Quinn River Lahontan Cutthroat Trout

Existing Populations

Lahontan cutthroat trout populations in the Quinn River basin are remnant of a larger population inhabiting pluvial Lake Lahontan during the Pleistocene era. The Quinn River Lahontan Cutthroat Trout SMU is comprised of four populations (Table 1). The McDermitt, Tenmile, and Oregon Canyon populations are considered extinct due to hybridization and introgression with non-native hatchery rainbow trout (Coffin and Cowan 1995, Bowers *et al.* 1994, ODFW Aquatic Inventory Project, unpublished data, R. Perkins, ODFW Ontario Field Office, personal communication). The McDermitt population was also subject to strong competition with brook trout in the headwater reaches and brown trout in the lower reaches. Lahontan cutthroat trout in the Sage population are isolated above a man-made partial barrier and express a resident life history strategy.

Table 1. Populations, existence status, and life history of the Quinn River Lahontan Cutthroat Trout SMU.

Exist	Population	Description	Life History
No	McDermitt	McDermitt, Cottonwood, Payne, Indian creeks , Riser creek and tributaries	--
No	Tenmile	Tenmile Creek	--
Yes	Sage	Sage and Line Canyon Creeks	Resident
No	Oregon Canyon	Oregon Canyon Creek	--

Lahontan cutthroat trout from Sage Creek were transplanted into Tenmile Creek as a conservation measure. Since then they have hybridized with rainbow trout and pure Lahontan cutthroat trout no longer exist in Tenmile (R. Perkins, ODFW Ontario field office, pers. Comm..). Cutthroat trout were also introduced in Indian Creek (McDermitt population) in 1980 and 1981 (Hanson *et al.* 1993). Recent population surveys found cutthroat trout x rainbow trout hybrids in upper Indian Creek. Pure Lahontan cutthroat trout were not found and are considered extinct (ODFW Aquatic Inventory Project, unpublished data; M. Peacock and L. Briggs, University of Nevada, Reno, unpublished data).

Pure Lahontan cutthroat trout from Sage and Line Canyon creeks were introduced into Corral Canyon Creek (NV) as a conservation measure, to prevent the loss of the last population of pure Lahontan cutthroat trout in the basin, and to spread the risk of extinction.

Lahontan cutthroat trout are present in seven creeks in the Quinn River basin in Nevada; Washburn, Crowley, Eight-mile, South Fork Flat, Rebel, and Rock creeks, and the East Fork Quinn River. Status of these populations is not evaluated in this review.

Distribution

Analysis of the distribution criterion is based on 1:100,000 GIS hydrography of Lahontan cutthroat trout distribution developed by ODFW (Hanson 1999). A population fails the criterion if distribution is: 1) less than ten km or 2) not connected to other populations.

Distribution of Lahontan cutthroat trout in the Oregon portion of the Quinn River Basin is limited to 15 km in Sage and Line Canyon creeks (Table 2). The Sage population is isolated above a man-made barrier intended to slow the invasion of introduced rainbow trout and other non-native species (ODFW unpublished data). The initial barrier was not as much a vertical

structure, as a myriad of irrigation networks and channels that were difficult for fish to negotiate. Strategically placed boulders in a steep cascade were also thought to make passage challenging for trout. In 2002 the NW DPS Recovery Team installed a full spanning gabion barrier. The purpose of the barriers is to prolong the invasion of rainbow trout long enough to implement a sound and effective conservation plan. Given the isolated nature of the Sage population and its inability to mix with other populations, it fails the distribution criterion.

Table 2. Distribution data used to evaluate Quinn River Lahontan cutthroat trout populations.

Population	Distribution (km)	Connected to Other Pops.	Pass/Fail
McDermitt	*Extinct population*		
Tenmile	*Extinct population*		
Sage	15.4	No	Fail
Oregon Canyon	*Extinct population*		

Abundance

The abundance criterion was evaluated according to the number of reproductive adults present in each population. For the purposes of this review, populations with fewer than 50 adults fail the interim criterion. The sum of interconnected populations also must exceed 500 adults to avoid the risk of genetic drift. Thus an SMU or an isolated population must exceed 500 adults in order to pass the abundance criterion.

In 1992 Nevada Department of Wildlife reported estimates of 50 Lahontan cutthroat trout in each of Sage and Line Canyon creeks (Hanson et al. 1993).

In 1996 ODFW conducted a population survey to estimate abundance of Lahontan cutthroat trout in the McDermitt Creek basin using a stratified, systematic sample design (ODFW Aquatic Inventory Project, unpublished data). Lahontan cutthroat trout were detected only in Sage and Line Canyon creeks above a man-made barrier. The population was estimated at 7,340 (+\- 12%) age 0+ fish and 1,790 (+\- 20%) 1+ fish. For the purposes of this review, cutthroat trout age three years and greater are considered reproductive adults. Based on a length frequency distribution, fish age three years and greater comprised 11% of the population. Given that the number of adults was estimated to be fewer than 500 adults, the Sage population fails the abundance criterion (Table 3).

Table 3. Estimated adult abundance of Quinn River Lahontan cutthroat trout populations (ODFW Aquatic Inventory Project, unpublished data).

Population	Estimated Adult Abundance	Pass/Fail
McDermitt	*Extinct population*	
Tenmile	*Extinct population*	
Sage	197	Fail
Oregon Canyon	*Extinct population*	

Productivity

Data available to appropriately evaluate the productivity criterion are insufficient. Data are not available to quantitatively assess productivity and the intrinsic potential population increase for redband trout in the Quinn River SMU. In the absence of these data a qualitative assessment of the productivity criterion is based on distribution and abundance, connectivity, life history, habitat quality, and presence of non-native species. For the purposes of this review, current distribution and abundance is treated as an indication of past population trend. A population that

is widely distributed and exhibits high densities is assumed to have minimally rebounded from past drought or disturbance events. Connectivity to a diversity of high quality habitats capable of supporting multiple life history during extreme environmental conditions enables populations to rebound quickly. The expression of a migratory life history can produce large, highly fecund adults that further increases the intrinsic productivity. Thus, a population passes the criterion if it is 1) connected to habitat capable of supporting multiple life histories and/or serving as refuge during periods of environment constraint, 2) widely distributed, and 3) relatively abundant. A population may also pass the criterion if data indicate an increasing or stable trend in abundance. These qualities suggest populations are resilient and minimally able to rebound rapidly after periods of low abundance. This assessment, however, does not attempt to describe the degree to which populations may rebound. A population may pass the productivity criterion and not attain total abundance equivalent or greater than that prior to the previous low period. The presence of non-native species, hatchery fish, or significant habitat degradation may negatively affect productivity and cause a population to fail the criterion.

Although productivity appears to be adequate for the population to persist through drought years, the productivity of the Sage population is likely limited by poor habitat quality, inbreeding depression, absence of a migratory life history, and isolation (Coffin and Cowan 1995).

Table 4. Factors influencing productivity of Quinn River SMU cutthroat trout populations.

Population	Factors	Pass/Fail
McDermitt	*Extinct Population*	
Tenmile	*Extinct Population*	
Sage	Extremely limited distribution and abundance; poor habitat quality; lack of migratory life history; isolated; possible inbreeding depression (USFWS 1995).	Fail
Oregon Canyon	*Extinct Population*	

Reproductive Independence

Populations of Lahontan cutthroat trout in the Sage population are native fish sustained by natural production. There are no documented stocking events. The Sage population passes the reproductive independence criterion.

Hybridization

Hybridization with rainbow trout disrupts important long-term adaptations of cutthroat trout (Lundquist and Allendorf 2002) and is considered a significant threat to Lahontan cutthroat trout populations. Introduced hatchery rainbow trout and cutthroat trout x rainbow trout hybrids are prevalent in the McDermitt Creek basin (ODFW Aquatic Inventory Project, unpublished data). Hybridization with rainbow trout is the primary cause of extinction of pure Lahontan cutthroat trout in Tenmile, McDermitt, and Oregon Canyon populations (Hanson et al. 1993, R. Perkins, ODFW Ontario Field Office, personal communication).

A man-made barrier on Sage Creek was designed to slow the invasion of non-native rainbow trout. Genetic analysis of fish captured in Sage and Line Canyon creeks documented 20% of the samples in Sage Creek were cutthroat trout x rainbow trout hybrids. Samples from Line Canyon were all pure Lahontan Cutthroat trout (M. Peacock and L. Briggs, University of Nevada, Reno, unpublished data). Any degree of hybridization is considered a significant impact given the small population size of the pure cutthroat trout in the SMU. The Sage population fails the hybridization criterion.

Assessment Conclusions

Lahontan cutthroat trout populations in the Quinn River basin are remnants of a larger population inhabiting pluvial Lake Lahontan during the Pleistocene era. The Quinn River Lahontan Cutthroat Trout SMU is comprised of four populations, three of which are now extinct due to hybridization with non-native rainbow trout. Sage Creek is the only population to persist in the SMU, has an extremely limited distribution and abundance, and is vulnerable to hybridization. The population is located above a barrier designed to slow the invasion of rainbow and hybrid trout. Eight populations exist in Nevada and are not evaluated in this review. The SMU meets one of the six interim criteria and is classified as 'at risk'(Figure 1). 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.

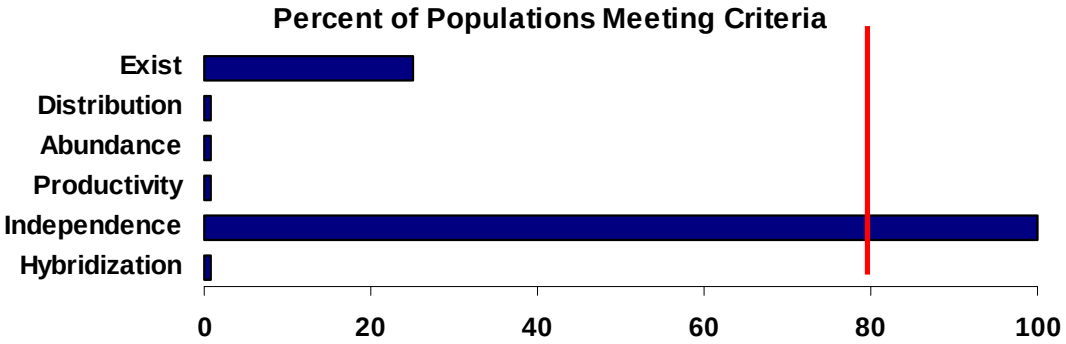

Figure 1. Assessment outcome for each of the six interim criteria with respect to the 80% threshold identified by the NFCP.