

Comment for Washington Department of Fish & Wildlife (WDFW)  
SEPA Document 16041: Addendum to Lake and Stream Rehabilitation FSEISs  
Rotenone Applications to the Park and Blue Lakes chain for fall 2016  
John Arlt August 4<sup>th</sup>, 2016

To those responsible for these major decisions:

My attempt is to keep this comment as short and clear as possible, although that may prove difficult as a decade of research in this matter has much to cover since the last rotenone application to these lakes in 2006. The goal is to bring to light the many concerns as to why the proposed application of rotenone formulations to Park and Blue Lakes specifically should not take place. WDFW is operating out of a set of assumptions based on California studies indicating applied chemicals do not enter well systems, specifically from Lake Davis. The hydrology of the California Lake system(s) is much different than those of Park and Blue Lakes. Rotenone and the formulations used are specifically of real concern for human health and neurological disorders, the scientific evidence has only strengthened this concern since 2006. WDFW officials should at minimum review the hydrology data and perform hydrology studies on these lakes and domestic wells before any application of rotenone formulations. WDFW should have as its first priority the safety and protection of local residents that will be exposed to these toxic chemicals when this tenth round of application takes place. The real health threat that will take place to the local residents from hazardous chemical exposure, specifically long term neurological illness, must be proven to be non-existent. The following are not opinion, they are easily accessed documents and information from internet sources, many from California and Washington Fish and Wildlife or associated state agencies. WDFW, along with the Department of Ecology "should" already have such documentation in hand with thorough reviews completed. My feeling is at this time that is not the case (my opinion only for that statement).

- Isotopic hydrology studies on Lake Davis California were performed by the Lawrence Livermore National Laboratory in 2007 (*Isotopic Survey of Lake Davis and the Local Groundwater*). Of the 167 wells on Lake Davis tested, all but 2 wells showed their source of water was groundwater from rain or snowmelt sources, and NOT from the surface waters of Lake Davis itself.

Interpretation by USGS personnel indicate this is equivalent to dumping toxic chemicals downstream in a river, then taking water samples from upstream to detect if those chemicals are present in the water, and what those chemicals are. You will never detect any. It is very obvious why Lake Davis has not had any well contamination associated with rotenone applications to the lake itself.

- Isotopic hydrology studies of Park and Blue Lakes from Friedman in 1971 (*A Model of the Hydrology of the Lakes of the Lower Grand Coulee, Washington*) show that NO groundwater is required for water level balance, and surface water from Banks Lake and precipitation is only required (Table 8).

Interpretation is that there is no net flow of groundwater into Park and Blue Lakes, which is opposite of Lake Davis in California. The most likely source of water that would feed the many wells on Park and Blue Lakes would therefore be water from the lake itself.

- The numerous well logs for Park and Blue Lakes available from Washington State Department of Ecology show fractured basalt, large rubble, porous basalt, basalt, large gravel and boulder, as the major geological components of the well structure. Sediment is either non-existent or minimal in the top 12 inches to a few feet at most. The majority of these wells are less than 100 feet deep and located less than 50 meters from the shoreline.

Coupled with the hydrology data such conditions provide for a very high confidence that lake water is drawn into these wells as the water source.

- To Date there have been NO tests performed in Washington by state agencies or associated labs including WDFW on rotenone applications and well water (*Risk Assessment for Piscicidal Formulations of Rotenone*) page 55.

The only comment or interpretation here is this is very bad, no other way to really state it.

- The only study ever done in Washington State regarding rotenone applications and well water was performed in 2006 by an independent lab during the rotenone application by WDFW at Park Lake. The well tested was 20 feet deep and 60 feet off the shoreline. The MitoScan™ bioassay was used to analyze well and lake water samples. The test showed mitochondrial toxins were not present in the well immediately prior to rotenone application, and that toxins were found in well samples 4 days and 8 days after rotenone applications and matched with the toxicity of lake samples.

This data was provided to WDFW and the department of Ecology, and is still available. It is assumed this data was summarily dismissed as it was not performed by a state lab, I only know this because I ran the tests myself, and have yet to be hired by the state.

- In 2011 the National Institute of Health (NIH) published a report that was a cumulative research effort between the National Institute of Environmental Health Sciences (NIEHS) and the Parkinson's Institute and Clinical Center in Sunnyvale, California. The study found a significant association between two pesticides and increased risk of developing Parkinson's disease. The two highly linked pesticides were rotenone and paraquat.

The NIH and Parkinson's Institute are both very credible organizations to say the least. In 2012 US Fish & Wildlife released a response to this report in attempts to quell the heightening health concerns of rotenone applications for fisheries management and the real threat to a possible ban of these practices (*Rotenone Use in Fish Management and Parkinson's Disease: Another Look*).

- The MitoScan™ bioassay utilizes submitochondrial particles (SMP's) that are very sensitive to poisons that act on the electron transport chain, and thus strongly linked to mechanisms for the onset of Parkinson's disease and similar neurological illness.
- Rotenone is known to be a very powerful mitochondrial poison, acting on Complex I of the mitochondrial electron transport chain. Deguelin, TCE (trichloroethylene), naphthalene (and alkyl-naphthalenes), xylene, and toluene are also all found in rotenone formulations that have been used and will be used for lake poisoning to Park and Blue Lakes this fall of 2016.
- All of these chemicals (Deguelin, TCE (trichloroethylene), naphthalene (and alkyl-naphthalenes), xylene, and toluene), along with rotenone are known to be mitochondrial poisons and are thus toxins of concern with regards to the onset of Parkinson's disease and similar neurological illness.
- These chemical mixtures enhance the solubility of rotenone in water, increase the absorption into human tissues, and likely all act in a synergistic mode to increase the toxicity of the rotenone formulations. It is well documented that the synergist PBO has been used in past rotenone formulations for the very purpose of increasing the "fish kill" power of rotenone. PBO has more recently not been used in the rotenone formulations, it was simply deemed too high of a risk factor to human health and/or the environment.

The real threat of toxic chemicals that have a known link to neurological illness entering residential domestic wells exists. It is very likely based on sound scientific information that toxic chemicals have entered wells on Park and Blue Lakes from past rotenone applications by WDFW. Further application of rotenone formulations this fall to these lakes, with the known risks to human health, is highly concerning. The many local residents that are already diagnosed with Parkinson's disease, currently being tested for Parkinson's disease, or have other related neurological disorders have real concerns to say the least, not only for themselves, but for their grandchildren as well.

John Arlt  
AFLP