be expected to replace more sensitive species and the overall species diversity will decrease.

Most of the studies on rotenone impacts to aquatic invertebrates have been short-term. Most have only identified larval aquatic insect forms and, therefore, have not determined the number of species affected or eliminated by rotenone. If a higher taxon than a single species is affected, one can assume that a higher number of species are being affected. For example, when a study reports

that a genus, family, or order has disappeared or shown major stream drift, one must assume the taxon represents more than one, and perhaps many, species.

A 5-year study on a river in Utah (Mangum and Madrigal 1999) found that "up to 100% of Ephemeroptera, Plecoptera, and Trichoptera [mayflies, stoneflies and caddisflies] were missing after the second rotenone application. Forty-six percent of the taxa recovered within one year, but 21% of the taxa were still missing after five years. They further found that at least 19 species were still missing five years after the rotenone treatments. (I say "at least" because some taxa were identified only to genus and may have included more than one species).

In a short-term study on a Pennsylvania stream, Helfrich (1978) found that all 4 major orders of macroinvertebrates in the study stream exhibited substantial decreases in numerical abundance 11 days after rotenone treatment. Populations of Plecoptera and Diptera were "nearly exterminated." Trichoptera and Ephemeroptera were reduced to 50% of the pretreatment levels.

The studies currently being conducted by the agencies in California are on immature aquatic insect forms, only, and are not capable of identifying most species, except in rare instances where a genus includes only one or two species, or where a larval form has characteristics so unusual that the species can be determined. Taxonomic insect keys are written primarily for adult males. To date, no study has been conducted in California to determine which endemic and rare invertebrate species are being lost due to the use of rotenone.

The information given on macroinvertebrate sampling in this Draft Plan contains no data and is only one paragraph (Draft Plan. p.31). Thus, we will discuss information given in other agency documents regarding the potential impacts to aquatic macroinvertebrates.

The studies on which the CDFG and FS have relied for impacts from the 1991–93 poisoning in the Silver King drainage (Trumbo et al. 2000), in fact, show long-term effects on aquatic invertebrates and significant changes in composition of macroinvertebrates in the Silver King drainage as a result of past poisoning. These studies provide clear evidence of the potential for significant and long-term impacts to non-target instream communities. A plot of even the crude BCI ratings given for aquatic samples in the Forest Service EA for the proposed

rotenone project in the drainage shows that aquatic invertebrates had not recovered to pre-project conditions three years following the last poisoning in 1993 (Figure 2).

We analyzed the only detailed taxa data presented in the Trumbo et al. (2000) report, and it was clear that the stonefly taxa were different in composition, and many stoneflies identified to the genus or species level before the project were not present three years after the project.

We compared the pre-project stoneflies (1990 + pre-1991) at each station with the post project stoneflies (1996) at each station. We compared the sites by how much overlap of taxa below the family level (genus and species) existed pre- and post-project. Because so few stonefly species can be identified at the species level in the immature form, these are primarily common species, not the rarest. The rare species were probably lumped at the family or order level. There was no explanation in the study for the lack of finer identification. We counted only genera unless two species in the same genus were clearly identified.

The results were as follows for the stoneflies:

Site 1 (Control): 3 of the 4 taxa found in 1996 were the same as the 7 taxa found in 90-91. (a loss of 3 of 7 stonefly taxa, 3 were the same taxa as preproject).

Site 2: 2 of 5, 1996, same as 9 found in 90-91 (a loss of 4 of 9 taxa, two were the same taxa as preproject.)

Site 3: 0 of 0, 1996, same as 7 found in 90-91 (a loss of all taxa by post-project.)

Site 6: 1 of 3, 1996, same as 5 found in 90-91 (a loss 2 of 5 taxa, one was the same as preproject.)

Site 7: 2 of 3, 1996, same as 6 found in 90-91 (a loss of half the taxa, two were the same as preproject.)

Site 8: 0 of 3, 1996, same as 10 found in 90-91 (a loss of 7 of 10 taxa, none were the same from pre-project to post-project.)

As can be seen, these results show consistent decreases in taxa in common and number of taxa at the sites between pre- and post-project samples. Recovery had not occurred within the three years between the end of the poisoning and the last data set collected.

Looking at the data another way, we calculated a stonefly index of diversity using the Margalef diversity index, $M_{DIV} = S-1/Log_eN$, where S= number of Plecoptera taxa and N is the total number of individuals. These data came from Trumbo et al. (2000), Appendix H and I. We used all numbers and all taxa categories in those tables for 1990 and pre-1991 (before treatment) and 1996 (three years after treatment). We calculated a diversity index for both 1990 and pre-1991 data and then averaged the two indices for the before-treatment values. The control site (C) showed an increase in diversity over that period, as did treatment site 6 (Figure 1, p. 9a). Large decreases in diversity were seen at sites 2, 3, and 8 and a small decrease was evident at site 7 three years following the end of the rotenone applications.

For these analyses we used the data at face value with the recognition that these sites may have been poisoned by rotenone in earlier years, that no real control site existed that was comparable to the treatment sites, that there were odd differences in the way data were presented from the 1990 samples to the end of the project, that there was no explanation for the lumping of taxa groups in the later samples and no explanation for the missing sites 4 and 5.

The Water Quality Control Plan for the Lahontan Basin (Basin Plan) requires that species composition objectives "shall be met for all non-target aquatic organisms within one year following treatment." And the relevant species composition objective states: "Species composition shall not be altered to the extent that such alterations are discernible at the 10 percent significance level" (see Lahontan Basin Plan requirements for the East Fork Carson River Hydrologic Unit). The data indicate that the 1991-1993 poisoning did not meet these objectives, and it is highly unlikely that the proposed project can meet these objectives. In sum, the data from the 1991-93 rotenone project and other published literature indicate that the proposed project would violate the Lahontan Basin Plan's requirements that non-target organisms shall recover within one year following stream poisoning with rotenone.

The taxonomic list provided in the Forest Service EA is low in numbers of invertebrate taxa and represents a highly disturbed watershed, a poorly designed study or negligent analysis or all three. In a drainage of this size in a Wilderness

Area (that should be relatively undisturbed), we might expect somewhere between 200 and 400 species of aquatic invertebrates, or more, and several endemic species (Erman 1996). This drainage however has undergone extreme disturbance in the form of repeated stream poisonings, extensive livestock grazing, and stocking of non-native fish species.

The Sierra Nevada has a high number of endemic, locally distributed aquatic invertebrates of evolutionary importance (Erman 1996). It is unfortunate that agencies that should be concerned about maintaining this biodiversity, particularly in Wilderness Areas, are so focussed on single-species management that they put many other species at risk.

The plans to poison springs, even where fish are not present, make permanent species losses far more likely. Endemic species are often present in springs (Erman and Erman 1990, 1995). Springs are quite dissimilar even within the same stream basin (Erman and Erman 1990). It seems an abuse of the Endangered Species Act and the California Wilderness Act to use methods to restore a single species that put other native species at risk of extinction.

Macroinvertebrate species in general are distributed in rather narrow sections along a stream gradient. Only the most cosmopolitan species could survive downstream from upper reaches, seeps and springs. Species are replaced by other species along a stream gradient.

The great majority of aquatic invertebrates are insects, most of which emerge as adults into the terrestrial environment where they are an abundant and important food source for a wide variety of birds, amphibians, reptiles, mammals, and fish. In addition, size of species is important for food supply of other species. Studies have shown that large-sized organisms are often replaced by small-sized organisms when a disturbance occurs in stream systems (reviewed in Erman 1996).

Impacts to Other Species

Food is an essential component of "habitat." The loss of aquatic macroinvertebrates, emerging aquatic insects and fish over a three-year poisoning cycle in 11 miles of stream, springs and a high mountain lake in one drainage will be a major habitat disturbance for many other species in the food

web. Emerging aquatic insects will be significantly reduced for at least four years if this poisoning project is carried out. The great majority of aquatic insects have one-year life cycles, and some species have life cycles of two or more years. Eggs of most species at this high elevation are laid in the late summer and early fall. A late summer–early fall poisoning would significantly reduce species emergence for the following year and would reduce fall emergence for the year of poisoning.

Amphibians like the mountain yellow-legged frog and the Yosemite toad in addition to being in danger of being killed outright by the poison, will lose a major food supply. Birds like the willow flycatcher, the dipper and the yellow warbler will lose a large portion of their food supply, as will bats and fish-eating birds and animals, such as kingfishers and bald eagles. The cascading effects to the food web of a large poisoning project will be extreme and far-reaching. The FWS, the agency responsible for endangered species, should have analyzed these effects to non-target species in this Draft Plan. Instead the Draft Plan is a myopic, single species approach to increasing numbers of one species for sport fishing.

It was never the intent of the Endangered Species Act to conduct recovery projects to increase single species that would put other species at risk of extinction.

Cumulative Impacts

Two major cumulative impacts from poorly conceived fish management have occurred throughout the western U.S. for decades. The first is the stocking of non-native fish by the FWS and state fish and game departments, and the second is the widespread and intentional destruction of life by stream and lake poisoning that has been conducted, particularly in wildlands, to undo the damage of the continuing fish stocking. It is an endless and unanalyzed cycle.

The CDFG has planted most of the fish it later wants to poison (with, we assume, agreement from the FWS). Prior to the 1991 stream poisoning project above Llewellyn Falls, approximately 800 fish were moved below the falls into the area that the FS, CDFG, and FWS now want to poison (Flint et al. 1998). Also in 1991, CDFG planted non-native trout in Tamarack Lake where the agencies now propose poisoning to eliminate unwanted fish. "In 2003, approximately 500 hybridized trout were removed from Silver King Creek and stocked in suitable

waters outside the project area" (Forest Service EA, p. 6). The EA is silent about what those "suitable waters" were, but the Trout Unlimited website (www.tucalifornia.org) said the hybrids were moved to high mountain lakes, where they will undoubtedly become a further problem for mountain yellow-legged frogs.

And, of course, the four populations of PCT in other basins are all non-natives in those habitats. Six out of ten recorded PCT transplants to non-native sites have failed (Draft Plan p.16, Table 1). Other non-native locations are being considered (Draft Plan, p. 61). Poisoning precedes most transplants. It is clear that the agencies involved in these management activities do not understand what cumulative impacts are.

In the Sierra and other parts of the West, "trout of concern" are being planted in headwater areas or lakes that were originally fishless and contained many endemic and rare species of invertebrates and some amphibians. These native species are being negatively affected by the introduction of large non-native predators at the top of the food chain (Herbst et al. 2003, Knapp 1996, Knapp and Matthews 2000).

There can be no long-term restoration of native fish as long as fish stocking by Fish and Game agencies and FWS continues in the drainages of concern. These agencies have been educating the public for a very long time that moving fish around is a good idea. In California, the CDFG even does outreach with schools and groups, giving them fish eggs to rear and plant in streams. At this point, it would require a massive, long-term re-education program first of the agencies and then, of the general public, to stop fish introductions wherever people want that fish species.

"The primary threat to the Paiute cutthroat trout is hybridization with nonnative trout..." (Draft Plan, p. 49, para. 1). That threat will remain no matter how large an area the PCT occupies.

Below is a list of just a few of the projects of poisoning and stocking threatened fish into previously fishless waters or waters with other fish that we found. Taken together they represent a small fraction of the cumulative impacts of current fish management on native species from both fish stocking and

poisoning. Most of them are in National Parks or Wilderness Areas where we would expect native species of all kinds to be protected.

PCT projects:

1) 1956 Bull Lake poisoned (E.F. Carson drainage, Carson-Iceberg Wilderness) removed Lahontan cutthroat and Tui chubs, both natives species for the drainage, to stock PCT (Ryan and Nicola 1976).
2) 1957 Birchim Lake (Inyo County) poisoned to stock PCT (Ryan and Nicola 1976).
3) 1965 Delaney Cr. Poisoned in Yosemite N.P. to rid it of planted brook trout so exotic Paiute could be stocked (Ryan and Nicola 1976).
4) 1965 Upper and Lower Skelton Lakes poisoned in Yosemite N.P. (headwaters of Delaney Ck) to remove brook and to protect Paiute (unsuccessfully) (Ryan and Nicola 1976).
5) Sharktooth (John Muir Wilderness), Cabin, and Stairway (Ansel Adams Wilderness) all previously fishless (reviewed in FWS Recovery Plan and (Ryan and Nicola 1976).
6) FWS Draft Plan: sec. 4.2, p. 57 "explore additional out-of-basin population locations."

Lahontan Cutthroat Trout projects:

Unknown dates for Lahontan cutthroat trout recovery (from Fishery Management Plan for Lahontan cutthroat trout Salmo clarkii henshawi in California and Western Nevada Waters, 1986. Signed by CDFG, Nevada Dept. Wildlife, FWS, Forest Service Region 5 and Intermountain.

Here are known places around the current Silver King project:

1) Slinkard Creek (poisoned) stocked.
2) Upper Truckee (poisoned) stocked.
3) W.F.Grey Ck. (previously fishless) stocked.
4) Silver Ck. (poisoned) stocked.
5) Mill Cr. (to be poisoned).

6) 1980 upper N. and S. forks of By-Day Ck (E. Walker R.) stocked, previously fishless.
7) 1982 east branch Disaster Ck previously fishless, stocked with LCT.
1984-85 Water Canyon within Carson River drainage, Bodie Ck within Walker River both planted and previously fishless.
Plus, 11 other "substitute sites" for stocking Lahontan CT, all "need" chemical poisoning.

In summary for Lahontan cutthroat: The "limited expansion option" would stock 11 streams of the Lahontan basin, 10 would be chemically poisoned. "Moderate expansion option: all of the 11 in the first option plus 11 other "substitute sites" (mentioned above) all of which would be chemically poisoned. The Plan selected "limited expansion option" but "Option 3 (moderate expansion option) will be considered as a second phase."

Golden Trout projects:

There is a similar pattern of poisoning and restocking for the recovery of golden trout in the Golden Trout Wilderness. The Sequoia National Forest Fishing website reports that since 1975 about 65 miles of streams and 8 lakes have been poisoned and restocked with Golden Trout.

The impacts of all these poisoning and stocking projects on non-target species have been ignored, for the most part, as they are in this FWS Draft Plan. The Draft Plan makes no effort to assess the cumulative impacts to such species as the mountain yellow-legged frog, Yosemite toad, willow flycatcher, the yellow warbler and hundreds of other species of all this poisoning being conducted in other nearby watersheds or of all the past poisoning in the Silver King drainage (7 or 8 times in various parts of the Silver King drainage) or in many other watersheds across the Sierra. Nor does it recognize that a threatened trout species outside its native habitat is a non-native species and as much an impact as any other non-native species.

On the whole, this proposed management plan, far from benefitting native amphibians, will only further deteriorate their habitat in several locations. One of the more misleading statements in this Draft Plan is the sentence on p. 9 that "the

long-term effects of removal of nonnative and hybrid fish will be beneficial to native amphibians." We know of no studies that show that PCT are less an impact on amphibians than are other trout.

Role of Non-Governmental Fishing Organizations

While we have had a great deal of difficulty getting information on this project (documented in earlier comments by NAE to the CDFG and FS), some groups, it seems, have been working on the project for years as the following indicates:

"Trout Unlimited continues to spearhead the work on Silver King Creek while relying on the cooperative agencies for scientific and logistical support. We are planning the next phase of the project in conjunction with agencies and will provide an abundance of volunteer labor as well as funding for equipment, materials, and transportation." (Trout Unlimited website regarding PCT in Silver King Creek—www.tucalifornia.org).

A Rotenone Stewardship Program, funded partially by the Foreign Domestic Chemicals Corporation and Prentiss Incorporated, whose products are promoted in the website advice column, is part of the American Fisheries Society Fish Management Chemicals Subcommittee (AFS website).

Summary and Conclusions

The FWS Draft Revised Recovery Plan for the Paiute Cutthroat Trout is a proposal for another large stream and lake poisoning project in a Wilderness Area. It was not the intent of the Wilderness Act to manage Wilderness Areas to expand distribution of a single species beyond its native range. No new information has been presented in this Draft to convince us that this plan is necessary or scientifically supportable. And it is a major risk to non-target species.

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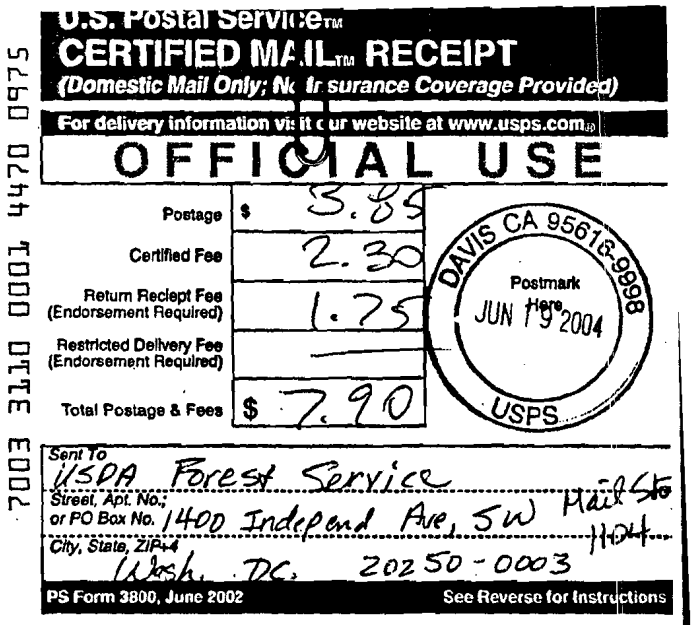
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To:
Appeal Deciding Officer
Chief of the Forest Service
USDA Forest Service
Ecosystem Management Coordination Staff
1400 Independence Avenue, SW
Mail Stop 1104
Washington, DC 20250-0003

This document is an appeal filed pursuant to 36 CFR part 215.

Exhibit L
for RWQCB
Aug. 5, '04

The appellant is:
Nancy A. Erman
43200 E. Oakside Place
Davis, CA 95616
naerman@ucdavis.edu
530/758-1206

The decision document being appealed is the Decision Notice and Finding of No Significant Impact for the Paiute Cutthroat Trout Recovery Project in Silver King Creek on the Humboldt-Toiyabe National Forest, Carson Ranger District, USDA Forest Service, Alpine County, California,. ..

The date of the decision was April 30, 2004.

The Responsible Official is Jack Troyer, Regional Forester, Intermountain Region.

The Legal Notice for this decision was published in the Reno Gazette Journal on May 7, 2004.

The subject of the decision document and Environmental Assessment (EA) is a proposal to poison with rotenone 11 miles of stream, springs, seeps and a high

mountain lake in the Carson-Iceberg Wilderness Area up to twice a year for a period of three years.

The change that I am requesting is for the Forest Service either to reverse its decision to adopt alternative 2 and instead adopt Alternative 1, the No Action Alternative, or to prepare a joint EIS/EIR with the California Department of Fish and Game (CDFG) and the Fish and Wildlife Service (FWS).

I am a retired professional aquatic ecologist with a specialty in freshwater invertebrates. I am filing an appeal of this decision as a private citizen, in the public interest. I filed previous comments on the EA, March 12, 2004 and on the letter, January 7, 2004 (from Supervisor Vaught, Dec. 22, 2003). I reviewed the scoping document and EA on the earlier proposed project and filed comments with Humboldt-Toiyabe National Forest, May 29, 2002 and Aug. 31, 2002. I reviewed the Negative Declaration documents of the California Department of Fish and Game (CDFG) and filed comments with the CDFG, June 12, 2002. I am incorporating all above documents by reference because I have submitted them to the Forest Service previously.

I am filing this appeal for the following reasons:

New information has been revealed regarding the project.

The project does not have an NPDES permit to discharge rotenone into the waters of California, contrary to the statement that has been made at least 6 times in the Decision Notice and FONSI and at least two times in the EA and responses to comments (e.g., pp. 4, 8, 9, 10, 12, 84). Nor did the project have an NPDES permit at the time the EA was released. The NPDES permit expired in January 2004. The Forest Service has misrepresented these facts in the EA, Decision Notice and FONSI (letter from Harold Singer Executive Officer, Lahontan RWQCB to Nancy Erman, June 3, 2004, Exhibit 1).

The California State Water Resources Control Board did not include rotenone in their new general NPDES permit, May 20, 2004. Therefore, this project likely will require a public hearing before the Lahontan Regional Water Quality Control Board (Lahontan RWQCB) prior to that Board deciding on an NPDES permit (Exhibit 1).

Further, there is evidence that the poisoning project can not meet the Lahontan RWQCB Basin Plan requirements, contrary to the statement made in the Decision Notice and FONSI. And in addition, the Lahontan RWQCB have not completed their review of this project (Exhibit 1).

The Water Quality Control Plan for the Lahontan Basin (Basin Plan) requires that species composition objectives "shall be met for all non-target aquatic organisms within one year following treatment." And the relevant species composition objective states: "Species composition shall not be altered to the extent that such alterations are discernible at the 10 percent significance level" (Lahontan Basin Plan requirements for the East Fork Carson River Hydrologic Unit). The data indicate that the 1991-1993 poisoning did not meet these objectives, and it is highly unlikely that the proposed project can meet these objectives. In sum, the data from the 1991-93 rotenone project and other published literature indicate that the proposed project would violate the Lahontan Basin Plan's requirements that non-target organisms shall recover within one year following stream poisoning with rotenone.

The proposed project is in violation of the Clean Water Act if it can not meet the Basin Plan requirements.

The project, therefore, does not meet criterion #5 set forth by Regional Forester Troyer on p. 7 of the Decision Notice and FONSI as one of the 5 criteria he used to arrive at his decision: "The action needs to protect and maintain water quality." The Lahontan Basin Plan requirements can not be met nor were they met during the rotenone poisoning in this stream drainage in 1991–1993.

The letter from the Lahontan RWQCB of July 3, 2003, no longer applies in light of the above new information and should not have been referred to in responses to comments in the EA (e.g., p. 79, p. 85).

The staff and members of the Lahontan RWQCB did not know the complete facts of the project in July 2003, when the letter referred to above was written by Harold Singer to CDFG. The Lahontan staff was apparently unaware at that time that the Forest Service had abandoned their EA process, had not replied to public comments, and was not intending to complete an EA, as required by NEPA, before proceeding with this poisoning project in a Wilderness Area. The Lahontan Staff apparently was also unaware that the CDFG had never responded to public input on their Negative Declaration for the proposed project.

The Decision Notice and FONSI have omitted the information that the Forest did not intend to complete a NEPA process or respond to public comments before proceeding with the poisoning project in the summer/fall, 2003. It required a legal action to force the Forest Service to prepare this EA and develop alternatives as required by NEPA. The statement on p. 5, last sentence, para. 4, under Public Involvement is a misleading half-truth. It implies that the Forest Service had withdrawn the project by not signing a Decision Notice and FONSI when, in fact, the Forest Service intended to proceed with the project without completing the EA and without responding to public comments. The letter from Gary Schiff, District Ranger, to public commenters of March 13, 2003, is included here as Exhibit 2.

The Paiute cutthroat trout is not in danger of decline, according to our analysis of data and evidence given in the FWS Draft Revised Recovery Plan for the Paiute Cutthroat Trout and comments on the draft, incorporated here by reference.

The Fish and Wildlife Service has not yet completed or released a Final Revised Recovery Plan for the Paiute Cutthroat Trout. That document may yet

undergo substantive changes as a result of public comment and review by independent scientists. The conditions of the 1985 Paiute Cutthroat Trout Recovery Plan, which is still in effect, have been met. The Paiute cutthroat trout has been restored to far more area than it is believed to have occupied originally, as discussed in my earlier comments and those submitted by Wilderness Watch (See also comments and analysis from N. Erman and D. Erman on FWS Draft Revised Recovery Plan for the Paiute Cutthroat Trout, Exhibit 3).

It is premature for the Forest Service to attempt to complete an EA and proceed with poisoning before completion and adoption of the FWS Revised Recovery Plan for the Paiute Cutthroat Trout.

It is a violation of NEPA to conduct unnecessary actions that significantly alter the environment without demonstrating a clear need for such actions. No demonstrated need exists for this project (Exhibit 3).

In the Decision Notice and FONSI Mr. Troyer states "I believe the benefits of restoring a species threatened with extinction outweighs the temporary impacts of the treatments." But the Paiute cutthroat trout, a subspecies, is not "threatened with extinction" and the impacts of the treatments are not "temporary."

The proposed poisoning project will endanger many non-target species. The project, therefore, does not meet criterion #3 set forth by Regional Forester Troyer on p. 7 of the Decision Notice and FONSI as one of the 5 criteria he used to arrive at his decision: "The action needs to not cause long-term effects to the viability and diversity of species." It is clear that the last poisoning in this stream drainage has caused long-term effects to invertebrates (Exhibit 3 and comments by N. Erman on the EA, Aug. 31, 2002, and on the EA, March 12, 2004, and EA response to comments 8-28 and 9-3). There is no reason to assume that this project will not cause further significant, long-term effects.

The Forest Service responses to comments are contradictory on the issue of long-term impacts to non-target species. In an answer to comments 5-3 and 20-3 (p. 86) the response is "effects (on aquatic organisms and wildlife) are expected to be short-term." And, again, in response to comments 12-22 and 12-23, the FS states that effects to macroinvertebrates are expected to be short-term (p. 78). But in response to comments 8-28, 8-36, 12-13, 13-4 and 9-3 (p. 78-79), the Forest Service concedes that impacts have been long-term in the past.

The Forest Service has failed to conduct macroinvertebrate species inventory in the project area and stream drainage to determine what non-target species are in the area. The project has a high probability of affecting or eliminating endemic and rare, non-target species as discussed in detail in my previously submitted comments. The EA fails to address this issue and, instead, gives a nonsense answer (EA response to comment 8-31).

The Chief of the Forest Service signed a Memorandum of Understanding in 1999 with the Directors of the Bureau of Land Management, the Fish and Wildlife Service, the U.S. Geological Survey, the National Park Service, the Smithsonian Institute, and the Nature Conservancy for the conservation of springsnails and their habitats. The Decision Notice, FONSI and EA have failed to identify which springs and seeps will be poisoned. It has also failed to conduct pre-project inventory of species of springsnails in the project area.

The Decision Notice, FONSI and EA are arbitrary in their dismissal of the impact to the food supply of non-target species at risk stating that such species as the yellow warbler and willow flycatcher will be forced "to forage greater distances while [aquatic] insect populations recover" (p. 96). The statement continues to ignore the fact that this critical food supply will be significantly depressed, and possibly completely eliminated, for at least 4 years, (as discussed in my previous comments).

The response to comment 8-34, p. 80, continues to dismiss a large body of well-established, published research over many decades that shows longitudinal

zonation of macroinvertebrate species along a stream gradient. A review through 1970 can be found in the classic treatise by H.B.N. Hynes: The Ecology of Running Waters. My own studies on east-side Sierra streams were discussed and cited in my earlier comments. Species change along a stream gradient, and it can not be assumed that upstream "source" populations can or will "re-colonize" downstream areas.

The Decision Notice is factually incorrect in other substantial and significant ways. There are other critical discrepancies among the state and federal agencies regarding this project, as follows:

No scientific evidence exists to determine the exact historical location of the Paiute cutthroat trout, as discussed in the FWS Draft and our comments on the draft (Exhibit 3). The FWS has conceded in their Draft Plan that the historical habitat of the subspecies may have been above Llewellyn Falls (p. 15).

The Forest Service has admitted in responses to comments (12-13,13-18, p. 90) that the recently "discovered" lower barrier in the stream may not be a barrier under high water conditions and has not been examined under high water flows. It is unknown whether or not fish can get through the barrier. If they can get through, the Paiute cutthroat likely did not evolve in the lower stream section below Llewellyn Falls; and the area to be poisoned, therefore, is not historical habitat. Isolation of some kind would have been necessary for this subspecies to evolve from its precursor. In addition, if fish can get through the barrier, then poisoning the stream section is pointless.

The FWS has suggested that barriers may have to be "established" to prevent reinvasion of non-native trout into the lower stream section where the poisoning is planned. Clearly, the FWS is not certain that barriers to fish migration are present in the lower stream section (FWS Draft Recovery Plan and Exhibit 3). If barriers are not present, the lower stream section can not be assumed to be the historic habitat of the Paiute cutthroat trout.

A clear contradiction exists between the FWS Draft Management Plan and the Forest Service EA. This EA states that "no barrier construction or removal is planned under the proposed action nor are any reasonably foreseeable" (Response to Comment 8-47, p. 75) and on p. 74, "the proposed project does not include any actions to physically modify stream or riparian habitat." The contradiction is one of fundamental misunderstanding of the conditions in the stream and of future management of the stream habitat between the two federal agencies.

The primary reason that most rotenone poisoning projects ultimately fail is that humans sooner or later put fish back into the poisoned sections. They have been taught by CDFG for many decades that this is a good thing to do. And so, whether or not a barrier exists is immaterial to the ultimate success or failure of the poisoning objectives. The risk of unwanted fish getting into the habitat of the Paiute cutthroat subspecies remains the same whether or not this stream section is poisoned, as discussed in my previous comments on the EA.

Two different purposes have been given for this project. One is "to restore the Paiute cutthroat trout to its historic habitat area." The second is "to remove the threat of hybridization to Paiute cutthroat trout from non-native salmonids downstream from Llewellyn Falls" (EA comments p. 73). The first has already been accomplished and the second can not be accomplished because non-native trout are present throughout the Forest and Wilderness Area and can be moved at any time.

The Forest Service has failed to conduct cumulative impact analysis on non-target, native species of all past poisoning in this drainage, in spite of clear evidence, submitted in my earlier comments, that aquatic invertebrates had not recovered several years after the last poisoning in 1991–93.

The Forest Service has failed to conduct cumulative effects analysis on the use of stream poisons on non-target species in the Carson–Iceberg Wilderness and the Humboldt-Toiyabe Forest.

The Forest Service has failed to evaluate the cumulative impacts of fish stocking on native species throughout the Sierra and in this drainage.

Rather than analyzing cumulative effects from past, present, and future fish stocking and poisoning, the Forest Service EA has repeatedly limited its responses in the EA, Decision Notice and FONSI to the proposed project area; thereby, ignoring the purpose of cumulative effects analysis. See, for example, response to comment 13-5, p. 78. Cumulative impacts were discussed in my previous comments and those of Laurel Ames. (Also see Exhibit 3, p. 17—21.)

The Forest Service allowed the project to begin in the summer of 2003 prior to completing an EA. Hybrid fish were electroshocked and moved from the proposed project area to other parts of the Forest without assessing cumulative impacts of non-native fish on native biota. These actions were in direct conflict with the Forest's objectives to restore native amphibians and the Lahontan cutthroat trout.

In addition, the Forest Service has allowed a private fishing club (Trout Unlimited) to move hybrid fish from Silver King Creek to unspecified high mountain lakes without conducting NEPA review of these actions. (Information provided in my EA comments.)

The CDFG Administrative Report on the last poisoning project in the Silver King Creek drainage must be considered new information to the Forest Service and reviewed in a joint EIS/EIR. The response to comment 8-62 is that the Forest Service did not know of its existence. I provided the information in my previous comments. (Flint, R. A., W. L. Somer and J. Trumbo. 1998. Silver King Creek Paiute cutthroat trout restoration 1991 through 1993. California Department of Fish and Game, Inland Fisheries Administrative Report No. 98-7). The report was released five years after the rotenone poisoning had ended. It documents accidents and errors that occurred during the 1991-93 poisoning in the drainage.

During the last poisoning, non-native fish escaped from the "live cars" and necessitated the application of a far greater amount of rotenone, 40μg/L, into the stream than was allowed. Perhaps because the Forest Service has not reviewed this report, their response to comment 8-59, p. 90 reveals that they will be making the same mistake of using non-native fish in the live cars again. And the same accident may happen again.

The Decision Notice and FONSI state that "The CDFG has extensive experience using rotenone, which includes successful fish removal projects adjacent to the project area" (p. 10). It, therefore, seems relevant to review the record, again to determine just how "successful" the CDFG has been in the Silver King Creek drainage and in the Lahontan Region. See also my comments on the Scoping Document, May 29, 2002. These comments were not included or responded to in the Decision Notice, FONSI and EA.

The following information from the Lahontan RWQCB files and from CDFG files illustrates the problems with CDFG rotenone projects:

During rotenone poisoning of Silver King Creek, Mono County, 1992, approximately 1000 fish were killed downstream of the project area from the application of potassium permanganate (Lahontan RWQCB files). The following year, 1993, during a repeat poisoning of the same area, detoxification of the rotenone was chemically incomplete (Flint et al. 1998). The record shows that CDFG has difficulty managing the performance of potassium permanganate and detoxifying the rotenone.

In the Lahontan Region alone, 6 of 11 rotenone projects between 1988 and 1994 violated water quality standards. Rotenone, rotenolone, or naphthalene were detected downstream or persisted longer than limits established in Basin Plans (Lahontan RWQCB files).

During application of rotenone in Silver Creek, Mono County, in 1994, independent testing by the Regional Water Quality Control Board found carcinogenic compounds in water. In contrast, testing by CDFG at the same sites found no detectable carcinogenic compounds (Lahontan RWQCB files).

Rotenone was detected in sediment during a CDFG project in Silver Creek, September 20, 1995. CDFG was well over their target application rate of rotenone, with data apparently missing at a critical period (Lahontan RWQCB files).

Rotenone and its breakdown products have persisted in water for long periods after CDFG poisoning projects (Lahontan RWQCB files).

Reporting to RWQCBs from CDFG has not been timely. The Flint et al. 1998 Administrative Report, for example, was not submitted until 5 years after the project was completed.

The high rate of past problems and water quality violations on similar projects in the region indicate a potential for significant effects and the need for a joint EIS/EIR.

The Decision Notice, FONSI and EA have failed to consider new information on the connections between rotenone and Parkinson's disease, provided in EA comments by Ann McCampbell, M.D., by Citizens for Alternatives to Toxics and by me. The EA has considered only one study published four years ago and has ignored all recent published information on the connection between rotenone and Parkinson's disease.

The project is highly controversial. The need for the project has been questioned by the Alpine County Board of Supervisors, by university and independent scientists, by some fishing organizations, by several non-governmental organizations, and by other individuals.

In summary, the substantial lack of communication and the miscommunication among the agencies involved in this project indicate the need for a joint EIR/EIS. These several staggered, separate and incomplete reviews by state and federal agencies are unacceptable on a project this controversial in a Wilderness Area and with such a long history of agency management. The proposed project has a potential for significant impacts and irreversible damage to the stream ecosystem. The Forest Service has capriciously dismissed substantive data and comments. The proposed project clearly poses the potential to result in significant adverse effects to non-target species. The Forest Service can not reasonably make a finding of no significant impact for this project. Therefore, a joint EIS/EIR should be prepared.

Exhibit 2

United States Department of Agriculture
Forest Service
Humboldt-Toiyabe National Forest
Carson Ranger District
1536 S. Carson Street
Carson City, NV 89701
(775)882-2766
(775) 884-8199 (Fax)

File Code: 2670-3

Date: March 13, 2003

Dear Interested Public:

I want to thank you for providing comments on the Environmental Assessment for the proposed Paiute Cutthroat Trout Recovery Project. A majority of our commenters felt that it was confusing and redundant having both the California Department of Fish & Game (CDFG) and the Forest Service (FS) doing separate environmental analysis for this project. It was suggested that just one planning effort be used. Consequently, I asked the project's Interdisciplinary Team to determine if it was possible to do one environmental analysis and if so, how. After discussions with various staff from our Regional Office, it was determined that doing one environmental analysis for this project was appropriate.

In a Memorandum of Understanding (MOU) between State of California, Department of Fish and Game and Forest Service, US Department of Agriculture (Forest Service Manual [FSM] 2611.1, R5 Supplement No. 2600-96-1), the Forest Service recognizes that the Department of Fish and Game has been designated by the State of California as the trustee for the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. The Forest Service Manual also states that the FS and CDFG mutually agree to coordinate with respect to compliance with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) and, where appropriate, to prepare joint environmental documents (FSM, R5 Supplement No. 2600-96-1, FSM 2611.1, IIIA, page 5 of 14). The MOU also provides the direction for pesticide treatments (FSM 2611.1, R5 Supplement No. 2600-96-1, page 14 of 14) and introduction, stocking, and translocations (FSM 2611.1, R5 Supplement No. 2600-96-1, page 16 of 14), which identifies the CDFG as the lead agency for these types of projects. Special management areas, which includes Wilderness, are also addressed in the MOU (FSM 2611.1, R5 Supplement No. 2600-96-1, page 17 of 14).

The Forest Service Wilderness Management Handbook (FSH 2309.19) contains policies and guidelines for fish and wildlife management in Wilderness developed jointly through a MOU by the International Association of Fish and Wildlife Agencies (IAFWA), the Forest Service, and the Bureau of Land Management in August 1986. This direction is consistent with the MOU between the FS and CDFG and requires Forest Service approval for the use of motorized equipment, mechanical transport, pesticides, or chemical treatments within Wilderness.

Given the above information, it is clear the Department of Fish and Game is the lead agency and that one planning document is all that is required. The Forest Service's role is to analyze the use of motorized equipment, mechanical transport, and chemical treatments within the Carson-

Iceberg Wilderness. The Forest Service will concurrently complete a minimum tools analysis to determine whether to allow the proposed project or some modified version of it within the Wilderness. The Regional Forester will be the authorizing official. If approval is authorized, a letter to the CDFG from the Regional Forester will identify the terms and conditions or mitigation measures necessary to operate within the Wilderness.

The comments you provided during the initial scoping for this project and/or the 30-day public review and comment period will be instrumental both in CDFG's planning effort and in helping the Forest Service complete the minimum tools analysis. We have shared all comments received with the CDFG for their consideration prior to completing their CEQA document.

Comments received relative to the impacts of the proposal on wilderness values in the Carson-Iceberg Wilderness will be considered in the development of the minimum tools analysis. For example, pack stock rather than a helicopter are proposed for use during the fish salvage.

I want to thank you again for you input. Please contact Erick Walker at (775) 882-2766 or ewalker02@fs.fed.us if you have any questions regarding this project.

Sincerely,

GARY SCHIFF
District Ranger

Comment Letter 8

From: "Don C. Erman" <dcerman@ucdavis.edu>
To: BWarden@waterboards.ca.gov
CC: naerman@ucdavis.edu
Date: 5/15/2009 11:24 AM
Subject: Silver King NPDES

Dr. Warden:

As I have started looking, I have some questions concerning the Tentative NPDES permit for the Silver King Creek poisoning project that I hope you can clarify.

When the permit states that a carrier-free powdered rotenone product (as well as the two liquid formulations specified) may be used, does that mean the Board is specifically eliminating Noxfish as an approved chemical in the project? And when the permit states that the carrier-free powdered rotenone must be reviewed in the EIS/EIR, is the Board aware that other than CFT, Nusyn-Noxfish, and Noxfish that no other rotenone formulations have been considered and reviewed in the EIS/EIR? 1

Could you also explain why all the active ingredients, shown on the product labels, are not included in the permit findings for standards, testing or regulation? Specifically, why aren't "other cube resins", present in all proposed rotenone formulations, considered in the permit? Why isn't piperonyl butoxide also not considered in the Tentative permit? We have presented scientific references to the Board in the past concerning the independent and interactive toxicity of both of these active ingredients. 2

Could you also clarify the correct dose given on p. 5 where the permit states "Nusyn-Noxfish/CFT Legumine will be applied at a target concentration of 0.5 to 1.0 mg/L formulation (25 to 50 microg/L rotenone) to all flowing streams." I am unsure which formulation concentration applies to which chemical and why then the rotenone concentration is a range of values (25 to 50). Is the intent to permit a dose of 25 microg/L of rotenone in Nusyn-Noxfish but a 50 microg/L dose of rotenone in CFT Legumine? And if so, why? The EIS/EIR has stressed the low amount to be used this time and in fact lower than any previous treatment project. 3

Thank you for your attention to these details.

Don C. Erman

Comment Letter 9



BW

Recipient Information

To: lauri kemper
Company: eng. north lahontan water
Fax #: 5305442271

Sender Information

From: jeanpublic
Email address: jeanpublic@yahoo.com
Sent on: Thursday, May 14 2009 at 9:47 AM CDT

This fax was sent using the FaxZero.com free fax service. FaxZero.com has a zero tolerance policy for abuse and junk faxes. If this fax is spam or abusive, please e-mail support@faxzero.com or send a fax to 800-980-6858. Specify fax #1898742. We will add your fax number to the block list.

i do not concur with fws cutthroat trout plan. i do not approve of rotenone killing all fish so that you can restore anything at all. it is clear that climate change has made restoring trout highly speculative. for that you are making work for yourself, spending taxpayer dollars wastefully and negligently for a plan that has no possibility of succeeding. this plan is beyond the pale. stop spreading chemical toxics all over the earth. i think plans like these are from insane people. jean public 15 elm st florham park nj07932

1