Imnaha Bull Trout

Existing Populations

The Imnaha Bull Trout SMU is comprised of four populations, none of which are considered extinct (Table 1). Population delineation is defined based on geographical, physical, and thermal isolation of the spawning distribution of each population and populations are the same as those identified in the Imnaha-Snake Rivers Chapter of the Bull Trout Draft Recovery Plan (USFWS 2004), Buchanan et al. (1997), and Ratliff and Howell (1992).

Table 1. Populations, existence status, and life history of the Imnaha Bull Trout SMU.

Exist	Population	Description	Life History
Yes	Imnaha	Imnaha River above Sheep Creek.	Resident /Migratory
Yes	Big Sheep	Big Sheep Creek and tributaries.	Resident /Migratory
Yes	Little Sheep	Little Sheep Creek and tributaries.	Resident /Migratory
Yes	McCully	McCully Creek above WVI canal.	Resident

It is unknown if bull trout naturally exist in Little Sheep Creek. The Wallowa Valley Improvement Canal (WVI), constructed in the 1880s, transports water from Big Sheep, Salt, Little Sheep, and McCully creeks to Prairie Creek in the Wallowa River basin for irrigation purposes. The Little Sheep bull trout population may have been established from the delivery of water and fish from Big Sheep Creek via the WVI canal (B. Knox, ODFW Enterprise Field Office, personal communication). For the purpose of this review, Little Sheep is treated as a current existing population.

Two additional populations, Sheep and Granite, exist on the Idaho side of the Snake River and are in close proximity to the Imnaha River populations. Intermixing among all populations potentially exists but has not been documented. Sheep and Granite populations are not assessed in this status review.

Distribution

Although historical distribution is undocumented, it is believed that current distribution of bull trout in the Imnaha basin reflects the historical distribution (USFWS 2004, Buchanan et al. 1997). However, the historical summer distribution likely extended further downstream than it does today. Currently, bull trout utilize the entire Imnaha River and the Big Sheep Creek system. Adult bull trout overwinter and rear in the lower reaches of the Imnaha River, downstream of Summit Creek, and in the Snake River. Spawning and resident distribution occurs in headwater reaches of each population.

Analysis of the distribution criterion is based on 1:100,000 GIS hydrography of bull trout distribution (Hanson 2001, Buchanan et al. 1997) and information summarized in the Bull Trout Draft Recovery Plan (USFWS 2004). These data are primarily based on summer distribution sampling that often represents the most restricted distribution. A population fails the criterion if the spawning and resident distribution is: 1) less than ten km, 2) not connected to other populations, or 3) occupies less than 50% of the historical distribution when historical distribution data are denoted on GIS. In basins where the GIS hydrography does not depict historical distribution, the results show populations occupy 100% of their historical range. Though this is likely accurate for Imnaha River bull trout, these results should be interpreted

with caution since historical data are not always available. Two of the four populations fail the distribution criterion (Table 2).

Table 2. Distribution data used to evaluate Imnaha bull trout populations.

Population	Spawning Distribution (km)	% of Historical	Connected to Other Pops.	Pass/Fail
Imnaha	75.3	100	Yes	Pass
Big Sheep	31.5	100	Yes/No	Pass
Little Sheep	6.5	60	Yes/No	Fail
McCully	10.8	100	No	Fail

The Wallowa Valley Improvement canal dramatically affects the distribution of bull trout in Big Sheep, Little Sheep and McCully populations. Diversions for the WVI canal in each creek allow bull trout to move downstream but prevent any upstream movement. The canal is not screened and has the potential to capture bull trout from all streams it bisects (Buchanan et al. 1997).

Spawning and resident distribution of the Little Sheep population is limited to a total of 6.5 km which includes the lower reaches of Cabin and Redmont creeks. In addition to being restricted, the distribution is bisected by the WVI Canal. Fish can move downstream past the diversion but are unable to move upstream (USFWS 2004). Because of these factors Little Sheep fails the distribution criterion.

The McCully population fails the distribution criterion because it is isolated upstream of the WVI canal. The upstream barrier created by the WVI canal diversion prohibits the expression of a migratory life history and mixing with other populations. As an isolated population, this group is at greater risk of extinction due to stochastic events.

Abundance

Few data are available to adequately assess the abundance of bull trout in the Imnaha SMU. Data that are available were either collected more than ten years ago in 1992 or are better used to describe relative abundance and population trend. In the absence of quantified and current estimates of abundance, best guess estimates are based on the 1992 density estimates, recent field observations, and professional judgment (Table 3). Populations of bull trout with fewer than 100 spawning adults are considered at risk of inbreeding and fail the interim risk criteria. The sum of interconnected populations also must exceed 1,000 adults to avoid risk of genetic drift (Rieman and Allendorf 2001). Thus an SMU or an isolated population must total greater than 1,000 reproductive adults in order to pass this criterion.

Table 3. Estimated adult abundance of Imnaha bull trout populations (ODFW, Enterprise Fish District, unpublished data).

Population	Estimated Adult Abundance	Pass/Fail
Imnaha	2,000	Pass
Big Sheep	> 300	Pass
Little Sheep	--	Fail
McCully	> 300	Pass

-- *Data not available*

The Imnaha population is one of the most abundant and viable in Oregon. Based on redd counts, weir trap data, and creel information, the Imnaha-Snake Rivers Bull Trout Recovery Team estimates the entire SMU to contain approximately 4,000 adults, a majority of which reside in

the Imnaha River population (USFWS 2004). This population is estimated to contain at least 2,000 adult bull trout, and passes the abundance criterion.

The only measures of abundance in Big Sheep and McCully populations were density estimates collected more than ten years ago in 1992. Based on these data the number of adult bull trout in each population is estimated to be greater than 300 individuals. Field observations made since then indicate current densities have remained similar to those recorded in 1992 (B. Knox, ODFW Enterprise Fish District, personal communication). Evidence does not exist to suggest significant changes in abundance and productivity have occurred since. Both populations pass the abundance criterion.

Although estimates of abundance for the Little Sheep population are not available, it failed the abundance criterion because bull trout were found during presence/absence surveys in 1991, but not in 1992 (USFWS 2004). Buchanan et al. (1997) considers the Little Sheep population at a "high risk of extinction". There is no evidence to suggest this population should pass the abundance criterion.

Productivity

Data are not available to quantitatively assess productivity and the intrinsic rate of population increase for bull trout in the Imnaha SMU. In the absence of these data the assessment of the productivity criterion is based on distribution and abundance, connectivity, life history, habitat quality, and presence of non-native species. A population passes the criterion if it is widely distributed and relatively abundant or if there are indications of an increasing or stable trend in abundance. These qualities suggest populations are minimally able to sustain current abundance. The presence of a migratory life history and connectivity between populations and habitat also increases the probability of a population sustaining itself. The presence of non-native species or significant habitat degradation may negatively affect productivity and cause a population to fail the criterion if it is limited in other factors.

Only the Little Sheep population fails the productivity criterion due to an extremely limited distribution and low abundance (Table 4). The level of productivity of this population is not likely high enough to replace itself each year. Imnaha, McCully, and Big Sheep populations pass the criterion.

Table 4. Factors considered in the assessment of the productivity criterion of Imnaha bull trout.

Population	Factors	Pass/Fail
Imnaha	Extremely abundant and widely distributed; spawning distribution within designated wilderness; express a migratory life history.	Pass
Big Sheep	Abundance and distribution appears adequate though population bisected by the WVI canal; spawning areas partially within designated wilderness; express a migratory life history.	Pass
Little Sheep	Restricted distribution and extremely low abundance; limited expression of a migratory life history; habitat impacted by 1992 forest fire (Buchanan et al. 1997).	Fail
McCully	Isolated population though abundance and density appear high (USFWS 2004); resident life history; population likely self-sustaining.	Pass

Reproductive Independence

All populations in the Imnaha Bull Trout SMU are native fish sustained by natural production and pass the reproductive independence criterion. Hatchery bull trout programs do not currently exist in Oregon.

Hybridization

Brook trout are not known to occur in the Imnaha River basin, and thus hybridization is not a threat to populations in the SMU. All populations pass the hybridization criterion.

Assessment Conclusions

The Imnaha Bull Trout SMU includes four populations in the Imnaha River basin. Two additional populations occur in close proximity on the Idaho side of the Snake River. Potential of intermixing between all populations exists, but has not been documented. Distribution of McCully, Little Sheep, and Big Sheep populations is negatively impacted by irrigation diversions and barriers to movement. Even though the SMU is classified as 'at risk', passing only three of the six criteria (Figure 1), the Imnaha population is considered one of the most abundant and viable in Oregon. Limited data sets and inferences from other information for populations in this SMU provide a qualified level of confidence in the assessment of the interim criteria.

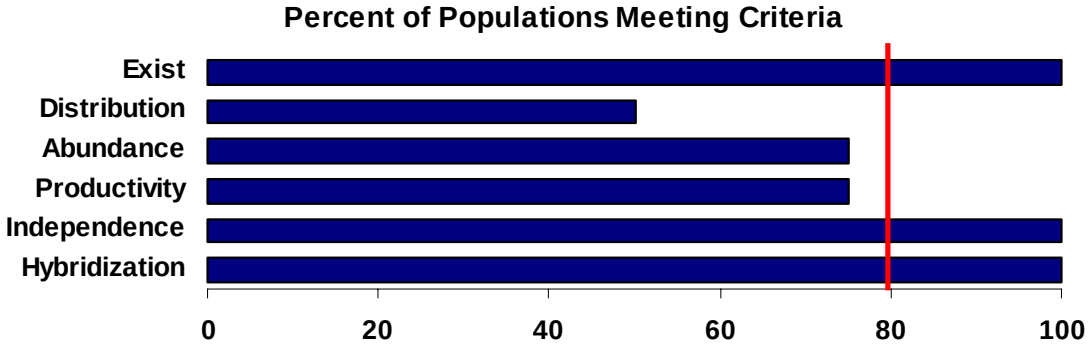

Figure 1. Assessment outcome for each of the six interim criteria with respect to the 80% threshold identified by the NFCP.