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State of Washington

Addendum 1 to Quality Assurance Project Plan

Evaluation of Migration Behavior and Survival of Juvenile Steelhead in Satus Creek, Washington

January 2026

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Quality Assurance Project Plan

Evaluation of Migration Behavior and Survival of Juvenile Steelhead in Satus Creek, Washington

by Tobias Kock (USGS) and Kevin Haydon (Ecology)

January 2026

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EAP: Environmental Assessment Program

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Note: The numbered headings in this document correspond to the headings in the original QAPP. Only relevant sections are included here; therefore, some numbered headings may be missing.

1.0 Background and Project Description

Updated to reflect one-year delay in implementation and variability in number of fish tagged and fish tagged per year.

The Yakima River, in central Washington state, supports four distinct populations within the Yakima Major Population Group (part of the Middle Columbia River Steelhead Distinct Population Segment). These include Satus Creek, Toppenish Creek, Naches River, and Upper Yakima River populations. The Satus Creek population is noteworthy because Satus Creek and its tributaries spatially comprise approximately 9% of the Yakima River Basin but support the largest percentage of returning adult steelhead spawners during recent years.

Estimates from PIT tag detections during the 2019–2021 spawn years indicated that 64% of Yakima River adult steelhead were detected in Satus Creek. Overall, the number of returning adult steelhead to the Yakima River basin has been very low since 2017, which is consistent with other steelhead populations throughout the Columbia River basin. Previous studies have provided numerous insights into life history characteristics of Satus Creek steelhead. Adults primarily return to Satus Creek during December–April, peak spawning occurs during February and March, and emergence occurs during May and June. Juvenile steelhead spend 1–3 years in Satus Creek (age-1 is the predominant age class at migration) before out-migrating to the Pacific Ocean. Recent data (2019–2021) suggests that Satus Creek juvenile steelhead begin out-migrating in January, earlier than their counterparts from Toppenish Creek and the Naches River, and continue to do so through May each year.

Preliminary data suggests that outmigration survival within Satus Creek is very low based on survival estimates of approximately 20% from tagging locations in the upstream reaches to the PIT interrogation site located near the creek mouth. Factors that could be resulting in high mortality include degraded habitat resulting from overgrazing and predation from piscivorous fish (e.g., smallmouth bass, Northern pikeminnow) and birds (e.g., American white pelicans, Great blue herons). As a result of these factors, there is a need to evaluate and describe factors influencing survival of juvenile steelhead in Satus Creek and in the lower Yakima River.

A collaborative study design involving the U.S. Geological Survey, Yakama Nation Fisheries, and Washington Department of Ecology was developed to begin collecting data useful for assessing behavior and survival of juvenile steelhead in these stream reaches. The proposed study is a two-year effort that will primarily rely on radiotelemetry to monitor movements and survival of juvenile steelhead. Between 50 and 100 fish will be tagged during the study with 25-50 fish planned for 2026 and the remaining 25-50 fish planned for 2027. The study will focus on evaluating behavior in the lower 25 miles of Satus Creek and in the lower Yakima River (Figure 1).

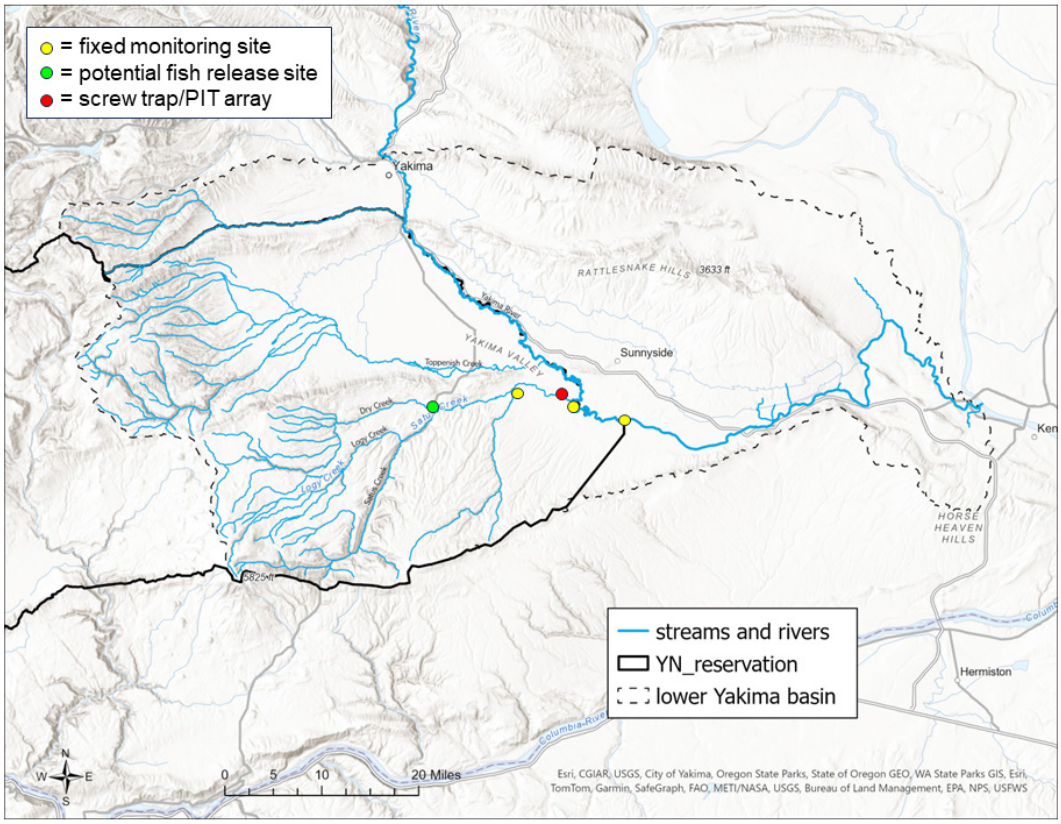


Figure 1. Study area map.

2.0 Organization and Schedule

Updated to reflect modified staffing support for the project, one-year delay in implementation, and variability in total number of fish tagged and fish tagged per year.

Principal Investigator

Toby Kock, Supervisory Research Fish Biologist, United States Geological Survey: 23 years of experience leading telemetry studies throughout the western United States. Toby has been leading telemetry studies in the Yakima Basin since 2012 evaluating juvenile and adult salmon behavior and survival. https://www.usgs.gov/staff-profiles/tobias-j-kock

Field Lead/Telemetry Expert

Brian Ekstrom, Fish Biologist, United States Geological Survey: 21 years of experience with telemetry studies throughout the western United States. https://www.usgs.gov/staff-profiles/brian-ekstrom

Fish Surgeon

Jamie Sprando, Fisheries Technician. United States Geological Survey: 24 years of experience leading fish tagging crews throughout the western United States. https://www.usgs.gov/staff-profiles/jamie-m-sprando

Data Analyst
Amy Hansen, Fish Biologist, United States Geological Survey: 24 years of experience analyzing telemetry datasets from studies conducted throughout the western United States. https://www.usgs.gov/staff-profiles/amy-c-hansen

Yakama Nation Fisheries Lead
Tim Resseguie, Fisheries Research Scientist IV, Yakama Nation Fisheries. 21 years of experience in the Satus Creek watershed working with rotary screw traps and PIT-tagging studies.

Ecology OCR QAPP Coordinator
McKenna Murray, Hydrogeologist, Washington Department of Ecology - Office of Columbia River. Provides review and feedback of draft QAPP Addendum, approves Final QAPP Addendum.

Ecology OCR Project Manager
Kevin Haydon, Senior Environmental Planner, Washington Department of Ecology - Office of Columbia River. Coordination of QAPP development and finalization. Coordinate with the project team for completion of deliverables, timelines, and budget.

Ecology QAPP Addendum Reviewer
Shawna Warehime, Environmental Planner, Washington Department of Ecology – Office of Columbia River. Coordination and review of QAPP Addendum development and finalization. Coordinate with the project team for completion of deliverables.

Anticipated Schedule
January 2026: mobilize telemetry stations and tagging equipment, tag and release 25-50 juvenile steelhead.

January 2026-March 2026: maintain telemetry stations, conduct mobile tracking, download data.

May 2026-September 2026: process Year 1 data, provide preliminary results to stakeholders, consider study design modifications to improve Year 2 study.

October 2026: mobilize telemetry stations and tagging equipment.

November-January 2026: tag and release 25-50 juvenile steelhead

October 2026-February 2027: maintain telemetry stations, conduct mobile tracking, download data.

March-December 2027: process Year 2 data, conduct multi-year analysis, provide preliminary results to stakeholders, prepare and complete final multi-year report.