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Sent to:
August 5, 2013 **comments-pacificsouthwest-sequoia-greenhorn@fs.fed.us**

Roger Porter
Kern River Ranger District
32588 Highway 190
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cc: Ara Marderosian
Rick Stevens

Subject: Scoping Comments for the Tule River Hydropower Vegetation Control Project for maintenance of Pacific Gas and Electric Company's (PG&E) Tule River Hydroelectric Project on behalf of Sequoia ForestKeeper & Kern-Kaweah Chapter of the Sierra Club

Sequoia ForestKeeper (SFK) and the Kern-Kaweah Chapter of the Sierra Club (the Club) thank you for the opportunity to comment.

1. The EA should include an Alternative that does not use herbicides for vegetation control.

The proposal for this project is to control vegetation, which can be done without herbicides. In fact, the proposal states "Proposed activities also include mechanical treatments to establish ROWs and clearances." Proposal PDF p. 4. Therefore, the EA must consider and fully analyze an alternative to achieve the goals of the project without the use of herbicide. Moreover, this project is in the Giant Sequoia National Monument, which was established to protect the objects of interest for which the Monument was established. Those objects of interest including "a spectrum of interconnected vegetation types provides essential habitat for wildlife, ranging from large, charismatic animals to less visible and less familiar forms of life …." The Forest Service should make an effort to not expose these objects to toxic chemicals.

2. Riparian Buffers are inadequate and should be increased.

The scoping notice states that "Fish bearing streams, perennial waterbodies, and standing water would be buffered by a minimum of 50 feet, and all intermittent streams buffered by a minimum of 25 feet, depending on slope." Proposed Action, PDF p. 4. We believe this is inadequate and should be significantly increased.

3. The EA must disclose adverse effects from the various herbicides proposed for use.

SFK and SC object to the use of herbicides for vegetation management anywhere near water bodies with fish or amphibian populations. Where any herbicides are used, the EA must disclose any adverse effects to fish and amphibians.

Since combinations of chemicals increase the toxic effect, Sequoia National Forest should not allow any procedure which uses combinations of chemicals at any site, until further confirming studies can be performed.[1]

Past, current, and planned application of herbicides used in the Sequoia NF has caused great concern in adjacent communities as well as throughout the state, with respect to possible adverse human health and ecological consequences.

a. Glyphosate (in Roundup)

Studies on the environmental effects of Glyphosate have shown many concerns over the use of Glyphosate in any watershed, some are listed below.

The Journal of Pesticide Reform published a two part report on Glyphosate, Part 1: Toxicology, By Caroline Cox, Volume 15, Number 3, Fall 1995, Northwest Coalition for Alternatives to Pesticides, Eugene, OR., listed many recent toxicological studies which indicates that Glyphosate causes many kinds of damage in animals. Some of these studies are listed below.

"In animal studies, feeding of glyphosate for three months caused reduced weight gain, diarrhea, and salivary gland lesions. Lifetime feeding of glyphosate caused excess growth and death of liver cells, cataracts and lens degeneration, and increases in the frequency of thyroid, pancreas, and liver tumors. Glyphosate-containing products have caused genetic damage in human blood cells, fruit flies, and onion cells. Glyphosate causes reduced sperm counts in male rats, a lengthened estrous cycle in female rats, and an increase in fetal loss together with a decrease in birth weights in their offspring. It is striking that laboratory studies have identified adverse effects of glyphosate or glyphosate-containing products in all standard categories of toxicological testing." [2]

According to the Environmental Protection Agency report, National Primary Drinking Water Regulations, lists Health Effects from Glyphosate. "EPA has found glyphosate to potentially cause the following health effects when people are exposed to it at levels above the MCL for relatively short periods of time: congestion of the lungs; increased breathing rate. Long-term: Glyphosate has the potential to cause the following effects from a lifetime exposure at levels above the MCL: kidney damage, reproductive effects." [3]

According to Texas Tech University studies of the Impact of Low Levels of Herbicides on Fish, low levels of aquatic herbicides affect largemouth bass and other fish species. The project shows that 2 4-D

[1] Associated Press, 7 June 1996, "Pesticides More Lethal When Mixed", by John A. McLachlan of Tulane University about combining chemical pesticides, which by themselves have been linked to breast cancer and to male birth defects, are up to 1,000 times more potent when combined.

[2] The Journal of Pesticide Reform, two part report, Part 1: Toxicology, By Caroline Cox, Volume 15, Number 3, Fall 1995, Northwest Coalition for Alternatives to Pesticides, Eugene, OR.

[3] National Primary Drinking Water Regulations, Environmental Protection Agency.

caused the greatest amount of stress in juvenile largemouth bass, followed by diquat, fluridone, endothall, and glyphosate. The project also monitored the bass to observe whether an herbicide that is known to stress fish would cause changes in growth and gonadal development over a three-month timeframe. Blood, plasma, cortisol, osmolality, and glucose levels were sampled. The fish were measured and weighed every week for 3 months. [4]

The Journal of Pesticide Reform published a two part report on Glyphosate, Part 2: Human Exposure and Ecological Effects by Caroline Cox, Volume 15, Number 4, Winter 1995, Northwest Coalition for Alternatives to Pesticides Eugene, OR., listed many recent studies which indicates that Glyphosate causes many ecological effects. Some of these studies are listed below.

> "Residues of the commonly-used herbicide glyphosate have been found in a variety of fruits and vegetables. Residues can be detected long after glyphosate treatments have been made. Lettuce, carrots, and barley planted a year after glyphosate treatment contained residues at harvest Glyphosate can drift away from the site of its application. Maximum drift distance of 400 to 800 meters (1300-2600 feet) have been measured." [5]

> "Glyphosate residues in soil have persisted over a year. Although not expected for an herbicide, glyphosate exposure damages or reduces the population of many animals, including beneficial insects, fish, birds, and earthworms. In some cases glyphosate is directly toxic; for example, concentrations as low as 10 parts per million can kill fish and 1/20 of typical application rates caused delayed development in earthworms. In other cases, (small mammals and birds, for example) glyphosate reduces populations by damaging the vegetation that provides food and shelter for the animals." "Glyphosate reduces the activity of nitrogen-fixing bacteria. These bacteria transform nitrogen, an essential plant nutrient, into a form that plants can use. Glyphosate reduces the growth of mycorrhizal fungi, beneficial fungi that help plants absorb water and nutrients. Glyphosate also increases the susceptibility of plants to diseases, including Rhizoctonia root rot, take-all disease, and anthracnose." [5]

The report "Drinking Water Public Health Goal of the Office of Environmental Health Hazard Assessment" published by the California Environmental Protection Agency Pesticide and Environmental Toxicology Section, Office of Environmental Health Hazard Assessment November 1997, states that, In a recent study in rabbits, glyphosate was shown to reduce ejaculate volume, sperm concentration and libido and increase abnormal and dead sperm." [6]

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[4] Wildlife, and Fisheries Management Department at Texas Tech University (TTU). For details, contact Winter at (806) 742-1983 or c7wjd@ttacs.ttu.edu or Patino at (806) 742-2851 or r.patino@ttu.edu .

[5] The Journal of Pesticide Reform published a two part report on Glyphosate, Part 2: Human Exposure and Ecological Effects by Caroline Cox, Volume 15, Number 4, Winter 1995, Northwest Coalition for Alternatives to Pesticides
Eugene, OR.

[6] "Drinking Water Public Health Goal of the Office of Environmental Health Hazard Assessment", published by the California Environmental Protection Agency Pesticide and Environmental Toxicology Section, Office of Environmental Health Hazard Assessment November 1997

According to the ENVIRONMENTAL PROTECTION AGENCY, Glyphosate persists in soils in cooler climate areas from 3 to 141 days and that Glyphosate does cause effects, although minimal, in birds, mammals, fish and invertebrates(Glyphosate Registration Eligibility Decision (RED) issued by EPA September, 1993). [7]

According to the EXTOXNET Pesticide Information Notebook. For more information, contact the Pesticide Management Education Program, Cornell University, 5123 Comstock Hall, Ithaca, NY 14853-0901. Roundup was more toxic to fish than was glyphosate. In rainbow trout, for instance, the 96-hour LC50 was 8.3 mg/l with Roundup and 38 ppm with glyphosate. The LC50 for glyphosate was 120 mg/l for bluegill sunfish. An additive used in the Roundup formulation (modified tallow amine used as a surfactant) is apparently more toxic to fish than many common surfactants. For this reason, the formulation for use in aquatic situations (Rodeo) omits this ingredient. The time it takes for half of the product to break down ranges from 1 to 174 days. [8]

The following is a synopsis of some of the environmental effects of Glyphosate, resulting from world wide studies, written by Dr. John Fagan.

> One study revealed residues as long as 3 years after application of Roundup (Torstensson, NTL, et al. Ecotoxicol. Environmental Safety 18:230;1989).
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> Roundup is also harmful to fish (WHO UN Environmental Program, International Labor Organization. 1994. Glyphosate. Environmental Health Criteria #159. Geneva, Switzerland), earthworms (Soil Biol. Biochem. 24:1739;1992), and beneficial insects (Pestic. Sci. 30:309;1990).
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> Toxic reactions in farm workers (Pease, W.S. et al, 1993, Preventing pesticide-related illness in California agriculture: Strategies and priorities. Environmental Health Policy Program Report. Berkeley, CA: University of California School of Public health, California Policy Seminar).
>
> Roundup reduced sperm counts and lengthened the estrous cycle (US Dept. Health & Human Services. Public health Service. National Institutes of Health. NTP technical report on toxicity studies of glyphosate (CAS No. 1071-83-6) administered in dosed feed to F344/N rats and B6C3F mice. (NIH Publication 92-3135), and Toxicity Reports Series No. 16. Research Triangle Park, NC: National toxicology Program).
>
> Other reproductive and developmental problems were also observed in rats (WHO UN Environmental Program, International Labor Organization. 1994. Glyphosate. Environmental Health Criteria #159. Geneva, Switzerland). Some multiple generation studies have also resulted

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[7] Federal Register: (April 11, 1997 (Volume 62, Number 70)] [Rules and Regulations] [Page 17723-17730] [[Page 17723]] ENVIRONMENTAL PROTECTION AGENCY, 40 CFR Parts 180, 185, and 186 [OPP-300469; FRL-5598-6]

[8] EXTOXNET Pesticide Information Notebook. For more information, contact the Pesticide Management Education Program, Cornell University, 5123 Comstock Hall, Ithaca, NY 14853-0901.

> in adverse effects on fetal development (US EPA Office of Pesticide Programs. Special Review and Reregistration Division. 1993. Reregistration Eligibility Decision (RED) Glyphosate. Washington DC (September, 1993). [9]

In 1995 the Australian WA Department of Environmental Protection released a report prepared by researchers from Curtin University of Technology. The report entitled. 'Acute Toxicity of a Herbicide to Selected Frog Species', found that the glyphosate /surfactant formulations were ten times more toxic to tadpoles than technical grade glyphosate, probably due to the surfactant. The NRA review report and fact sheet is available from Catherine Harrison, NRA Chemical Review Section on 06 272 3213.

For more on the effects from glyphosate, consider those in Exhibit A – Effects of Glyphosate and Exhibit B - Glyphosate Ecological Effects #2.

b. Triclopyr BEE, Fluroxypyr, Imazapyr, Sulfometuron methyl, Chlorsulfuron, and Clopyralid)

SFK and SC have limited information about these herbicides, which are proposed for use in combinations with Glyphosate and with each other. The EA must also disclose the potential adverse effects from these herbicides both individually and in combination on human health, wildlife, and ecology.

For a toxicological profile of triclopyr, see http://www.alternatives2toxics.org/tox_profile-triclopyr.htm.

Please review and include a discussion of the effects from all the herbicides planned for use.

4. New Science on the effects of pesticides on frogs must be considered in the EA.

Since amphibians and frogs are likely present in the streams or other waterbodies in the project area, the EA must disclose and consider new research on the adverse effects of pesticides on frogs. *See* Exhibit C – Smalling et al. (2013) - Accumulation of Pesticides in Pacific Chorus Frogs in the Sierras.

The report mentions and discusses the effects from glyphosate:

> Although the occurrence of a few pesticides (atrazine, endosulfan, and organophosphate insecticides) has been studied extensively in amphibian habitats [2], little is known about the exposure and potential effects on amphibian health of many other current-use pesticides. There is, however, increasing evidence that pesticide exposure may impact amphibians directly. For example, **glyphosate** formulations are considered highly toxic to

[9] Studies of environmental effects of Glyphosate written by Dr. John Fagan... To: Richard Wolfson <rwolfson@concentric.net> Subject: Re: ROUNDUP facts From: Robert Cohen <i4crob@IDT.NET> Date: Mon., 28 Jul 1997 15:38:45 -0700 : John B. Fagan, Ph.D. Professor of Molecular Biology, Maharishi University of Management, Fairfield, Iowa 52557-1078.

amphibians [8, 9], while effects on larval development have been observed after exposure to the pyrethroid, cypermethrin [10, 11]. Another recent study described the effects of several previously untested fungicide formulations on tadpoles and juvenile frogs [12]. The cumulative relationship between current-use pesticides and other variables on amphibian health is complex. Synergism can occur with pesticide mixtures being more toxic than the sum of individual compounds [13], and other stressors (such as disease) can enhance pesticide effects [6, 7]. Although a clear link between pesticide exposure and population declines has not been established [14], we cannot rule out the role of pesticides in amphibian survival, especially as the use of pesticides continues to increase.

Previous laboratory studies have focused on the effects of the herbicide **glyphosate** [9]; the insecticides carbaryl, chlorpyrifos, diazinon, and endosulfan on many different species of anurans [5, 19, 39, 40]; and the fungicide formulations containing pyraclostrobin [12, 41]. Fungicides were detected frequently in frog tissue collected from many of the sites, and more information is needed to understand the effects of these compounds. Although certain pesticides have been shown to have an effect on many different species of anurans, the concentrations are orders of magnitude higher than what has been reported in the environment, especially in remote locations. It is also important to note that only frogs with sublethal concentrations of contaminants are available to sample because lethal concentrations would, by definition, remove the frogs from the pool of available samples. Therefore, the effects of the pesticides detected in the present study on populations of wild amphibians in the Sierra Nevada can only be inferred from limited information. Additional field and laboratory studies may be needed to confirm the hypothesized effects.

Because current regulations do not require testing of amphibians, many globally common pesticides have rarely been tested on amphibians. For example, one of our most frequently used pesticides is glyphosate, a broad-spectrum herbicide that is sold under a wide variety of commercial formulations including Roundup (Monsanto, St. Louis, MO) and Rodeo. Glyphosate is the second most widely used pesticide in the United States. It is currently applied to 8.2 million ha of cropland in the United States including 2 to 3 million kg for home and garden applications and 4 to 6million kg for commercial and industrial applications (Aspelin and Grube 1999; National Pesticide Use Database www.ncfap.org/database/default.htm). Whereas glyphosate has been widely tested on birds, mammals, invertebrates, and fish, tests on amphibians have been rather limited until recently (Mann and Bidwell 1999; Perkins et al. 2000; Smith 2001; Lajmanovich et al. 2003; Edginton et al. 2004; Thompson et al. 2004; Wojtaszek et al. 2004). Despite the widespread use of glyphosate in North America, its effect on North American amphibians appears to have been tested in only a few species (Smith 2001; Edginton et al. 2004; Thompson et al. 2004; Wojtaszek et al. 2004). Thus, the need to test the impact of glyphosate on North American Correspondence to: R. A. Relyea; email: relyea@pitt.edu amphibians is paramount.

Roundup is a broad-spectrum herbicide composed of both the active ingredient (glyphosate) and a surfactant that enables penetration of plant cuticles (polyethoxylated tallowamine [POEA]). The half-lives of glyphosate and POEA are 7 to 70 days and 21 to

28 days, respectively, depending on site conditions (USEPA 1992; Giesy et al. 2000). At current application rates, a water body with a mean depth of 15 cm and no intercepting vegetation can have a maximum concentration of 3.7 mg AI/L (Giesy et al. 2000). In natural habitats, Roundup has been detected at concentrations of 0.1 to 2.3 mg AI/L (Newton et al. 1984; Goldsborough and Brown 1989; Feng et al. 1990; Horner 1990). At these concentrations, Roundup is moderately lethal or nonlethal to aquatic invertebrates (LC50 of 3.5 to 323 mg AI/L) and fish (LC50 of 2.8 to 25 mg AI/L).
The few studies existing suggest that Roundup is moderately lethal to amphibians (LC5048-h = 1.5 to 15.5 mg AI/L; Giesy et al. 2000; Edginton et al. 2004). This moderate toxicity appears to be caused not by the active ingredient (glyphosate) but by the POEA surfactant (Mann and Bidwell 1999; Perkins et al. 2000; Tsui and Chu 2003).

Although there are few data on the effects of Roundup on amphibians, there are numerous data on the impact of Roundup on other organisms. Giesy et al. (2000) recently completed an extensive review of the glyphosate literature. They found that Roundup is practically nontoxic to birds (based on 3 species) and mammals (based on 5 species). The toxicity of Roundup is variable for freshwater fish (based on 11 species), ranging from moderately toxic in bluegill sunfish (Lepomis macrochirus; LC5096-h of 2.8 mg AI/L) to slightly toxic in rainbow trout (Oncorhynchus mykiss; LC5096-h of 25 mg AI/L). For aquatic invertebrates (based on 8 species), Roundup ranges from moderately toxic in crayfish (Orconectes nais; LC5096-h of 3.5 mg AI/L) to practically nontoxic in mosquito larvae (Anopheles quadrimaculatus; LC5024-h of 323 mg AI/L; Giesy et al. 2000). If we estimate the toxicity to amphibians using these data for fish and aquatic invertebrates, we would expect glyphosate to be slightly to moderately toxic to amphibians. However, the current study found that glyphosate is moderately to highly toxic to amphibians.

For Sequoia ForestKeeper and the Kern-Kaweah Chapter of the Sierra Club,

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