State of Washington
Department of Fish and Wildlife

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Ms. Julie Ashmore
Okanogan Highlands Alliance
Post Office Box 163
Tonasket, Washington 98855-0163

Dear Ms. Ashmore:

Thank you for your comments regarding our Lake and Stream Rehabilitation Program. We consider all public comments at every juncture of modifying our program. Please find below, responses to your most pressing comments.

The Washington Department of Fish and Wildlife's (Department) Lake and Stream Rehabilitation Program predominantly treats waterbodies with rotenone that have been treated previously. It is a rare occasion that "new" waters are treated with rotenone. If this occurs, it is generally because we desire to manage against non-native species, considered invasive, or as a conservation measure, or both. Examples of a conservation measure would include restoration and/or protection of a native Westslope Cutthroat population; protection and enhancement of a Northern Leopard Frog population; or to help restore or enhance waterfowl habitat and waterfowl production. In most cases, the lakes that are treated have been managed primarily as trout-fishing opportunities for many years, and the treatments are a response to illegal introductions of species that either prey on stocked trout or out-compete them for food.

You mention that "Contemporary projects that are using more up-to-date methodologies…" There are no methodologies that are more up-to-date than what we use in Washington. Our agency uses the same methodologies as most other agencies across the country. Five of our seven core-program-staff have gone through an intensive training course in the use of rotenone, sponsored by the American Fisheries Society. The other two staff members are scheduled to receive that training this spring (see the American Fisheries Society standard operation procedure manual for the use of rotenone at http://www.fisheriessociety.org/rotenone/rot.pdf).

In your comment letter, you state that we should not treat lakes with rotenone that have known Common Loon nesting activity, that contain known State or Federal "species of concern," or are on the agency Priority Habitats and Species List. There are 13 lakes in Washington State known to have active Common Loon nesting activity and the Department has taken the management lead to ensure protection of those birds. Many of these Common Loon populations benefit from

trout stocking activities. In some cases, the trout populations and stocking are a direct result of our Lake and Stream Rehabilitation Program and the historical use of rotenone to establish the trout fisheries that exist there today. The Department would not knowingly treat lakes with listed species or critical habitat concerns. During annual planning for lake and stream rehabilitation projects, all projects are vetted through our Wildlife and Habitat Programs before final project approval is obtained from the Department's Director. It is the mandate of our agency and the professional duty of its biologists to do everything possible to protect critical habitat and species. All core staff members of our Lake and Stream Rehabilitation Program are senior-level biologists who take considerable pride in their dedication to the Department's values and mandates of conservation of native aquatic and terrestrial flora and fauna.

There are repeated mentions of the documents that are being adopted in this year's proposed programmatic SEPA determination as being outdated. Even though a couple of the adopted documents were written 13-23 years ago, many of the important points of those documents refer to the physical laws of water chemistry and biological interactions, which have not changed. You make no mention of the more recent documents that we reference in the programmatic SEPA determination. These documents represent recent and relevant information relating to the use of rotenone: 1) Turner, Larry et al. 2007. *Risk Assessment for Piscicidal Formulations of Rotenone*. Compliance Services International, Lakewood, Washington. 104 pages. 2) Finlayson, Bryan et al. 2010. *Planning and Standard Operating Procedures for the Use of Rotenone in Fish Management - Rotenone SOP Manual*. American Fisheries Society, Bethesda, Maryland. 3) Finlayson, Brian et al. 2012. *Rotenone Use in Fish Management and Parkinson's Disease: Another Look. Fisheries*, 37:10. pp. 471-474. 4) *WDFW Statewide Lake and Stream Rehabilitation Final Programmatic Environmental Assessment* (September 30, 2008).

The science of lake rehabilitations has not progressed as rapidly as other branches of physical or biological sciences. The Department had a Final EIS in 1976. We submitted a Final Supplemental EIS (FSEIS) sixteen years later, in 1992, then another FSEIS ten years later in 2002. The 2002 document: 1. Reviewed new information on human health issues that may indicate a change of policy concerning how rotenone is used; 2. Provided policy and framework for safe application of rotenone; 3. Provided a policy that would address health concerns of inert ingredients often used with rotenone; and 4. Provided a policy and framework to protect both groundwater and the public when rotenone is used. Since that time, the 'referenced documents', mentioned in the previous paragraph have addressed recent changes in these areas. Turner, et al.'s risk assessment (2007) addresses many important issues regarding the safe use of rotenone, e.g., chemical and biochemical subjects, human health considerations, groundwater contamination study data, rotenone label and application information, chemical characteristics, "environmental fate" of rotenone during and after a treatment, and environmental effects on water, microbes, algae, zooplankton, aquatic invertebrates, amphibians, fish, mammals, birds, insects, and plants. They also do an ecological exposure assessment, a risk assessment to other aquatic biota, address ESA concerns, water quality, potential impacts to agriculture, and other human health effects and potential risks. This report alone covers and updates information on all the subjects that the 2002 FSEIS was designed to update. The other documents we 'reference' provide more, updated information.

Finally, you make several references to the need for more information on the effect of rotenone on various plankton communities. You need only to browse the internet for a large number of studies that have assessed the impacts to various zooplankton communities by rotenone, dating back to the 1940s. Details are numerous and varied, and results show impact by rotenone is quite varied as well. Brown and Ball (1942) reported that cladocerans recover within five weeks and copepods within one month while Anderson (1970) said rotifers and crustaceans take six months to recover and that other species took up to three years to recover fully, but that all zooplankton populations did return to pre-treatment levels. In Beal and Anderson's study (1993), recovery started one moth post-treatment and they claim there was full recovery within eight months. The fact that we do not restock treated waters with fish until the spring following our fall treatments helps hasten zooplankton recovery because there is no predation. Even after we restock with fish, the numbers of fish we stock are such that overgrazing is not a problem. Kiser, et al. (1963) found open-water species were all gone immediately post-treatment, but species living within dense aquatic vegetation were not extirpated by rotenone and that the open-water species started returning three months post-treatment. Our agency prints a zooplankton monitoring report every year, post-treatment, looking at the impacts to our treated lakes. The established research gives us a very good understanding of the impacts of rotenone to zooplankton communities, and we also have a good understanding of recovery. We also have a very good understanding of the importance of phytoplankton and zooplankton in aquatic ecosystems and their vital importance as a source of food for both fish and other wildlife. One thing that is difficult to predict related to recovery is the association of dispersal rates and strategies of certain species and their relationship to the greater community, e.g., poor dispersing species recovery slower but it is sometimes difficult to predict who that might be (Vinson and Vinson, 2007).

To add to that understanding, and to look at a more specific case study in Washington lakes, we are currently contracted with Portland State University to design and carry out a study to expand our knowledge of the impacts on zooplankton from rotenone exposure. The study started last year and is monitoring a number of control and treatment lakes, and sampling pre- and post-treatment with a much higher frequency than we have been able to do in the past.

Thank you again for your comments and you will be notified of any other opportunities for public input.

Sincerely,

Bruce Bolding
Fish Biologist
Inland Fisheries Management
Fish Program, Fish Management Division

References:

Anderson, R.S. 1970. *Effects of rotenone on zooplankton communities and a study of their recovery patterns in two mountain lakes in Alberta*. Journal of the Fisheries Research Board of Canada 27:1335-1356.

Beal, D.L. and R.V. Anderson. 1993. *Response of zooplankton to rotenone in a small pond.* Bulletin of Environmental Contamination and Toxicology. 51:551-556.

Brown, C.J.D., and R.C. Ball. 1943. *An experiment in the use of derris root (rotenone) on the fish and fish-food organisms of Third Sister Lake*. Transactions of the American Fisheries Society. 72:267-284.

Kiser, R.W., J.R. Donaldson and R.R. Olson. 1963. *The effect of rotenone on zooplankton populations in freshwater lakes*. Transaction of the American Fisheries Society 92:17-24.

Vinson, M.R. and D.K. Vinson. 2007. *An analysis of the effects of rotenone on aquatic invertebrate assemblages in the Silver Kind Creek Basin, California*. U.S Forest Service. Humboldt-Toiyabe National Forest. Carson City, NV.