DECLARATION OF NANCY A. ERMAN (edited for size)

Californians for Alternatives to Toxics v.
UNITED STATES FISH AND WILDLIFE
SERVICE; UNITED STATES
FOREST SERVICE
Case No.: 2:10-cv-01477-FCD-CMK (TEMP)

I am a retired professional aquatic ecologist with a specialty in freshwater invertebrates and a Specialist Emeritus at the University of California at Davis. I studied aquatic invertebrates in streams and springs of the Sierra Nevada for 30 years. I published scientific papers on aquatic invertebrate distribution and behavior with an emphasis on stream and spring environments and the taxonomic order Trichoptera (caddisflies).

I participated in the Sierra Nevada Ecosystem Project and wrote chapter 35 in the Final Report to Congress, Status of Aquatic Invertebrates. I have also studied state and federal agency oversight of freshwater environments in California and have written and spoken extensively on my findings.

From the time I first learned of the Silver King Creek "Paiute Cutthroat Trout Recovery Project," I have reviewed thoroughly the agencies' documents and submitted comments to state and federal agencies (California Department of Fish and Game (CDFG), U.S. Fish and Wildlife Service USFWS), USDA Forest Service (USDA FS), and the Lahontan Regional Water Quality Control Board (LRWQCB) at every stage of project review beginning in 2002. For the Court's ease, I summarize here some of the key points that I have many times written to the agencies and are contained in the administrative record.

I provided this court with a declaration in 2005 showing detailed, long-term impacts to non-target aquatic invertebrates from the last, most recent rotenone poisoning of upper Silver King Creek from 1991–1993. Invertebrate monitoring was conducted for three years following the third poisoning episode in 1993. Major impacts to invertebrates were still evident in 1996 when monitoring was ended.

The LRWQCB Basin Plan considers impacts lasting longer than one year as long-term.

Because poisoning was conducted twice a year for three years in a row, impacts lasted for at least six years (1991–1996) and probably much longer. The current project is proposing the same time span for poisoning— twice a year for up to three consecutive years. The current proposed project is for the lower part of the Silver King stream basin most of which has not been previously poisoned.

In their response to public comments in the Final EIS/EIR the agencies (CDFG, USFWS, and USDA FS) have now admitted that impacts to invertebrates were still evident three years following poisoning with rotenone in 1991–1993. They had previously denied this. They have also stated in the EIS/EIR that some species may be lost as a result of the next rotenone poisoning and that rare and endemic species may be lost.

The current proposed project is almost the same as the project first proposed in 2005 except that different rotenone formulations (CFT Legumine and perhaps, Noxfish) will be used. The impacts to non-target invertebrate species should be expected to be as large or

larger than they were the last time the stream was poisoned in 1991–93. The amount of rotenone to be applied will be approximately 2 to 4.6 times higher than the mean concentration that was measured in the 1991–93 poisoning project.

CFT Legumine was the rotenone formulation used in the 2007 Lake Davis project, where the lake and all streams and springs flowing into the lake were poisoned to eliminate northern pike. The formulation did not perform as expected, according to the CDFG Administrative Report, 2008, and rotenone was still present in the lake six months following the application and was present in streams two weeks after application (at which time the agencies ceased monitoring).

The questions asked of a scientific study to assess the effects of a non-specific poison like rotenone are: what are the impacts to the non-target species and what species may be lost forever as a result of poisoning? The only way to answer that question is to know what non-target species are in the area prior to poisoning.

The agencies have refused again in the EIS/EIR to conduct a species inventory before they poison most of the remainder of the Silver King Creek watershed. I disagree with the agencies that such an inventory is not feasible, and I supplied this court in 2005 with an outline of how it could be done feasibly. I include a similar outline here.

A reasonable inventory of macroinvertebrate species could be conducted in two to three years. With as many volunteers as CDFG and the USFS seem to have at their service for this project, it would be relatively easy to do the collecting necessary for species inventory.

The monitoring and analyses conducted by the agencies is at group levels of invertebrate taxonomy. The agencies are not identifying most species prior to poisoning. Therefore, when a broad taxon of invertebrates (genus, family, order, class) disappears after poisoning, it likely represents several or many species. And when a taxon is the same before and after poisoning, the actual species may be different. With general enough measures of taxa assemblages, it is possible to have major changes in the species composition of the invertebrates that will not be revealed in the data analyses being used by the agencies. The least sensitive species in each broad taxon and those with the greatest dispersal capacity will return to the area after poisoning.

The agencies are collecting immature larval forms of most of the aquatic invertebrates. Most of these cannot be identified to species. Reproductively mature forms must be collected and identified to determine species. In the case of most insects, the flying adult forms must be collected. The agencies have been monitoring macroinvertebrates in the Silver King Creek basin since at least 1984, more than enough time to determine the species of the macroinvertebrates. They could also have identified species in the last six years since they last proposed this project.

Eleven macroinvertebrate taxa (families or genera) found in Silver King Creek between 1984 and 2006 are on the California Natural Diversity Database (CNDDB) Special Animals list. Fifteen species are listed on the CNDDB from those taxa. Until and unless adult specimens are collected and identified, it will not be known if these species occur in the Silver King Creek basin. The CNDDB is a computerized inventory of “the most rare animals, plants, and natural communities in California.” It is kept by the Wildlife and Habitat Data Analysis Branch of the CDFG in collaboration with the Nature Conservancy and the Natural Heritage Network.

Drs. Mark Vinson and Deanna Vinson, were consultants hired by the agencies to analyze invertebrate data and review the literature on rotenone impacts of invertebrates. Their report, included as part of the EIS/EIR, stated: “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.”

I concur with their assessment. Once species have been identified in an area, it becomes possible to make associations between the larvae and the adults and so determine what species are present from the larval samples.

Dr. Mark Vinson suggested that the agencies sponsor a PhD student to conduct a species inventory. I agree that such a study would go a long way to learning what species are in this watershed prior to poisoning it.

The Vinsons also wrote in their report summary: “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.” I agree with this summation as well.

Another consultant to the agencies, Dr. Fred Mangum, gave his opinion that the likelihood that there are rare and endemic macroinvertebrates in Silver King Creek is very low and that the stream is not unique or isolated. Dr. Mangum directed a USDA Forest Service invertebrate analysis laboratory in Provo, Utah, that identified invertebrates to broad taxonomic groups. That laboratory, now closed, used larval taxonomic keys that were incapable of identifying most species. It is perhaps for this reason that he has this opinion about similarity of invertebrates throughout the West. At broad taxonomic groups, the invertebrates in the West and in cold mountain streams are similar. At the species level, however, they are very different. The Sierra Nevada has many unusual aquatic invertebrate species that are not found in other areas.

My own work on caddisflies in the Sagehen Creek basin, also on the east side of the Sierra, is an example. In one study I collected and identified 77 species of caddisflies and compared them with species lists published elsewhere in the West and in Alaska. Thirty-nine of those species in the Sagehen basin were not present on a Trichoptera species checklist that had been published for the state of Utah.

The fact that I could conduct this study also refutes the statement in the EIS/EIR that the state of art of benthic invertebrate taxonomy is not sufficiently advanced to allow identification of invertebrates at the species level. There are experts in most taxonomic groups in universities and museums throughout North America who are willing to identify reference collections of prepared specimens. There are many published checklists of taxonomic groups of species in the western U.S. and thousands of species descriptions in the literature for western U. S. freshwater invertebrates.

Sagehen Creek, like Silver King Creek, has a history of past logging and sheep grazing. Nevertheless, it contains several unusual species in springs and spring streams. One of the caddisfly species I found was present in only one spring. Some forms of land and water use, like logging and livestock grazing, while causing a disturbance to streams do not wholly eliminate animal life, as does poisoning. Poisoning requires a higher standard of assessment before it is carried out by government agencies than the routine monitoring presently being done by the government.

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."

They were to compare the 1991–96 study on aquatic invertebrates in Silver King Creek with a later 2002 –2006 study. They found the data unsuitable for such an evaluation, as did I. There were too many variables to make a valid comparison with the earlier studies (1990–1996). 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. I 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. And, finally, the samples were analyzed in different laboratories with different protocols. The Provo, Utah, USDA Forest Service laboratory subsampled; 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.

The agencies have begun yet a third study of invertebrates that once more changes the sampling protocols from those of the first two studies. Further, the current study is using upstream stations, some that have been poisoned many times in the past, as control stations to compare with the next sites they plan to poison. These stations may not contain the species that were native to those areas prior to being poisoned repeatedly and can not be considered as "controls." To use them as control stations for yet another poisoning in the basin would bias results.

The Agencies continue to repeat the incorrect statement that springs and seeps, if notpoisoned, can serve as macroinvertebrate refugia for post-project re-colonization. I have refuted this assertion several times in comments to the agencies. Again, the misunderstanding about species and where they live is evident in the EIS/EIR. Many species found in springs and seeps do not live farther downstream in the watershed. The Agencies have a confused understanding about the word "refuge" as it applies to springs. Springs are refuges for species from other climatic periods. Many springs have constant or near-constant temperatures, and so species from warmer or colder climate regimes reside in springs. For these reasons many spring species cannot live farther downstream where temperatures are variable.

The statements that springs and seeps will be protected are untrue. According to EIS/EIR, springs and seeps will be poisoned if they have a water connection to streams or are believed to have fish in them or are believed to provide a refuge for fish during the poisoning. The statements in the EIS/EIR apparently are made to give the illusion of protection to species and habitats.

On a similar issue, the agencies continue to claim that species from upstream will recolonize areas poisoned downstream. But, invertebrates occupy specific microhabitats within a stream system. They are not everywhere present throughout a stream system. They are distributed by species along a stream gradient. All but the most widely distributed species are replaced rather than added to from upstream to downstream. Extensive research has been done on this topic since the 1940s. Statements made in the EIS/EIR that upstream areas will serve as refugia to re-colonize downstream areas are fundamentally false. Only a small percentage of species would be able to exist throughout

the stream system. Furthermore, most of the upper watershed has been poisoned repeatedly in the past and likely is missing native species.

In addition, aquatic invertebrates are an essential part of the food webs of aquatic and riparian species in the Sierra Nevada. 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. The loss of large portions of emerging insects for several years during and following the poisoning of miles of stream (and, possibly, a lake) would be a major impact to riparian animals in the area.

To conclude, in my opinion, the agencies still have not evaluated the potential impacts of a non-specific poison on this stream system because they have not inventoried the species that will be lost or impacted. We are in almost exactly the same place we were in 2005, except that now the agencies have admitted that long-term impacts occurred previously when they poisoned the upper part of this system and that species may be lost if they poison again. But they refuse to learn what species those may be, an untenable position for agencies that claim to protect all species under their authority.

Related to the human impacts of rotenone, in my comments, I referred the agencies to over 350 studies linking rotenone and Parkinson's Disease. My comments and references were not considered by the agency. Yet another study from this year confirms what the other studies also indicate, that Parkinson's Disease is positively associate with rotenone. (Tanner 2011).

Dated: May 19, 2011.

Nancy A. Erman