

PRE-REHABILITATION PLAN

Flume Creek (Pend Oreille County)

I. PROPOSAL:

A. Justification for Proposed Rehabilitation

Westslope Cutthroat Trout (WCT) *Oncorhynchus clarki lewisi* are native to the Pend Oreille River watershed in Washington, but have declined in abundance and range. On March 20, 2013, the City of Seattle (hereafter Seattle City Light; SCL) was awarded a 42-year Federal Energy Regulatory Commission (FERC) license for operation of the 1,040-megawatt Boundary Hydroelectric Project (hereafter Project; FERC No. 2144), located on the Pend Oreille River in Pend Oreille County, Washington. The license stipulates that SCL shall implement measures under License Article 9 to protect and enhance fish and aquatic resources in the Project area, especially in support of native salmonid recovery in Project tributaries (US-FERC 2013). In consultation with Project stakeholders that comprise the Fisheries and Aquatic Workgroup (FAWG), formed to oversee implementation of license requirements, SCL developed a Fish and Aquatics Management Plan (FAMP; SCL 2010) to guide measures implemented under the current license. The presence of non-native fish species, particularly Brook Trout *Salvelinus fontinalis*, is a serious threat to persistence and/or recovery of native salmonids in the Pend Oreille Basin through interbreeding or competition for habitat and food resources (Andonaegui 2003). License Article 9(D) and FAMP section 5.4.2 describe measures for the suppression or eradication of non-native fish species in the Project area, including eradication through piscicide treatments (SCL 2010; US-FERC 2013). Cooperative efforts between Washington Department of Fish and Wildlife (WDFW), SCL, and the Kalispel Tribe of Indians Natural Resource Department (KNRD) are underway in Pend Oreille County to eradicate non-native fish from and restore native WCT to selected stream sections.

Flume Creek joins Boundary Reservoir from the west near Metaline, Washington. A large cascade and 43-foot vertical waterfall at RM 0.30 isolates the drainage from the reservoir (Walker et al. 2015). Sampling in the Flume Creek watershed by WDFW (McLellan and O'Connor 2001) and KNRD revealed a simple fish community consisting of Brook Trout and WCT. Sculpin *Cottus spp.* were reported by West Fork Environmental (WFE) in lower Flume Creek above the falls (WFE 2012), but the report may have been in error as Sculpin have not been observed in other surveys (R2 1998; McLellan and O'Connor 2001; Terrapin 2017) or recent focused attempts to collect them (KNRD unpublished data, WDFW unpublished data). The salmonid species occupying the drainage are geographically partitioned, with Brook Trout inhabiting most of the watershed and WCT limited to headwater areas above Brook Trout distribution. Flume Creek was stocked with Brook Trout by Pend Oreille County in 1916 (Darwin 1917) and Washington Department of Game between 1933–1944 and in 1981 (WDFW unpublished data). No stocking records were found for WCT in the basin (WDFW unpublished data), however, genetic sampling of WCT in the Flume Creek watershed in 2012 revealed a high degree of relatedness between Flume Creek WCT and the WDFW Kings Lake WCT broodstock (WFE 2012; Small et al. 2015; Small et al. 2017). Whether WCT are endemic to the Flume Creek drainage is unknown, but genetic data suggests that undocumented stockings of Kings Lake-origin WCT likely occurred in the Flume Creek watershed at some point in the past.

The Flume Creek watershed is well-suited to nonnative fish eradication via piscicide treatment due to the presence of complete upstream fish passage barriers (natural waterfall and temporary fish management structure; tFMS – see below) and geographic isolation of native species in the

drainage above non-native fish distribution. Washington Department of Fish and Wildlife, in partnership with KNRD and SCL, began conducting annual piscicide treatments using rotenone to remove Brook Trout from the Flume Creek drainage above the waterfall in August 2019 (Baker and Walker 2019), with a second treatment completed in August 2020 (Baker and Walker 2020). A tFMS was constructed on mainstem Flume Creek in October 2019 approximately 0.25 miles downstream of the confluence with Middle Fork Flume Creek to facilitate effective treatment of the watershed. Treatment of the portion of the watershed above the proposed tFMS (proposed here) will be completed first, with non-native fish eradication proceeding below the tFMS following confirmation of Brook Trout removal above the structure. Reintroduction of native WCT will occur in treated areas following eradication of Brook Trout.

B. Physical Description of Water Proposed for Rehabilitation

1. WATER: **Upper Flume Creek**
2. LOCATION: T39N, R43E, S04, S05, and S09; and T40N, R43E, S32 and S33 in Pend Oreille County
3. SURFACE ACRES: N/A MAXIMUM DEPTH: N/A
4. DISCHARGE: 3-7 cfs
5. OUTLET: Tributary to Boundary Reservoir (Pend Oreille River)
6. STREAM: Yes. This is a tributary stream rehabilitation.
7. PUBLIC ACCESS: Yes
8. LAND OWNERSHIP: Public 95% (USFS), 5% Private (SCL)
9. ESTABLISHED RESORTS: None

C. Proposed Management Actions

1. WATER: **Upper Flume Creek**
2. TARGET SPECIES: Brook Trout
3. DATE LAST REHABED: 8/18/2020
4. PROPOSED TREATMENT DATE: 08/17/2021
5. REPLANTING DATE: Estimated spring or fall 2022
6. SPECIES: Westslope Cutthroat Trout
7. CATCHABLES: N/A FINGERLINGS: N/A – Approximately 3,000 WCT via translocation from Slate Creek and/or stocking from the SCL Native Fish Conservation Hatchery Facility will be introduced to upper Flume Creek following Brook Trout eradication.
8. PROPOSED TOXICANT: Rotenone, liquid and powder.
CONCENTRATION: 1.75 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 10 gal liquid and 25 lbs powder.
9. METHOD OF APPLICATION: Drip can, backpack sprayer, and rotenone/gelatin/sand mixture.
10. CREW DESCRIPTION: Leader(s) Bill Baker, Personnel ~ 40

II. PURPOSE:

Historically widespread and abundant throughout the lower Pend Oreille River Basin, WCT have experienced significant constriction of range and abundance within the last 100 years. Removal of non-native Brook Trout followed by restoration of WCT in Flume Creek is consistent with WDFW's goal to "conserve and protect native fish and wildlife". This work would aid in restoring ecosystem function, provide source stocks of genetically pure WCT for the future, and act as a buffer against future petitioning of WCT under the Endangered Species Act (ESA).

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

This project has two objectives:

1. Eradicate non-native Brook Trout from Flume Creek and its tributaries above the tFMS.
2. Re-establish WCT throughout Flume Creek and its tributaries above the tFMS.

Objective 1 will be achieved when non-native Brook Trout are completely removed from the project area. Follow-up environmental DNA (eDNA) sampling will be utilized to confirm eradication of Brook Trout. Reproducing populations of WCT, expanding both in population size and spatial distribution, would indicate completion of Objective 2. Achievement of Objective 2 may take multiple years.

IV. RESOURCE IMPACTS:

1. The population of the target species, Brook Trout, will be eradicated. Non-native Brook Trout compete with WCT for resources and must be completely removed to achieve project success.
2. Regional Lands, Habitat, Wildlife and Non-Game managers have been apprised of the proposed Flume Creek rehabilitation. No unmitigated concerns have been expressed on the potential impacts to non-targeted species.
3. According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the 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 pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so. Almost no chance of eliminating an entire population exists.
4. Professional biologists and other naturalists have visited this site frequently over the past 50 years. To our knowledge, no endemic, rare, threatened or otherwise listed species will be impacted by the rehabilitation. The Flume Creek treatment area is located within the home range of the Salmo Pack of wolves *Canis lupus*, but the wolves are unlikely to be present in the area during treatment operations due to increased human presence, traffic, and activity in the days surrounding treatment.

V. MITIGATING FOR ADVERSE IMPACTS:

1. Drinking water will be provided to landowners downstream of the project area (who use stream water for drinking) during the period of rotenone presence in the project area. Removal of the majority of dead fish is planned. Dead fish will be buried on USFS property. Additionally, water filtration may be supplied to downstream landowners who obtain drinking water from the stream if collection of fish carcasses is deemed insufficient to alleviate public health concerns related to bacteria from decomposing fish in the stream.
2. Summer rehabilitation will not interfere with spring nesting of waterfowl or spawning of adult/rearing of juvenile amphibians.

3. Livestock use of the waters to be treated will not be significantly affected. The concentration of rotenone used in the treatment will be far below that considered harmful to mammals or birds. The landowners and USFS grazing allotment permittee will be notified of the rehabilitation and consequent exposure of livestock to rotenone.

4. No endemic, rare, threatened or otherwise listed species are known to inhabit this area. The Flume Creek treatment area is located within the home range of the Salmo Pack of wolves, but the wolves are unlikely to be present in the area during treatment operations due to increased human presence, traffic, and activity in the days surrounding treatment.

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

6. The stream will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish (DOE 2015).

VI. RECREATIONAL IMPACT:

Flume Creek is managed under WDFW general fishing rules, including a standard stream fishing season (Saturday before Memorial Day–October 31) and statewide harvest rules for other game fish. Statewide rules include no size restrictions or daily limit for Brook Trout. Recreational angling use of the Flume Creek drainage is limited, contributing little to the local economy. Most Brook Trout found in the treatment area are small (4-6 inches). Westslope Cutthroat Trout will provide limited angling opportunity following re-establishment of the population, but fish size will also be small. Hunting, wood gathering, berry picking, and hiking likely occur on or near Flume Creek, but should not be adversely affected by the treatment.

VII. ECONOMIC IMPACTS:

Economic impacts will be limited for this project area. Angling pressure is light in the Flume Creek project area, and contributes little to the local economy. Cost to conduct pre-treatment data collection and the proposed 2021 treatment should total around \$15,000. The project will be funded primarily by SCL (FERC mitigation funds).

As noted previously, the re-establishment of WCT in Flume Creek is intended to provide some buffer against the listing of the species under the ESA. An ESA listing of WCT could impact area farming/ranching, logging, and mining operations, which comprise a portion of the Pend Oreille County economy.

VIII. RELATED MANAGEMENT ACTION:

See I.C.6. for post-treatment fish reintroduction information. Following establishment of WCT, annual surveys will be conducted to monitor population abundance, spatial distribution, and genetic metrics.

IX. PUBLIC CONTACT:

Public meetings will be held during May or June 2021 in Pend Oreille County and Olympia to

explain WDFW 2021 rehabilitation proposals, assess public opinion, and address concerns.

X. REFERENCES:

- Andonaegui, C. 2003. Bull trout limiting factors: For Water Resource Inventory Area (WRIA) 62 (Pend Oreille County, northeast Washington state). Report to the Washington State Conservation Commission, Olympia, Washington.
- Bean, N. J., S. Harvey, J. A. Olson, W. P. Baker, and B. M. Walker. 2018. Flume Creek Westslope Cutthroat Trout restoration project - Summary of 2017 field investigation activities: fish sampling, fish management structure, and project logistics. Report to Seattle City Light by Kalispel Tribe of Indians (Usk, WA) and Washington Department of Fish and Wildlife (Spokane, WA).
- Baker, W. P., and B. M. Walker. 2019. 2019 post treatment and discharge monitoring report for upper Flume Creek, Pend Oreille County, Washington. Washington Department of Fish and Wildlife, Spokane.
- Baker, W. P., and B. M. Walker. 2020. 2020 post treatment and discharge monitoring report for upper Flume Creek, Pend Oreille County, Washington. Washington Department of Fish and Wildlife, Spokane.
- Bradbury, A. 1986. Rotenone and trout stocking. Washington Department of Game, Fisheries Management Division. Fisheries Management Report 86-2.
- Darwin, L. H. 1917. Twenty-sixth and twenty-seventh annual reports of the State Fish Commissioner to the Governor of the State of Washington: April 1, 1915, to March 31, 1917. State of Washington Department of Fisheries and Game, Seattle.
- Finlayson, B., D. Skaar, J. Anderson, J. Carter, D. Duffield, M. Flammang, C. Jackson, J. Overlock, J. Steinkjer, and R. Wilson. 2018. Planning and standard operating procedures for the use of rotenone in fish management – rotenone SOP manual, 2nd edition. American Fisheries Society, Bethesda, Maryland.
- McLellan, J., and D. O'Connor. 2001. 2000 WDFW Annual report for the project Resident Fish Stock Status Above Chief Joseph and Grand Coulee dams. Part I. Baseline assessment of Boundary Reservoir and its tributaries. Project # 199700400. Prepared by Washington Department of Fish and Wildlife for U.S. Department of Energy, Bonneville Power Administration, Portland, Oregon.
- R2 Resource Consultants (R2). 1998. Boundary Hydroelectric Project Bull Trout field investigations. Prepared for: City of Seattle, Seattle City Light Department. Redmond, Washington.
- Seattle City Light. 2010. Boundary Hydroelectric Project (FERC No. 2144) fish and aquatics management plan. City of Seattle, Washington.
- Small, M. P., S. Bell, and A. Bearlin. 2015. 2015 Boundary Hydroelectric Project Native Salmonid Genetics Program report: genetic analyses of native salmonids in Sullivan

Basin and comparisons of salmonids in nearby tributaries of the Pend Oreille River. Report to Seattle City Light; Washington Department of Fish and Wildlife, Olympia.

Small, M. P., G. Gee, and A. Bearlin. 2017. 2017 Boundary Hydroelectric Project Native Salmonid Genetics Program report: SNP genetic analyses of Westslope Cutthroat Trout in Sullivan Basin and nearby tributaries of the Pend Oreille River. Report to Seattle City Light; Washington Department of Fish and Wildlife, Olympia.

Terrapin Environmental (Terrapin). 2017. Field trip completion report: survey results – Flume Creek Watershed. Prepared for: City of Seattle, Seattle City Light Department.

United States of America, Federal Energy Regulatory Commission (US-FERC). 2013. Order issuing new license, project no. 2144-038, 142 FERC 62,231. City of Seattle, Washington.

Walker, B. M., B. Heiner, W. P. Baker, S. R. Dotts, and J. Peterson. 2015. Prioritization of fish passage barriers in the Pend Oreille River basin (WRIA 62). Washington Department of Fish and Wildlife, Colville.

Washington Department of Ecology (DOE). 2015. Fishery resource management general permit: national pollutant discharge elimination system and State waste discharge general permit. Washington Department of Ecology, Olympia.

West Fork Environmental (West Fork). 2012. Salmonid tissue sampling in the Boundary Hydroelectric Project area, NE Washington. Prepared for: City of Seattle, Seattle City Light Department.

Initiated by: Region 1, District 1 Fisheries Management