

2023 PRE-TREATMENT PLAN FOR WEST MEDICAL PONDS, SPOKANE COUNTY, WASHINGTON



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1.0 INTRODUCTION

West Medical Lake has historically been one of the State of Washington's most popular Lowland Lake Trout Season Opening Day fisheries. During years of peak productivity, as much as 30% of the trout harvest for District 2 waters can occur on this lake. WDFW annually stocks West Medical Lake with Brown Trout *Salmo Trutta* and Rainbow Trout *Oncorhynchus mykiss*. Illegal introductions of non-native game fish and regulated species have plagued trout production in West Medical Lake over the last several decades. Most recently, Goldfish *Carassius auratus* compromised the trout fishery, resulting in unacceptably low angler catch rates and use, and the fishery could no longer be supported via fry-planting of trout due to increased competition (Osborne 2018a). Thus, WDFW conducted a lake rehabilitation using rotenone in 2018 (Osborne 2018b).

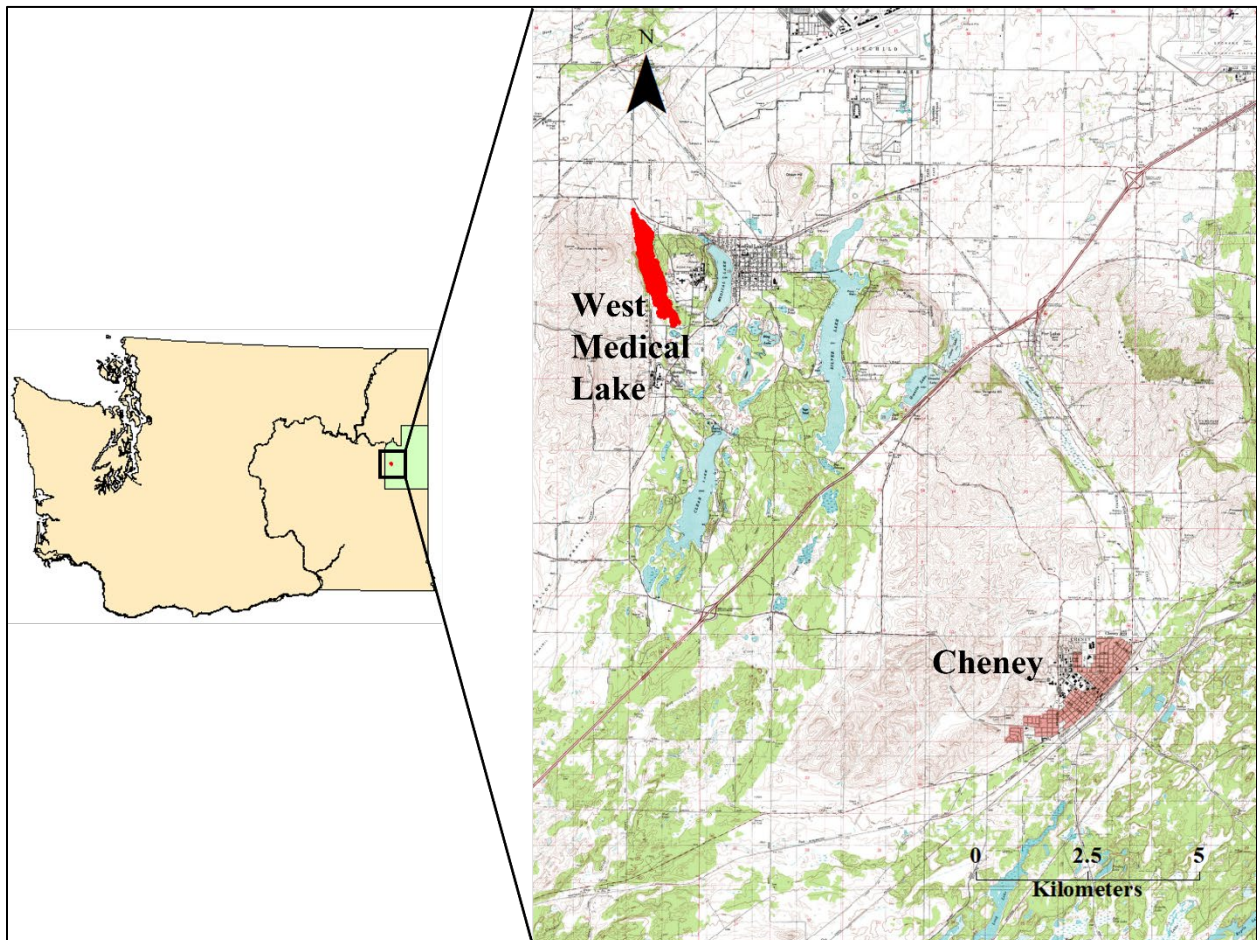


Figure 1. West Medical Lake (red) area map, location in Spokane County (green), and Washington State.

Although the 2018 rehabilitation was highly successful, Goldfish persisted at low abundance.

Goldfish have a relatively high rotenone tolerance compared to most other fish species (Marking and Bills 1976), and are difficult to eradicate. During spring, water levels at West Medical Lake are sufficiently high to inundate shallow vegetated areas around the lake. These areas are preferred spawning/rearing habitat for Goldfish. In fall, lake water levels recede, trapping hundreds of age-0 Goldfish in 4 known locations (West Medical Ponds; Figure 2). In the fall, these low areas are disconnected from West Medical Lake and remain isolated until the water level rises in spring. At that time, left unchecked, Goldfish inhabiting the ponds redistribute into West Medical Lake, adding to the existing adult population. Due to the importance of the trout fishery, and the recent rehabilitation to eradicate Goldfish, WDFW treated disconnected ponds 2-4 with rotenone in 2019 (Pond 1 was dry; Osborne 2019) and Pond 3 in 2020 (Ponds 1, 2, and 4 were dry; Osborne 2020) to eradicate the trapped Goldfish. No treatment was required in 2021 and 2022 as all ponds were dry. However, Goldfish remain in West Medical Lake, and will continue utilizing these spawning areas in the spring. Annual treatment of the ponds will likely prolong the trout fishery via elimination of competing Goldfish, and thus allow for longer periods between full lake rehabilitations.



Figure 2. West Medical Ponds.

2.0 WATER DESCRIPTION

1. **WATER:** West Medical Ponds
2. **COUNTY:** Spokane
3. **LOCATION:** T24N, R40E, S12 and S24. Center of ponds are located at:
 - Pond 1 = 47.58329N, -117.71100W
 - Pond 2 = 47.56172N, -117.70128W
 - Pond 3 = 47.56159N, -117.70031W
 - Pond 4 = 47.56198N, -117.70003W
4. **LAKE DESCRIPTION:** West Medical Ponds are portions of West Medical Lake that

become disconnected and isolated from the lake seasonally at low water levels. Figures below are estimated, as size of the ponds varies annually depending on lake water level. One or more ponds are often dry in fall.

- Area (includes all ponds; acres): 0.4
 - Volume (acre-feet): 4.0
 - Maximum depth (feet): 5.0
 - Average depth (feet): 1.5
5. **WATER WITHDRAWALS:** There no potable water rights for West Medical Lake. However, there are irrigation and stockwater rights (Appendix Table 1). There are no water withdrawals from the West Medical Ponds.
 6. **OUTLET:** None.
 7. **STREAM:** No.
 8. **PUBLIC ACCESS:** Yes.
 9. **LAND OWNERSHIP:** Public 100% (Eastern State Hospital (DSHS), Washington State Veterans Cemetery).
 10. **ESTABLISHED RESORTS:** None.
 11. **TARGET SPECIES:** Goldfish
 12. **DATE LAST REHABILITATED:** October 6, 2020
 13. **PROPOSED TREATMENT DATE RANGE:** October, 2023
 14. **RE STOCKING DATE:** N/A. Ponds will not be restocked.
 15. **SPECIES:** N/A
 16. **CATCHABLES:** N/A
FRY/FINGERLINGS: N/A

3.0 TOXICANT(S) AND DEACTIVATION

1. **TOXICANT(S):** Rotenone Powder Fish Toxicant (powder formulation; EPA Reg. #89459-32) and CFT Legumine Fish Toxicant (liquid formulation; EPA Reg. #655-899).
2. **TOXICANT CONCENTRATION (ppm):** up to 4.0
3. **TOXICANT AMOUNT (gal of liquid and lbs of powder rotenone product @ 5% active ingredient; ai):** up to 5 gal liquid.
4. **METHOD OF TOXICANT APPLICATION:** Backpack sprayer, tank and liquid pump installed in pick-up bed.
5. **DEACTIVATION (OXIDIZER):** None. Ponds will detoxify on their own, typically within 6-8 weeks following treatment. Ponds are completely isolated and disconnected from West Medical Lake and detoxify before reconnection to the main lake in spring.
6. **OXIDIZER CONCENTRATION (ppm):** N/A
7. **OXIDIZER AMOUNT (lbs of powder):** N/A
8. **METHOD OF OXIDIZER APPLICATION:** N/A

4.0 PURPOSE

WDFW provides many types of fisheries in response to public desires. WDFW manages both trout and warmwater recreational fisheries with a variety of fish species, requiring varying levels of skill. Public demand for, and participation in, production trout fisheries is high. These

fisheries are prized as relaxed outdoor opportunities for families to recreate together, offer an appropriate challenge for occasional or novice anglers, and are integral to the state and local economies.

Alternatives to rehabilitation are costly or impractical. The trout fishery at West Medical Lake is supported through stocking of trout fry and fingerlings, which is the most cost-effective option available to WDFW. Trout fry do not survive or grow well when in competition with non-native game and regulated fish species (including Goldfish). To maintain a trout fishery comparable to that produced via lake rehabilitation followed by fry and fingerling- trout stocking in West Medical Lake would require annual plants of at least 110,000 catchable-sized Rainbow Trout. Stocking of catchable-sized fish is more than ten times as expensive as fry planting, and Region 1 lacks the hatchery space and water to institute a catchable fish-stocking program at West Medical Lake. Therefore, controlling Goldfish abundance is paramount to the success of the West Medical Lake fishery.

5.0 DESCRIPTION OF FISH SPECIES TO BE ERADICATED AND HOW DMP ACTION THRESHOLDS ARE MET

The fish species targeted for eradication is Goldfish.

The Discharge Management Plan for the State of Washington Department of Ecology (DOE) Fishery Resource Management General National Pollutant Discharge Elimination System (NPDES) Permit No. 0041009 stipulates (Section B, subsection 2, item a) that the restoration of recreational trout fishery is a justification for a lake rehabilitation (Bolding et al. 2015). Previously, Goldfish degraded the West Medical Lake trout fishery, requiring lake-wide rehabilitation (Osborne 2018b). Annual removal of Goldfish trapped in the West Medical Ponds stymies Goldfish population growth, prolonging the benefits of the 2018 rehab and maintaining quality trout fishing in West Medical Lake by preventing trapped Goldfish from recruiting to the spawning population.

6.0 INTENDED OUTCOME/MEASURE OF SUCCESS

WDFW intends to eradicate Goldfish trapped in West Medical Ponds. Success will be achieved by removing Goldfish from the ponds through rotenone treatment. Success will be indicated through visual observation of dead fish and failure to observe live fish.

7.0 RESOURCE IMPACTS

1. The targeted populations of Goldfish will be eradicated or drastically reduced.
2. Regional Lands, Habitat, Wildlife, and Non-Game managers have been apprised of the proposed West Medical Ponds rehabilitation. No unmitigated concerns have been expressed regarding the potential impacts to non-targeted species.
3. Rotenone is highly toxic to gill-breathing organisms because it is absorbed directly into the bloodstream through the gill epithelium. According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on rotenone concentration and

species. Crustaceans are most tolerant while smaller insects are most affected. Immediate reduction of populations averages 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pre-treatment levels within two months. Zooplankton are more severely impacted, and communities generally take twelve to twenty-four months to fully recover (McGann and Strecker 2018). Risk to amphibians is dependent on life stage. Obligate gill-breathing stages (tadpoles) experience mortality rates similar to fish, while lung-breathing adults are not negatively affected. Mortality of transitional stages is directly related to the proportion of oxygen obtained via gills (Grisak et al. 2007, Billman et al. 2012). Amphibians native to Washington metamorphose to adulthood by late summer, so the timing of lake rehabilitations (fall) results in minimal impact to those species. Rotenone concentrations applied in piscicide treatments are essentially non-toxic to lung-breathing organisms (birds, mammals, reptiles, and adult amphibians) because the primary route of exposure is through ingestion, and natural enzymes in the digestive tract are effective at neutralizing rotenone (Ling 2003). In addition, rotenone does not concentrate in fish tissue and is quickly broken down in the environment (Ling 2003).

4. Application of rotenone under this proposal has been determined “not likely” to affect threatened and/or endangered species or their habitat by the United States Fish and Wildlife Service (Behan 2017) because:

- No threatened or endangered species (aquatic or terrestrial) are present in the treatment area.
- West Medical Lake does not fall within designated critical habitat.
- Negative impacts to aquatic habitats are temporary.
- Treatment will not impact terrestrial habitats.
- Disturbance associated with treatment activities is temporary and short in duration.
- Rotenone will be contained within the project area.
- Routes of entry for lung-breathing aquatic or terrestrial organisms are limited; thus, direct mortality from ingesting water or fish containing rotenone is very unlikely.
- Reductions of prey (fish or aquatic invertebrates) due to treatment are temporary.

8.0 MITIGATING FOR ADVERSE IMPACTS

1. Drinking or irrigation water will be provided on request to landowners who utilize lake water for potable or irrigation during the period of rotenone toxicity. No potable water rights or withdrawals are present at West Medical Lake.

2. Fall rehabilitation will not interfere with spring nesting of waterfowl, mating of adult amphibians, or rearing of juvenile amphibians.

3. Livestock use of the waters to be treated will not be significantly affected. There are no product label restrictions for stockwatering for any of the products to be used in this treatment. The concentration of rotenone used in the treatment will be far below that

considered harmful to mammals or birds. Landowners will be notified of the rehabilitation and potential exposure of livestock to rotenone.

4. Appropriate respirators and other personal protective equipment (PPE) will be utilized by staff involved with mixing and applying liquid and powdered rotenone per the product label and American Fisheries Society Rotenone Standard Operating Procedure (SOP) manual (Finlayson et al. 2018).

5. The ponds will be posted according to NPDES requirements, providing information about rotenone product(s) to be applied, application date(s), and public use and water use restrictions, as well as contact information for WDFW project lead(s) and the DOE NPDES permit manager (DOE 2015).

9.0 RECREATIONAL IMPACT

West Medical Lake is open to fishing annually from the 4th Saturday in April through September 30th under statewide harvest rules for game fish. The proposed rotenone treatment will occur after the closure of the 2023 fishing season. Rotenone will detoxify prior to re-connection of the ponds to West Medical Lake in spring 2024; thus, the treatment will have no impact on angling. No other recreational impacts are anticipated, as treatment will not impede pleasure boating or wildlife viewing and will occur during the fall when water temperatures are too cold for swimming, water skiing, or beach activities.

10.0 ECONOMIC IMPACTS

An estimated minimum of 35,000 angler trips per year made to West Medical Lake when the trout fishery is functioning properly results in an economic impact totaling \$1,400,000 annually (2011 dollars; based on USFWS estimate of \$40.00 per trip; USFWS 2013). If the West Medical Ponds project maintains trout fishing for a single day longer than taking no action, it will generate an estimated \$3,836 in economic activity. The estimated cost of this rehabilitation is \$2,000 (including costs of rotenone, staff time, travel, etc.). The investment will be easily realized within the first year of treatment.

11.0 RELATED MANAGEMENT ACTION

Increased penalties and enforcement activities are desirable if WDFW is to dissuade illegal stocking of state-managed waters. Educating the public about the cost of rehabilitation, with emphasis on what WDFW might otherwise be able to accomplish with those resources, is advised. That outreach and education could help curb illegal fish introductions and turn local opinion against offenders.

12.0 PUBLIC CONTACT

Public meetings will be held during May/June 2023 online and/or in Spokane County and Olympia to explain WDFW 2023 rehabilitation proposals, garner public input, and address concerns.

13.0 PRE-TREATMENT ANALYTICAL METHODS USED FOR

MONITORING

The following pre-treatment monitoring is required by DOE (2015).

13.1 Water Chemistry

WDFW must collect pre-treatment measurements of water chemistry, including water temperature, dissolved oxygen, and pH, at a representative location in the treatment water within 24 hours prior to treatment. Pre-treatment water chemistry data will be collected using a YSI multimeter (Yellow Springs International/Xylem; Yellow Springs, OH).

13.2 Volatile Organic Compounds (VOC)

If potable water rights/withdrawals are present in the treatment water AND liquid rotenone is applied, WDFW must collect a water sample to test for background levels of VOCs. These samples are sent to an accredited environmental laboratory within 48 hours for processing. Sample analysis for VOC's must be able to detect concentrations ≤ 0.5 ppb. No potable water rights or withdrawals are present in West Medical Lake, so no VOC samples will be collected.

14.0 POST-TREATMENT ANALYTICAL METHODS USED FOR MONITORING

The following post-treatment monitoring is required by DOE (2015).

14.1 Water Chemistry

WDFW must collect post-treatment measurements of water chemistry, including water temperature, dissolved oxygen, and pH, at a representative location within 24 hours following treatment. Post-treatment water chemistry data will be collected using methods described above (Pre-Treatment).

14.2 Trout Toxicity Bioassay

Beginning 24 hours following the rotenone application, again at 7 days following the treatment, and continuing weekly thereafter until all fish survive 48 consecutive hours, caged sentinel fish (e.g., Rainbow Trout fingerlings) must be placed in the treated waterbody and monitored for survival. Five sentinel fish will be placed in a cage at each bioassay location, with the number of locations based on whether potable water rights are present in the Project Area. If no potable rights are present, a single bioassay is required. If potable rights are present, then bioassay must occur at 3 locations representative of the potable withdrawals in the Project Area or at the number of locations equal to 20% of the number of potable water rights, whichever number is greatest. No potable water rights or withdrawals are present in West Medical Lake, thus, bioassay would occur at a single location in each treated pond (Appendix).

14.3 Water Withdrawals

1. Potable Water Rights

Potable water withdrawals from the treated water body must cease prior to treatment and cannot resume until ***BOTH*** following conditions are met:

- **Rotenone concentration**

Potable water withdrawals from the treatment water may resume only after rotenone concentration in the treated waterbody falls below 40 ppb (active ingredient). Rotenone concentrations must be analyzed by methods listed in SOP 16 of the Rotenone SOP manual (Finlayson et al. 2018), which includes bioassay with salmonids. Bioassay must be conducted in locations representative of potable withdrawals within the treated area, and result in 100% survival of bioassay fish at all locations before potable withdrawals may resume. Bioassay must be conducted at a minimum of three locations, or at the number of locations equal to 20% of the number of potable withdrawals from the treatment water, whichever number of locations is greatest. No potable rights or known potable withdrawals occur from West Medical Lake.

- **Volatile Organic Compounds (VOC)**

Potable water withdrawals may not resume until VOC concentrations return to background (pre-treatment) levels or fall below 0.5 ppb. Samples will be sent to an accredited environmental laboratory within 48 hours for processing. Sample analysis for VOC's is conducted with minimum detection levels at or below 0.5 ppb.

- 2. Irrigation or Livestock Withdrawals:** Treatment waters must meet standards applicable to crop irrigation and livestock watering required by the rotenone product labels before water withdrawals can resume. Irrigation is not likely to be occurring at the time of treatment, and the ponds will have detoxified prior to irrigation beginning in spring 2024. Currently, there are no livestock watering restrictions for the rotenone products proposed for use in this treatment.

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APPENDIX

Table A. 1. West Medical Lake surface water rights. Note: Points of withdrawal are not within the West Medical Ponds, which are isolated from the lake at the time of treatment.

Record #	Name	Source	Latitude	Longitude	Potable	Period of Withdrawl	Purpose
S3-200086CL	WA State DSHS	West Medical Lake	47.5697	-117.7036	N	April-October	Irrigation
S3-00320C	WA State DSHS	West Medical Lake	47.5813	-117.7074	N	April 1-October 1	Irrigation and Stockwater