2024 PRE-TREATMENT PLAN FOR WEST MEDICAL LAKE, SPOKANE COUNTY, WASHINGTON

Randall Osborne[1], Bill Baker[2], and Brian Walker[2]
Washington Department of Fish and Wildlife
Fish Management Division

[1]District 2
2315 N. Discovery Place
Spokane Valley, WA 99216

[2]District 1
755 S. Main St.
Colville, WA 99114

Table of Contents

List of Figures

List of Tables

1.0 INTRODUCTION

West Medical Lake (Figure 1) 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. More 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).

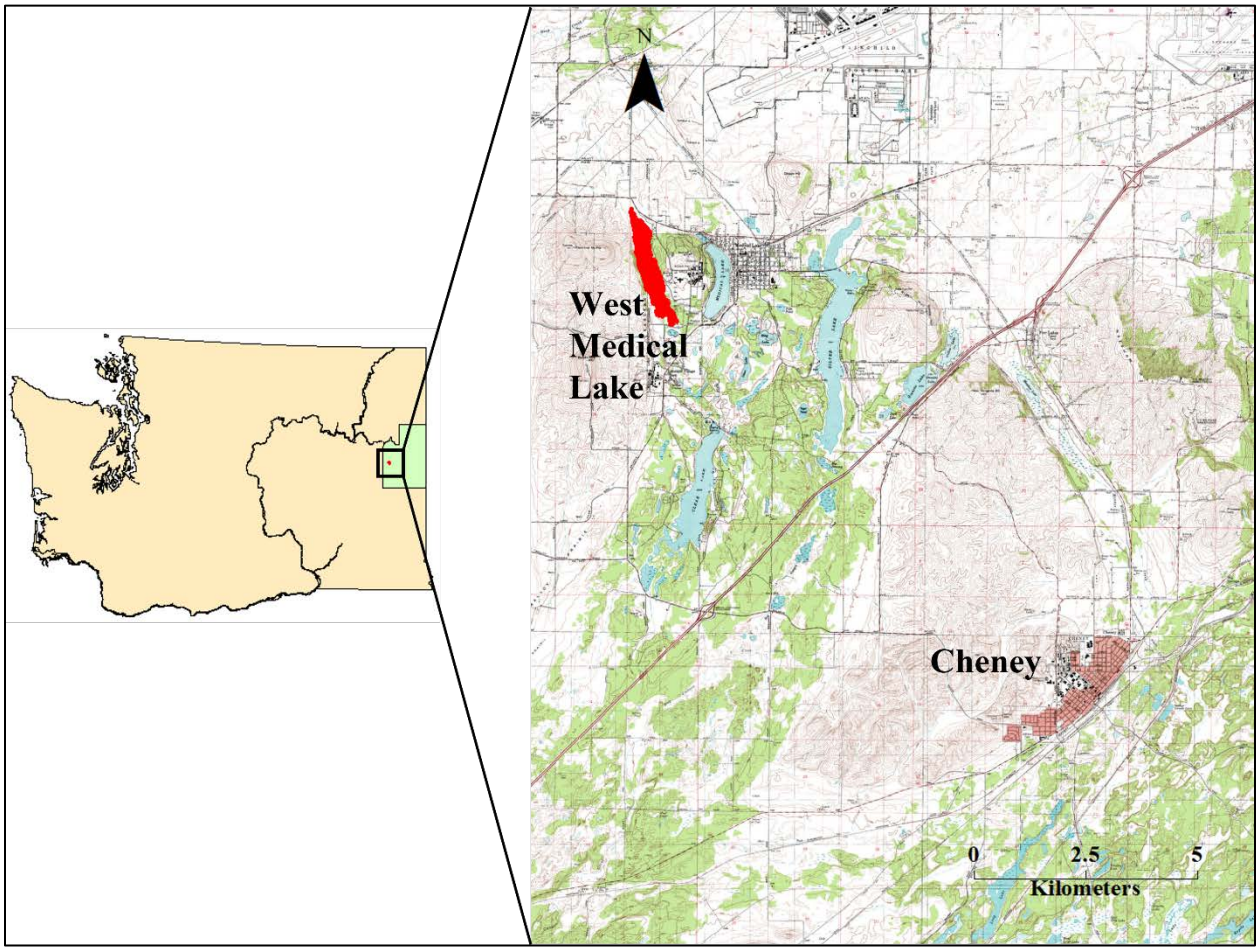

Figure 1. West Medical Lake (red) area map, location in Spokane County (green), and Washington State.

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. Moreover, Goldfish spawn in shallow vegetated areas around the lake, which become inundated during spring. Some of those areas become isolated ponds when water levels recede during fall, trapping hundreds of age-0 Goldfish. During years when those isolated areas are wetted, and Goldfish are observed, WDFW treats the ponds with rotenone in an attempt to prolong the trout fishery in the lake and allow longer periods between full-lake rehabilitations (Osborne 2019, Osborne 2020).

Despite WDFW's efforts since the 2018 rehabilitation, Goldfish have again become overpopulated, compromising the trout fishery in West Medical Lake, and making fry planting efforts futile. Because of this, WDFW is proposing to rehabilitate West Medical Lake in fall 2024.

2.0 WATER DESCRIPTION

1. **WATER:** West Medical Lake

2. **COUNTY:** Spokane
3. **LOCATION:** T24N, R40E, S11,12,13,14 and 24. Center of lake is located at 47.326897N, -117.685462W
4. **LAKE DESCRIPTION:**
    - Area: 223
    - Volume (acre-feet): 5,042
    - Maximum depth (feet): 35
    - Average depth (feet): 22
5. **WATER WITHDRAWALS:** There are no potable water rights for West Medical Lake. However, there are irrigation and stock-water rights (Appendix Table 1).
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 9-10, 2018
13. **PROPOSED TREATMENT DATE RANGE:** October 14-18, 2024
14. **RESTOCKING DATE:** Spring 2025
15. **SPECIES:** Rainbow Trout, Brown Trout
16. **CATCHABLES:** 25,000 Rainbow Trout – April 2025
    15,000 Brown Trout (Put-Grow-and-Take) – April 2025
    FRY/FINGERLINGS: 50,000 Rainbow Trout – May 2025
    100,000 Rainbow Trout – annually thereafter
    10,000 Brown Trout – October 2025, annually thereafter

3.0 TOXICANT(S) AND DEACTIVATION

1. **TOXICANT(S):** Rotenone Powder Fish Toxicant (powder formulation; EPA Reg. #89459-32), CFT Legumine Fish Toxicant (liquid formulation; EPA Reg. #655-899), and Prenfish Fish Toxicant (liquid formulation; EPA Reg. #89459-85).
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 54,000 lbs. powder, up to 120 gal. liquid.
4. **METHOD OF TOXICANT APPLICATION:** Pumper boat slurry, airboat spray, backpack sprayer, and tank/liquid pump installed in pick-up bed.
5. **DEACTIVATION (OXIDIZER):** None. Lake will detoxify on its own, typically within 6-8 weeks following treatment.
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. To maintain a comparable fishery in this lake with catchable-sized trout would require annual plants of at least 110,000 fish. Stocking catchable-sized fish is roughly ten times the cost of planting fry, and WDFW Region 1 lacks the hatchery space and water to institute a catchable fish-stocking program as a substitute for lake rehabilitation. Spring fry survival in lakes free of competing species ranges from 50-80 percent. Regardless of fish size at stocking, competition with Goldfish limits trout survival, growth, and condition substantially. Ultimately, in the absence of rehabilitation, the current fish community in West Medical Lake will continue to negatively affect trout recruitment and quality, leading to a poor trout fishery and negative public satisfaction.

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). Trout survival rates are currently poor, and Goldfish are abundant and continue to increase in number (WDFW unpublished data).

6.0 INTENDED OUTCOME/MEASURE OF SUCCESS

WDFW intends to restore West Medical Lake to a popular, easily accessible trout fishery based on fry-stocked trout. The average catch rates should be 3 to 5 fish/angler on the opener with a sustained harvest of 2 to 3 fish/angler for the remainder of the fishing season. Success will be measured during Opening Day creel, random creel contacts, and biological surveys. Beneficial effects of the treatment should last approximately 8 to 10 years under the current management scheme. In addition to reasons listed under Resource, Recreational and Economic Impacts, to abandon this lake as a trout fishery is to invite other incursions across the state in trout-only managed lakes.

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 Lake 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. Irrigation water will be provided on request to landowners who utilize lake water for 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 stock-watering 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 lake 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 2024 fishing season; thus, the treatment will have no impact on angling. The target catch rate is 2-5 Rainbow Trout per angler trip with a carryover harvest rate of 10 to 15 percent. The fishery should generate an estimated 35,000 angler-trips per season. Stocking, including catchable-sized trout, will resume in spring 2025 in time for the West Medical Lake 2025 fishing season. Catch and angler satisfaction should be greatly enhanced for subsequent seasons due to improved trout survival and size. 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, resulting in a positive economic impact totaling $3,220,000 annually (2022 dollars; based on USFWS estimate of $92.00 per trip; Van Deynze 2014). If the project maintains quality trout fishing for 8 years, it will generate an estimated $25,760,000 in economic activity. The total annual cost to plant this lake with trout fry and fingerlings is less than $10,000. The estimated cost of rehabilitation is $419,600 (including costs of rotenone, staff time, travel, etc.). The investment by the state will be realized within the first year after treatment.

11.0 RELATED MANAGEMENT ACTION

See Section 2.0 (WATER DESCRIPTION) for post-treatment fish stocking information.

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 2024 online and/or in Spokane County and Olympia to explain WDFW 2024 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. Because no potable water rights exist in West Medical Lake (Appendix; Table A.1.), bioassay would occur at 1 location.

14.3 Water Withdrawals

1. Potable Water Rights

No potable surface water rights exist for West Medical Lake.

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 will not be occurring at the time of treatment (DSHS-CSS, personal communications) and the lake will have detoxified prior to irrigation beginning in spring 2025. 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.

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