

## **Characterizing Steelhead Spawning Patterns in the Klickitat River – New Results from Radio Telemetry and Genetic Investigations**

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**ABSTRACT:** A radio telemetry study conducted in the Klickitat River from 2009-2014 focused on characterizing steelhead patterns in the following areas: hatchery and wild spawner interactions; passage issues; rates of harvest, mortality, and other fates; and spawning and behavioral patterns between summer- and winter-run steelhead, as well as different genetic stock groups that enter the Klickitat subbasin. Fish were captured and radio-tagged at the Lyle Falls adult trap (at rivermile 2.4) and released there or just upstream; movements were then monitored via mobile tracking and fixed receivers at various sites in the Klickitat subbasin. Detection data were reviewed to determine fates, behavior, and spawning locations and spawn start/end dates where possible. Previously reported results focused on interactions between hatchery and wild steelhead spawners – hatchery steelhead generally spawned lower in the subbasin and earlier in time than wild steelhead. More recent analysis and incorporation of genetic information has yielded additional results for adipose-present (primarily wild) steelhead. Multiple genetic stock reporting groups entered the Klickitat subbasin, including native Klickitat (75.4%), Lower Columbia (4.6%), conglomerate Middle Columbia/Lower Snake River (7.7%), other Snake River (7.7%), and Yakima River and upper Columbia stocks (1.2% each). Fish that assigned to Skamania Hatchery stocks comprised 2.3% of the adipose-present radio-tagged steelhead. Run timing peaks of adipose-present steelhead occurred in March and August. A majority of fish from most of these genetic reporting groups stayed in the Klickitat and did not leave while being tracked. Majorities of the native Klickitat (59.4%), Lower Columbia (54.5%), Middle Columbia/Lower Snake (57.9%), and other Snake River (58.6%) stocks were determined to have spawned in the wild in the Klickitat subbasin. Native Klickitat stocks spawn throughout most areas of the subbasin, but in highest numbers in middle mainstem Klickitat River reaches and in the Little Klickitat and White Creek watersheds. Other Middle Columbia and Snake River stocks also spawn in fairly widespread areas. Winter-run steelhead spawned at a higher rate (72.2%) than summer-run steelhead (41.8%). Summer and winter steelhead showed fairly similar spawn timing patterns (with 86.0% starting in March-April) while winter steelhead may have a tendency to spawn in lower areas within the subbasin. These findings indicate there is likely substantial overlap in spawn timing and geographic area between summer and winter steelhead in the Klickitat (corroborating other recent genetic research), and that out-of-basin steelhead frequently use and even spawn within the Klickitat subbasin. Spawning in the mainstem Klickitat (especially between the Little Klickitat and White Creek) is also more prevalent than observed in previous monitoring efforts.