

Hood River Bull Trout Abundance and Life History

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18 December 2006**

Background and Study Focus

Bull trout in the Hood River basin are geographically restricted to two local populations. The Clear Branch local population occurs in Laurance Lake reservoir and tributaries upstream of Clear Branch Dam, and the Hood River local population is restricted to the mainstem Hood River and the Middle Fork Hood River downstream of the dam. The status of both populations is extremely precarious. The Clear Branch population is at risk of a random extinction event due to low numbers, isolation and limited spawning habitat (USFWS, 1998). The Hood River population is threatened by passage barriers, unscreened irrigation systems, impaired water quality and periodic siltation of spawning substrate by glacial outbursts.

Clear Branch bull trout are known to spawn in Clear Branch and Pinnacle Creek. Adult and juvenile life history of this local population has not been studied. Clear Branch Dam isolates this population by preventing upstream passage of adults and severely restricting downstream migration of juveniles. Depending on the water year, the Middle Fork Irrigation District (MFID) may not spill at all, or the timing of the spill may not coincide with the timing of downstream migration (East Fork Hood River and Middle Fork Hood River Watershed analysis). Adult bull trout tagged moving upstream at Powerdale Dam have been observed at the base of Clear Branch dam, suggesting that there may be spillover survivors homing back to Clear Branch. However, the link between Clear Branch spillover fish and the remnant fluvial life history present in the Hood River has not been determined. Entrainment of bull trout in the irrigation diversion at the base of Clear Branch Dam also has not been determined.

Spawning activity of the Hood River local population has been observed in a few tributaries within the Middle Fork Hood River and is thought to consist of less than 10 stream kilometers. Spawning has been observed in the Middle Fork Hood River, Bear Creek, Compass Creek and Coe Branch. However, Coe Branch and Compass Creek are glacial streams with a high volume of sand and silt which may compromise spawning success. The Middle Fork and mainstem Hood River provide foraging, migration and overwintering habitat. Hood River bull trout are also known to migrate into the Columbia River. Two bull trout tagged at the Powerdale Dam (RK 7.2 of mainstem Hood River) were recovered near Drano Lake in Washington State; and one was captured 11 kilometers downstream of the confluence of the Hood and Columbia Rivers. Every year

(usually between May and July), adult bull trout, presumably migrating upstream from the Columbia River, are captured and anchor-tagged at Powerdale Dam. Although some of these tagged fish have been observed upstream (one in Coe Branch and three below Clear Branch dam), the destination of fluvial adults within the Hood River basin is largely unknown.

Access to spawning and rearing areas is threatened by flow diversions with inadequate screening and passage facilities. Several structures are suspected to impede upstream migration or entrain juvenile and adult bull trout into irrigation works. These structures include the diversion at Clear Branch Dam (passage and screening), Eliot Branch (passage and screening), Coe Branch (passage and screening), and the Farmers Irrigation District diversion (screening) on the mainstem Hood River. However, little research has been conducted to assess the impacts of these structures on migrating bull trout.

Beyond a general knowledge of the distribution of bull trout in Hood River basin and the nature of anthropogenic factors that potentially restrict their connectivity, little is known about this recovery unit. The goal of our research is to gain a better understanding of the status and life history of bull trout in Hood River basin to aid in the management of this recovery unit. Specifically, we plan to determine the distribution and abundance of natal populations and investigate the link between migratory individuals captured at Powerdale dam, and elsewhere in the basin, to populations in natal headwater habitats. We will also investigate the extent that Hood River bull trout use the mainstem Columbia River and neighboring Columbia River tributaries. Finally, we will assess the impacts of selected irrigation systems on migrating subadult and adult bull trout. These objectives were initiated in 2006.

Summary of Initial Results

Distribution and Abundance of Natal Populations

An electrofishing mark-recapture population estimate was conducted in Clear Branch upstream of Laurance Lake reservoir during mid-July. It resulted in a Lincoln-Petersen population estimate of 513 bull trout \pm 61%. Of the 128 bull trout captured during the estimate, only 4 were larger than 200 mm indicating that stream-resident adults were rare in this population. .

Presence/absence electrofishing surveys on Eliot Branch, Coe Branch and its unnamed tributaries, and Compass Creek were conducted in April and May. Two bull trout were captured and PIT-tagged on Coe Branch between the mouth and the Coe hydroelectric/irrigation diversion and two were PIT-tagged in the first 500 meter upstream of the diversion. Otherwise, bull trout were not observed elsewhere on the distribution surveys.

Redd surveys on Clear Branch were conducted once a week from 9 August until 26 September when the first redd was observed. It was surveyed twice a week until we stopped observing new redds, which was 9 October. In total, 16 redds were observed in upper Clear Branch, 4 of which were counted downstream of our traps. Median length and width of the pocket and mound was 65 cm and 35 cm. Pinnacle Creek redd surveys were done on the same schedule and were started on 28 July. Four redds were observed on Pinnacle Creek, two of which were downstream of the traps. The first redd was seen on 25 September and the last on 9 October. Bull trout in Pinnacle Creek and Clear Branch each constructed a redd in stream area exposed by lowered reservoir levels. Both of these redds were inundated again and under at least one meter of standing water by early November.

Exploratory redds surveys included the Middle Fork tributaries of Tony Creek, Bear Creek, Squeegie Creek, Compass Creek, Coe Branch and one of its unnamed tributaries, Green Point Creek, and Boomer Creek; the West Fork tributaries of McGee Creek and Elk Creek; and the East Fork tributary Cold Springs Creek. No bull trout redds were observed during exploratory surveys.

Movement and Life history

We installed and operated a downstream-migrant trap located on Upper Clear Branch about 300 m upstream of Lake Laurance reservoir. It began fishing 50% of the stream on 24 May. Weir panels were added as the spring flows subsided and the trap fished 100% of the stream by 7 July. The trap was removed on 17 October. In total, 164 bull trout (including recaptures) were caught moving downstream into this trap; 136 juvenile bull trout were caught, averaging 129 mm fork length (range, 88-176 mm); and 124 bull trout (>100 mm) were PIT-tagged.

The Upper Clear Branch upstream-migrant trap was installed on 7 July and fished the entire stream until it was removed on 20 October. This trap caught 27 adult bull trout migrating upstream to spawn. The mean fork length was 293 mm (range, 202-545 mm).

Pinnacle Creek traps were installed about the same time as the upper Clear Branch traps. The downstream-migrant trap caught 31 juvenile bull trout with mean fork length of 100 mm (range, 83-131 mm) and 1 adult of 290 mm. This adult was captured moving downstream on 20 September, during the same week that the first redd was observed 200 m upstream of the trap. The upstream-migrant trap caught one adult (228 mm FL) on 16 October.

At the Powerdale Dam upstream-migrant trap, four bull trout were captured and PIT-tagged by ODFW district crew members between 22 May and 16 June. These fish averaged 515 mm FL (range, 380-580 mm). Traps downstream of the dam and Lake Laurance reservoir on Clear Branch were installed on 2 June and removed on 12 October. The upstream-migrant trap, located about 150 m

downstream of the dam, caught one adult bull trout (380 mm) on 11 September. This fish had been captured and PIT-tagged at Powerdale Dam upstream-migrant trap on 16 June. The downstream-migrant trap did not catch any fish.

Three (of the four) bull trout captured between 22 May and 16 June and PIT-tagged at the Powerdale Dam trap were recorded 11 km upstream at the Middle Fork Hood River PIT-tag reader near Dee between 29 June and 29 July. Travel time for these fish was 27, 38, and 44 days. One of these PIT-tagged fish was captured about 16 km upstream 44 days later at the lower Clear Branch upstream-migrant trap.

Entrainment at the Coe Branch Diversion

At the Coe Diversion PIT-tag reader, three bull trout were detected during the season. They were PIT-tagged during distribution surveys on Coe Branch. No bull trout ascended the fish ladder at the Coe Diversion, but one bull trout PIT-tagged upstream of the diversion was detected occasionally at the PIT-tag arrays downstream of the diversion. One *O. mykiss* (177 mm FL) tagged downstream of the diversion apparently did pass over the Coe diversion because it was detected moving downstream through the antenna arrays and was frequently detected at the two downstream antenna arrays.

Additional References

- Hood River Watershed Group (HRWG). 1999. Hood River Watershed Assessment. Hood River Watershed Group and Hood River Soil & Water Conservation District. Hood River, OR.
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- US Fish and Wildlife Service (USFWS). 2002. Bull trout (*Salvelinus confluentus*) draft recovery plan. Portland, OR.