2023 PRE-TREATMENT PLAN FOR WILLIAMS LAKE, STEVENS COUNTY, WASHINGTON

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1.0 INTRODUCTION

Williams Lake is a popular winter trout fishery in the Colville area. Illegal introductions of nuisance fish species have plagued trout production in this lake (Baker and Walker 2017). Largemouth Bass *Micropterus salmoides* and Yellow Perch *Perca flavescens* were illegally introduced shortly after WDFW rehabilitated Williams Lake in 2017 to remove illegally introduced populations of Goldfish *Carassius auratus* and Smallmouth Bass *Micropterus dolomieu*. Predation by and competition with illegally introduced species has resulted in poor recruitment of Rainbow Trout *Oncorhynchus mykiss* fry plants. Poor survival and growth of trout necessitate the removal of illegally introduced fish species.

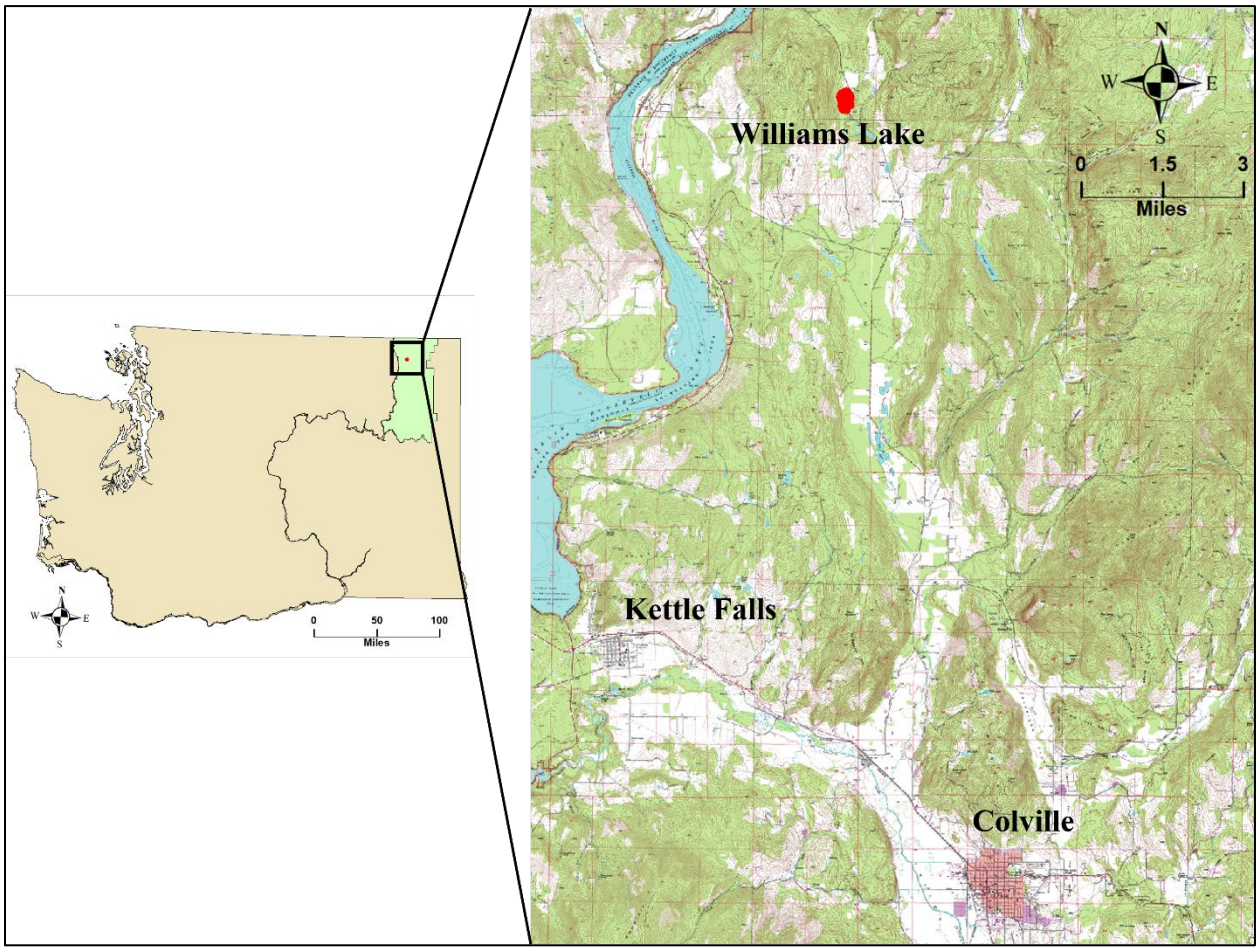

Figure 1. Williams Lake (red) area map, location in Stevens County (green), and Washington State.

2.0 WATER DESCRIPTION

1. **WATER:** Williams Lake
2. **COUNTY:** Stevens
3. **LOCATION:** T38N, R38E, S36. Center of Lake is located at 48.75518N, -117.96715W.

4. **LAKE DESCRIPTION:**
    - Area (acres): 38
    - Volume (acre-feet): 988
    - Maximum depth (feet): 47
    - Average depth (feet): 25
5. **WATER WITHDRAWALS:** No potable surface rights exist for Williams Lake. Washington State DNR holds two surface rights for stockwater, wildlife, recreation, and fire protection.
6. **OUTLET:** Seasonally intermittent outlet stream to wetland area (dry at time of treatment).
7. **STREAM:** Yes. Seasonally intermittent outlet will be dry at time of treatment.
8. **PUBLIC ACCESS:** Yes.
9. **LAND OWNERSHIP:** Public 50% (WDNR), Private 50%.
10. **ESTABLISHED RESORTS:** None.
11. **TARGET SPECIES:** Largemouth Bass and Yellow Perch
12. **DATE LAST REHABILITATED:** October 17, 2017
13. **PROPOSED TREATMENT DATE RANGE:** October 2023
14. **RESTOCKING DATE:** Spring 2024
15. **SPECIES:** Rainbow Trout
16. **CATCHABLES:** 3,800 in April 2024
    FRY/FINGERLINGS: 15,000 in May 2024
    18,000 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):** 2 ppm
3. **TOXICANT AMOUNT (gal of liquid and lbs of powder rotenone product @ 5% active ingredient; ai):** up to 30 gal liquid and 5,500 lbs powder.
4. **METHOD OF TOXICANT APPLICATION:** Pumper boat slurry and airboat spray.
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. Winter-season trout fisheries provide outdoor opportunity during the winter months.

Alternatives to rehabilitation are costly or impractical. To maintain a comparable fishery in this lake with catchable-sized trout would require around 4,000 stocked annually. 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, predation from and competition with Largemouth Bass and Yellow Perch limits trout survival, growth, and condition substantially. Ultimately, in the absence of rehabilitation, the current fish community in Williams Lake will continue to negatively affect trout recruitment and quality, leading to a poor trout fishery.

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

The fish species targeted for eradication are Largemouth Bass and Yellow Perch.

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 and Section C, subsection 1, item a) that demonstrated poor survival of trout and increasing numbers (and high relative abundance) of panfish and/or predatory fish are each thresholds that justify lake rehabilitation (Bolding et al. 2015). Trout survival rates are currently poor and Largemouth Bass and Yellow Perch are abundant and continue to increase in number (WDFW unpublished data).

6.0 INTENDED OUTCOME/MEASURE OF SUCCESS

WDFW intends to restore Williams 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 Winter Season 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 Largemouth Bass and Yellow Perch will be eradicated or drastically reduced.

2. Regional Lands, Habitat, Wildlife, and Non-Game managers have been apprised of the proposed Williams 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.
- No designated critical habitat is present at Williams Lake.
- 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. Fall rehabilitation will not interfere with spring nesting of waterfowl, mating of adult amphibians, or rearing of juvenile amphibians.

2. 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.

3. 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).

4. 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

Williams Lake is a winter-season (Friday after Thanksgiving through March 31) production fishery. It has a five trout limit with no size or gear restrictions. 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 a minimum of 960 angler-trips per season. The proposed rehabilitation will result in the loss of the Williams Lake 2023/2024 winter fishing season. Stocking, including catchable-sized trout, will resume in spring 2024 and fishing opportunity will be restored in time for the Williams Lake 2024/2025 winter 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 960 angler trips per year made to Williams Lake as a result of the proposed management action would result in an economic impact totaling $38,400 annually (2011 dollars; based on USFWS estimate of $40.00 per trip; USFWS 2013). If the project maintains quality trout fishing for 8 years, it will generate an estimated $307,200 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 $42,500 (including costs of rotenone, staff time, travel, etc.). The investment by the state will be realized within the second 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 May/June 2023 online and /or in Stevens County and Olympia to explain WDFW 2023 rehabilitation proposals, garner public input, and address concerns.

13.0 PRE-TREATMENT ANALYTICAL METHODS USED FOR MONITORING

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).

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. Bioassay would occur at 1 location in Williams Lake following treatment (0 potable water rights).

14.3 Water Withdrawals

1. **Potable Water Rights**
   No potable surface water rights exist for Williams Lake.
2. **Irrigation or Livestock Withdrawals:**
   No surface water irrigation rights exist for Williams Lake, and there are no livestock watering restrictions for the rotenone products proposed for use in this treatment.

15.0 REFERENCES:

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