Coyote Lake Lahontan Cutthroat Trout

Existing Populations

Lahontan cutthroat trout populations in the Coyote Lakes basin are remnant of a larger population inhabiting pluvial Lake Lahontan during the Pleistocene era. Hydrologic access routes of founding cutthroat trout from Lake Lahontan basin into the Coyote Lakes basin have yet to be described (Coffin and Cowan 1995). The Coyote Lake Lahontan Cutthroat Trout SMU is comprised of five populations (Table 1). All populations express a resident life history strategy; however large individuals in the Willow and Whitehorse Complex populations suggest a migratory component may exist.

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

Exist	Population	Description	Life History
Yes	Willow	Willow Creek and tributaries.	Resident / Migratory
Yes	Whitehorse Complex	Whitehorse and Little Whitehorse Creeks, and tributaries.	Resident / Migratory
Yes	Doolittle	Doolittle Creek above barrier.	Resident
Yes	Cottonwood	Cottonwood Creek above barrier.	Resident
Yes	Antelope	Antelope Creek.	Resident

Lahontan cutthroat trout from Willow and Whitehorse creeks were transplanted into Cottonwood Creek in 1971 and 1980, and into Antelope Creek in 1972 (Hanson et al. 1993). Whether Lahontan cutthroat trout were present in these creeks prior to stocking activities is disputed (Behnke 1992, Hanson et al. 1993, Coffin and Cowan 1995, K. Jones, ODFW Research Biologist, Corvallis, OR personal communication). For the purpose of this review these populations are considered native. Lahontan cutthroat trout were also transplanted into Fifteenmile Creek above a natural barrier (Hanson et al. 1993), but they did not establish a self-sustaining population (ODFW Aquatic Inventory Project, unpublished data).

Nine naturalized populations exist in Pike, Little Alvord, Big Alvord, Cottonwood, Willow Mosquito, and Little McCoy creeks in the Alvord Lake Basin, and Denio and VanHorn Creeks in the Pueblo Valley basin. These populations were established through translocations from Willow and Whitehorse creeks between 1970 and 1981 for conservation purposes. A naturalized population in Guano Creek in the Catlow Valley basin was established in 1957 with Lahontan cutthroat trout collected from Willow Creek in 1955 and reared at Wallowa Hatchery. Lahontan cutthroat trout stocks from California were also stocked in Guano Creek (T, Walters, ODFW Malheur Watershed District Office, personal communication). These naturalized populations are 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 or large rivers and migratory corridors.

Populations within the Coyote Lake Lahontan Cutthroat Trout SMU are naturally isolated. Historically Willow, Antelope, and Whitehorse creeks flowed into pluvial Coyote Lake. These stream systems are no longer connected due to desiccation of the lake, a drier climate, and irrigation diversions and withdrawal. Currently Willow, Antelope, and Whitehorse creeks dry up

prior to the Coyote Lake sink (Kostow 1995), however it is unknown if Willow and Whitehorse creeks connect during consecutive high water years. Geologic barriers to upstream fish migration exist in Cottonwood and Doolittle creeks isolating populations upstream of the barriers (Jones et al. 1998). A 3-m-high headcut in lower Willow Creek may act as a barrier to upstream migration and is considered a recent feature caused by anthropogenic factors (K. Jones, ODFW Research Biologist, Corvallis OR, personal communication). Willow, Antelope, Cottonwood, and Doolittle populations fail the distribution criterion due to a lack of connection to other populations (Table 2). Fish in Doolittle and Cottonwood can potentially move downstream over the barriers and mix with the Whitehorse population, therefore the Whitehorse population is not considered isolated. The Antelope and Cottonwood populations are distributed over less than ten km, and are at extreme risk of extinction due to stochastic events.

Table 2. Distribution data used to evaluate Coyote Lake Lahontan cutthroat trout populations.

Population	Distribution (km)	Connected to other pops.	Pass/Fail
Willow	37.1	No	Fail
Whitehorse Complex	55.5	Yes	Pass
Doolittle	12.3	No	Fail
Cottonwood	2.5*	No	Fail
Antelope	6.9	No	Fail

** based in 1999 population surveys.*

Abundance

The abundance criterion was evaluated according to the number of reproductive adults present in each population. 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.

Coyote Lake Lahontan cutthroat trout abundance has been estimated every five years since 1985 (Hanson *et al.* 1993, Jones et al. 1998, ODFW unpublished data). All population surveys estimated the number of age 1 and older fish in each population. For the purposes of this review cutthroat trout age three years and greater were considered reproductive adults and calculated as approximately 7% of the age 1+ population (Jones et al. 1998). The evaluation of the abundance criterion was based on the most recent population estimate (Table 3). The 1989 Whitehorse Complex population estimate includes Doolittle and Cottonwood populations.

Table 3. Estimated adult abundance of Coyote Lake Lahontan cutthroat trout populations (Hanson et al. 1993, Jones et al. 1998, ODFW unpublished data)

	Number of Adults			
Population	1989	1994	1999	Pass / Fail
Willow	147	649	853	Pass
Whitehorse Complex	455*	821	1225	Pass
Doolittle	*	<100	116	Fail
Cottonwood	*	<100	<100	Fail
Antelope	--	--	--	Fail

**Whitehorse estimate includes fish in Doolittle and Cottonwood creeks.*

Abundance in Antelope Creek has not been evaluated. Given the distribution of this populations is fragmented and extremely limited, this review assumes abundance does not exceed 500 adults,

and is likely much less. The Antelope population fails the abundance criterion until abundance can be quantitatively assessed.

Productivity

Data are not available to quantitatively assess productivity and the intrinsic potential of population increase for all populations in the Coyote Lakes 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 purpose 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. Connection to a diversity of high quality habitats capable of supporting multiple life history types 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: 1) is connected to habitat capable of supporting multiple life histories and/or serving as refuge during periods of environment constraint, 2) expresses multiple life history strategies, 3) is widely distributed, and 4) 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.

Table 4. Factors influencing productivity of Coyote Lake SMU cutthroat trout populations.

Population	Factors	Pass/Fail
Willow	Adequate distribution, but isolated from other populations; adult abundance increased between 1989 and 1999 suggesting that productivity was adequate to support population growth; impacts to habitat in lower reaches and presence of headcut potentially impacts the intrinsic potential.	Pass
Whitehorse Complex	Adequate distribution; adult abundance increased between 1989 and 1999 suggesting that productivity was adequate to support population growth; data provide no evidence of year class failures; lower portions of Whitehorse and Little Whitehorse creeks are severely impacted by grazing and agricultural practices; drying in the lower portion of Little Whitehorse Creek due to drought and grazing disrupts connectivity of Little Whitehorse to the greater Whitehorse system, this periodic connection potentially reduces productivity in the Whitehorse Complex.	Pass
Doolittle	Limited distribution and abundance; during dry years and summer months distribution shrinks to just a few beaver ponds which are severely impacted by heavy grazing; not connected to habitats capable of supporting a migratory life history.	Fail
Cottonwood	Extremely limited distribution; low abundance; and isolated from other populations; not connected to habitats capable of supporting a migratory life history.	Fail
Antelope	Extremely restricted and isolated distribution; abundance undocumented but likely limited; not connected to habitats capable of supporting a migratory life history.	Fail

Reproductive Independence

Data specific to reproductive independence do not exist for the Coyote Lakes SMU. Instead this review uses current and historical stocking records to evaluate the risk of hatchery origin rainbow trout to native cutthroat trout. A population passes the criterion if hatchery origin

rainbow trout are not currently stocked within the population, and if any available genetic analyses reveal minimal evidence of genetic mixing between hatchery and wild stocks.

Populations of Lahontan cutthroat trout in Coyote Lake basin are native. The only two known transplanting events occurred in 1971 and 1980 when cutthroat trout from Willow and Whitehorse creeks were transplanted into Cottonwood Creek above the barrier falls. In 1972 cutthroat trout from Whitehorse Creek were planted in Antelope Creek. Given that the translocated fish originated from local populations, these activities were not considered to have impacted fish in each population, but instead are considered conservation measures. All populations pass the reproductive independence criterion.

Hybridization

Lahontan cutthroat trout are the only fish species present in the Coyote Lakes SMU. Hybridization with non-native species is not a concern. All populations pass the hybridization criterion (Table 5).

Table 5. Occurrence of hatchery rainbow trout and hybridization for Coyote Lake Lahontan cutthroat trout populations.

Population	Presence of Hatchery Rainbow Trout	Pass/Fail
Willow	No	Pass
Whitehorse Complex	No	Pass
Doolittle	No	Pass
Cottonwood	No	Pass
Antelope	No	Pass

Assessment Conclusions

Lahontan cutthroat trout in the Coyote Lake basin are likely descendants of populations inhabiting pluvial Lake Lahontan during the Pleistocene era. The Coyote Lake SMU is comprised of five native cutthroat trout populations. Distribution is naturally fragmented, restricted by barrier falls and a discontinuous stream network. Three populations have low abundance and limited productivity. Ten naturalized populations were established during the 1970s in Alvord Lake basin and Catlow Valley for conservation purposes. These populations were not evaluated in this review. The SMU passes three 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.

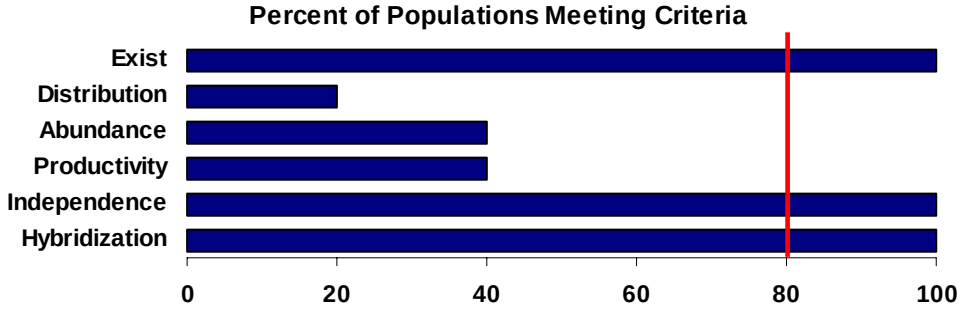

Figure 1. Assessment outcome for each of the six interim criteria with respect to the 80% threshold identified by the NFCP.