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July 17, 2015

Nathan Lubliner
Washington State Department of Ecology
PO Box 47696
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Dear Mr. Lubliner,

On behalf of the Okanogan Highlands Alliance (OHA), I have reviewed the Draft FISHERIES RESOURCE MANAGEMENT GENERAL PERMIT, National Pollutant Discharge Elimination System and State Waste Discharge General Permit. Please consider the following comments in the development of the final permit.

Comments on the fact sheet

Information in the draft NPDES fact sheet was adapted from WDFW's Environmental Impact Statement (EIS) documents, which makes these documents pertinent to OHA's NPDES comments. It should be noted that some of the documents utilized by WDFW are outdated. In addition, contradictions arising in the 20-year span of these documents provide an inconsistent base for the Lake and Stream Rehabilitation Program. Science has continued to progress since 1992 and 2002 when the EIS documents were generated, and many of the studies referenced in these documents are much older yet. When undertaking a treatment that poisons the life in Washington's lakes, WDFW and Ecology should draw on the most recent analysis of impacts in the agency's decision making. Several examples of why the EIS should be updated are provided throughout the following comments. The underlying reason is demonstrated by the lack of congruency between the "Risk Assessment for Piscicidal Formulations of Rotenone" and the 1992 and 2002 EIS documents. Rather than cumulatively adopting outdated EIS documents, Ecology should require WDFW to develop a new EIS that can stand alone and will not be contradicted by outdated and/or inaccurate information in previous versions.

The language in Ecology's fact sheet is clearly biased toward the use of rotenone. The fact sheet should be written to convey facts, objectively covering both sides of an issue. Using phrases such as "Fisheries biologists believe," is not an appropriate way to convey

scientific facts. In doing so, this document purports to speak for the majority of fisheries biologists. OHA contends that many fisheries biologists do not believe that fish toxicants are the best choice for managing fish populations. The language in the fact sheet also makes it clear that Washington's lake management program is geared toward sport-fishing. With references to "nuisance fish," and to killing all fish in the water body so that sport fish can be stocked, there is no pretense of supporting native fish species.

In addition, the fact sheet states, "the management emphasis for state waters is determined according to habitat parameters," when clearly the management emphasis has been on providing trout for anglers. Restoration of native fish and habitat has been the exception, and not the rule, in Washington's lake management program. OHA recognizes that there are some lakes with non-native exotic species issues, and we agree that non-native exotic species are a problem. However, more thought and consideration needs to go into evaluating which lakes are treated, how many, and for what purpose.

The draft NPDES fact sheet also states that the management emphasis for state waters is determined according to public desires and recreational demands. However, WDFW state surveys of anglers should include sample sizes that are large enough to report data reliably for all constituents represented in the study. For example, the 2011 National Hunting and Fishing Survey for Washington[1] provides sample sizes sufficient to represent all fish species except bass. Numbers reported related to bass fishing are qualified with, "Sample size too small (less than 10) to report data reliably." If entire lakes are to be poisoned to remove bass in favor of trout, the action needs to be based on representative preference data, not numbers that have been extrapolated out of too-small sample groups. Furthermore, the philosophy of creating trout-only fisheries should be reassessed based on the wide variety of fish species that anglers reported interest in fishing for in the WDFW 2013 Angler Survey.[2] It is notable that RCW 77.04.012 specifies the department and commission's mandate to "maximize the public recreational game fishing and hunting opportunities for **all** citizens," (emphasis added) as opposed to maximizing opportunity for that percentage of citizens who prefer trout. If the Lake and Stream Rehabilitation Program took into consideration a more diverse angler base, perhaps fewer lakes would be deemed necessary for treatment.

In addition, the option should be given further consideration, of managing mixed-species lakes maintained by trout fry stocking and no rotenone treatment. When weighing cost versus benefit between the three options, ecological costs must be taken into consideration.

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[1] US Fish & Wildlife Service, 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: Washington; Issued June 2013, FHW/11-WA

[2] Responsive Management: Washington 2013 Angler Survey Report, WDFW, Responsive Management National Office

Monitoring and Ecological Impacts

Many researchers seem to agree that there is a high degree of variability in zooplankton and macroinvertebrate response to rotenone. OHA supports the inclusion of a zooplankton study in the NPDES permit, and we urge Ecology to require that a baseline study be done each year on all waters scheduled to be treated, instead of providing three years for a single study to be completed at some point during each permit cycle on selected lakes. Follow-up monitoring should be done subsequent to all treatments, to compare the conditions before and after rotenone treatment. In addition, the study should be expanded to include macroinvertebrate populations, with monitoring occurring both before and after treatments. OHA recognizes that monitoring is labor intensive and expensive. However, if appropriate monitoring is not conducted, how will we ever know the impacts? How can we justify permitting a lake-poisoning program without adequate baseline and monitoring of appropriate species?

On page 35, the draft permit states, "We will not assume that zooplankton will recover to a pre-treatment state; rather that zooplankton in treatment lakes will be no different than zooplankton in control lakes following rotenone treatment." **This assumption should be reassessed. Introducing poison into public waters should only be considered if Ecology can ensure, through NPDES permit requirements, that both zooplankton and macroinvertebrate populations will recover to a pre-treatment state.** The only way to determine how these populations are responding to rotenone treatment is to study those populations in all lakes being treated, both before and after treatment. Anything less does the public a disservice. OHA appreciates Ecology recognizing, "an additional issue is that single sites or single sampling periods may not be representative of reference conditions. This is particularly true for biotic responses, which may be quite variable." If zooplankton and macroinvertebrate populations were monitored in all lakes being treated, both before and after treatment, this issue would be adequately addressed. A cost-controlling measure for this monitoring effort would be to treat fewer lakes.

An opportunity to reassess the magnitude of this program is found in the type of habitat being treated. Contemporary projects that are using more up-to-date methodologies have adopted mitigation such as "avoid[ing] unique habitats such as seeps and springs."[3] In contrast, the WDFW Final Programmatic Environmental Assessment[4] refers to seeps and springs with the focus that they too may be poisoned if they are in the project areas of the lakes and streams identified for treatment. Specific adaptations to

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[3] Silver King Creek Paiute Cutthroat Trout Restoration Project, Public Comments and Responses, Final EIS/EIR, Feb. 2010

[4] Final Programmatic Environmental Assessment for WDFW Statewide Lake and Stream Rehabilitation Program, as funded by the USFWS Wildlife and Sportsfish Restoration Program, September 30, 2008 (Temple, Anderson)

rotenone application procedures are outlined for treating seeps and springs (using sand-gelatin-rotenone balls). The WDFW Environmental Assessment goes on to minimize the importance of these habitats by stating that they are "generally confined to small areas…." However, even a small wetland can carry significant ecological values.

A critical component to the zooplankton study is appropriate selection of control lakes. The draft NPDES states, "Control lakes are slightly larger and at higher elevations compared to treatment lakes." OHA finds these differences to be unacceptable. Control lakes should be in the same size and elevation categories, in order to provide relevant reference information. If this means that lakes that would normally be considered for rotenone treatment must now be set aside for control purposes, then Ecology should require that WDFW expand the study to include more appropriate control lakes. Control lakes should be mandated for exclusion from rotenone treatment for the foreseeable future, in order to serve their purpose adequately.

Small, higher elevation lakes in the Okanogan Highlands should not be painted with the same broad management strokes as other lakes found in more populated areas at lower elevations. It is unclear why Little Beaver Lake would be grouped in with "Fish WA Lowland Lakes," given that it sits at 2,900 feet above sea level in the Okanogan Highlands. While Beaver Canyon is not above the 3,500 foot cut-off for WDFW definition of a "high lake" in eastern Washington, neither does it fit the definition of a "lowland lake." Most importantly, its zooplankton and macroinvertebrate populations may not respond in the same way as lowland lakes to rotenone treatment. While some studies have shown recovery of zooplankton within eight months of treatment, Anderson[5] observed recovery to take three years in two mountain lakes in Alberta. The lakes in Beaver Canyon, Okanogan County, may have more in common with mountain lakes than lowland lakes, and in the absence of regional studies, it is not known how our local lakes have responded. In addition, Anderson's study took place 45 years ago and should be updated with new research on higher elevation lakes. Since macroinvertebrate monitoring was not required by NPDES permit # WA0041009 for lake treatments, it is not known how WA populations have responded to rotenone. Additionally, the public should be provided with documentation of the criteria that make each of these lakes suitable (or unsuitable) for supporting a trout-only fishery in a program that targets mainly lowland lakes.

A significant guiding factor in understanding the ecological impacts of the Lake and Stream Rehabilitation Program results from the monitoring being dictated by the NPDES permit. The NPDES is a discharge permit, and as such, is largely focused on water quality. **While this is an essential component of monitoring, potential impacts on higher taxa and the ecosystem as a whole must also be taken into account.** As an agency charged

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[5] Anderson, R.S. 1970. Effects of rotenone on zooplankton communities and a study of their recovery patterns in two mountain lakes in Alberta. J. Fish Res. Bd. Can. 27: 1335-1356.

with *protecting, preserving and enhancing Washington's environment for current and future generations*, OHA urges Ecology to recognize the importance of avoiding negative impacts on non-target species and taking action to assess and mitigate impacts. The zooplankton study is a good start. Baseline and post-treatment monitoring of macroinvertebrates, amphibians, waterfowl, and terrestrial waterfowl should be conducted on treatment sites. How many amphibians have been killed by rotenone treatments? Have mink, otters, and shrews had sufficient access to fish and invertebrates to maintain residence at a lake that is void of fish between fall and spring? These questions can only be answered through adequate monitoring that includes an ecosystem-based approach.

A proposal that "is likely to have a significant adverse impact on the environment"[6] should be accompanied by a monitoring plan that **includes collection of baseline data to establish conditions prior to treatment**, and parameters to be monitored that include representation from all trophic levels that may be impacted. Adequate follow up should determine if/when previously healthy components of the ecosystem return to pre-treatment conditions.

The NPDES permit should require monitoring for n-Methyl 2-Pyrrolidone (NMP), a component of the formula being used for treatments, instead of using general language such as "any other inert ingredients listed on MSDS". OHA supports the requirement that permittees "must conduct pre-treatment VOC testing to determine if VOC's are present in the water body prior to treatment (background levels of VOCs)." The highly variable results in WDFW's post-monitoring reports **underscore the need for baseline monitoring at every lake before treatment is conducted** and we appreciate this requirement being included. OHA supports the requirement that "Permittees are responsible for ensuring VOC's discharged to the water body from treatments have dissipated to background levels or dropped below 0.5 ppb before surface water withdrawal can resume." We suggest a higher level of specificity on what parameters must be monitored. NMP is not a healthy substance to have in a lake. This substance is on the list of *Chemicals Known to the State to Cause Cancer or Preproductive Toxicity* cited in California Proposition 65 (1986). The MSDS sheet describes biodegradation as not likely to produce hazardous short term products, but states, "long term degradation products may arise." MSDS also states, "Environmental Precautions: should not be released into the environment." The CA Department of Public Health states that NMP is easily absorbed through the skin, and can affect the central nervous system or brain. It is known to harm the developing fetus when tested in pregnant animals. It is not known how long NMP persisted in Little Beaver Lake because monitoring protocols called for testing only after 24 hours and four weeks. The fact that this compound is being introduced as an "inert" part of a liquid rotenone formula (as opposed to being introduced independently) does not excuse it from potentially impacting aquatic

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[6] WDFW SEPA "Determination of Significance and Adoption of Existing Environmental Documents," DS/Adoption 15-008: Programmatic Lake and Stream Rehabilitation, 2/3/2015, Lisa Wood

ecosystems. In addition, if the unique topography certain lakes has prevented volatile organic compounds from readily dispersing as would be expected in lowland lakes, resulting in longer VOC exposure duration, other variables may be different in these kinds of highland lake's response to treatment, which could impact its biological resources.

Additional water quality parameters should be added to the monitoring required after one year, including any parameters that register significantly higher at four weeks than other lakes tested in the region or above baseline. Also, it should be made clear what criteria are being used by ALS labs to make the statement, "No abnormalities or nonconformances were observed during the analyses of the project samples," and these criteria may need to be reassessed. This statement of "no abnormalities" was made for all three lakes treated in 2012, which each had NMP detectable levels persisting beyond four weeks. When baseline data are collected, then parameters should be evaluated in relation to baseline, instead of an arbitrary statement of "no abnormalities." OHA encourages Ecology to clearly articulate how the contracted lab should assess the measured parameters.

As the draft NPDES permit states, "Recovery is notoriously difficult to define." In addition it can be highly variable. The 17 weeks to four years cited in the Risk Assessment7 is a broad spectrum to consider for reestablishment of aquatic invertebrates. Considering that important trophic levels may be compromised, it is notable that the 2002 SEIS does not address impacts to zooplankton, macroinvertebrates, or other aquatic invertebrates. The 1992 SEIS makes brief mention, but understates the potential impacts by claiming, "Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover." In the Lake Davis study (according to 2008 Env Assessment), macroinvertebrate taxa abundance remained significantly lower through the end of their study. It does not make sense to then conclude that "rotenone treatments are not expected to result in the loss of taxa or in reduced productivity of invertebrate communities." There is no mention of rare or sensitive species taking much longer to recover (which is a reality well established in the literature[7]), or changes that may occur in the diversity or population structure; nor is there mention of the dramatic variability that has been observed according to the literature cited in the Risk Assessment. **Also, without baseline inventory and follow-up monitoring of the macroinvertebrates found in lakes being treated in WA State, it is impossible to know whether rare species are being adversely impacted.**

The 1992 SEIS is also inconsistent when compared with the highly variable aquatic invertebrate recovery rates cited in the "Risk Assessment for Piscicidal Formulations of Rotenone" (Risk Assessment). The 1992 SEIS states, "No mitigation for these impacts is deemed necessary as recovery is always rapid." However, recovery is <u>not</u> always rapid and

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[7] Risk Assessment for Piscicidal Formulations of Rotenone, Turner, 2007, Compliance Services International

in some cases has been shown to take up to four years, per the Risk Assessment. Some rare invertebrate species may not recover at all, as shown in the Lake Davis, CA studies.[8] This should be corrected in an updated EIS. The SEIS also claims, "By spring, aquatic invertebrates will have returned to former, or even greater, abundance to provide forage for non-target wildlife." Again, this is not assured by the research, and the absence of studies conducted in those lakes being treated precludes this kind of guarantee from being made. WDFW's 2010-2012 Zooplankton Monitoring Report cites some studies finding negligible effects while others found dramatic, long-term effects on aquatic macroinvertebrate communities.[9] If the NPDES is going to incorporate the program's EIS documents by reference, the EIS should be updated to reflect realistic impacts and statements that can be backed up by research. If recovery is not known to be rapid, then mitigation should be provided. Conducting studies on macroinvertebrates in addition to zooplankton (including collection of baseline data and follow-up monitoring) would allow the agency to ascertain the effects of rotenone treatment on these populations WA lakes. Until such study is conducted to determine recovery rates, adopted documents should not claim "rapid recovery."

A key issue with treating lakes in the Okanogan Highlands relates to waterfowl and the young that rely on macroinvertebrates as a primary source of nutrition, particularly during the first six weeks of life, including Common loons.[10] Common loons have unsuccessfully attempted to nest at Beaver Lake in Okanogan County in recent years, while successfully nesting at Lost Lake and only seven other lakes in WA State in 2014. The Common loon is a rare breeder in Washington and is listed by WDFW as "State Sensitive" WA State Species of Concern, and is reported by WA Department of Natural Resources Natural Heritage Program[11] and USFWS[12] as a sensitive species ranked as imperiled and very vulnerable to extirpation in WA State. Loon chicks rely on macroinvertebrates for food, and thus it is imperative that loon nesting lakes are *not* treated with rotenone. There would be no assurance of enough time between fall treatment and spring breeding to reestablish macroinvertebrate populations sufficient to support loon chicks. The Common loon is also listed by WDFW as a "Species of Greatest Conservation Need," along with several other species found in and around Okanogan Highland lakes, including the Western

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[8] Results of a Monitoring Study of the Littoral and Planktonic Assemblages of Aquatic Invertebrates in Lake Davis, Plumas County, California, Following a Rotenone Treatment; California Department of Fish and Game, Aquatic Bioassessment Laboratory 2005 Nimbus Rd. Rancho Cordova, CA, 95670

[9] Mangum F.A., and J.L. Madrigal. 1999. Rotenone Effects on Aquatic Macroinvertebrates of the Strawberry River, Utah: A Five-Year Summary. *Journal of Freshwater Ecology*. 14(1): 125-134.

Binns, N.A. 1967. Effects of rotenone treatment on the fauna of the Green River, Wyoming. Fisheries Research Bulletin 1. Wyoming Fish and Game Commission, Cheyenne. 114pp.

[10] Poleschook, G., Common Loon Feeding Study, 2004-2005

[11] DNR Natural Heritage Program, http://www1.dnr.wa.gov/nhp/refdesk/lists/animal_ranks.html

[12] USFWS Status Assessment and Conservation Plan for the Common Loon (Gavia immer) in North America, http://wdfw.wa.gov/conservation/loons/common_loon_status_assessment.pdf

grebe, Trumpeter swan, Northern pintail, Lesser scaup, Bald eagle, and the Great blue heron (also state monitored and on the WDFW Priority Species List). The Black Tern is found on lakes in the Okanogan Highlands and has been known to nest at Lost Lake as well as in Beaver Canyon, and is a state monitored species in WA, is federally designated as a Category 2 candidate for listing under the Endangered Species Act, and a bird-at-risk on the Washington Gap Analysis list. Black Terns are insectivorous, including aquatic insects in their diet. OHA staff have identified Columbia spotted frogs (*Rana luteiventris*), a Federal Candidate and State Candidate species, at Lost Lake in Okanogan County and they are likely to breed in wetlands at other lakes in the vicinity. Alvo[13] suggests, "the period from hatching to departure from the natal lake may be the most critical time in a Common loon's life for food availability, because chicks are largely restricted to food that they or their parents can find on the natal lake."

As mitigation for impacts of rotenone use, OHA strongly encourages Ecology to prioritize protection of the above-mentioned species by *not* allowing treatment of lakes that support these species for breeding and/or foraging, with particular care to avoid loon-nesting lakes.

WDFW claims that rotenone is being used to support waterfowl populations should be reassessed. The 1992 SEIS is contradictory with regard to impact on waterbirds, and should be updated instead of being adopted as is. The document states, "There will be no measurable impacts to waterfowl." The document goes on to acknowledge, "For a few weeks after the early spring rehab, invertebrate densities will be low, especially for zooplanters. This will have some adverse impacts to predatory inverts and ultimately to some wetland birds." Many wetland bird species rely on aquatic insects as a primary component of their diet, and would be adversely affected by the loss of this food source. In addition, the Risk Assessment states that "rotenone is classified as slightly toxic to birds on a subacute dietary exposure basis," and "slightly toxic to birds and the taxa for which they serve as surrogates (reptiles and terrestrial phase amphibians) on an acute oral exposure basis." Due to the impact on bird species' food sources as well as being slightly toxic to birds, the statement of "no measureable impacts to waterfowl" should be removed from the EIS. An updated EIS should include impacts related to acute toxicity. The Risk Assessment states, "There is essentially no possibility of a risk to birds," but this is not reconciled with rotenone being described as "slightly toxic" to birds. Nor is it reconciled with the EIS statement, "This will have some adverse impacts to predatory inverts and ultimately to some wetland birds." In addition, the 2002 EIS states, "Due to the fall timing of the treatment, waterfowl use won't be affected, osprey will have migrated...." This assessment does not take into account the reliance of waterfowl on macroinvertebrate populations in the spring. In addition, fish fry

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[13] Common Loon, Gavia immer, Breeding Success in Relation to Lake pH and Lake Size over 25 Years, Alvo, R. 2009, Canadian Field-Naturalist 123(2): 146-156

rely on macroinvertebrates in order to survive and grow. Nowhere in the programmatic documents is this connection noted or addressed.

When considering ecological impacts, it should be recognized that trout-only fisheries do not favor loons and other piscivorous waterfowl, which prefer perch and other slower moving fish species, with trout being more difficult to catch.[14] According to Byrd,[15] "Preferred [loon] prey fish are those which swim somewhat erratically such as yellow perch (*Perca flavescens*), pumpkinseeds (*Lepomis gibbosus*) and bluegill (*Lepomis macrochirus*)." Barr also suggests that loons may benefit sport fisheries by suppressing species competing with game fish.

The mechanism of action of uptake and toxicity of rotenone to reptiles requires further study. A fish population study using rotenone on Lake Conroe (Montgomery County, Texas), conducted between 1980 and 1986, indicated that aquatic turtles (*K. subrubrum*) were indeed susceptible to rotenone poisoning. At least 60 dead or dying individuals were observed around the periphery of the lake 24–48 hours after treatment[16]. This is thought to be a very conservative figure, however, as *K. subrubrum* tends to sink when dead. How then can the WA lake management program claim that rotenone treatments proposed in Washington State are not expected to adversely impact reptiles? **When considering an NPDES permit, Ecology should take the ecological impact into account by requiring that the impacts be understood with adequate baseline data and properly articulated prior to implementation.**

In addition, Ecology should question the WDFW finding of no significant impact, "Projects do not disturb wetland habitats," for WDFW's Statewide Lake and Stream Rehabilitation Program. Ecology should reconsider issuing an NPDES permit for a program that claims not to disturb wetland habitats, and yet releases poison that negatively impacts a variety of trophic levels. Prior to issuing the permit, impacts should be appropriately described and mitigation should be outlined.

OHA urges Ecology to consider the management goals for these bodies of water and whether these goals are realistic and appropriate for the ecosystems involved. The Lake and Stream Rehabilitation Program is based more on a recreational model than an ecological model, with an emphasis on serving angler preferences. However, important ecosystems and species are affected by the treatment program and must be considered in management goal setting and decision-making. If there were a few select lakes that WDFW deemed of particular importance for establishing a trout-only fishery, the Lake and Stream Rehabilitation Program would find a more reasonable balance between active recreation

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[14] Barr, J.F. 1996. Aspects of common loon (gavia immer) feeding biology on its breeding ground. Hydrobiologia 321:119-144.

[15] Common Loon (Gavia immer) Biogeography and Reproductive Success in an Era of Climate Change, Allison Byrd, Thesis, University of Maine, 2013

[16] McCoid and Bettoli, 1996

management and letting nature take its course. The magnitude of this program, however, should be reassessed.

Western grebes have been known to abandon traditional nesting areas following rotenone treatment,[17] a solid indicator of non-target impacts. The fact that grebes have returned two years later in some cases does not ensure that nesting territories for this and other waterfowl species will not be lost for a longer period in the future. For rare breeders such as the Common loon, losing one breeding territory due to non-target effects of rotenone may represent 8-13% of successful breeding in WA State for a given year, an unacceptable cost in the risk/benefit ratio.

According to the 2008 Environmental Assessment, "The WA Fish and Wildlife Commission adopted a policy on lake and stream rehabilitations (POL-C3010), in 2002… The policy further directs that all lake and stream rehabilitation projects… will avoid negative impacts to state or federally listed threatened, endangered, candidate, or sensitive species." The 1992 Final Supplemental Environmental Impact Statement (SEIS) statement of no impact to listed species is outdated, and a new EIS should be developed. The 1992 SEIS[18] says, "No known endemic, rare, threatened or otherwise listed species will be impacted by the rehabilitation." Similarly, the 2002 SEIS[19] states, "endemic species and or species which are rare, endangered or otherwise listed: None known." However, the species described above are "otherwise listed" on lists such as WDFW's Priority Species List and Species of Greatest Conservation Need, WA Department of Natural Resources Natural Heritage rankings, WDFW WA State Status Reports for Threatened and Endangered Species, WDFW WA State Species of Concern lists, in addition to Endangered Species Act (ESA) candidate lists. These species regularly utilize lakes in the Okanogan Highlands and elsewhere in the state for foraging and/or breeding and could be impacted by macroinvertebrate or other losses related to rotenone treatment. The EIS should be updated to reflect these potential impacts to listed species. Once potential impacts to these listed species is acknowledged, then the *mitigation for impacts* section should be updated to reflect appropriate mitigation measures, instead of stating, "None required." Appropriate mitigation would be to avoid treating areas known to be used for breeding by state or federally listed threatened, endangered, candidate, or sensitive species, and to avoid areas containing seeps and springs. In addition, the USFWS NEPA process should include listed species relevant to the kinds of habitats being treated, such as the Columbia spotted frog and black tern, with a special provision added for the Common loon based on its imperiled status in WA State.

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[17] Final Programmatic Environmental Assessment for WDFW Statewide Lake and Stream Rehabilitation Program, as funded by the USFWS Wildlife and Sportsfish Restoration Program, September 30, 2008 (Temple, Anderson)

[18] Washington Department of Wildlife, Habitat and Fisheries Management Divisions, Report #92-14, Final Supplemental Environmental Impact Statement Lake and Stream Rehabilitations, 1992-1993

[19] WDFW Final Supplemental Environmental Impact Statement, Lake and Stream Rehabilitation: Rotenone Use and Health Risks. John Hisata Fish Program, Fish Management Division, January 2002

Also, it seems unavoidable that the lag time between treatment and restocking would affect the diet of water shrews, otters, and any wildlife that rely on fish as a primary food source. This impact should be included in an updated EIS, instead of stating, "The same [no measureable impact] is true for other non-targeted terrestrial species…." The 1992 SEIS goes on to contradict this no impact statement by acknowledging but understating the potential impact, "Indirect effects might occur when rotenone disrupts the food supply for small mammals that feed on fish or benthos. In Washington this category includes mink (*Mustela vison*), river otter (*Lutra canadensis*), and water shrew (*Sorex palustris*)." The 1992 SEIS goes on to say, "River otters rely almost entirely on fish for food, and the temporary loss of prey following rotenone treatment may disturb them." For example, how far would and an otter or raccoon family have to travel during the harsh time of year after rotentone treatment – fall, winter, and early spring – when a suitable forage base for these predators no longer is present? Bald eagles, osprey, and other fish feeding predators would face the same issue.

When most or all fish and benthos are removed from a lake, it is sure to affect those species that feed on fish and benthos. This should be more realistically stated in a new, updated, EIS. Understating the potential impacts does not instill good faith in due process. A new EIS should provide non-target species impacts that are congruent with WDFW's 2010-2012 Zooplankton Monitoring report, which states, "Changes in the abundance and/or structure of the plankton community by the use of chemicals like rotenone can have marked effects on subsequent fish populations that depend on plankton either directly or indirectly for nutrition." Further, it should be included that these marked effects are likely to also extend to non-target species that rely on fish and invertebrates as a food source.

The Risk Assessment document proposed for adoption refers to higher taxa (e.g. birds and insects) as, "species only marginally related to piscicidal uses." Before adopting this document for programmatic use, it should be modified to acknowledge that certain significant and sensitive waterbird species are <u>directly related</u> to piscicidal uses by way of their dependence upon macroinvertebrate populations for feeding young. If macroinvertebrates are removed from a loon nesting lake for one breeding season, that entire loon nesting territory is at risk for being lost for the year, and jeopardized for future years as a result.

Two invertebrate species have been identified that may potentially be found in eastern Washington treatment areas as State Candidate species (Columbia clubtail, Gomphus lynnae, and California floater Anodonta californiensis). <u>Without baseline we don't know if these species are present.</u> As the NPDES draft permit recognizes (in relation to the zooplankton study), "Although ideally control and treatment lakes would be as similar as possible in regards to basic physical and chemical characteristics, very little baseline data exists for these lakes." Ecology should require WDFW to conduct baseline data collection immediately, before implementing any further treatment. **While it will never be possible to retroactively collect baseline data from the past (previous to rotenone**

treatments), there is no time like the present to determine what conditions exist prior to further treatment.

The Risk Assessment document (utilized by WDFW and incorporated by reference into Ecology's fact sheet) does an adequate job of pointing out gaps in the available data, for example:

> *There are no data available to assess the acute or chronic toxicity of rotenone to microbes… There are no standard laboratory data available to assess the acute or chronic toxicity of rotenone to algae…. There are no data available to assess the acute or chronic toxicity of rotenone to aquatic macrophytes…. Standardized toxicity test data on aquatic invertebrates is quite limited… Rotenone data on aquatic stages of amphibians is limited.*

The only chronic invertebrate data available were on water fleas. Chronic toxicity is often under-represented in risk assessments due to the time involved in producing the data; however, it is an important component to consider, since acute toxicity only demonstrates short-term effects.

It is clear that not only do outdated EIS documents need to be updated, but new studies must be conducted to better understand the impact of rotenone treatment. The above-mentioned taxa represent essential trophic levels in the pyramid of life, supporting higher order taxa. Starting with Rachel Carson's publishing of *Silent Spring*, the scientific community has begun to understand that John Muir was correct in saying, "When we try to pick out anything by itself, we find it hitched to everything else in the Universe." All trophic levels are connected. Microbes are at the heart of many ecosystem processes, including decomposition, nutrient recycling and partitioning, and food for micro-consumers, processes that affect the rest of the pyramid of life. If there are no data available on the toxicity of rotenone on microbes, algae, or aquatic macrophytes, and data on aquatic invertebrates and amphibians are limited, then a significant piece of the risk analysis is missing. Proceeding with treatment in the absence of this information means that the adverse impacts cannot be predicted.

Given that 95-100% of cladocerans and copepods are known to be lost after rotenone treatment, and given that "'complete recovery' required 17 weeks to four years in various studies[20]," it is clear that zooplankton populations are adversely affected. If the argument is to be made that non-native fish species are over-grazing the zooplankton populations, then baseline data should be gathered to establish this issue prior to considering rotenone treatment as a method of addressing it. Monitoring of treated lakes should establish that treatment has addressed zooplankton over-grazing before treatment is repeated for the same reason. Alternate treatment methods should also be considered.

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[20] According to Risk Assessment for Piscicidal Formulations of Rotenone, Turner, 2007

Given that a study cited by Bradbury (1986, per Risk Assessment[6]) showed "100% mortality of leopard frog (*Rana pipiens*) tadpoles and metamorphosed tiger salamanders (*Ambystoma tigrinum*) after exposure of 8-24 hours in 100 μg/L rotenone," further study on amphibian impacts is needed before a risk/benefit decision can be made. Given that "gilled stages of the salamander were affected, but not necessarily killed at 17 μg/L," again, further research must be conducted before rotenone should be used again in WA lakes. The information presented in the Risk Assessment does not seem congruent with the descriptions in the 1992 EIS, which provides an additional rationale for the need for an updated EIS. The 1992 EIS states, "While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) and herptiles are at risk. However, the chances of eliminating the entire population are minimal." Firstly, "100% mortality" is in direct conflict with "relatively tolerant." Secondly, low chances of eliminating the entire population does not equate to acceptable impacts. Most importantly, it does not make sense to concurrently utilize documents that are in direct conflict with each other.

Public health and communication

The NPDES should include a stronger communication component for excluding the public from treatment areas. Adequate signage is essential, in English and Spanish, during the initial period after a rotenone treatment is implemented. The NPDES permit represents an opportunity to ensure that measures that will protect public health.

As mitigation for the program's impacts, Ecology should include a public involvement component in the NPDES permit, which would engage the public in utilizing and/or moving the fish before they are poisoned. WDFW should be required to communicate extensively with the public prior to treatment to minimize the amount of waste involved in killing healthy fish. For example, in the weeks leading up to a treatment, there should be no catch limits until the lake is treated with rotenone, so that people can take advantage of those fish and allow them to be utilized. WDFW should organize "fish-out" events prior to lake poisoning. For example, to help mitigate for the treatment, a program should be developed for local fishing groups and local anglers to catch as many bass as possible in a two or three week period prior to lake treatment, and be asked to place them in specific lakes as a mitigation for the loss of those fish in the treated lakes. The public, including groups such as bass clubs, should receive communication making it clear that the agencies will work with them to move non-target fish to lakes where they are best-suited to live. This type of program could involve the community in fish management instead of excluding the people from the process. This would help mitigate harm to the fisheries that many members of the public enjoy, as well as the loss of use of the lakes for fishing during and after treatment.

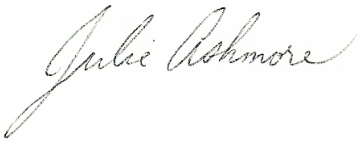
Conclusion

In conclusion, OHA urges Ecology to consider the management goals for these bodies of water and whether these goals are realistic and appropriate for the ecosystems involved. By requiring a smaller number of lakes to be selected for treatment, Ecology could help ensure that the continued existence of listed species is not jeopardized and that critical habitats are not adversely modified (as required by USFWS[21]). OHA is concerned that the documents that are incorporated into the fact sheet by reference are outdated, and that a substantial amount of information is missing from the risk assessment for trophic levels that are central to the healthy functioning of aquatic ecosystems. The old EIS documents should not be relied upon as current information; new information should be incorporated.

OHA would like to underscore the importance of avoiding treatment in lakes where Common loons are nesting, and other species of conservation significance listed above that rely on macroinvertebrates as a primary food source. In addition, OHA sees a distinct need for a programmatic monitoring plan that recognizes the importance of understanding potential impacts to non-target species may be affected by water quality impacts. This monitoring plan should include collection of adequate baseline data, adequate monitoring for all potentially impacted trophic levels in addition water quality parameters, and follow up for at least three years to determine what the impacts to these aquatic ecosystems has been. Mitigation and monitoring should be in keeping with contemporary practices such as those adopted by the Silver King Creek project. Ecology might consider recommending a partnership between WDFW and universities, to provide research opportunities related to the Lake and Stream Rehabilitation Program. The NPDES should acknowledge that ecosystem impacts are connected to water quality impacts. The Lake and Stream Rehabilitation Program should also be required to adopt an adaptive management plan so that if monitoring shows significant impacts, corrective action can be taken. In addition, if significant adverse impacts are measured, then compensatory mitigation should be implemented to help offset the damage to these aquatic ecosystems.

Thank you again for the opportunity to comment. Please keep OHA informed of any activity related to this program, and let us know if there are other decisions involving a public comment period, as well as any action related to the NPDES permit.

Sincerely,



Julie Ashmore
Conservation Coordinator

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[21] Final Programmatic Environmental Assessment for WDFW Statewide Lake and Stream Rehabilitation Program, as funded by the USFWS Wildlife and Sportsfish Restoration Program, September 30, 2008, p. 3