Trout Habitat Restoration Plan

Salvage and Reintroduction Plan

Upper West Branch LeClerc Creek Native Fish Restoration

Prepared for:

Box Canyon Hydroelectric Project
Technical Committee

Submitted by

Brian M. Walker, Nick J. Bean, Shane Harvey, William P. Baker, and Jason A. Olson

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1.0 INTRODUCTION

The Box Canyon Hydroelectric Project (FERC license no. 2042-013) is operated by the Public Utility District No. 1 of Pend Oreille County (PUD). Box Canyon Dam is located on the Pend Oreille River in Northeast Washington State, approximately 90 miles north of the City of Spokane. On July 11, 2005, the Federal Energy Regulatory Commission (FERC or Commission) issued a new license for operation of Box Canyon Dam (Order; US-FERC 2005). Some of the provisions in the Order were subsequently modified in a Settlement Agreement (SA) and included in an order amending the Project license on February 19, 2010 (130 FERC 61,148; US-FERC 2008). These include a requirement for the Trout Habitat Restoration Program (THRP) in the Box Canyon Watershed (Appendix A of the License Amendment Order, Revised 4(e) Condition 6).

Under the THRP, the PUD is required to restore 164 miles of tributary habitat. Conditions for habitat restoration are provided in Section 1.1 as follows:

> *The Licensee shall restore 164 miles of tributary habitat pursuant to the terms identified in this section. These restoration efforts shall be completed within 25 years of this agreement and shall be prioritized in the Calispell, Cee Cee Ah, Cedar, LeClerc, Indian, Mill, Ruby, and Tacoma creek watersheds.*

In Section 1.3.1, the THRP goes on to say:

> *"Restoration" of each stream segment will include a combination (some or all) of the following measures as determined necessary by the Technical Committee:*
>
> - *Channel improvements (limited to geomorphologic improvements and barrier removal)*
> - *Floodplain restoration*
> - *Riparian corridor restoration*
> - *Fencing*
> - *Conservation easements and/or purchases*
> - *Non-native fish removal (see section 1.3.2)*
> - *Reintroduction of target fish species (see section 1.3.3)*

In meetings of the Box Canyon Technical Committee (TC) and Fish Subcommittee (FSC) during 2019, an agreement was reached that the LeClerc Creek Watershed (Figure 1) would be the first priority for restoration work. The TC and FSC approved Phase 1 of the Upper West Branch LeClerc Creek Native Fish Restoration Project (WDFW and KNRD 2020) in 2020, with field work beginning during summer 2020 and completed in summer 2022 (Walker et al. 2022).

Phase 1 of the Upper West Branch LeClerc Creek (UWBL) Native Fish Restoration Project consisted of data collection to inform proposed piscicide (rotenone) treatments (Phase 2) of the UWBL Watershed. Data collected in Phase 1 are described in Walker et al. (2022) and incorporated into a rotenone treatment implementation plan (Walker et al. 2024).

Phase 2 of the Project would consist of native fish (Westslope Cutthroat Trout *Oncorhynchus clarkii lewisi* and Bull Trout *Salvelinus confluentus*) salvage followed by piscicide treatment to remove non-native fish (e.g., Brook Trout *Salvelinus fontinalis*, Brown Trout *Salmo trutta*, and Rainbow Trout *Oncorhynchus mykiss*). Any Bull Trout (likely extirpated from the Project Area) captured and a portion of the captured Westslope Cutthroat Trout (WCT) would be transported to the SCL Native Salmonid Conservation Facility (NSCF) and held in captivity. The remaining individuals would be translocated outside any part of the Project Area to be treated with rotenone. Mature WCT held at the NSCF would be spawned annually during Phase 2 (3-5 years), to produce progeny that would be reintroduced to the UWBL Project area.

Phase 3 of the Project would restore native fish (WCT) to UWBL. Offspring from the WCT broodstock at the NSCF would be reintroduced to the Project Area following confirmation of non-native fish eradication. Broodstock may also be repatriated to UWBL once no more NSCF production is required.

2.0 PROJECT AREA

The UWBL Project Area is located in the upper portion of the LeClerc Creek Watershed (Figure 1), in Township 36N, Range 44E, Sections 3 and 4, and Township 37N, Range 44E, Sections 14-17, 20-23, 25-29, and 32-35.

More than 90% of property within the Project Area is owned by the USFS (Colville National Forest) with the remainder owned by Stimson Lumber Company (Figure 2). Few locations are accessible from USFS Road 1935; most are only accessible by foot. During summer 2024, a network of access routes was flagged to facilitate ingress/egress of staff during the proposed treatment (Figure 2). Rotenone would be applied to approximately 13.4 km (8.3 miles) of stream within the Project Area to remove non-native Brook Trout.

3.0 WESTSLOPE CUTTHROAT TROUT GENETICS AND DISTRIBUTION

Fish distribution was defined through presence/absence electrofishing and environmental DNA (eDNA) sampling (Figure 2; Walker et al. 2022). Westslope Cutthroat Trout were found throughout the Project Area but exhibited variation in abundance and density within and between tributaries.

Small et al. (2007) and Smith et al. (2023) analyzed WCT genetics from discrete portions of the West Branch LeClerc Creek watershed. Results are summarized in Table 1. Descriptions of streams within the Project Area and associated WCT genetic information follow in the subsections below.

3.1 Upper West Branch LeClerc Creek

Mainstem UWBL is the largest stream in the UWBL Project Area (wetted width 2-8 m). Brook Trout and WCT are sympatric within the treatment reach from the tFMS upstream approximately 2.2 km to a series of cascades, with only WCT present above that point (Walker et al. 2022;

Figure 2). Genetic collections in UWBL and its tributaries repeatedly indicate that the greatest genetic diversity (e.g., expected heterozygosity, H_E; allelic richness, AR) and largest effective population (Ne) size within the entire Project Area occur within the UWBL mainstem population (H_E = 0.318 - 0.323, AR = 1.783 - 1.8, N_e = 61 - 107; Small et al. 2007, Smith et al. 2023, Smith et al. 2025).

3.2 Upper West Branch LeClerc Creek Tributary 1

Upper West Branch LeClerc Creek Tributary 1 (UWBL T1) joins mainstem UWBL from the east 170 m downstream of the tFMS, immediately after crossing the USFS-1935 road. Although small ($\leq$ 1 m wetted width), it is fish-bearing from its mouth upstream 2 km to a fish passage barrier created by a large, relic beaver dam (Bean and Harvey 2015). The culvert under the USFS-1935 road is perched, forming an upstream fish passage barrier and isolating almost the entire drainage. A small number of WCT were present in sympatry with Brook Trout above the culvert, prompting KNRD to initiate annual suppression in 2003 (Olson and Andersen 2003). Brook Trout were extirpated from UWBL T1 by 2014, with WCT expanding in abundance and distribution within the UWBL T1 watershed (Olson and Andersen 2003, Bean and Harvey 2015, Harvey and Bean 2017). Twenty-five (25) WCT were captured in 2022 and tissue sampled for genetic analysis (Walker et al. 2022). UWBL T1 exhibited a high N_e (57.05), strong H_e (0.27), and robust allelic richness (1.60; Table 1).

3.3 Upper West Branch LeClerc Creek Tributary 2

Upper West Branch LeClerc Creek Tributary 2 (UWBL T2) originates from Molybdenite Mountain and flows into the UWBL mainstem from the northwest. The sub-watershed consists of four perennial, fish-bearing forks (UWBL T2 and Forks A, B, C; Figure 2) which comprise > 5 km of fish-bearing stream. Brook Trout are present in sympatry with WCT in all 4 streams, with allopatric WCT populations occupying each drainage above Brook Trout distribution (Walker et al. 2022). WCT in this portion of the watershed exhibited some of the lowest genetic diversity in the Project Area (Table 1). Populations in the upper portion of UWBL T2 (H_e = 0.179, AR = 1.452) and UWBL T2 Fork A (H_e = 0.228, AR = 1.552) appear to be isolated (N_e = 5 and 3, respectively) and experiencing substantive genetic drift (Smith et al. 2025). UWBL T2 Fork C had better metrics, with H_e = 0.27, AR = 1.731, and N_e = 32 (Table 1).

3.4 Upper West Branch LeClerc Creek Tributary 3

Upper West Branch LeClerc Creek Tributary 3 (UWBL T3) joins UWBL mainstem from the north approximately 100 m downstream of the mouth of Saucon Creek. It is incorrectly shown on USGS topographic maps as a tributary to Saucon Creek. Brook Trout and WCT are present from its mouth upstream to a cascade (890 m; Walker et al. 2022; Figure 2). Comprehensive fish presence/absence surveys were conducted in UWBL T3 in 2017 by KNRD (KNRD unpublished data). Electrofishing and eDNA sampling confirmed no Brook Trout above the cascade (KNRD unpublished data, Carim et al. 2017). Despite WCT being observed above the barrier in the past, only a single WCT was captured during the survey in 2017 (KNRD unpublished data).

Concurrent eDNA sampling in 2017 above the barrier also detected WCT DNA at only a single location (out of 6 sample sites; Carim et al. 2017). The recorded decline in fish abundance has coincided with (and is potentially caused by) a shift in discharge causing UWBL T3 to become intermittent. Extremely low discharge with many reaches disconnected by areas of subsurface flow was observed throughout the drainage in 2017 (KNRD unpublished data), and no surface flow was observed below the cascade in 2024 (KNRD unpublished data). No genetic samples have been collected from this tributary, and it is likely fishless above the cascades.

3.5 Saucon Creek

Saucon Creek is comprised of 2.1 km of fish-bearing stream from its mouth upstream to a natural fish passage barrier (cascade; Harvey and Bean 2024). It flows south-east before turning south-west to parallel UWBL for approximately 1 km before joining UWBL from the north. Brook Trout were present in Saucon Creek, but annual suppression by KNRD beginning in 2014 has resulted in functionally (if not fully) eradicating them from the watershed (Harvey and Bean 2024). No Brook Trout have been captured in Saucon Creek since 2022, even though suppression was conducted in 2023 and 2024 (Harvey and Bean 2023, 2024). Brook Trout DNA was detected at 2 locations in Spring 2024 eDNA sampling, but despite intensive electrofishing beginning 100 m below the lowest detection and continuing upstream to end 100 m above the highest detection, no Brook Trout were observed (Harvey and Bean 2024). Westslope Cutthroat Trout have increased substantially in number and the population has expanded in spatial distribution to occupy vacated habitat (Harvey and Bean 2024). This population exhibits healthy genetic metrics (H_e = 0.285, AR = 1.704, and N_e = 38; Table 1; Small et al. 2007, Smith et al 2023, Smith et al. 2025).

3.6 Diamond Fork

Diamond Fork flows south-west from Monumental Mountain and joins the UWBL mainstem from the south, comprising just over 3 km of fish-bearing stream. Almost exclusively inhabited by Brook Trout, few WCT persist in mainstem Diamond Fork (Walker et al. 2022). WCT samples from Diamond Fork collected in 2002 exhibited robust genetic metrics (H_e = 0.291, AR = 1.717, and N_e = 46) and were very closely related to the mainstem UWBL population (Small et al. 2007, Smith et al. 2023, Smith et al. 2025). However, during sampling conducted in 2020, only 2 WCT were captured above the large beaver complex associated with the mouth of Diamond Fork Tributary 2 (DF T2; Walker et al. 2022; Walker et al. 2024; Figure 2), indicating that no functional population currently exists above that point. Diamond Fork Tributary 2 (DF T2) joins Diamond Fork from the east after flowing through a series of inactive beaver impoundments and was found to have a population of WCT during sampling in 2020 (Walker et al. 2022). Fish-bearing habitat extends from the mouth upstream 1150 m. Brook Trout predominate in the lower reaches of DF T2. However, upstream from the relic beaver activity, Brook Trout are gradually replaced by WCT, which are allopatric in the headwaters. Due to the small size and relative isolation of DF T2, no WCT tissue samples were collected for genetic analysis.

4.0 WESTSLOPE CUTTHROAT TROUT SALVAGE

Prior to rotenone treatment of the UWBL Project Area to remove non-native Brook Trout, salvage of WCT is necessary to ensure (1) minimal impact to native fish and (2) within-basin stock WCT are available for population re-establishment once Brook Trout are removed.

4.1 2024 Pilot Salvage

Streams within the UWBL Project Area were divided into 100 m sampling units (SU) using ArcGIS Pro (ESRI, Redlands, California; Figure 3). On September 9, 2024, a pilot WCT salvage effort was conducted. Three teams collected WCT via single-pass backpack electrofishing using Smith Root LR-24 backpack electrofishing units fished with pulsed-DC at the lowest voltage, amperage, and frequency settings (600 - 850v, 30 Hz, 18-20% duty cycle) adequate to collect fish without injury. Salvage work was confined to the morning hours (08:00-12:00) to avoid handling fish during the warmest portion of the day. Prior to the effort, a collection target of up to 300 WCT, comprised of 3 separate size classes (defined by total length; TL) was established: 40% (n = 120) from Size Class 1 (juvenile; 80-100 mm), 40% (n = 120) from Size Class 2 (sub-adult; 101-150 mm), and 20% (n = 60) from Size Class 3 (adult; ≥ 151 mm). To minimize relatedness, no more than 25 WCT (across all size bins) were collected per SU. In addition, this pilot salvage effort was only conducted within select portions of the UWBL Project Area (mainstem UWBL only; no tributaries) to focus on collection of WCT with the most desirable genetic metrics ($H_E > 0.3$, AR > 1.75, and $LDN_e = 60$; Smith et al. 2025) for propagation of progeny to be used for population re-establishment following Brook Trout removal.

Salvage teams electrofished a total of 15 SUs and collected 291 WCT. Retained WCT were sorted by size category and placed in covered totes within the stream overnight. No WCT mortalities were observed.

Salvaged WCT were transported to the NSCF during early morning of September 10, 2024, where they were placed into 8 ft circular fiberglass tanks for extended rearing. On November 19, 2024, all fish were measured for length and weight. Those over 100 mm were also tissue sampled and received a passive integrated transponder (PIT) tag.

As of March 15, 2025, only a single WCT mortality from this effort had occurred, and NSCF staff have been successful at transitioning the population onto hatchery feed (Mitch Combs, NSCF Manager, pers. comm). Lessons learned from extended rearing of the pilot group (e.g. transition onto hatchery feed, growth and maturation, etc.) will be used to refine methodology for subsequent wild WCT salvage and rearing to occur in future projects.

4.2 2025 Project Area Salvage

Full-scale salvage of WCT within the UWBL Project Area would occur prior to the first rotenone treatment (proposed for August 2025; Walker et al. 2024). Up to 1,500 salvaged fish from select portions of the Project Area with desirable genetic metrics, which include mainstem UWBL (throughout the Project Area and extending 13 SUs downstream of the tFMS to

encompass the rotenone deactivation zone), as well as the lower portions of Diamond Fork, Saucon Creek, UWBL T2, and UWBL T3 would be transported to the NSCF (hereafter referred to as "NSCF-Eligible" fish). The remainder of salvaged WCT would be translocated outside of the portion of the Project Area to be treated with rotenone (but within the West Branch LeClerc drainage – these fish are hereafter referenced as "translocation" fish). Salvage SUs are shown in Figure 3 and are colored to indicate disposition of captured WCT. One hundred twenty-three SU's would be salvaged, including 67 which are NSCF-eligible.

During the 2024 Pilot Salvage, no more than 25 WCT were retained from each SU. Staff sought to minimize relatedness of the NSCF pilot group and were successful. Relatedness was very low (<1.5% of WCT collected were full-siblings; Smith et al. 2025), indicating that a greater number of WCT could be collected per SU during the full-scale salvage effort. Thus, all WCT collected within the NSCF-eligible SUs would be transported to the NSCF. Young-of-Year WCT captured anywhere in the treatment area would be transported and released downstream of the mouth of Mineral Creek to ensure that mis-identification of a Brook Trout or Brown Trout YOY does not result in introduction of non-native fish above the treatment area.

Additional WCT may also be collected from the UWBL mainstem below the tFMS, Mineral Creek, UWBL T1, or the upper portion of Saucon Creek (all of which have desirable genetic metrics; Table 1; Smith et al. 2025) to supplement the NSCF-salvage group if fewer than 1,500 fish are collected during the salvage effort. Data collection, tissue sampling, and tagging of fish transported to the NSCF would follow the description provided in Section 4.1 (2024 Pilot Salvage).

5.0 WESTSLOPE CUTTHROAT TROUT HATCHERY SPAWNING AND REARING

The NSCF-salvage group would be held for 3-5 years, and adult fish would be spawned annually to produce multiple year-classes of progeny. Following removal of Brook Trout from the UWBL Project Area, WCT produced in the NSCF (F1 generation) would be released to re-establish the population. Pending recommendations from WDFW Fish Health staff, individuals from the NSCF-salvage group may also be repatriated to the UWBL Project Area. Following WCT reintroduction, monitoring would occur to evaluate population demographics, abundance, and spatial distribution (CFS-G 2016).

The NSCF-salvage group would be tissue sampled to assess genetic purity, genetic diversity (and other metrics), and relatedness to other members of the salvage population. Fish with > 3% hybrid genes (e.g., introgressed with Rainbow Trout *O. mykiss*) would be removed (CFS-G 2016).

Up to 1,500 WCT would be retained in the NSCF-salvage group. Staff would determine sex and maturity of fish held on station, and they would be graded by size and maturity. A spawning

matrix would be developed to minimize relatedness. Selection criteria for mating and spawning protocol would generally follow CFS-G (2016):

> *Matings between siblings (R_{XY} > 0.25) will not be allowed, so available spawners may be lower than observed mature fish on hand. Unrelated mature fish will be randomly selected as they ripen and paired in a 2x2 factorial fashion. Once males are spawned, they will not be used again that year. Overall, a 1:1 ratio of males to females will be used. No size or condition selection will be conducted.*

Spawning of factorial groups composed of equal numbers of males and females (e.g., 2x2 or 3x3) would be conducted with methods similar to those described in CFS-G (2016). Modifications to selection and spawning protocol may be made based on project needs and/or recommendations by WDFW and NSCF staff.

Following spawning and water hardening, fertilized eggs would be placed in Heath incubation trays. Each tray would be sub-divided into 4-9 family groups using Schnee Cups. Family groups would be equalized at ponding to minimize genetic over-representation. Incubation and rearing would be conducted similar to the methods described by CFS-G (2016). Modifications to incubation and rearing may be made based on project needs and/or recommendations by WDFW and NSCF staff.

The NSCF-salvage group would be sampled periodically to assess survival and growth, with seasonal observation of sexual maturity. Survival, growth, and maturity thresholds described below are based on Piper et al. (1982), Downs et al. (1998), and CFS-G (2016). Failure to attain thresholds would result in adjustments to husbandry or, if necessary, augmentation of the NSCF-salvage group with additional WCT from the West Branch LeClerc Creek Watershed.

NSCF-salvage group thresholds:

a. Annual survival (by FL size bin)
    i. $\leq$ 115 mm: $\geq$ 75%
    ii. 116-150 mm: $\geq$ 80%
    iii. 151-180 mm: $\geq$ 90%
    iv. 181+ mm: $\geq$ 90%
b. Annual weight (g) growth (all FL size bins): 50%
c. Sexual Maturity (by FL size bin)
    i. $\leq$ 115 mm: 0%
    ii. 116-151 mm: $\geq$ 0%
    iii. 151-180 mm: $\geq$ 75%
    iv. 181+ mm: $\geq$ 90%

Projected lifestage-specific survival and growth for the F1 generation are described in CFS-G (2016).

6.0 REINTRODUCTION

Rotenone treatments in the UWBL Project Area are anticipated to occur from 2025-2027. Following the third treatment, eDNA sampling would be conducted to confirm Brook Trout removal or identify locations of remaining fish. If Brook Trout are detected, they would be targeted for mechanical removal. Once removal is confirmed, reintroduction of WCT would begin (tentatively planned for fall 2028).

The 3-5 year treatment period would allow for multiple year-classes of WCT F1s to be produced at the NSCF. Reintroduction to the UWBL Project Area would consist primarily of stocking Age-1 and Age-2 fingerlings, but Age-0 fry and eyed eggs (e.g., in remote site incubators; RSI) could also be stocked. Reintroducing fish of varying ages is necessary to ensure uninterrupted annual recruitment to the spawning population. As an illustration of the importance of spawner recruitment continuity, translocations of WCT into Cee Cee Ah Creek following non-native fish eradication were dominated by adult fish (Andersen 2012; Andersen and Bean 2013). This strategy quickly produced offspring because spawning occurred immediately, but it ultimately slowed the restoration effort due to a gap in year-classes as mature fish from the original adult donor stock senesced out of the population while their progeny were still immature (Walker et al. 2015). Following that 2-3 year period of limited production, population growth accelerated as progeny matured, resulting in increased abundance and spatial distribution (KNRD unpublished data, Harvey and Bean 2024).

Past WCT reintroductions conducted in Pend Oreille River tributaries occurred in relatively small streams (e.g., Cee Cee Ah Creek, Andersen 2012, Andersen and Bean 2013; Smalle Creek, Walker et al. 2019), and the number of fish translocated was governed by the number of donor stock that could be obtained. Thus, WCT recovery occurred at a slow to moderate pace, as far more vacant habitat was present in newly treated streams than could be seeded with resident WCT mined from nearby populations (<8 inches as adults) which exhibit relatively low fecundity. In contrast, following removal of non-native Brook Trout, WCT restoration in the UWBL Project Area is anticipated to occur more quickly due to availability of abundant source stock produced at the NSCF.

Fish survey data from Pend Oreille River tributaries collected between 1995-2019 were used to estimate reintroduction targets for WCT within the UWBL Project Area (KNRD unpublished data). For mainstem UWBL Creek and the lower portions of tributaries (High-Density Reintroduction SUs), 138 WCT/SU would be stocked annually for a minimum of 2 years. Remaining tributary SUs would be divided into two categories; those with allopatric WCT which would not be stocked (Volitional Dispersal SUs) and those within the treatment area which would be stocked at a lower density of 26 WCT/SU (Low-Density Reintroduction SUs). Survival of hatchery trout stocked into streams with established fish populations is poor (17.2% from Age-1 to Age-2, Miller 1954; 80-200 mm trout < 3% overwinter, > 200 mm trout < 15% overwinter, Cresswell 1981, 5-10% from stocking as sub-catchables to harvest, Wiley et al. 1993). However, hatchery influence would be minimal for UWBL WCT F1s produced at the

NSCF (derived from wild stock and held in a naturalized rearing environment, including low fish density and lithographed circular tanks to mimic stream complexity), and they would be stocked into vacant habitat (no fish present due to recent rotenone treatment). No estimates for survival of WCT in a newly established population could be found in the literature. Because data are lacking, a conservative first-year hypothesized survival for reintroduced WCT in UWBL of 50% was assumed. F1s introduced into UWBL would be adipose fin-clipped to allow for differentiation in subsequent sampling from in-stream production.

Figure 4 shows Reintroduction SUs for the UWBL Project Area. In total, approximately 12,000 WCT would be reintroduced over 2 years. Stocking would consist of 4,000 Age-1 and 2,000 Age-2 fish annually. The NSCF has the capacity to produce up to 6,000 yearling WCT (or equivalent poundage of smaller or larger fish) annually for a salvaged population (CFS-G 2016). Survival and fitness of reintroduced WCT F1s may vary by size of fish at release. Population monitoring is described in Section 7.0 (MONITORING) below, and data would be used to refine stocking practices for future WCT restoration projects (See Adaptive Management, Section 8.0).

WCT F1s would be transported from the NSCF by hatchery trucks and scatter-planted throughout Reintroduction SUs. High-Density Reintroduction SU's would receive approximately 46 Age-2 fish and 92 Age-1 fish, while Low-Density Reintroduction SU's would receive approximately 9 Age-2 and 17 Age-1 WCT (Figure 4).

Stocking would be repeated the following year (approximately 2029). Pending recommendations from Fish Health staff, repatriation of remaining healthy members of the salvage population at the NSCF would also be considered.

7.0 MONITORING

The newly established WCT population in UWBL would be monitored via single-pass electrofishing of every 5th Reintroduction SU (moving in an upstream direction from the tFMS or tributary mouth; hereafter referred to as "Initial Monitoring") two years after the second WCT reintroduction (approximately 2031) to assess spatial distribution and in-stream reproduction. Thresholds for success would be:

1. Spatial distribution – WCT observed in all sampled SUs
2. Reproduction – ≥5 non-adipose-clipped WCT per SU observed in 50% of sampled SUs

Two years following Initial monitoring (2033), WCT population abundance would be assessed. A minimum of 6 High-Density Reintroduction SUs and 6 Low-Density Reintroduction SUs would be designated as Monitoring SUs and would be sampled via multiple-pass electrofishing surveys every 5 years (hereafter referred to as "Standard Monitoring"). Captured young-of-the-year would be tallied and transported above or below the Monitoring SU and released without further handling. Age 1+ fish would be enumerated, measured for TL (mm) and wet weight (g), inspected for an adipose fin clip, and then released back into the Monitoring SU once

electrofishing was completed. Data would be analyzed to assess population abundance of Age 1+ WCT. Thresholds for success would be:

1. 50% of High-Density Reintroduction Monitoring SUs with ≥ 69 Age-1+ WCT
2. 50% of Low-Density Reintroduction Monitoring SUs with ≥ 13 Age 1+ WCT

Genetic assessment of the population would be conducted once every 10 years (hereafter referred to as "Genetic Monitoring"), beginning concurrently with the 2nd standard monitoring effort (2038). Sampling would consist of single-pass electrofishing of 50% of spatially distributed SUs within the Project Area to collect up to 20 tissue samples from Age-1+ WCT/SU. Thresholds for success would be:

1. $H_E \geq 0.323$
2. $AR \geq 1.8$
3. $LDN_e \geq 107$

Fulfillment of all monitoring thresholds is intended to ensure health and persistence of the reintroduced population. See Section 8.0 for discussion of potential remedies if monitoring thresholds are not met.

8.0 ADAPTIVE MANAGEMENT

An adaptive management approach would be employed to ensure the success of the UWBL Native Fish Restoration Project (Figure 5). The approach considers success criteria for hatchery operations, as well as thresholds for WCT population indices following re-establishment. The NSCF represents a new tool for WCT restoration in the Pend Oreille River Basin. In time, experience with spawning and rearing of wild WCT may result in modifications to NSCF operations affecting:

1. Number and size bins of salvaged WCT per population
2. Spawning procedure
3. Feeding
4. Rearing densities
5. Water temperature and daylight regime
6. Stocking timing (season)
7. Number and size of fish stocked

Similarly, if monitoring thresholds for successful WCT population re-establishment (as described in Section 7 (MONITORING)) were not met, management actions, including the following, may be implemented:

1. Introduction of additional UWBL-origin F1s from the NSCF.
2. Translocation of genetically-pure WCT from within the West Branch LeClerc Creek drainage.

3. Translocation of genetically-pure WCT from outside the West Branch LeClerc Creek drainage.

If monitoring thresholds were met, no additional management action would be necessary.

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FIGURES

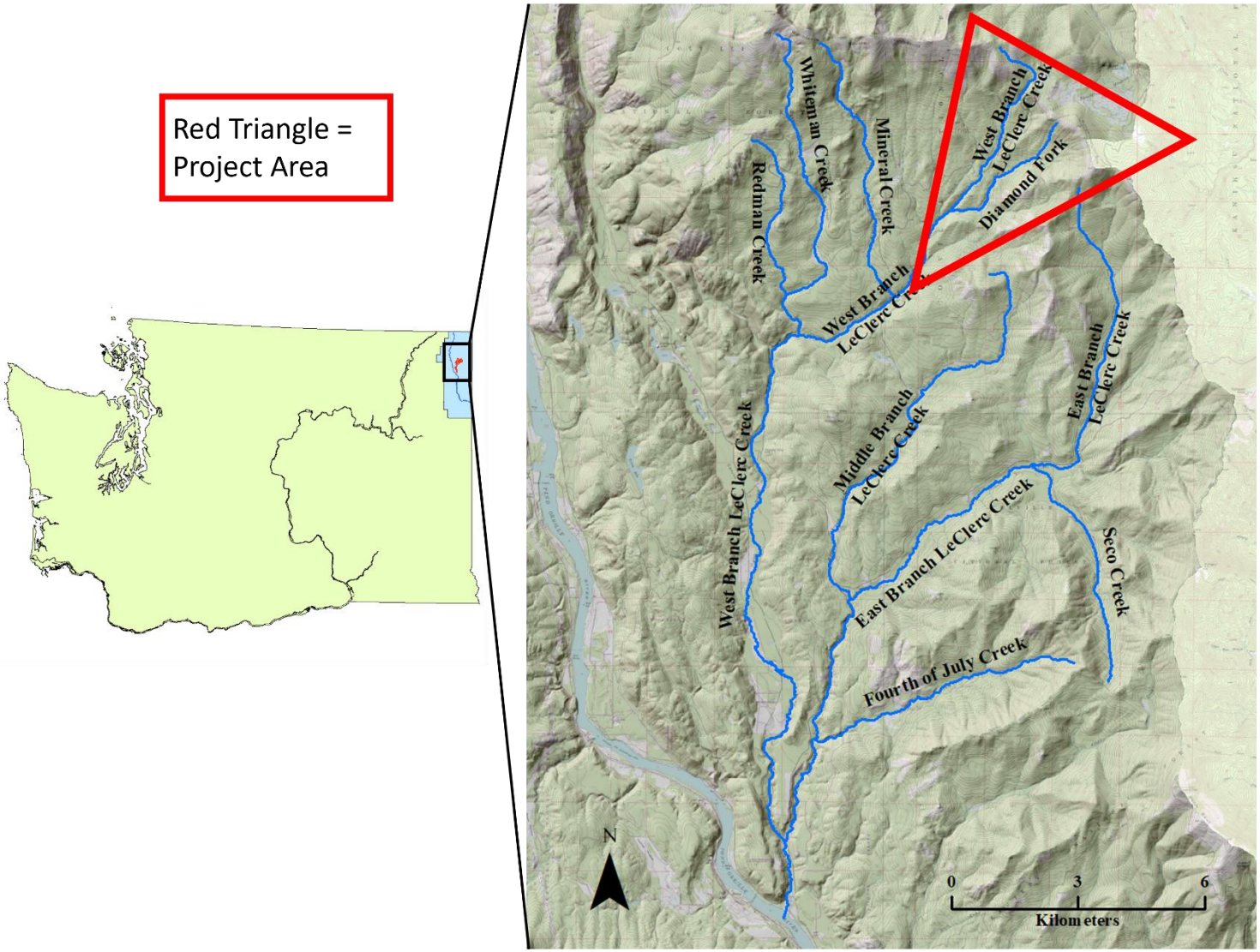

Figure 1. Map showing the location of West Branch LeClerc Creek in Washington State, its location in the LeClerc Creek Watershed, and the Project Area for proposed non-native fish removal/native fish restoration.

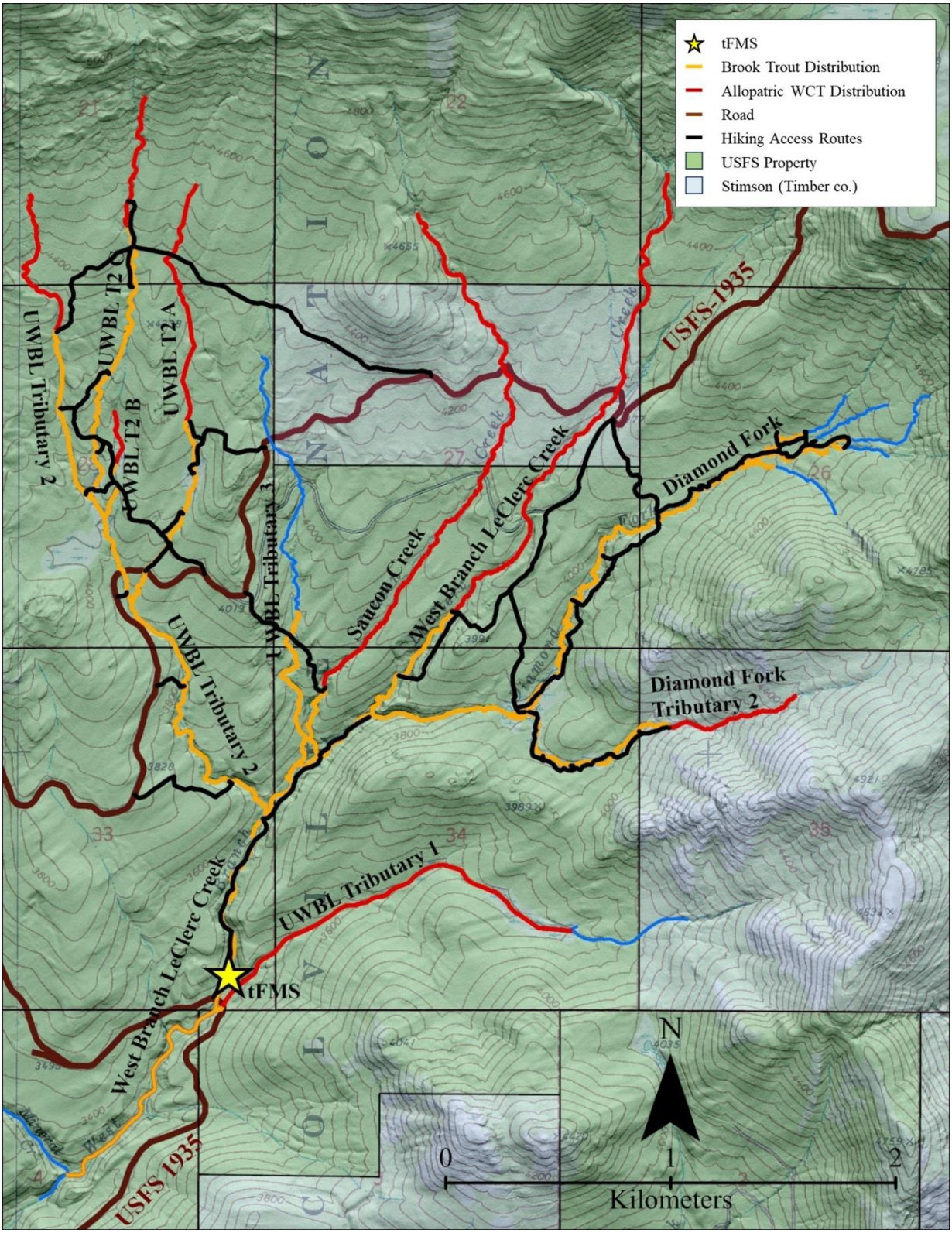

Figure 2. Map of the Upper West Branch LeClerc Creek Project Area showing property ownership, access, and fish distribtion. With the exception of DF and UWBL T1, the upper extent of WCT distribution is unknown.

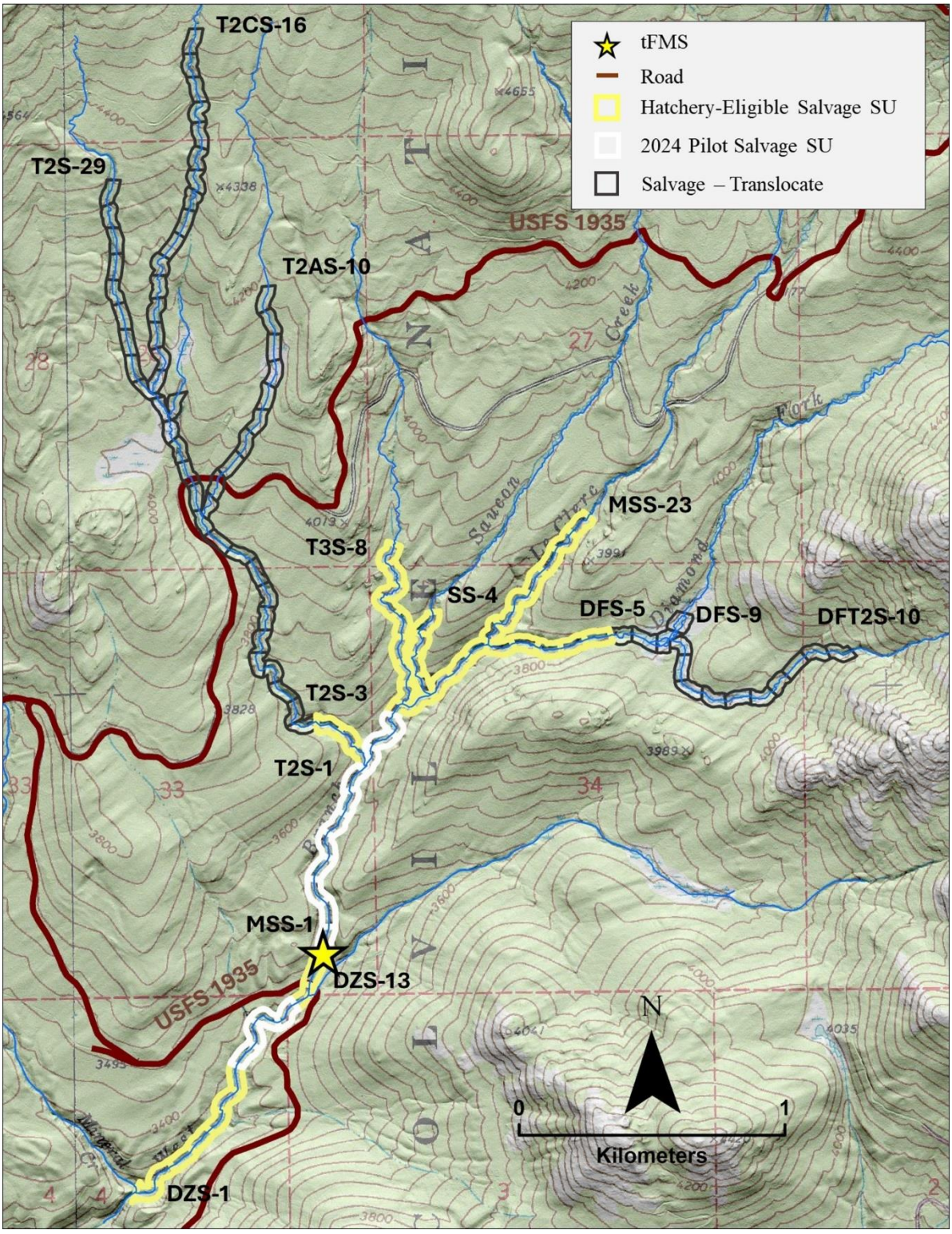

Figure 3. Upper West Branch LeClerc Project Area Salvage SU's.

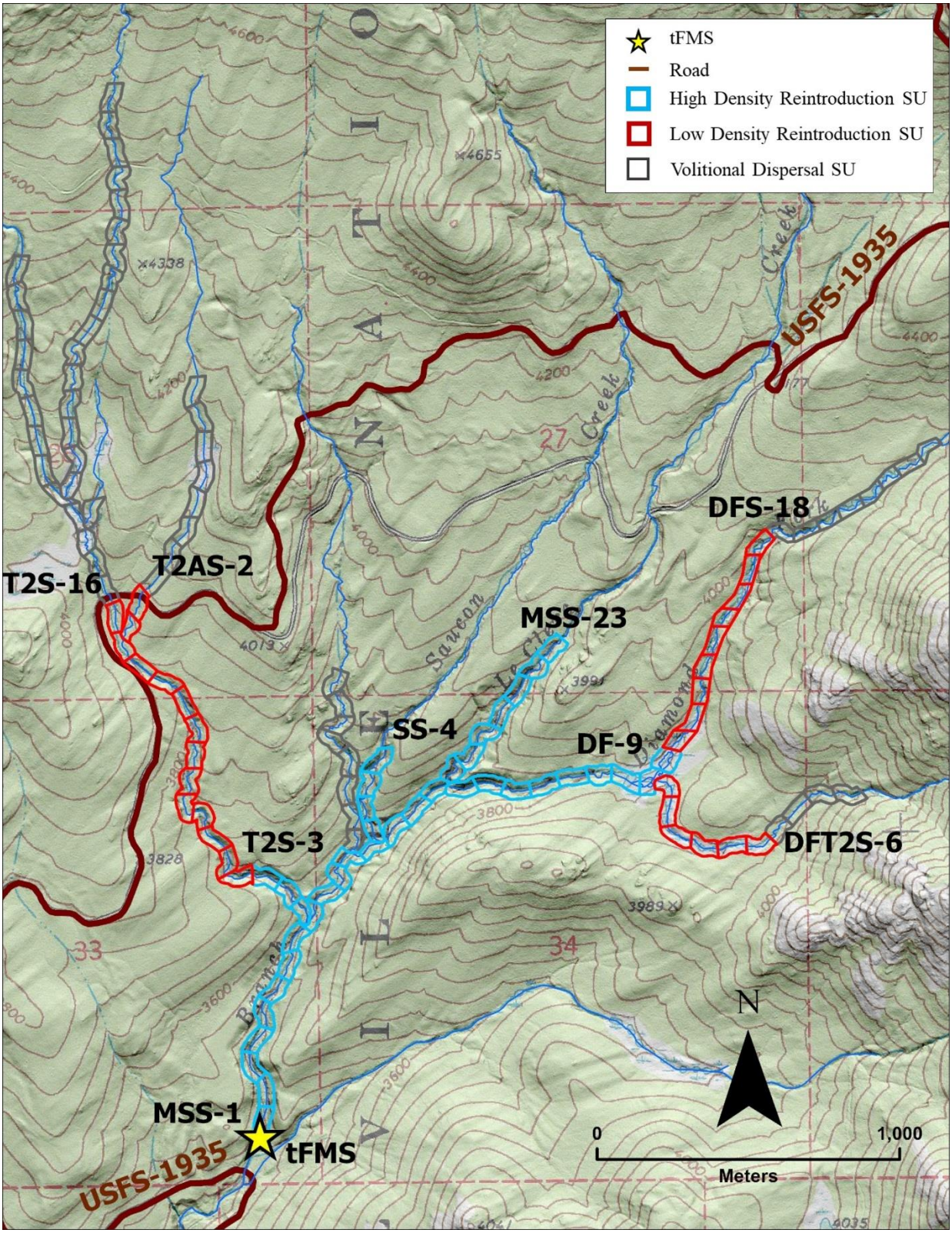

Figure 4. Upper West Branch LeClerc Project Area Westslope Cutthroat Trout Reintroduction SUs.

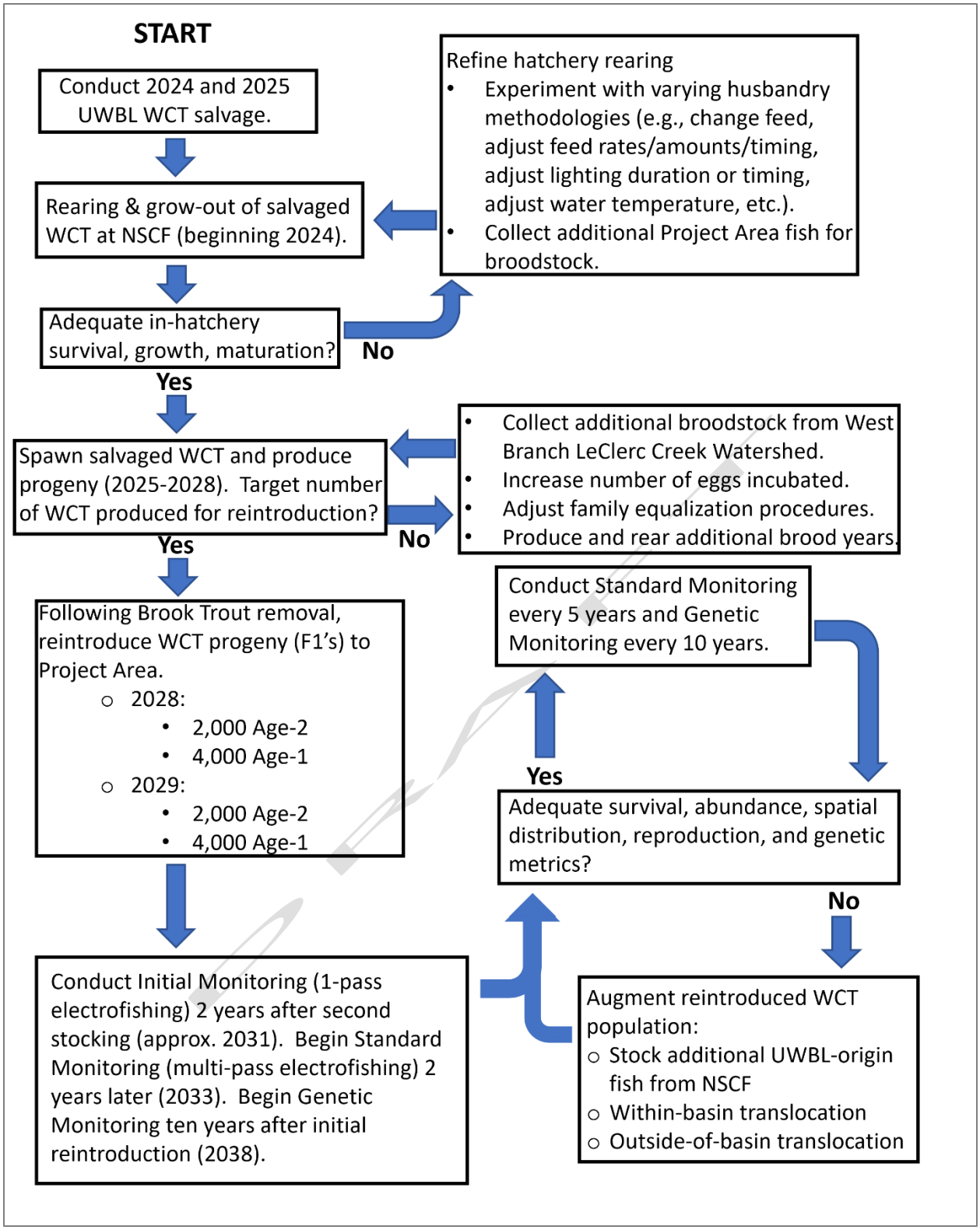

Figure 5. Adaptive management flow chart for UWBL WCT reintroduction.

TABLES

Table 1. Genetic metrics of UWBL Project Area or nearby WCT populations (Table is taken from Smith et al. 2025). WBLeClerc Combined includes all the data sets listed individually in the rows below it for comparison with 2024 pilot salvage genetic samples.

Collection	HE	AR	PM	FIS	HWE0.05	HWEFDR	LDNe	SibNe
WBLeClerc2024_Salvage	0.323	1.8	0.978 (4, 176)	0.023	19 (0.001)	1 (0, 1)	107 (99-116)	118 (89-158)
WBLeClerc_Combined	0.324	1.794	0.967 (6, 174)	0.129	55 (0)	43 (0, 43)	34 (32-36	61 (43-88)
DiamondFrk	0.291	1.717	0.817 (33, 147)	-0.039	5 (0.749)	2 (0, 2)	46 (32-74)	-
MineralCreek	0.302	1.755	0.917 (15, 165)	0.005	13 (0.038)	3 (1, 2)	54 (47-61)	-
SauconCreek	0.285	1.704	0.861 (25, 155)	0.006	11 (0.089)	4 (0, 4)	38 (35-42)	-
WBLeClerc	0.318	1.783	0.944 (10, 170)	0.031	16 (0.005)	1 (0, 1)	61 (51-74)	-
WBLeClerc_Trib1	0.297	1.725	0.867 (24, 156)	0.018	8 (0.379)	1 (0, 1)	57 (45-74)	-
WBLeClerc_Trib2	0.179	1.452	0.506 (89, 91)	0.172	10 (0.006)	0 (0, 0)	5 (3-8)	-
WBLeClerc_Trib2A	0.228	1.552	0.578 (76, 104)	0.08	7 (0.15)	0 (0, 0)	3 (3-4)	-
WBLeClerc_Trib2C	0.295	1.731	0.828 (31, 149)	-0.021	4 (0.871)	0 (0, 0)	32 (23-50)	-