

5.0 SNAKE RIVER SPRING/SUMMER CHINOOK ESU

5.1 POPULATIONS

5.1.1 Tucannon River

5.1.1.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of flow, altered channel morphology, temperature, and agricultural and forestry practices. The lower Tucannon River has lost more than 20 percent of its sinuosity due to channel straightening. Some watersheds occupied by this population are affected by the Little Goose or Lower Monumental reservoirs; therefore, in Table 5-1, *Index of Potential to Increase Population* was rated as low. *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated medium, and *Ecological Improvement Potential* and *Improvement Potential Adjusted Based on Practical Constraints* were rated low.

5.1.1.2 Suggested Mitigation Measures and Constraints

Habitat for this population can be improved for this area by addressing grazing and the most significant channel modifications (i.e., straightened channel, large wood reduction, sugar dikes, irrigation, flow modification, confined riparian area, dewatering, Pomeroy Sewer plant with tertiary treatment, timber harvest in upper watershed, brook trout, weir, eight man-made ponds that are screened but may warm river, and a steelhead acclimation facility).

Removal of dams to increase smolt migration is likely to meet extreme resistance. Converting private lands to public ownership and further regulation of private land use are unlikely to be supported on a large scale.

5.1.2 Asotin Creek

5.1.2.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of flow, altered channel morphology, temperature, and agricultural and forestry practices. In Table 5-1, *Index of Potential to Increase Population* was rated as very high. *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated as medium, and *Ecological Improvement Potential* and *Improvement Potential Adjusted Based on Practical Constraints* were both rated low, because the lower 17 miles of Asotin Creek are roaded, the lower eight miles are bordered by small ranches, and the lower mile flows through the City of Asotin. Public lands are in good to excellent condition and private lands are in fair to good condition. Many habitat improvement projects have already been completed. Removal of development on lower Asotin Creek is unlikely to enjoy broad local support.

Table 5-1. Snake River Spring/Summer Chinook (yearlings) Ecological Improvement Potential

		Data Sources						
		①	②	③	④	⑤	⑥	⑦
		Range of System Survival Rates GAP [D*]	Index of Potential to Increase Population: H/M/L (base period abundance/productivity estimate; recent abundance/productivity estimate or % Interim Target)	Qualitative Assessment (CHART, NWFSC approach and other info) of Potential to Improve/Increase Habitat (H/M/L)	Primary Candidate Anthropogenic Limiting Factors: Flow, Channel Morphology (bed, banks, sediment, LWD, sinuos., connectiv.), Temperature, Water Quality	Ecological Improvement Potential	Improvement Potential Adjusted Based on Practical Constraints	Proposal to Fill Gap and Performance Measures/Standards/M&E
31 Populations								
1 SNTUC	Tucannon River	VH (430; 438)	M	F, CM, T	L	L		
2 SNASO	Asotin Creek	VH (28; 5)	M	F, CM, T	L	L		
3 GRWEN	Wenaha River	VH (1355; 268)	L	F, CM	L	L		
4 GRLOW	Lostine River	VH (318; 82)	M	F, CM	M	M - L		
5 GRMIN	Minam River	VH (569; 162)	M	F, CM	M	M - L		
6 GRCAT	Catherine Creek	VH (961; 72)	H	F, CM	H	M		
7 GRUMA	Grande Ronde Upper Mainstem	VH (539; 94)	H	CM	H	M		
8 IRMAI	Imnaha River Mainstem	VH (1681; 169)	M	F, CM	M	M		
9 IRBSH	Big Sheep Creek	VH (144; 4)	H	WQ	L	L		
10 SFLSR	Little Salmon River	M (no counts)	M	F, CM, T	M	M - L		
11 SFMAI	S. Fork Salmon River Mainstem	VH (1391; 475)	L	CM	L	L		
12 SFSEC	Secesh River	VH (162; 85)	L	CM (floodplain loss)	L	L		
13 SFDFS	E. Fork South Salmon River	VH (246; 93)	M	CM	M	M - L		
14 SRCHA	Chamberlain Creek	M (72; 40)	L		L	L		
15 MFBIG	Big Creek	VH (408; 75)	M	CM	L	VL		
16 MFLMA	Middle Fork Salmon River (below Indian Creek)	VH (27; 3)	L		VL	VL		
17 MFCAM	Camas Creek	VH (137; 31)	L	F	L	L		
18 MFLOO	Loon Creek	VH (189; 74)	L		VL	VL		
19 MFPIS	Pistol Creek	VH (no counts)	L	CM (floodplain loss)	VL	VL		
20 MFSUL	Sulphur Creek	VH (115; 30)	L	F	VL	VL		
21 MFBEA	Bear Valley Creek	VH (897; 230)	M		L	VL		
22 MFMAR	Marsh Creek	VH (182; 44)	L	CM	VL	VL		
23 MFUMA	Middle Fork Salmon River (above Indian Creek)	VH (170; 48)	L		VL	VL		
24 SRNFS	N. Fork Salmon River	VH (81; 21)	M	F, CM	VL	VL		
25 SRLM	Lemhi River	VH (863; 75)	H	F, CM, T, WQ	H	M		
26 SRPAH	Pahsimeroi River	H (no counts)	H	F, CM, T	H - M	M		
27 SRLMA	Salmon River Lower Mainstem (below Redfish Lake)	VH (851; 68)	H	F, CM	H	M		
28 SREFS	E. Fork Salmon River	VH (703; 99)	M	F, CM, T,	M	M - L		
29 SRYFS	Yankee Fork	VH (209; 20)	M	F, CM	L	L		
30 SRVAL	Valley Creek	VH (276; 35)	M	F, CM	M	M - L		
31 SRUMA	Salmon River Upper Mainstem (above Redfish Lake)	VH (491; 14)	H	F, CM	H-M	H - M		

*D = Delayed mortality due to transportation

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

5.1.2.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.3. Wenaha River

5.1.3.1 Background

Most of the watersheds occupied by this population are in designated wilderness areas. With the exception of small, reach-scale, local, anthropogenic impacts, these watersheds are not degraded from historical conditions. The anthropogenic impacts are related to altered channel morphology and forestry practices in the lower reaches of the Wenaha In Table 5-1, *Index of Potential to Increase Population* was rated very high. *Qualitative Assessment of Potential to Improve/Increase Habitat, Ecological Improvement Potential and Improvement Potential Adjusted Based on Practical Constraints* were both rated low, because the wilderness area provides little opportunity for any habitat improvement, and modifications of private land use are unlikely to enjoy broad local support.

5.1.3.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.4. Lostine River

5.1.4.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of flow, altered channel morphology, and agricultural and forestry practices. *Index of Potential to Increase Population* was rated very high in Table 5-1. *Qualitative Assessment of Potential to Improve/Increase Habitat and Ecological Improvement Potential* were rated medium, and *Improvement Potential Adjusted Based on Practical Constraints* was rated medium to low. The headwaters of the Lostine River are in a wilderness area with good habitat and flows until the river reaches private land.

5.1.4.2 Suggested Mitigation Measures and Constraints

Opportunities for habitat improvement in the lower river include reversing habitat alterations, correcting major flow problems, especially in summer and fall, and resolving fish passage problems from channel-spanning diversion structures. Accomplishing these improvements relies upon the cooperation of private landowners.

5.1.5. Minam River

5.1.5.1 Background

The watersheds occupied by this population have been somewhat degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of flow, forest practices, and grazing. The Minam River is on the 303(d) list for temperature and sediment. The index of potential for an absolute increase in production was rated very high in Table 5-1.

Qualitative Assessment of Potential to Improve/Increase Habitat and Ecological Improvement Potential were rated medium, and *Improvement Potential Adjusted Based on Practical Constraints* was rated medium to low. Much of the watershed is in designated wilderness. There are grazing impacts on the Wallowa-Whitman National Forest in the upper watershed and some impacts from forestry practices on private land in the lower watershed. Flow is controlled by a dam at Minam Lake.

5.1.5.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.6. Catherine Creek

5.1.6.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of flow, altered channel morphology, agricultural and forestry practices, and grazing. *Index of Potential to Increase Population* was rated very high in Table 5-1. *Qualitative Assessment of Potential to Improve/Increase Habitat and Ecological Improvement Potential* were rated medium, and *Improvement Potential Adjusted Based on Practical Constraints* was rated medium to low.

5.1.6.2 Suggested Mitigation Measures and Constraints

The highest potential is in the lower half of Catherine Creek on private lands. There are major flow problems in the lower watershed and fish passage problems with channel-spanning structures. Channelization and habitat degradation are also common there. Improving these conditions will require the cooperation and consent of private landowners.

5.1.7. Grand Ronde, Upper Mainstem

5.1.7.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of altered channel morphology, forestry practices, and grazing. In Table 5-1, *Index of Potential to Increase Population* was rated very high. *Qualitative Assessment of Potential to Improve/Increase Habitat and Ecological Improvement Potential* were rated high, and *Improvement Potential Adjusted*

Based on Practical Constraints was rated medium. There is severe habitat degradation in the upper watershed from logging, agriculture, and grazing. There are temperature and flow problems throughout, and the stream has been channelized for flood control.

5.1.7.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.8. Imnaha River, Mainstem

5.1.8.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of flow, altered channel morphology, agricultural and forestry practices, and grazing. In Table 5-1, *Index of Potential to Increase Population* was rated very high. *Qualitative Assessment of Potential to Improve/Increase Habitat* and *Ecological Improvement Potential* were rated medium, and *Improvement Potential Adjusted Based on Practical Constraints* was rated medium to low. Most of the headwaters are in wilderness. There are feedlots along the mainstem and temperature is a problem in the lower river. Spring chinook in this population have been supplemented with hatchery fish. Logging and roads have contributed to habitat degradation. Improving these conditions will require the cooperation and consent of private landowners.

5.1.8.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.9. Big Sheep Creek

5.1.9.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of water quality, agricultural practices, and grazing. *Index of Potential to Increase Population* was rated very high in Table 5-1. *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated high, and *Ecological Improvement Potential* and *Improvement Potential Adjusted Based on Practical Constraints* were both rated low. This is a major tributary of the Imnaha River. There are grazing and forestry impacts and a major transfer ditch in this watershed. Improving these conditions will require the cooperation and consent of private landowners.

5.1.9.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.10. Little Salmon River

5.1.10.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of flow, altered channel morphology, temperature, grazing, roads, and forestry practices. The lack of a properly functioning riparian corridor in the Little Salmon River has affected stream temperatures and the structure of the channel due to a lack of LWD recruitment. (NWPC 2004 draft Salmon River Subbasin Plan) *Index of Potential to Increase Population* was rated medium in Table 5-1. *Qualitative Assessment of Potential to Improve/Increase Habitat and Ecological Improvement Potential* were rated medium, and *Improvement Potential Adjusted Based on Practical Constraints* was rated medium to low. Water is diverted for numerous purposes, homes have been built near the high-water mark, and most tributaries are inaccessible. State Highway 55 constricts channel migration.

5.1.10.2 Suggested Mitigation Measures and Constraints

Accomplishing any improvements will rely upon the consent of private landowners, and moving structures and roads is unlikely to attract much local support. The opportunity to improve flows is restricted by state water law.

5.1.11. South Fork Salmon River, Mainstem

5.1.11.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of altered channel morphology and roads. There is currently a high level of fine sediments in the South Fork mainstem due to the geologically unstable nature of the watershed and legacy effects from land management. Restoration efforts have taken place, and it is unlikely that additional efforts will effectively change sediment volumes in the channel. There is, however, a threat of additional sedimentation occurring, which would retard previous restoration efforts (NWPC 2004 draft Salmon River Subbasin Plan). Localized riparian issues exist in the South Fork watershed. A common factor limiting the condition of salmonid rearing habitat throughout the South Fork Salmon watershed is the lack of shade-providing, bank-stabilizing riparian vegetation (NWPC 2004 draft Salmon River Subbasin Plan). In Table 5-1, *Index of Potential to Increase Population* was rated very high based upon the difference between average redd counts from the ten-year base period and the most recent ten years (1391/475). *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated low based on the degree of habitat degradation and the restoration efforts accomplished to date. Sediment has been a major problem, but is improving in most of the watersheds due to changes in land management practices. Road maintenance continues to contribute sediment to the SF Salmon River. *Ecological Improvement Potential* was rated low, because recent redd counts (474) are already higher than expected for this degraded habitat when compared with recent redd counts in wilderness areas (445).¹ *Improvement Potential Adjusted Based on Practical Constraints* was rated low.

5.1.11.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.12. Secesh River

5.1.12.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of altered channel morphology. There are residential developments around the low-gradient meadows that support most of the spawning for this population. In Table 5-1, *Index of Potential to Increase Population* was rated very high based upon the difference in average redd counts from the ten-year base period and the most recent ten years (162/85). *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated low based upon the degree of habitat degradation. *Ecological Improvement Potential* was rated low, because recent redd counts (85) are already higher than expected for this degraded habitat when compared with recent redd counts in wilderness areas (52).¹

Improvement Potential Adjusted Based on Practical Constraints was rated low.

5.1.12.2 Suggested Mitigation Measures and Constraints

Protecting existing high-quality habitat around the low-gradient meadows that support most of the spawning for this population will prevent losses to this population, but will meet with significant resistance from local property owners.

5.1.13. East Fork South Fork Salmon River

5.1.13.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of altered channel morphology, roads, and legacy mining. A lack of functioning LWD is affecting channel structure in Johnson Creek and is reducing habitat quality for salmonids (NWPC 2004 draft Salmon River Subbasin Plan). In Table 5-1, *Index of Potential to Increase Population* was rated very high based upon the difference in average redd counts between the ten-year base period and the most recent ten years (246/93). *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated medium based upon the degree of habitat degradation. *Ecological Improvement Potential* was rated low, because recent redd counts (93) are already higher than expected for this degraded habitat when compared with recent redd counts in wilderness areas (79).¹ *Improvement Potential Adjusted Based on Practical Constraints* was rated medium to low.

5.1.13.2 Suggested Mitigation Measures and Constraints

Disconnection from the floodplain, a lack of large woody debris, chronic road effects, historical/recent mining, and CERCLA sites are problems that can be addressed, but will meet local resistance. For example, in 2003 the county removed a log jam from the EF SF Salmon River after being told explicitly not to do so.

5.1.14 Chamberlain Creek

5.1.14.1 Background

Most of the watersheds occupied by this population are in designated wilderness areas. With the exception of small, reach-scale, local, anthropogenic impacts, these watersheds are not degraded from historical conditions. In Table 5-1, *Index of Potential to Increase Population* was rated high based upon the difference in average redd counts between the ten-year base period and the most recent ten years (72/40). *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated low based upon the degree of habitat degradation, which is extremely small. *Ecological Improvement Potential* was rated low, because recent redd counts (40) are already higher than expected for this degraded habitat when compared with recent redd counts in wilderness areas (23).¹ *Improvement Potential Adjusted Based on Practical Constraints* was rated medium to low.

5.1.14.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.15 Big Creek

5.1.15.1 Background

Most of the watersheds occupied by this population are in designated wilderness areas. With the exception of small, reach-scale, local, anthropogenic impacts, these watersheds are not degraded from historical conditions. The anthropogenic impacts are related to legacy mining that caused altered channel morphology. In Table 5-1, *Index of Potential to Increase Population* was rated very high based upon the difference in average redd counts between the ten-year base period and the most recent ten years (408/75). *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated medium based upon the degree of habitat degradation related to legacy mining. *Ecological Improvement Potential* was rated medium based upon the degree of habitat degradation in relation to the difference between 32 percent baseline and 100 percent recent redd counts (131/75)¹.

Improvement Potential Adjusted Based on Practical Constraints was rated low.

5.1.15.2 Suggested Mitigation Measures and Constraints

Wilderness management rules protect this watershed; no specific measures are recommended at this time.

5.1.16 Middle Fork Salmon (below Indian Creek)

5.1.16.1 Background

Most of the watersheds occupied by this population are in designated wilderness areas. With the exception of small, reach-scale, local, anthropogenic impacts, these watersheds are not degraded from historical conditions. In Table 5-1, *Index of Potential to Increase Population* was rated very high based upon the difference in average redd counts between the ten-year base period and the most recent ten years (27/3). *Qualitative Assessment of Potential to Improve/Increase Habitat, Ecological Improvement Potential*, and *Improvement Potential Adjusted Based on Practical Constraints* were all rated low.

5.1.16.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.17 Camas Creek

5.1.17.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of flow and grazing. There is minor site-specific potential to improve habitat at old road crossings, to improve flows, screen irrigation diversions, and improve grazing management. In Table 5-1, *Index of Potential to Increase Population* was rated very high based upon the difference in average redd counts between the ten-year base period and the most recent ten years (137/31). *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated low. *Ecological Improvement Potential* was rated low based upon the degree of habitat degradation in relation to the difference between 32 percent baseline and 100 percent recent redd counts (44/31)¹. *Improvement Potential Adjusted Based on Practical Constraints* was rated low.

5.1.17.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.18 Loon Creek

5.1.18.1 Background

Most of the watersheds occupied by this population are highly functioning with site-specific potential to improve habitat at road crossings, water diversions and a mill site. *Index of Potential to Increase Population* was rated very high based upon the difference in average redd counts between the ten-year base period and the most recent ten years (189/74). *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated low and *Ecological Improvement Potential* was rated very low based upon the degree of habitat degradation in relation to the difference

between 32 percent baseline and 100 percent recent redd counts (61/74)¹. *Improvement Potential Adjusted Based on Practical Constraints* was rated very low.

5.1.18.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.19 Pistol Creek

5.1.19.1 Background

Most of the watersheds occupied by this population are highly functioning with site-specific potential to improve or protect habitat. Altered channel morphology and potential threats from private residential inholdings within the wilderness area are concerns for this population. Recent fires and debris flows have altered substrate composition, and impacts from legacy mining at the headwaters of Little Pistol Creek are evident. In Table 5-1, *Index of Potential to Increase Population* was rated very high. *Qualitative Assessment of Potential to Improve/Increase Habitat* and *Ecological Improvement Potential* were both rated low. *Improvement Potential Adjusted Based on Practical Constraints* was rated very low.

5.1.19.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.20 Sulphur Creek

5.1.20.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of flow and effects of legacy grazing. There are water diversions for irrigation and storage, and the headwaters of Sulphur Creek are recovering from past grazing. *Index of Potential to Increase Population* was rated very high based upon the difference in average redd counts between the ten-year base period and the most recent ten years (115/30). *Qualitative Assessment of Potential to Improve/Increase Habitat* rated low and *Ecological Improvement Potential* rated very low based upon the degree of habitat degradation in relation to the difference between 32 percent baseline and 100 percent recent redd counts (37/30)¹. *Improvement Potential Adjusted Based on Practical Constraints* was rated very low.

5.1.20.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.21 Bear Valley Creek

5.1.21.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be recovering from legacy grazing and mining. In Table 5-1, *Index of Potential to Increase Population* was rated very high based upon the difference in average redd counts between the ten-year base period and the most recent ten years (897/230). *Ecological Improvement Potential* was rated low and *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated medium based upon the degree of habitat degradation in relation to the difference between 32 percent baseline and 100 percent recent redd counts (287/230)¹.

5.1.21.2 Suggested Mitigation Measures and Constraints

Improvement Potential Adjusted Based on Practical Constraints was rated very low, because restoration efforts have taken place, and it is unlikely that additional efforts will effectively increase production or abundance. No specific measures are recommended at this time.

5.1.22 Marsh Creek

5.1.22.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be recovering from legacy grazing and mining. Current sheep grazing is a concern. In Table 5-1, *Index of Potential to Increase Population* was rated medium based upon the difference in average redd counts between the ten-year base period and the most recent ten years (182/44). *Qualitative Assessment of Potential to Improve/Increase Habitat* and *Ecological Improvement Potential* were rated low based upon the degree of habitat degradation in relation to the difference between 32 percent baseline and 100 percent recent redd counts (58/44)¹. *Improvement Potential Adjusted Based on Practical Constraints* was rated low.

5.1.22.2. Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.23. Middle Fork Salmon River (above Indian Creek)

5.1.23.1 Background

Most of the watersheds occupied by this population are highly functioning with site-specific potential to improve or protect habitat. In Table 5-1, *Index of Potential to Increase Population* was rated very high based upon the difference in average redd counts between the ten-year base period and the most recent ten years (170/48). *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated low and *Ecological Improvement Potential* was rated very low based upon the degree of habitat degradation in relation to the difference between 32 percent

baseline and 100 percent recent redd counts (54/48)¹. *Improvement Potential Adjusted Based on Practical Constraints* was also rated very low.

5.1.23.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.24 North Fork Salmon River

5.1.24.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of flow, altered channel morphology, roads, residential development, and forestry practices. In Table 5-1, *Index of Potential to Increase Population* was rated very high based upon the difference in average redd counts between the ten-year base period and the most recent ten years (81/21). *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated medium and *Ecological Improvement Potential* was rated very low based upon the degree of habitat degradation in relation to the difference between 32 percent baseline and 100 percent recent redd counts (26/21)¹. *Improvement Potential Adjusted Based on Practical Constraints* was also rated very low.

5.1.24.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.25 Lemhi River

5.1.25.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of flow, altered channel morphology, temperature, water quality, grazing, and agricultural practices. The hydrologic regime (peak flows, base flows, flow timing) and connectivity of most Lemhi tributaries have been altered by irrigation withdrawals. Only 7 percent of all tributaries remain connected to the mainstem. These changes limit the access of resident and anadromous populations to potentially available habitat and delay anadromous smolt and adult migration in the lower reaches of the mainstem Lemhi, which contributes to increased mortality rates (NWPC 2004 draft Salmon River Subbasin Plan). In Table 5-1, *Index of Potential to Increase Population* was rated very high based upon the difference in average redd counts between the ten-year base period and the most recent ten years (863/75). *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated high based upon the degree of degradation of habitat from historical conditions. *Ecological Improvement Potential* was also rated high based upon the degree of habitat degradation in relation to the difference between 32 percent baseline and 100 percent recent redd counts (276/75)¹.

5.1.25.2 Suggested Mitigation Measures and Constraints

Improvement Potential Adjusted Based on Practical Constraints was rated medium based on cost and the need to rely on the consent of private landowners to modify land and water use. No specific measures are recommended at this time.

5.1.26 Pahsimeroi River

5.1.26.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of flow, altered channel morphology, temperature, grazing, and agricultural practices. In the Pahsimeroi River Valley, all mainstem tributaries are disconnected throughout the year because of water diversions. This disconnection has resulted in alterations to the mainstem Pahsimeroi's (mouth to Hooper Lane) hydrologic regime (i.e., peak and base flows and flow timing) and has created barriers to migration (NWPCC 2004 draft Salmon River Subbasin Plan). Over a century of livestock grazing and instream flow alterations have substantially altered the species diversity, structure, composition, and connectivity of riparian zones in the Pahsimeroi watershed. These changes have resulted in excessive sedimentation, high stream temperatures, reduced shading, and bank instability, each of which may act cumulatively or independently to adversely affect chinook (SRPAH) and steelhead (SRPAH-s) populations (NWPCC 2004 draft Salmon River Subbasin Plan). The high number of irrigation diversions in the mainstem Pahsimeroi, from Patterson Creek to Big Springs Creek, has created numerous barriers to fish migration (NWPCC 2004 draft Salmon River Subbasin Plan). In Table 5-1, *Index of Potential to Increase Population* was rated high, *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated high, *Ecological Improvement Potential* was rated medium to high, and *Improvement Potential Adjusted Based on Practical Constraints* was rated medium.

5.1.26.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.27 Salmon River, Lower Mainstem (below Redfish Lake)

5.1.27.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of flow, altered channel morphology, grazing, agricultural practices and roads. Habitat in the mainstem, between the confluences of the North Fork Salmon and Pahsimeroi Rivers, is primarily limited by a modified hydrologic regime, inadequate pool:riffle ratios, and structural migration barriers (NWPCC 2004 draft Salmon River Subbasin Plan). The natural hydrologic regime in the Upper Mainstem Salmon (from the East Fork confluence to the headwaters) has been altered by streamflow withdrawals. The effects from these pressures include a reduction in base flow conditions and some modifications to flow timing (NWPCC 2004 draft Salmon River Subbasin Plan). Fish are

entering irrigation systems when irrigation is turned on before fish screens are in place, during operation of diversions and control structures, and via wastewater return flows and breached ditches (i.e., ‘backdoor’ access). Upon entering the hydrologically unstable irrigation system, fish are subject to threats from dewatering (i.e. temperatures, reduced forage, increased predation, etc.) (NWPC 2004 draft Salmon River Subbasin Plan). Sedimentation from various land use activities has impacted habitat quality and quantity in the mainstem from the East Fork confluence to the headwaters (NWPC 2004 draft Salmon River Subbasin Plan). The diversion of water for irrigation and its subsequent return, combined with reductions in riparian shading, are the primary factors contributing to increased temperatures in the mainstem Salmon from the 12-mile section upstream to Challis (NWPC 2004 draft Salmon River Subbasin Plan). Channel confinement and development of riparian areas, from the 12-mile section upstream to the headwaters, has caused a reduction in the pool:riffle ratio, a reduction in streambank stability, and a reduction in shade, and there is limited salmonid access to side channel habitat (NWPC 2004 draft Salmon River Subbasin Plan).

In Table 5-1, *Index of Potential to Increase Population* was rated very high based upon the difference in average redd counts between the ten-year base period and the most recent ten years (851/68). *Qualitative Assessment of Potential to Improve/Increase Habitat and Ecological Improvement Potential* were rated high based upon the degree of degradation of habitat from historical conditions in relation to the difference between 32 percent baseline and 100 percent recent redd counts (272/68)¹. *Improvement Potential Adjusted Based on Practical Constraints* was rated medium.

5.1.27.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.28 East Fork Salmon River

5.1.28.1. Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of altered channel morphology, flow, temperature, grazing, agricultural practices, and roads. Reductions in riparian shading combined with irrigation return flows are the primary factors contributing to increased temperatures (NWPC 2004 draft Salmon River Subbasin Plan). A reduction in riparian vegetation has resulted in decreased streambank stability (NWPC 2004 draft Salmon River Subbasin Plan). In Table 5-1, *Index of Potential to Increase Population* was rated very high based upon the difference in average redd counts between the ten-year base period and the most recent ten years (703/99). *Qualitative Assessment of Potential to Improve/Increase Habitat and Ecological Improvement Potential* were rated medium based upon the degree of degradation of habitat from historical conditions in relation to the difference between 32 percent baseline and 100 percent recent redd counts (225/99)¹. *Improvement Potential Adjusted Based on Practical Constraints* was rated medium to low.

5.1.28.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.29 Yankee Fork

5.1.29.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of flow, altered channel morphology, and legacy mining. Historical dredge mining has left unconsolidated dredge tailings in the lower Yankee Fork River (USRITAT 1998, USFS 1999c). These tailings, as well as other mining waste, may contribute toxic chemicals to the Yankee Fork and other downstream reaches and constrict the stream channel by interacting with adjoining floodplain areas. These problems limit habitat suitability for spring chinook (SRYFS), summer steelhead (SRUMA-s), and bull trout (UPS) populations (NWPC 2004 draft Salmon River Subbasin Plan). In Table 5-1, *Index of Potential to Increase Population* was rated very high based upon the difference in average redd counts between the ten-year base period and the most recent ten years (209/20). *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated medium based on the degree of degradation of habitat from historical conditions. *Ecological Improvement Potential* was rated low based upon the degree of habitat degradation in relation to the difference between 32 percent baseline and 100 percent recent redd counts (67/20)¹.

5.1.29.2 Suggested Mitigation Measures and Constraints

Improvement Potential Adjusted Based on Practical Constraints was rated low based on cost and the need to rely on the consent of private landowners to modify land and water use. No specific measures are recommended at this time.

5.1.30 Valley Creek

5.1.30.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of flow, altered channel morphology, and grazing. Grazing impacts include sediment, temperature, bank alteration, channel alteration, riparian vegetation, and fish passage impediments and life history alteration due to timing modifications. Downstream, fish face challenges due to predation, temperature, and lack of flow. In Table 5-1, *Index of Potential to Increase Population* was rated very high based upon the difference in average redd counts between the ten-year base period and the most recent ten years (276/35). *Qualitative Assessment of Potential to Improve/Increase Habitat* and *Ecological Improvement Potential* were rated medium based upon the degree of habitat degradation in relation to the difference between 32 percent baseline and 100 percent recent redd counts (88/35)¹. *Improvement Potential Adjusted Based on Practical Constraints* was rated low to medium based on reliance on consent of private landowners, including those involved in development around Stanley, Idaho.

5.1.30.2 Suggested Mitigation Measures and Constraints

No specific measures are recommended at this time.

5.1.31 Salmon River, Upper Mainstem (above Redfish Lake)

5.1.31.1 Background

The watersheds occupied by this population have been degraded from their historical conditions and are believed to be limiting for spring/summer chinook because of flow, altered channel morphology, and grazing. The natural hydrologic regime in the Upper Mainstem Salmon (from the East Fork confluence to the headwaters) has been altered by streamflow withdrawals. The effects from these pressures include a reduction in base flow conditions and some modifications of flow timing (NWPPC 2004 draft Salmon River Subbasin Plan). Sedimentation from various land use activities has impacted habitat quality and quantity in the mainstem from the East Fork confluence to the headwaters (NWPPC 2004 draft Salmon River Subbasin Plan). Roads, timber harvest, grazing, and changes to the hydrologic regime of the small Upper Salmon tributaries have acted alone or cumulatively to contribute excessive amounts of fine sediment to channels (NWPPC 2004 draft Salmon River Subbasin Plan). In Table 5-1, *Index of Potential to Increase Population* was rated very high based upon the difference in average redd counts between the ten-year base period and the most recent ten years (491/14). *Qualitative Assessment of Potential to Improve/Increase Habitat* was rated high based upon the degree of habitat degradation, and *Ecological Improvement Potential* was rated medium to high based upon the degree of habitat degradation in relation to the difference between 32 percent baseline and 100 percent recent redd counts (157/14)¹. *Improvement Potential Adjusted Based on Practical Constraints* was rated low to medium.

5.1.31.2 Suggested Mitigation Measures and Constraints

Ecological Improvement Potential was rated low, because recent redd counts (474) are already higher than expected for this degraded habitat when compared with recent redd counts in wilderness areas (445).¹ No specific measures are recommended at this time.

¹This evaluation is based upon status trajectories of populations in nearby wilderness areas. In those areas, despite relatively unchanged habitat conditions, populations have declined to 32 percent of the abundance levels observed in the 1950s and 1960s. This suggests that the decline of populations is being significantly affected by factors outside of the tributary subbasin. Given the proximity of this subbasin to those wilderness subbasins and the similarity in life histories of the populations, it is reasonable to assume that improvement potential in this subbasin would be similarly constrained by those exogenous factors driving population declines in the wilderness areas. Consequently, it is likely that increases in population survival resulting from habitat improvement in this subbasin would be limited by factors outside of the subbasin to no more than approximately 32 percent of the population's observed survival level in the reference period (1950s and 1960s).

5.2 LITERATURE CITED

To be completed.