6.0 SNAKE RIVER FALL CHINOOK SALMON ESU

6.1 POPULATION

6.1.1 Snake River Mainstem and Lower Tributaries

6.1.1.1 Background

There is only one population in this ESU, which encompasses the lower mainstem of the Snake River and lower reaches of the Clearwater, Imnaha, Grande Ronde, Salmon, and Tucannon rivers. The results of the analysis of habitat condition and potential to improve the status of this population are summarized in Table 6-1.

Table 6-1. Snake River Fall Chinook (yearlings) Ecological Improvement Potential

Data Sources: C S T N

1 Population		① Range of System Survival Rates GAP [D*]	② Index of Potential to Increase Population: H/M/L (base period abundance/productivity estimate; recent abundance/ productivity estimate or % Interim Target)	C S T N	③ Qualitative Assessment (CHART, NWFSC approach and other info) of Potential to Improve/Increase Habitat (H/M/L)	C S T N	④ Primary Candidate Anthropogenic Limiting Factors: **F**low, **C**hannel **M**orphology (bed, banks, sediment, LWD, sinuos., connectiv.), **T**emperature, **W**ater **Q**uality	C S T N	⑤ Ecological Improve-ment Potential	⑥ Improvement Potential Adjusted Based on Practical Constraints	⑦ Proposal to Fill Gap and Performance Measures/ Standards/ M&E
SNMAI	Mainstem below Hells Canyon Complex		L		L-VL		Morphology - stream banks; Water quality - temperature, metal contamination		L-VL	VL	

*D = Delayed mortality due to transportation

C S T N = Council, States, TRTs, NWC

Connor *et al*. (2002) report that a majority of fish in this population spawn in the mainstem Snake River between the top of Lower Granite Reservoir and Hells Canyon Dam, while most of the remaining fish spawn in the mainstems of the Clearwater and Grande Ronde rivers, though there is a minor amount of spawning in the Tucannon, Imnaha, North and South Forks of the Clearwater and Salmon rivers (Garcia *et al*. 1999).

This ESU has lost roughly 80% of its historical habitat, because Hells Canyon Dam blocks access to most of the historical habitat, and other Snake River dams have inundated former spawning areas and changed water temperatures (Dauble *et al.* 2003). Fall chinook salmon now occupy mostly remnant areas with marginal natural production potential, in comparison to the habitats available in their former range (Connor *et al*. 2002). The ESU is also threatened by genetic introgression from Upper Columbia River hatchery fish that stray into the area (TRT 2003). The habitat conditions in the remnant areas presently occupied by fall chinook salmon are not affected to a great extent by anthropogenic alterations or other impacts on temperature and streamflow associated with releases of water from Dworshak and Hells Canyon dams. However, productivity may be negatively affected by degraded water quality (i.e., heavy metal contamination from mine effluent in the Snake River, and increased water temperature throughout the ESU), by reduced quality and quantity of rearing habitat in near-bank areas and side channels resulting from streambank and floodplain modifications, and by sediment deposition in the Tucannon River.

Snake River fall chinook salmon spawn in larger rivers, ranging in size from the Tucannon River to the Snake River. The location of fall chinook salmon spawning areas and the hydraulic conditions affecting their suitability for egg incubation are controlled by broad-scale geomorphic features such as islands or bedrock outcrops that maintain deep pools and areas of upwelling (Geist and Dauble 1998). Fall chinook salmon spawning areas in larger rivers, such as the Snake and Clearwater rivers, do not readily respond to changes in fine sediment or small pool-forming elements such as large woody debris. Spawning areas in a more moderate-sized river such as the Tucannon are more likely to be susceptible to the effects of sedimentation. As a result, there has likely been little change in the amount of spawning habitat in the areas presently used by fall chinook salmon, but the quality of the habitat in the larger rivers has likely been altered by anthropogenic changes in water temperature and water quality and in the smaller rivers by sedimentation.

Little information is available on anthropogenic changes in the condition of rearing areas. However, since fall chinook rear along the margins of their natal streams, substantial changes in rearing habitat have likely occurred due to streambank modifications from riprap, floodplain developments, and streamside roads. It is likely that these changes have reduced the quantity and quality of rearing areas, but the effects on production are unknown.

The ratings for all of the indicators are low to very low, since there is no information indicating that changes in rearing habitat are limiting production below its natural potential in this area or that the quality or quantity of spawning areas has appreciably diminished in the areas presently occupied by fall chinook salmon.

6.1.1.2 Suggested Mitigation Measures and Constraints

Water quality problems and streambank alterations throughout the ESU are the most likely anthropogenic habitat alterations that have decreased production below its potential in the remnant areas now used by fall chinook salmon.

6.2 LITERATURE CITED

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