

Lolo Creek Summer Steelhead Population Viability Assessment

The Lolo Creek steelhead population (Figure 1) is part of the Snake River Steelhead DPS which has six major population groupings, including: Lower Snake River, Clearwater River, Grande Ronde River, Salmon River, Hells Canyon, and the Imnaha River. The DPS contains both A and B run steelhead. The Lolo Creek population contains both A-run and B-run adult life history types and resides in the Clearwater River MPG.

The ICTRT classified the Lolo Creek population as a “basic” population (Table 1) based on historical habitat potential (ICTRT 2005). A steelhead population classified as basic has a mean minimum abundance threshold of 500 naturally produced spawners with sufficient intrinsic productivity to achieve a 5% or less risk of extinction over a 100-year timeframe.

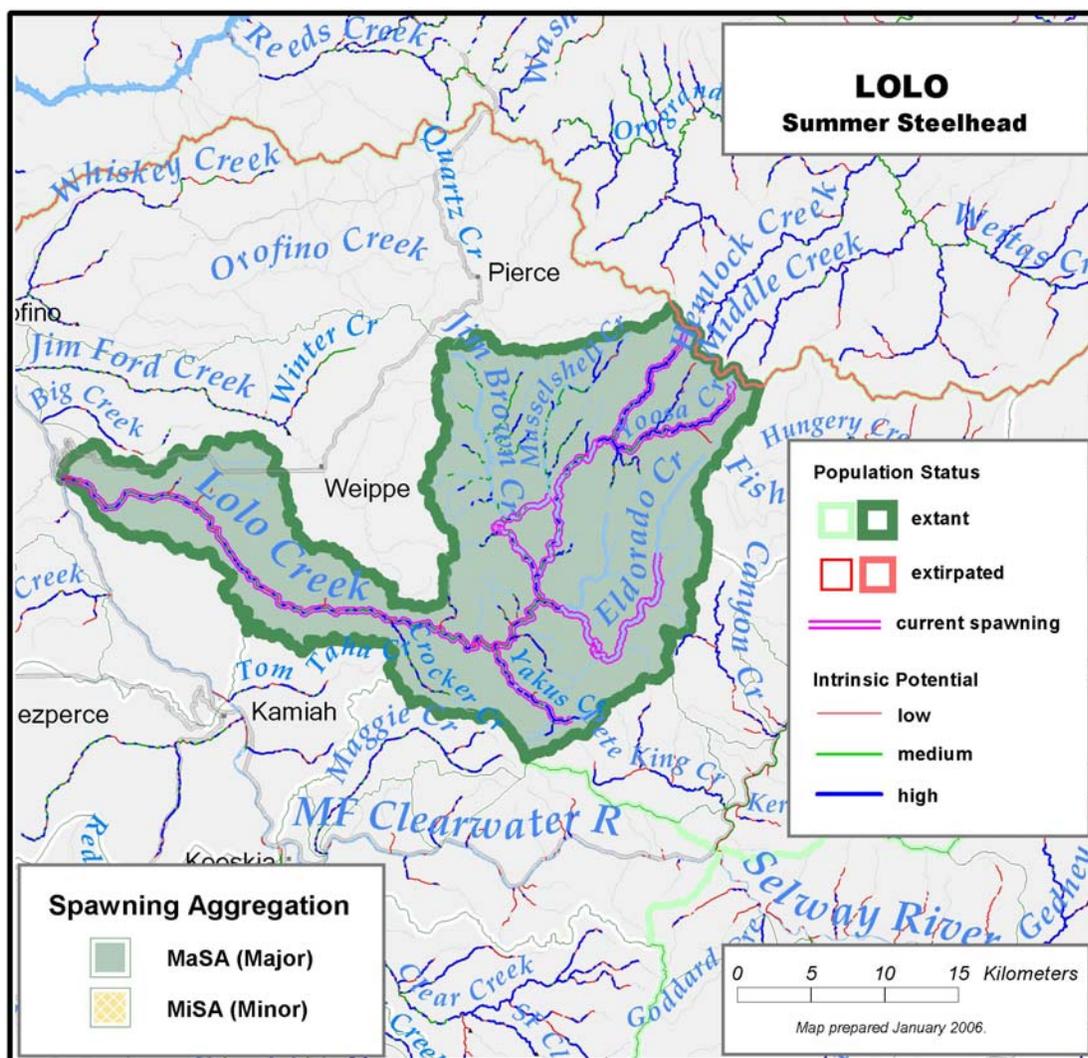


Figure 1. Lolo Creek steelhead major and minor spawning areas.

Table 1. Lolo Creek steelhead basin statistics

Drainage Area (km ²)	628
Stream lengths km* (total)	309
Stream lengths km* (below natural barriers)	238
Branched stream area weighted by intrinsic potential (km ²)	0.665
Branched stream area km ² (weighted and temp. limited)	0.665
Total stream area weighted by intrinsic potential (km ²)	0.976
Total stream area weighted by intrinsic potential (km ²) temp limited	0.976
Size / Complexity category	Basic / "C" (trellis pattern)
Number of MaSAs	1
Number of MiSAs	0

*All stream segments greater than or equal to 3.8m bankfull width were included

**Temperature limited areas were assessed by subtracting area where the mean weekly modeled water temperature was greater than 22°C.

Current Abundance and Productivity

Current natural abundance (number of adults spawning in natural production areas) is unknown for this population. There are no methods (weirs, traps, etc.) or surveys to enumerate adult abundance in the population. Surveys of juvenile density or abundance are conducted in some stream reaches. Dworshak Hatchery B-run steelhead stock has been outplanted into the population intermittently since 1977. The number and proportion of hatchery-origin steelhead spawning naturally in the population is unknown.

Abundance and productivity of the population are unknown. Table 2 and Figure 2 are included as placeholders while abundance and productivity are being assessed.

Table 2. Lolo Creek steelhead abundance and productivity measures.

10-year geomean natural abundance
20-year return/spawner productivity
20-year return/spawner productivity, SAR adj. and delimited*
20-year Bev-Holt fit productivity, SAR adjusted
20-year Lambda productivity estimate
Average proportion natural origin spawners (recent 10 years)
Reproductive success adj. for hatchery origin spawners

*Delimited productivity excludes any spawner/return pair where the spawner number exceeds 75% of the size category threshold for this population. This approach attempts to remove density dependence effects that may influence the productivity estimate.

Comparison to the Viability Curve

- Abundance: Unknown
- Productivity: Unknown
- Curve: Hockey-Stick curve
- Conclusion: Lolo Creek Summer Steelhead population is at **HIGH** risk based on uncertainty in current abundance and productivity. (Figure 3).

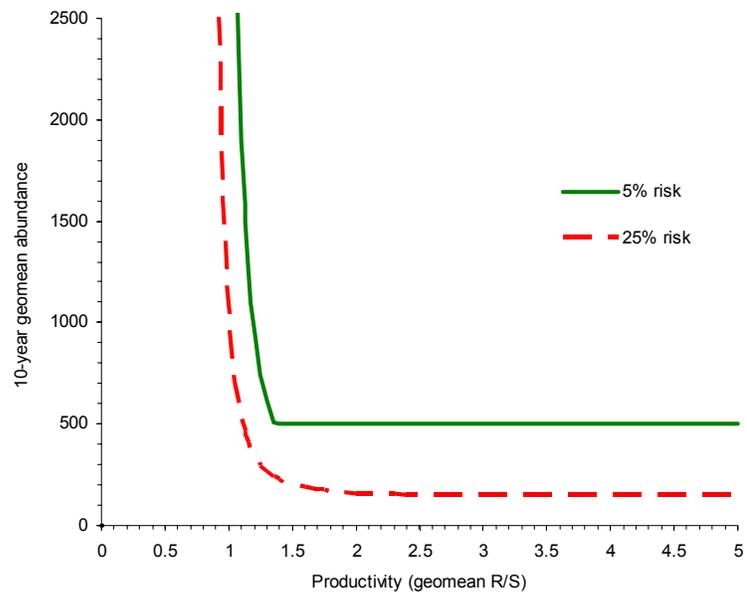


Figure 2. Lolo Creek steelhead viability curve. Current abundance and productivity estimates are unknown for this population.

Spatial Structure and Diversity

The ICTRT has identified one major spawning area (MaSAs) and no minor spawning areas (MiSAs) within the Lolo Creek steelhead population. There are no modeled temperature limitations for the MaSA in this population. A limited number of spawner surveys have been conducted across the population. Those surveys indicate spawning is occurring throughout Lolo Creek and in the tributaries Yakus, Eldorado, Yoosa, Hemlock and Musselshell creeks.

Factors and Metrics

A.1.a. Number and spatial arrangement of spawning areas.

As describe above there is only one MaSA in the population however, the total intrinsic potential habitat in the population is equivalent to approximately 2.7 MaSAs. The metric is rated *Low Risk* because of the fairly extensive branching provided by the tributaries to Lolo Creek and the relatively large amount intrinsic potential habitat.

A.1.b. Spatial extent or range of population.

Habitat use by steelhead was determined from steelhead redd counts and juvenile surveys conducted by IDFG. Redd count data for the population is very limited, especially with respect to the number and frequency of surveys. The data shows widely distributed utilization. Although a Very Low Risk rating for this metric could be inferred from the data, the metric is rated as *Low Risk*. The redd distribution data is not current and may not reflect the true current status of the population. Because of this uncertainty in the data the higher risk rating was applied.

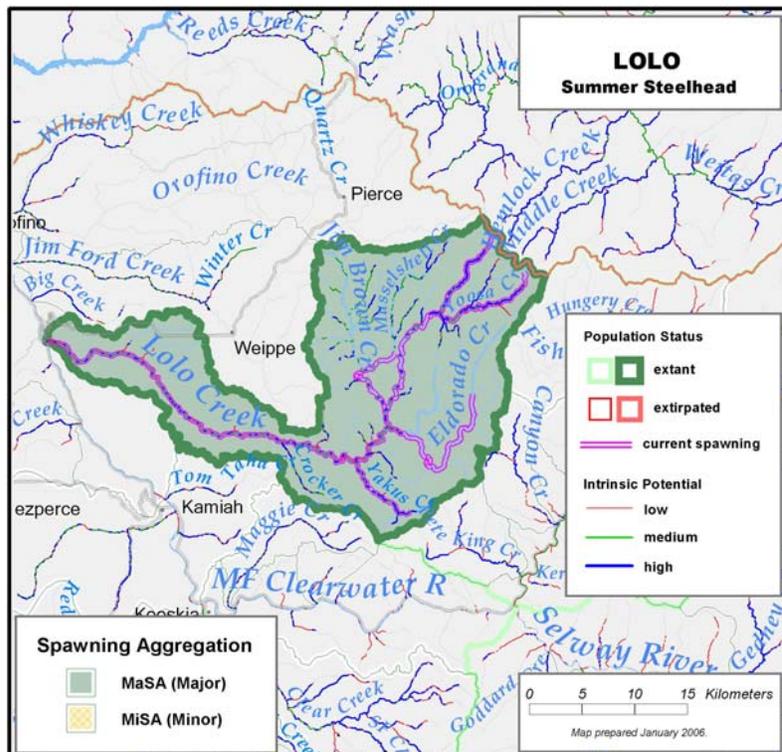


Figure 3. Lolo Creek steelhead distribution.

A.1.c. Increase or decrease in gaps or continuities between spawning areas.

It is not possible to assess change in gaps between spawning aggregates when comparing current and historic distributions because there is only one MaSA. The population is rated at *Very Low*

risk because the historical MaSAs is occupied and there has been no increase in distance between this population and other populations in the MPG or DPS.

B.1.a. Major life history strategies.

There are limited data to allow any direct comparisons between historic life history strategies and current strategies. Anthropogenic impacts have resulted in habitat changes from historic conditions. Fish movement pathways and continuity of habitat for juvenile steelhead have likely been influenced by flow and temperature changes. Although flow and temperature changes may have influenced life history strategies, it is not likely they have influenced major life history strategies or pathways. Anadromous *O. mykiss* persists in the population, only the adult summer run timing was present historically and it is presumed that both A-run and B-run type fish historically occupied the population. It appears all historic major life history pathways are present, although the mean and variability may have shifted slightly. The population was rated at *Low Risk* for this metric.

B.1.b. Phenotypic variation.

There is no direct evidence for loss or substantial change in phenotypic traits from historic conditions. The changes in flow patterns and temperature profiles discussed above (metric B.1.a) likely have reduced the variation in both juvenile migration and adult spawn timing. Reduced flows and elevated water temperatures result in a narrower window for successful smolt outmigration as well as truncation of adult spawn timing. Adult entry into freshwater and arrival on the spawning grounds likely has not changed however, adult entry into the Snake River and migration through the lower Snake River in late summer and early fall is delayed because of elevated mainstem temperatures. It is hypothesized that adult upstream migration has changed from historic conditions due to temperature effects; magnitude of the change is unknown. The population is rated at *Low Risk* for this metric because of the substantial change in adult run timing and likely changes in the mean and variability of juvenile migration and movement patterns.

B.1.c. Genetic variation.

Genetic ratings for populations were based on IC-TRT analysis of allozyme data presented in Winans et al. (2001) and Waples et al. (1993) and microsatellite data presented in Moran (2003). No genetic data was available for this population, therefore the metric was rated *Moderate Risk*.

B.2.a. Spawner composition.

No surveys are conducted to determine the proportion of naturally spawning fish that are hatchery origin. Significant to the assessment of spawner composition for this population is the long history of outplanting hatchery steelhead. Steelhead fry, fingerlings, smolts and adults have been released into the population at since 1977. All releases were Dworshak hatchery B-run stock.

(1) *Out-of-DPS strays*. This sub-metric was not rated because there is no data. The number of out-of-DPS strays in the population likely is zero or negligible, based on observations in the downstream Clearwater Lower Mainstem steelhead population.

(2) *Out-of-MPG strays from within the ESU.* This sub-metric was not rated because there is no data.

(3) *Out of population within MPG strays.* Neither the occurrence nor the number of out-of-population-within-MPG strays is known. However, out-of-MPG hatchery steelhead are deliberately released into the population under current management programs to supplement the natural population. This sub-metric is rated as High Risk because of the duration (multiple generations) of supplementation releases and the potential for the natural spawning population to consist of a high proportion of hatchery-origin fish.

(4) *Within-population hatchery spawners.* This sub-metric was not rated; there is no within-population hatchery program aside from the supplementation releases discussed above.

B.3.a. Distribution of population across habitat types.

The Lolo Creek steelhead population intrinsic potential habitat historically was distributed across three EPA level IV ecoregions (Table 3 and Fig. 4). The metric was rated *Low Risk* as there were no substantial changes in ecoregion occupancy. This is the lowest risk rating the population could achieve for this metric.

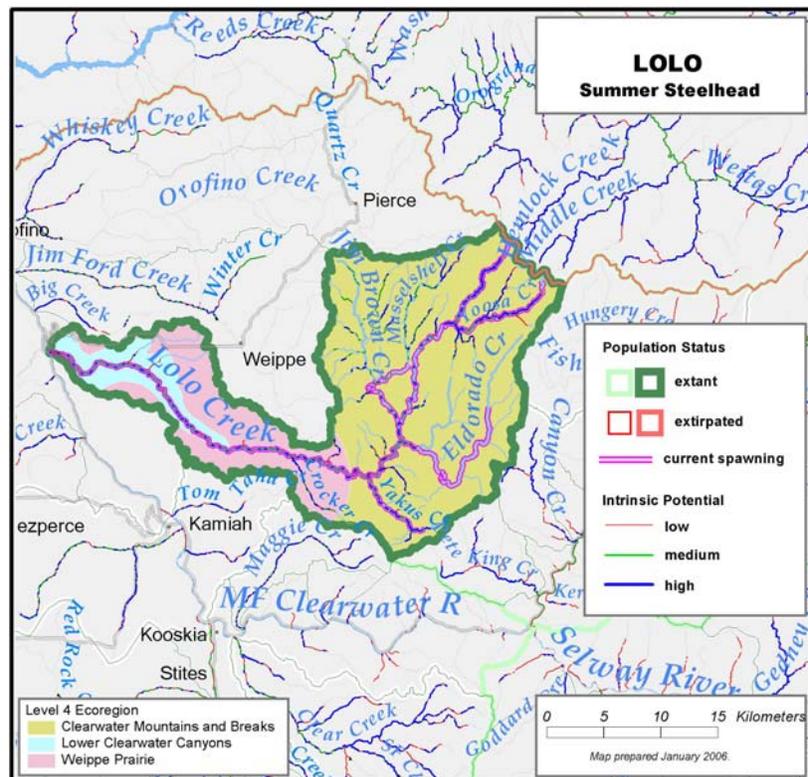


Figure 4. Lolo Creek steelhead population distribution across various ecoregions.

Table 3. Lolo Creek steelhead—proportion of spawning areas across various ecoregions.

Ecoregion	% of historical branch spawning area in this ecoregion (non-temperature limited)	% of currently occupied spawning area in this ecoregion (non-temperature limited)
Clearwater Mountains And Breaks	51.6	45.0
Lower Clearwater Canyons	26.3	34.2
Weippe Prairie	22.1	20.8

B.4.a. Selective change in natural processes or selective impacts.

Hydropower system: The hydrosystem and associated reservoirs impose some selective mortality on smolt outmigrants and adult migrants, the selective mortality is not likely to remove more than 25% of the affected individuals. The likely impacts are rated as *Low Risk* for this action.

Harvest: Overall harvest impacts on steelhead populations are unknown. There are no freshwater recreational fisheries directly targeting naturally produced steelhead; indirect mortalities are expected to occur in some fisheries selective for hatchery fish. It is unlikely that the incidental mortalities from recreational fisheries are selective. Harvest of steelhead in mainstem Columbia River gillnet fisheries may be selective, related to the mesh size of gillnets used. Further assessment is necessary to determine the extent of selective mortality occurring related to harvest. This action was rated as *Moderate Risk* because the population has been affected over many generations, the action is expected to continue into the future and because of the high degree of uncertainty in overall effect.

Hatcheries: There are no hatchery programs within this population and hatchery programs in proximate populations are not suspected to have a selective impact on this population. The selective impact of hatchery actions was rated as *Low risk*.

Habitat: Habitat changes resulting from land use activities in the basin may impose some selective mortality, but the extent is unknown. It is likely that any selective mortality impacts would affect a non-negligible portion of the population. This selective impact was rated *Low Risk*.

Spatial Structure and Diversity Summary

Overall spatial structure and diversity has been rated *Moderate Risk* for the Lolo Creek steelhead population (Table 4). This risk rating is driven by the Moderate risk rating for genetic variation, the rating applied because no data was available. Analysis of genetic data from the population may not result in a lower risk rating because of the influence of hatchery fish in the population.

Table 4. Spatial structure and diversity scoring table. “NR” scores indicate the metric was not rated.

Metric	Risk Assessment Scores				
	Metric	Factor	Mechanism	Goal	Population
A.1.a	L (1)	L (1)	Low Risk (Mean=1.33)	Low Risk	Moderate Risk
A.1.b	L (1)	L (1)			
A.1.c	VL (2)	VL (2)			
B.1.a	L (1)	L (1)	Moderate Risk		
B.1.b	L (1)	L (1)			
B.1.c	M (0)	M (0)			
B.2.a(1)	NR	High Risk (-1)	High Risk	Moderate Risk	
B.2.a(2)	NR				
B.2.a(3)	H (-1)				
B.2.a(4)	NR				
B.3.a	L (1)	L (1)	Low Risk (1)		
B.4.a	L (1)	L (1)	Low Risk (1)		

Overall Viability Rating

The Lolo Creek steelhead population does not currently meet viability criteria because Abundance/Productivity risk tentatively has been rated as High Risk and does not meet the criteria for a viable population (Fig. 5). Improvement in abundance/productivity status (reduction of risk level) will need to occur before the population can be considered viable. Also, the population currently does meet the criteria for a “maintained” population and can not achieve Highly Viable status unless overall spatial structure/diversity rating risk is reduced.

		Spatial Structure/Diversity Risk			
		Very Low	Low	Moderate	High
Abundance/ Productivity Risk	Very Low (<1%)	HV	HV	V	M
	Low (1-5%)	V	V	V	M
	Moderate (6 – 25%)	M	M	M	
	High (>25%)			Lolo Creek	

Viability Key: HV – Highly Viable; V – Viable; M – Maintained; Shaded cells – does not meet viability criteria.

Figure 5. Viable Salmonid Population parameter risk ratings for the Lolo Creek steelhead population. This population does not meet viability criteria.