Malheur River Bull Trout

Existing Populations

The Malheur River Bull Trout SMU is comprised of two populations, North Fork Malheur and Upper Malheur (Table 1). Populations are identified according to those defined in the Malheur River Chapter of the Bull Trout Draft Recovery Plan (USFWS 2004), Buchanan et al. (1997), and Ratliff and Howell (1992). Bull trout in both populations express resident and migratory life history strategies (Buchanan et al. 1997).

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

Exist	Population	Description	Life History
Yes	North Fork Malheur	NF Malheur River and tributaries, incl. Crane, Sheep and Swamp creeks.	Resident / Migratory
Yes	Upper Malheur	Upper Malheur River and tributaries, incl. Big and Lake creeks.	Resident / Migratory

Distribution

Analysis of the distribution criterion is based on 1:100,000 GIS hydrography of bull trout distribution (Hanson 2001, Buchanan et al. 1997). These data are primarily based on summer distribution sampling that often represent the most restricted distribution. A population fails the criterion if spawning and juvenile rearing 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 (Table 2).

Historically, bull trout were thought to utilize the entire Malheur River downstream to the Snake River. Summer and spawning habitat is assumed to have included most of the upper basin tributaries in the upper mainstem and North Fork basins (Buchanan et al. 1997, USFWS 2004). In 1919 Warm Springs Dam was built on the mainstem Malheur River creating Warm Springs Reservoir. Agency Dam was constructed in 1934 on the North Fork Malheur River creating Beulah Reservoir. Both dams were constructed for irrigation and flood control purposes and neither provided fish passage (USFWS 2004).

Distribution in the North Fork Malheur River has remained unchanged since bull trout were first documented in the basin in 1955 (Buchanan et al. 1997). Currently in the North Fork Malheur bull trout are present in and upstream of Beulah Reservoir including most upper basin tributaries. Spawning, juvenile rearing, and adult resident bull trout exist in Horseshoe, Swamp, Sheep, Elk, Little Crane, and Flat creeks. Migratory bull trout overwinter in Beulah Reservoir and river reaches upstream of the reservoir, and move to the upper basin to spawn.

Bull trout in the Upper Malheur population are distributed upstream of the confluence with Wolf Creek, including many of the upper basin tributaries. Spawning, juvenile rearing, and resident adult distribution includes Snowshoe, Meadow Fork, Big, and Lake creeks. Bull trout are not documented in Warm Springs Reservoir, however it may provide suitable overwinter habitat.

Given that Agency and Warm Springs dams do not provide passage, bull trout populations in the Malheur River SMU are reproductively isolated. Gene flow between populations is not possible. Even though spawning distribution is relatively extensive compared to other populations in Oregon, both populations fail the distribution criterion due to the lack of connectivity (Table 2).

Table 2. Distribution data used to evaluate Malheur River bull trout populations.

Population	Spawning Distribution (km)	% of Historical	Connected to Other Pops.	Pass/Fail
North Fork Malheur	101.6	100	No	Fail
Upper Malheur	54	54	No	Fail

Abundance

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.

Few data are available to provide a rigorous estimate of abundance. Instead abundance is inferred from census redd counts. Standardized annual spawning surveys have been conducted in the North Fork Malheur since 1996 (USFWS 2004). Abundance of bull trout in this population is estimated at 202 adults using the average of 1996-2004 redd counts (USFWS 2004, ODFW, Vale District Office, unpublished data) and an expansion factor of 2.3 fish per redd (Ratliff et al. 1996, Dunham et al. 2001) (Table 3). This population is not likely at risk of inbreeding.

Annual redd surveys have occurred in the Upper Malheur population since 1998, however, the presence of brook trout complicates redd counts. Identification of the species associated with an unoccupied redd is not possible. A redd cannot be positively identified as that of a bull trout unless bull trout are observed building the nest. Thus, use of these data to estimate bull trout abundance is unfeasible. Other data necessary to estimate abundance of bull trout in the Upper Malheur population are not available or do not represent current status (i.e. > 10 year old population estimates). Field observations reflect that bull trout densities are relatively low, except in Meadow Fork of Big Creek, which is an apparent stronghold in the population (T. Walters, ODFW Malheur Watershed District Office, personal communication).

Table 3. Estimated adult abundance of Malheur River bull trout populations.

Population	Estimated Adult Abundance	Pass/Fail
North Fork Malheur	202	Fail
Upper Malheur	--	Fail

-- *Data unavailable.*

Given the Malheur River SMU populations are reproductively isolated, each population must exceed 1,000 adults to avoid the deleterious effects of genetic drift. The USFWS Malheur River Bull Trout Recovery Team estimated fewer than 1,000 adult bull trout occupied the SMU (USFWS 2004). Thus neither population exceeds 1,000 adults and both are considered at risk of the deleterious effects of genetic drift. Both populations fail the abundance criterion.

Productivity

The assessment of the productivity criterion is based on trends of abundance over the past five years. A population passes the productivity criterion if the trend in abundance appears stable or increasing. A decreasing trend in abundance is cause for a population to fail the productivity criterion. Trends in abundance for the Malheur River SMU populations are evaluated using standardized census redd counts. This review recognizes the difficulties associated with

characterizing population trend using redd counts given the inherent variability in redd detection and sources of statistical error (Dunham et al. 2001, Maxell 1999, Rieman and Meyers 1997). The evaluation of the productivity criterion based on apparent population trend is subject to uncertainty and made with caution.

Standardized redd counts in the North Fork Malheur population began in 1996. Redd counts have declined since 2000, though recent redd counts are greater than those in 1996 (Figure 1). Given the recent trends in redd counts the populations fails the productivity criterion until productivity can be thoroughly evaluated.

Data appropriate to assess the Upper Malheur population are not available since redd counts are confounded by fall spawning brook trout. In the absence of these data the population is considered to fail the criterion due to low abundance, an isolated and fragmented spawning distribution, and the presence of a large population of brook trout. Migratory bull trout are present in the population but are not likely numerous enough to compensate for the negative impacts of the other factors.

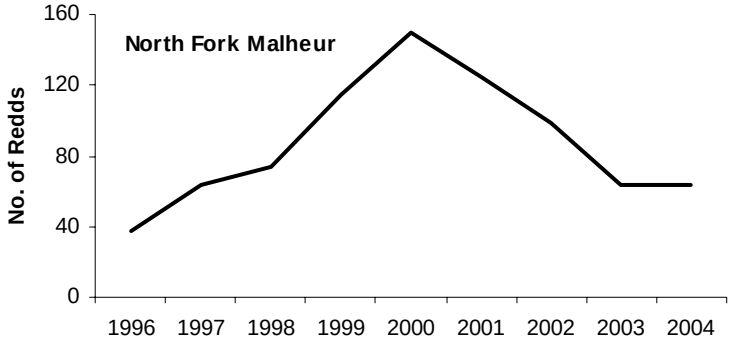

Figure 1. Trends in redd counts for North Fork Malheur population

Reproductive Independence

All populations in the Malheur River Bull Trout SMU are native fish sustained by natural production and pass the reproductive independence criterion.

Hybridization

A population is considered to pass the hybridization criterion if brook trout x bull trout hybrids are rare or non-existent. For populations in the Malheur River SMU, the degree of hybridization is not quantified, but professional judgment and the frequency of hybrids encountered during sampling provides a general indication. In cases where little or no information is available, and bull trout and brook trout are sympatric, this review assumes hybrids are common.

Stocking of brook trout in the Malheur River basin was first recorded in the late 1920s and 1930s (ODFW stocking records). Some brook trout releases resulted in self-sustaining populations. Currently brook trout are present and abundant in streams in the Upper Malheur population where bull trout x brook trout hybrids are common (ODFW, unpublished data). This population fails the hybridization criterion (Table 4). Brook trout are not present in the North Fork Malheur River.

Table 4. Occurrence of brook trout and hybridization for Malheur River bull trout populations.

Population	Brook Trout	Pass/Fail
North Fork Malheur	No	Pass
Upper Malheur	Yes	Fail

Assessment Conclusions

The Malheur River Bull Trout SMU consists of two populations, North Fork Malheur and Upper Malheur. Current spawning distribution is widespread, though fragmented, in headwater streams, and both populations are isolated from each other and other Snake River populations by impassable dams on the Malheur and North Fork Malheur Rivers. Brook trout are present and abundant in the Upper Malheur population and likely diminish the productivity of bull trout. The SMU met two of the six interim criteria and is classified as "at risk" (Figure 2). 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.

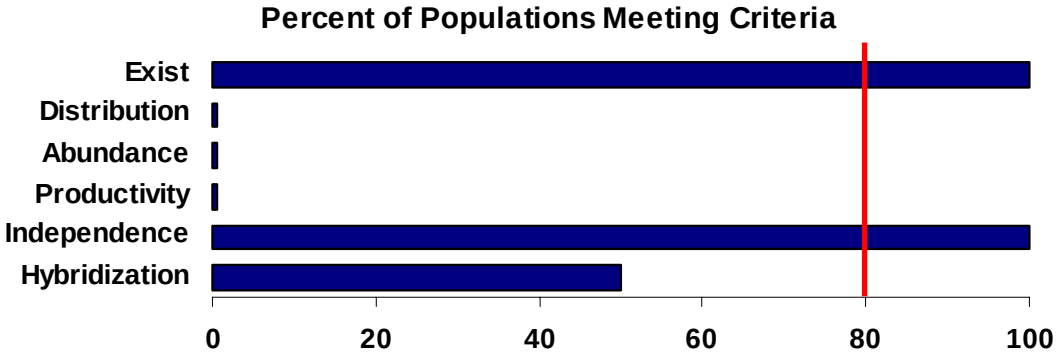

Figure 2. Assessment outcome for each of the six interim criteria with respect to the 80% threshold identified by the NFCP.