5.0 RECOVERY GOALS AND PLANNING TARGETS

5.1 VISION STATEMENT

Defining recovery goals and planning targets begins with establishment of a vision statement for the recovery region. The vision statement provides the context within which recovery goals and planning targets are set and strategies and actions are identified. The following vision statement for the Snake River Salmon Recovery Plan is based largely on statements from the Tucannon River, Asotin Creek, Walla Walla River, Grande Ronde River, and Lower Snake Mainstem subbasin plans:

> *Develop and maintain a healthy ecosystem that contributes to the rebuilding of key fish populations by providing abundant, productive, and diverse populations of aquatic species that support the social, cultural, and economic well-being of the communities both within and outside the recovery region.*

The vision statement includes: 1) meeting recovery goals established by NMFS for listed populations of anadromous fish species and by U.S. Fish and Wildlife Service for bull trout, 2) achieving healthy and harvestable populations of listed species in affected subbasins, and 3) realizing these objectives while recognizing that local culture and economies (agriculture, urban development, logging, power production, recreation, and other activities) are beneficial to the health of the human environment within the recovery region.

The SRSRB, in consultation with the RTT, has defined salmon recovery at two levels: recovery and restoration. Recovery is defined as meeting ESA de-listing requirements based on VSP criteria. The RTT considers that some limited harvest, both tribal and non-tribal, could occur during the recovery period. The goal of restoration is attainment of conditions that provide increased harvest opportunity for local communities and tribes, thereby meeting treaty trust and treaty rights, as well as fisheries mitigation objectives for mainstem dams.

Rebuilding key fish populations is based on achieving defined recovery goals. Planning targets are established to provide a "step by step" achievement of those goals. The approaches to achievement of the targets (and, eventually, recovery goals) are the strategies adopted by the SRSRB (Chapter 6.0). Strategies lead to actions and groups of actions designed to accomplish specific improvements in habitat or the other "Hs" (Chapter 7.0).This plan assumes a 15-year planning period, that is that all proposed actions will be conducted in the next 15 years. However the SRSRB recognizes that recovery may take additional time and actions that will be identified through adaptive management and monitoring and incorporated into later versions of this plan.

5.2 DESIRED FUTURE CONDITION

The desired future condition is determined by the vision statement: a healthy ecosystem that fulfills the requirements of the key species and the people of the recovery region. The most desirable condition would be an ecosystem that supports abundant, productive, diverse, and widely distributed salmonid populations. In order to reach that condition, there must be adequate and appropriate habitat for all salmonid life stages and free access to that habitat. Harvest must be at levels which do not diminish populations beyond their ability to sustain themselves and hatcheries cannot contribute more risks than benefits to the ecosystem and the salmonid populations. Regardless, hatcheries are congressionally mandated to mitigate for lost harvest opportunities.

Achievement of the desired future condition will be a long-term endeavor; however, the "future" within the context of this planning effort, is defined as fifteen years. Within that time frame, actions can be taken which will improve conditions for the key listed species.

The plan has focused on the 4 "Hs" when considering impacts to salmonids. As pointed out in Chapter 4.0, each of the "Hs" has contributed to the degraded condition of salmonid populations within the recovery region. Therefore, the future desired condition of the recovery region must consider the current and future condition of all the "Hs".

5.2.1 Habitat

In-Region Stream Habitat

The desired future condition for stream habitat within the recovery region would be attainment of watershed conditions where the effects of limiting factors on fish populations (Chapter 4.0) are substantially reduced or eliminated. Table 5-1 shows the general desired future conditions for the recovery region subbasins or watersheds for spring/summer Chinook and/or summer steelhead.

Table 5-1 Desired Future Conditions for Recovery Region Subbasins

Subbasin/Stream	Desired Future Condition
Asotin Creek Walla Walla River	• Restore riparian function and reduce temps • Restore floodplain connectivity • Eliminate passage barriers • Increase in-stream flow
Tucannon River	• Restore riparian function • Improve floodplain connectivity • Eliminate passage barriers
Lower Snake Mainstem Tributaries: Almota, Tenmile, and Deadman creeks	• Reduce fine sediment • Increase in-stream flow • Decrease maximum temperature • Increase large woody debris input
Lower Grande Ronde River	• Increase habitat diversity • Increase habitat quantity increase riparian and LWD
Lower Grande Ronde River: Wenaha River	• Maintain current condition or allow natural processes to improve conditions
Lower Grande Ronde River: Joseph Creek	• Reduce fine sediment • Reduce maximum stream temperatures • Increase habitat quality • Increase habitat quantity

Tables 5-2 through 5-9 show the specific restoration targets for key limiting environmental (EDT) attributes affecting spring/summer Chinook and/or steelhead populations in high priority restoration areas of the recovery region subbasins or watersheds..[19] The desired future habitat conditions are expressed in terms of "percent restoration" of key limiting environmental attributes in the designated high priority restoration areas. The values represent the degree to which historical and normative conditions are restored for a given attribute in a given Geographic Area and are expressed as a mean over all reaches. Although the actions described in Chapter 7.0 will be implemented only in the Washington portion of each subbasin, the habitat assumptions for reaches outside Washington are included because the fish production estimates depend upon habitat conditions improving in out-of-state reaches as well.

[19] Bull trout were not analyzed using EDT because the rule set for this species was not completed at the time the analysis occurred.

Table 5-2 Desired Future Habitat Conditions for Asotin Creek (Expressed in Percent Restoration of Historical Conditions) (Note: Expected similarities for Tenmile and other small tributaries that are part of the Asotin population.)

Geographic Area	Fine Sediment	Substrate Embeddedness	Turbidity	Pools	Pool Tailouts	Backwater Pools	Carcass Loading[a]	Benthic Production[a]	Woody Debris	Riparian Function	Temperature Maximum	Bed Scour	Artificial Confinement	Low Flow	Minimum Channel Width
Lower North Fork	49%	49%	49%	51%	51%	27%	10%	10%	54%	42%	–	50%	25%		–
Lower South Fork	100%	100%	100%	29%	29%	13%	10%	10%	25%	25%	100%	–	25%	–	–
Upper Asotin	50%	50%	50%	67%	67%	11%	10%	10%	21%	25%	100%	–	33%	–	–
Charley Creek	55%	55%	55%	47%	47%	34%	10%	10%	69%	25%	100%	41%	31%	–	–
Middle Asotin[b]	25%	25%	25%	–	–	15%	10%	10%	29%	25%	83%	–	–	–	–
Lower Asotin[b]	50%	50%	50%	–	–	19%	10%	10%	38%	56%	83%	–	–	–	–
Lower George	81%	81%	81%	65%	54%	38%	10%	10%	75%	22%	100%	66%	17%	50%	75%

[a] LWD addition assumed to increase carcass retention, benthic production and area of backwater pools.

[b] Only LWD and Riparian actions target this area directly, but beneficial effects of upstream sediment loading and temperature reduction programs are assumed to propagate downstream.

Table 5-3 Desired Future Habitat Conditions for the Tucannon River Expressed in Percent Restoration of Historical Conditions

Geographic Area	Fine Sediment	Substrate Embeddedness	Turbidity	Pools	Pool Tailouts	Backwater Pools[a]	Carcass Loading[a]	Benthic Production[a]	Woody Debris	Riparian Function	Temperature Maximum	Bed Scour	Artificial Confinement
Mouth Tucannon[a]	11%	11%	11%	–	–	–	–	–	–	–	3%	–	–
Lower Tucannon[a]	11%	11%	11%	–	–	–	–	–	–	–	46%	–	–
Tucannon River, Pataha Creek to Marengo	56%	56%	56%	39%	39%	22%	9%	22%	43%	31%	100%	100%	9%
Tucannon River, Maregno to Tumalum Creek	–	–	–	38%	38%	–	–	–	–	–	63%	100%	9%
Tucannon River, Tumalum Creek to Hatchery	–	–	–	33%	36%	11%	5%	11%	23%	29%	40%	–	–
Tucannon River, Hatchery to Little Tucannon River	–	–	–	24%	24%	21%	8%	21%	42%	22%	–	–	20%
Mountain Tucannon	–	–	–	28%	28%	10%	8%	10%	20%	27%	–	–	20%

[a] LWD addition assumed to increase carcass retention, benthic production and area of backwater pools.

Table 5-4 Desired Future Habitat Conditions for the Walla Walla Mainstem, North Fork, and South Fork Expressed in Percent Restoration of Historical Conditions

Geographic Area	Fine Sediment	Substrate Embeddedness	Turbidity	Pools	Pool Tailouts	Carcass Loading	Benthic Production	Backwater Pools	Woody Debris	Riparian Function	Temperature Maximum	Temperature Minimum	Bed Scour	Artificial Confinement
Walla Walla River (Mill Creek – E.L. WW)	100%	100%	100%	100%	100%	8%	19%	19%	38%	33%	100%	100%	15%	15%
Walla Walla River (E.L. WW – Tumalum Bridge)	100%	100%	100%	67%	67%	10%	25%	25%	50%	27%	100%	100%	23%	23%
Walla Walla River (Tumalum Bridge – Nursery Bridge)	50%	50%	50%	50%	50%	8%	20%	20%	40%	18%	5%	0%	25%	25%
Walla Walla River (Nursery Bridge – L. WW)	0%	0%	0%	0%	0%	8%	20%	20%	40%	18%	5%	0%	13%	13%
Walla Walla River (L. WW – Forks)	0%	0%	0%	0%	0%	3%	7%	7%	13%	8%	5%	0%	25%	25%
South Fork WW (mouth – Elbow)	50%	50%	50%	0%	0%	8%	19%	19%	38%	44%	5%	0%	17%	17%
North Fork (mouth – L. Meadows Canyon Creek (plus L. Meadows)	0%	0%	17%	17%	17%	4%	9%	9%	18%	6%	5%	0%	18%	18%

Table 5-5 Desired Future Habitat Conditions for the Touchet River and Tributaries Expressed in Percent Restoration of Historical Conditions

Geographic Area	Fine Sediment	Substrate Embeddedness	Turbidity	Pools	Pool Tailouts	Carcass Loading	Benthic Production	Backwater Pools	Woody Debris	Riparian Function	Temperature Maximum	Temperature Minimum	Bed Scour	Artificial Confinement
Coppei Creek (mainstem only)	100%	100%	100%	50%	50%	10%	25%	25%	50%	50%	100%	0%	33%	33%
Touchet River (Coppei-forks, plus Whiskey)	57%	57%	57%	36%	36%	9%	22%	22%	44%	33%	84%	84%	23%	23%
South Fork Touchet Mainstem	50%	50%	50%	100%	100%	3%	8%	8%	17%	11%	33%	33%	11%	11%
South Fork Touchet Tributaries	63%	63%	63%	53%	53%	4%	9%	9%	18%	33%	0%	0%	8%	8%
North Fork Touchet Mainstem	50%	50%	50%	24%	24%	8%	19%	19%	39%	10%	28%	28%	6%	6%
North Fork Touchet Tributaries (excluding Wolf)	0%	0%	0%	67%	67%	4%	10%	10%	20%	0%	0%	0%	0%	0%
Wolf Fork (mouth – Coates plus Robinson & Coates)	50%	50%	50%	45%	45%	10%	24%	24%	48%	39%	75%	75%	28%	28%
Wolf Fork (Coates to access limit, plus Whitney)	0%	0%	0%	66%	66%	3%	8%	8%	17%	25%	0%	0%	7%	7%

Table 5-6 Desired Future Habitat Conditions for Joseph Creek Expressed in Percent Restoration of Historical Conditions

Geographic Area	Bed Scour	Benthic Production	Channel Length & Gradient	Artificial Confinement	Embeddedness	High and Flashy Flow	Low Flow	Fine Sediment	Harass	Off-Channel Habitat	Pools	Predation Risk	Riparian Function	Salmon Carcasses	Temperature – Minimum	Temperature Maximum	Turbidity	Woody Debris	Withdrawals	Width 0 Minimum	Width 0 Maximum
Lower Joseph Creek	13%	50%	33%	17%	13%	13%	13%	47%	17%	13%	30%	17%	12%	2%	13%	13%	47%	20%	17%	33%	33%
Cottonwood Creek	29%	57%	71%	36%	34%	29%	35%	55%	36%	29%	40%	36%	31%	4%	29%	34%	55%	19%	36%	71%	71%
Swamp Creek	40%	50%	100%	50%	41%	40%	41%	41%	50%	40%	41%	50%	37%	5%	40%	41%	41%	10%	50%	100%	100%
Upper Joseph Creek	27%	50%	67%	33%	28%	27%	27%	44%	33%	27%	35%	33%	25%	3%	27%	27%	44%	15%	33%	67%	67%
Crow Creek	24%	50%	60%	30%	27%	24%	27%	47%	30%	24%	36%	30%	24%	3%	24%	27%	47%	17%	30%	60%	60%
Lower Chesnimnus Creek	13%	50%	33%	17%	17%	13%	15%	51%	25%	16%	43%	17%	15%	2%	13%	15%	51%	30%	17%	33%	33%
Upper Chesnimnus Creek	38%	47%	94%	50%	43%	38%	39%	43%	49%	39%	40%	47%	36%	5%	38%	39%	43%	10%	47%	94%	94%
Joseph misc. tribs	40%	50%	100%	50%	40%	40%	40%	40%	50%	40%	40%	50%	35%	5%	40%	40%	40%	10%	50%	100%	100%

Table 5-7 Desired Future Habitat Conditions for Lower Grande Ronde River Expressed in Percent Restoration of Historical Conditions

Geographic Area	Bed Scour	Benthic Production	Artificial Confinement	Embeddedness	Flow (peak)	Flow (low)	Fine Sediment	Harassment	Backwater Pools	Primary Pools	Off-Channel Habitat	Obstructions	Predation Risk	Riparian Function	Temperature – Minimum	Temperature Maximum	Turbidity	Woody Debris
Courtney Creek	40%	50%	50%	29%	40%	40%	29%	50%	19%	24%	40%	0%	50%	28%	40%	29%	40%	21%
Grossman Creek	0%	0%	0%	25%	0%	0%	14%	0%	10%	18%	0%	0%	0%	25%	0%	25%	0%	25%
Lower Grande Ronde (mouth to Wenaha)	0%	0%	0%	1%	0%	1%	1%	0%	1%	1%	0%	0%	%	1%	0%	0%	1%	2%
Lower Grande Ronde (Wenaha to Wallowa)	40%	50%	50%	40%	40%	25%	37%	50%	37%	37%	40%	0%	50%	35%	40%	40%	37%	12%
Lower Grande Ronde tribs (Shumaker Creek to 2nd Bear Creek)	0%	0%	0%	16%	0%	9%	16%	0%	8%	13%	0%	100%	0%	17%	0%	16%	8%	18%
Lower Grande Ronde tribs (Ward Canyon Creek to 1st GR Sheep Cr)	40%	50%	47%	30%	40%	40%	30%	50%	37%	38%	40%	0%	50%	19%	40%	28%	29%	12%
Lower Mud Creek (mouth to Tope Creek)	40%	50%	50%	18%	40%	40%	18%	19%	17%	19%	14%	0%	50%	16%	40%	34%	13%	11%
Lower Wenaha River (mouth to Weller Creek)	40%	50%	50%	20%	40%	40%	20%	50%	40%	40%	40%	0%	50%	17%	40%	40%	20%	10%
Upper Mud Creek (Tope Creek to headwaters)	40%	50%	50%	11%	40%	20%	11%	28%	15%	15%	21%	0%	50%	9%	40%	14%	11%	4%
Upper Wenaha River (Weller Creek to forks)	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Wenaha misc. tribs (Weller Creek to Beaver-Wenaha Creek)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Wildcat Creek	40%	50%	50%	29%	40%	40%	29%	50%	15%	21%	40%	0%	50%	27%	40%	29%	40%	23%

Table 5-8 Desired Future Habitat Conditions for Almota Creek Expressed in Percent Restoration of Historical Conditions

Reach	Fines	Embeddedness	Turbidity	Riparian Function	Woody Debris	Pools	Bed Scour
Almota Creek, mouth to Little Almota Creek	50%	50%	50%	–	13%	–	–
Little Almota, mouth to headcut	–	–	–	–	17%	–	–
Little Almota, headcut to cascade/culvert near Little Almota Road	–	–	–	–	17%	–	–
Almota Creek, L. Almota Creek to Second L. Almota Creek (Hungate Grade)	50%	50%	50%	33%	13%	13%	–
Second L. Almota Creek, mouth to impassibly steep in Sec 18	–	–	–	–	17%	–	–
Almota Creek, Second Little Almota Creek to unnamed RB ephemeral stream below confined reach	50%	50%	50%	33%	13%	–	–
Almota Creek, confined reach ending at forks in Sec 11	25%	25%	25%	–	17%	17%	61%
North Branch of upper Almota, mouth to impassibly steep and dewatered section	25%	25%	25%	–	17%	17%	74%
Almota Creek, forks in Sec 11 to impassibly steep section	25%	25%	25%	–	17%	–	–

Table 5-9 Desired Future Habitat Conditions for Deadman Creek Expressed in Percent Restoration of Historical Conditions

Reach	Fines	Embeddedness	Turbidity	Riparian Function	Woody Debris	Pools	Temperature
Deadman Creek embayment	–	–	–	–	14%	–	–
Deadman Creek, embayment to Willow Gulch Creek	–	–	–	–	14%	–	–
Deadman Creek, Willow Gulch Creek to Ping Gulch Creek	–	–	–	–	14%	–	–
Ping Gulch Creek, mouth to bridge at Leonard property	–	–	–	–	14%	–	–
Deadman Creek, Ping Gulch Creek to Lynn Gulch Creek	35%	35%	35%	17%	14%	14%	100%
Lynn Gulch Creek, mouth to perched culvert near mouth	–	–	–	–	14%	–	–
Lynn Gulch Creek, culvert to historical access limit at confluence of East. Lynn Gulch Creek	–	–	–	–	14%	–	–
Deadman Creek, Lynn Gulch Creek to confluence of NF and SF Deadman	27%	27%	27%	25%	14%	14%	–
NF Deadman Creek, mouth to current access limit at intermittent zone	–	–	–	–	14%	–	–
NF Deadman Creek, end of current access zone to historical access limit at forks of NF	–	–	–	–	14%	–	–
SF Deadman Creek, mouth to access limit at confluence of SF Deadman Gulch	50%	50%	50%	–	14%	14%	–

It should be noted that the desired future habitat conditions for these populations and subbasins are expressed in terms of “percent restoration of historical/normative conditions” which means the degree to which optimal conditions are restored to a particular area for a given environmental condition given only natural constraints. Percent restoration is calculated as (C – R) / (C – H), where C is the current value of a parameter, R is the assumed value after some restoration actions, and H is the historical value, which is assumed to represent the best value possible given the constraints of geology, natural weather patterns, etc.

Estuarine habitat

The 2004 BiOp for the Federal Columbia River Power System envisions a future condition where estuarine habitat is increased in quantity and quality. This is consistent with the Lower Columbia River Subbasin Plan (LCFRB 2004), which defines the future desired condition in the estuary as the following:

- Tidal swamps and marsh habitat would be restored in the estuary and tidal freshwater portion of the lower Columbia River. Connections between the river and the tidal floodplains would be restored along with riparian conditions and functions.
- The effects of toxic contaminants on salmonid and wildlife fitness and survival in the Columbia River estuary, lower mainstem, and near-shore ocean would be limited. Mitigation would be provided for channel dredging activities in the estuary and lower mainstem river including sediment delivery processes and conditions affecting the Columbia River estuary and lower mainstem.
- Through modifications in the annual water budget, the flow regime in the estuary and lower Columbia River would be managed to simulate peak seasonal discharge, increase the variability of flows during periods of salmonid emigration, and restore tidal channel complexity in the estuary.
- Bird predation on juvenile salmon in the lower Columbia River and estuary would be reduced through actions designed to spread bird-nesting areas over a larger area.

The NMFS Estuary Recovery Plan Module (see Appendix I) contains further information on actions within the estuary.

5.2.2 Harvest

For harvest, the desired future condition includes healthy ecosystems with abundant, productive, and diverse populations of key species. Viable and sustainable harvest opportunities would be available inside and outside the recovery region. Fisheries would be at levels allowing the meaningful exercise of tribal fishing rights and there would be viable and sustainable commercial and recreational fisheries for all citizens and to meet mitigation goals. Harvest would not adversely affect abundance, productivity, distribution, and genetic diversity of any key species.

Harvest management in all areas would be based on the abundance of the weakest components. Harvest opportunities would be optimized by the use of selective fishing strategies and/or terminal fishery areas targeting abundant stocks while minimizing impacts to weak stocks. Key management information would be accurate, timely, and comprehensive; fishery management agencies would take timely actions to keep harvests within pre-determined limits. Enforcement would be sufficient to reduce violations to insignificant levels.

Allocations of harvest opportunity among fisheries would be fair and equitable; measures would be taken to ensure that harvest opportunity is more equitably shared between Snake River and lower Columbia fisheries to allow increased terminal harvest opportunities for Chinook fisheries. Harvest-related impacts to essential fish habitat would be minimal or non-existent. Fishery management authorities and processes throughout the range of the key species would:

- be coordinated to ensure goals are met
- involve the tribes and states as co-managers
- be fair and equitable for harvest opportunities among parties and geographic areas of Lower Columbia and terminal or local areas
- be transparent and actively seek input from affected and interested individuals, organizations, and government institutions
- regularly review the adequacy of management plans and objectives
- be funded adequately to achieve their missions (including monitoring)

The general harvest goals for the future desired condition are as follows:

- Assure the meaningful exercise of tribal and non-tribal fishing rights within and outside the recovery region
- In the short term, establish harvest rates consistent with timely recovery and restoration of listed populations
- Enhance sustainable tribal and non-tribal fishing opportunities in the long term based on the productivity of affected populations and to meet harvest augmentation or mitigation programs
- Maintain or develop new harvest techniques that reduce harvest impacts to weak or listed stocks while increasing fishing opportunities for strong stocks
- Minimize adverse social, economic, and cultural impacts of harvest measures
- Maximize harvest of hatchery fish to minimize adverse genetic effects on wild stocks
- Maintain fishing opportunities for trout and other resident species; manage resident fisheries to ensure little or no adverse impact to key species

Increased harvest opportunity for salmon in the Snake River and its tributaries is a particularly important component of the desired future condition for citizens of the Snake River Basin. When the desired future condition is realized, it would include fisheries for spring/summer Chinook in the Tucannon, Walla Walla, Grande Ronde and Snake rivers, and fall Chinook in the Snake and lower Grande Ronde rivers. These new fisheries would be based on fish counts at mainstem dams, so that allowable harvest would increase for larger returns while still providing sufficient escapement for rebuilding. It is believed that a "sliding-scale" fishery would permit rebuilding of listed populations and could, therefore, be instituted before de-listing.

5.2.3 Hydro

It is assumed that future conditions will be as outlined in NMFS implementation plan for the Federal Columbia River Power System (NOAA 2204a).

5.2.4 Hatcheries

Future hatchery operations and releases will follow the terms outlined in the HGMPs for each program and will meet mitigation and recovery needs and provide for robust local fisheries.

5.3 RECOVERY GOALS

Setting recovery or de-listing goals for anadromous fish populations within the recovery region is the responsibility of NMFS, in coordination with fisheries co-managers. NMFS, through ICTRT, is working to establish biologically based viability criteria for application to ESUs of salmon and steelhead listed under ESA. The viability criteria are the basis for the recovery goals and will be used to determine whether or not a salmon population can sustain itself over time (i.e., be de-listed).

When NMFS considers if a population is recovered and can therefore be de-listed it must consider the same listing factors (or threats) used when placing a population on the endangered species list. The five factors to consider are:

A. The present or threatened destruction, modification, or curtailment of [the species'] habitat or range.

B. Over-utilization for commercial, recreational, scientific or educational purposes.

C. Disease or predation

D. The inadequacy of existing regulatory mechanisms.

E. Other natural or manmade factors affecting its continued existence.

NMFS has further defined each of these factors into specific criteria (see Appendix J) to help ensure that underlying causes of decline have been addressed and mitigated prior to considering a species for de-listing. Along with the numeric viability criteria discussed below these more qualitative criteria will inform future NMFS status reviews and potential de-listing decisions.

The viability criteria have led NMFS to define a Viable Salmon Population in terms of the four attributes previously discussed in Section 4.3.1: 1) abundance, 2) productivity, 3) life history diversity, and 4) spatial structure (McElhany et al. 2000). The ICTRT is responsible for developing specific quantifiable targets for these criteria. To date, preliminary criteria for some of the attributes have been defined for spring/summer Chinook and steelhead (ICTRT 2004). Fall Chinook and sockeye VSP criteria are expected in the near future.

Abundance and productivity are the parameters which have been most fully described at this point. Spatial structure and diversity, for the most part, are still in conceptual stages. Therefore, recovery targets for the spring/summer Chinook and steelhead populations considered by this plan will be based mainly on abundance and productivity. It is expected that, if abundance and productivity increase, spatial structure and diversity may also be positively affected. However, this will remain speculative until spatial structure and diversity can be quantified and easily translated into recovery goals. This recovery plan will be modified when quantifiable targets are established by ICTRT for spatial structure and diversity.

It should be noted that recovery goals for abundance and productivity are not related to "restoration goals" proposed by various agencies for specific populations (Section 5.4). Recovery goals apply to ESAs; restoration objectives also meet mitigation requirements established by Congress. Recovery goals are based on viability of a population; restoration goals are aimed at achieving "healthy and harvestable" populations. Restoration goals do not incorporate a relationship between productivity and abundance and often do not specify a productivity value at all. Generally, restoration goals are abundance targets for a specific population or production area and often specify the number of naturally produced and hatchery-origin fish that comprise the total abundance goal. Sometimes a harvest goal is also specified for populations. As will be seen in Section 5.4, recovery goals and restoration goals are fundamentally different. ESA recovery efforts meet a congressional mandate to maintain or restore ESA listed species. LSRCP mitigation and tribal restoration efforts are also congressionally mandated to provide for lost fisheries.

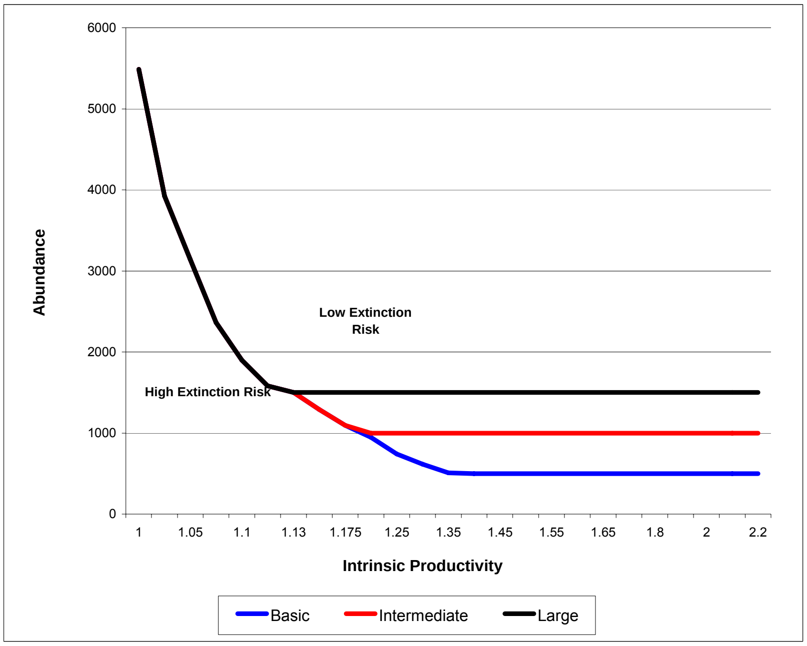
5.3.1 Abundance and Productivity

Abundance and productivity are population characteristics which are linked to one another. The viability criteria for abundance and productivity, and the "viability curves" that can be generated from them, have already been defined in general terms in Chapter 4.0. The specific viability curves developed for the three ESUs covered by this recovery plan (Snake River summer steelhead, Snake River spring/summer Chinook, and mid-Columbia summer steelhead) are described below.

The ICTRT established a goal for abundance and productivity that is based on the relationship between the two parameters and not for absolute values for populations or ESUs individually. The viability curves establish the recovery targets for the populations and/or ESUs, i.e., for a population to be a viable, the point where abundance and productivity meet must be located in the "low extinction risk" area above the curve. The differences between the viability curves for the various ESUs reflect differences in mean demographic and life history pattern variables, as well as differences in the variability of natural smolt-to-adult survival rates between ESUs. Intrinsic population sizes were defined by the ICTRT as 500 spawners in a Basic population; 1,000 spawners in an Intermediate population; and 2,000 in a Large population. Note that these numbers would be measured on the spawning grounds after accounting for any harvest or passage losses.

Figure 5-1 shows the viability curves for Snake River and mid-Columbia summer steelhead. Figure 5-2 shows the viability curve for Snake River spring/summer Chinook.

Snake River Steelhead			
Intrinsic Productivity (Recruits per Spawner)	Abundance		
	Basic	Intermediate	Large
1	5487	5487	5487
1.025	3925	3925	3925
1.05	3144	3144	3144
1.075	2363	2363	2363
1.1	1900	1900	1900
1.125	1582	1582	1582
1.13	1500	1500	1500
1.15	1290	1290	1500
1.175	1094	1094	1500
1.2	946	1000	1500
1.25	742	1000	1500
1.3	615	1000	1500
1.35	508	1000	1500
1.4	500	1000	1500
1.45	500	1000	1500
1.5	500	1000	1500
1.55	500	1000	1500
1.6	500	1000	1500
1.65	500	1000	1500
1.7	500	1000	1500
1.8	500	1000	1500
1.9	500	1000	1500
2	500	1000	1500
2.1	500	1000	1500
2.2	500	1000	1500



Mid-Columbia Steelhead			
Intrinsic Productivity (Recruits per Spawner)	Abundance		
	Basic	Intermediate	Large
1.05	12515	12515	12515
1.075	9391	9391	9391
1.1	6268	6268	6268
1.125	5000	5000	5000
1.13	4600	4600	4600
1.15	4203	4203	4203
1.175	3565	3565	3565
1.2	2818	2818	2818
1.25	2041	2041	2041
1.3	1581	1581	1581
1.35	1269	1269	1500
1.4	957	1000	1500
1.45	800	1000	1500
1.5	682	1000	1500
1.55	605	1000	1500
1.6	540	1000	1500
1.65	500	1000	1500
1.7	500	1000	1500
1.8	500	1000	1500
1.9	500	1000	1500
2	500	1000	1500
2.1	500	1000	1500
2.2	500	1000	1500

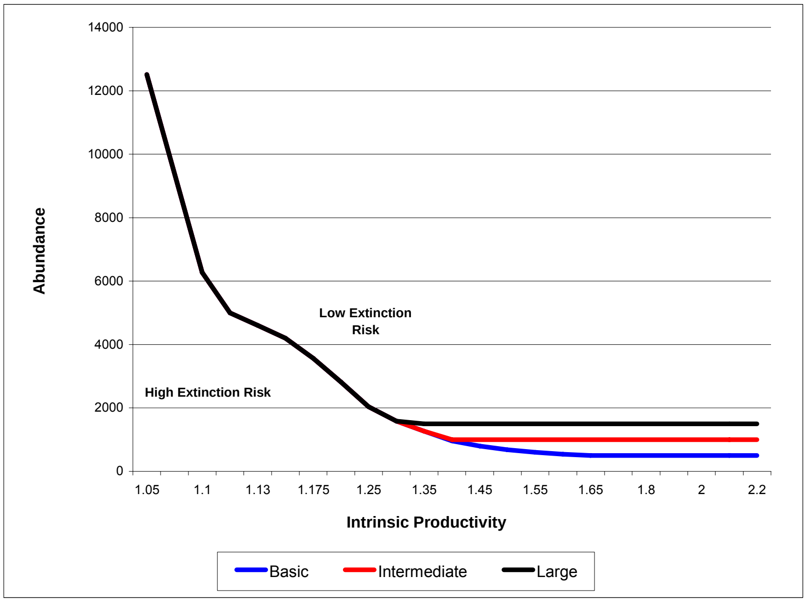


Figure 5-1 Viability Curves for Summer Steelhead Populations within the Snake River and Mid-Columbia ESUs

Snake River Spring/Summer Chinook			
Intrinsic Productivity (Recruits per Spawner)	Abundance		
	Basic	Intermediate	Large
1	7829	7829	7829
1.05	5096	5096	5096
1.075	4315	4315	4315
1.1	3925	3925	3925
1.13	3144	3144	3144
1.15	2518	2518	2518
1.175	2200	2200	2200
1.2	2000	2000	2000
1.25	1581	1581	1581
1.3	1350	1350	1350
1.35	1152	1152	1152
1.4	1035	1035	1035
1.45	957	957	1000
1.5	858	858	1000
1.55	785	785	1000
1.6	722	750	1000
1.65	650	750	1000
1.7	605	750	1000
1.8	527	750	1000
1.9	500	750	1000
2	500	750	1000
2.1	500	750	1000
2.2	500	750	1000
2.3	500	750	1000
2.4	500	750	1000

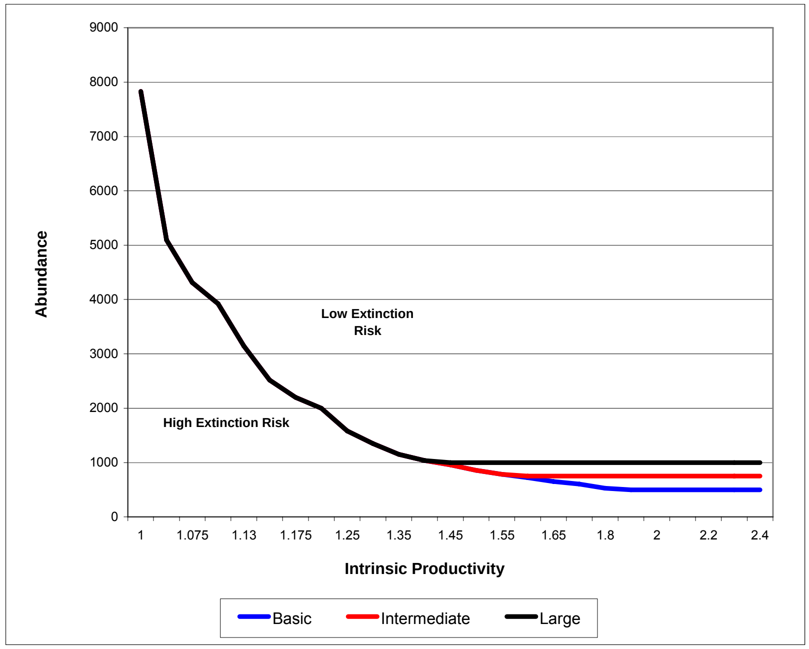


Figure 5-2 Viability Curves for Spring/Summer Chinook Populations within the Snake River ESU

In Chapter 7.0, the effect the SRSRP is expected to have on each species is shown as points (triangles) on this same type of curve (Figure 5-3). For each population, points will be presented for current empirical estimates of abundance, EDT Current, EDT Historical, PFC, restoration goals and expected abundance with full implementation of the recovery plan. Points below the viability curve will indicate that the population is at a higher risk of extinction than points above the line.

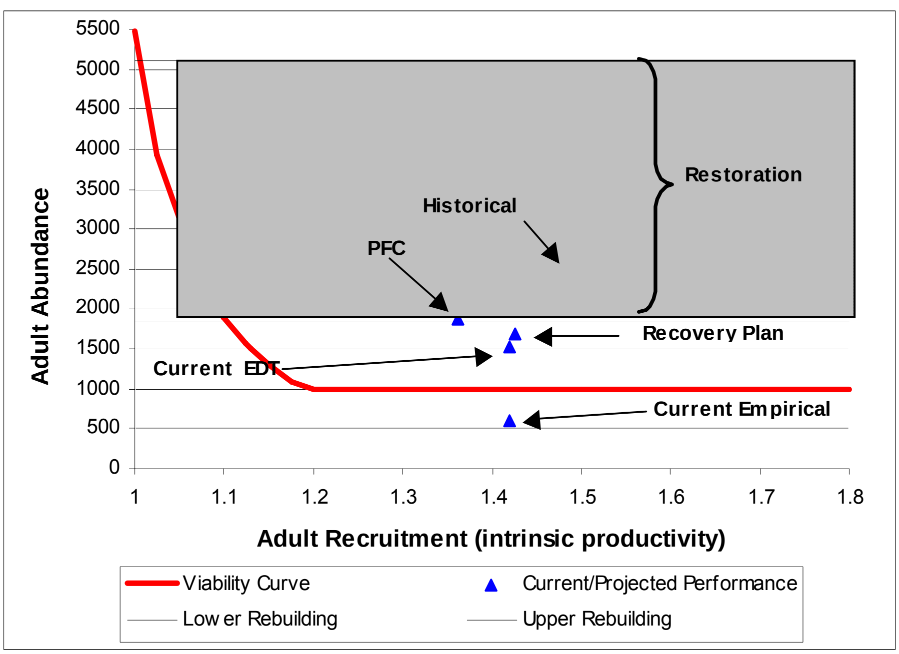


Figure 5-3 Example of Viability Curves used to Present Effects of SRSRP on Each Population

5.3.2 Spatial Structure and Diversity

The basic concepts underlying the VSP parameters associated with spatial structure and diversity were discussed in Section 4.3.1. Recovery goals for spatial structure and diversity cannot yet be quantified. In most instances, the details of assessing these parameters can be described only conceptually. Some of the quantitative measures the ICTRT has proposed to assess risk in terms of spatial structure and diversity have yet to be completed. In addition, a method of combining several independent VSP parameters to develop an integrated risk level for either spatial structure or diversity has not been developed either for a single population or for the constituent populations within an ESU. Moreover, some of these VSP criteria require information that is currently not available or which, in some cases, will never be available, such as historical demographic and genetic information.

Spatial Structure

The measurements based on spatial structure are expressed partly in terms of Major and minor Spawning Aggregations (MSAs and mSAs). Spawning aggregations are a function of the estimated capacity of a defined portion of a subbasin to support spawning adults during historical (pre-development) periods. The definitions and geographic locations of MSAs and mSAs within the recovery region were presented in Section 3.1.1.

Two independent VSP criteria for spatial structure have been developed by the ICTRT based on the number and spatial arrangement of MSAs and the relative current/historical size of spawning areas. Table 5-10 summarizes the criteria for "number and spatial arrangement of MSAs". Table 5-11 summarizes the criteria for "relative size of spawning areas".

Table 5-10 Preliminary Criteria Describing Risk Levels Associated with the Number and Spatial Arrangement of Spawning Areas (ICTRT 2004)

Factor & Metric	Pop. Group	Very Low Risk	Low Risk	Moderate Risk	High Risk
Factor: Number and distribution of spawning areas **Metric**: Number of MSAs, distribution of MSAs, and quantity of habitat outside MSAs	A B C D	4 or more MSAs in a non-linear configuration separated by >2 confluences **OR** 3 MSAs plus the sum of the other areas outside of MSAs with 75% of the capacity of an MSA	2-3 MSAs in a non-linear population separated by 1 or more confluences	Linear with capacity for 1 or more MSAs in linear configuration **OR** 1 MSA plus one or more branches (outside of MSA) that sum to greater than 75% of the capacity of an MSA	Linear, single MSA with "other" areas branched or linear that contributed less than 75% of the capacity of an MSA **OR** Branched MSA with no source area (capacity <500)

Source: ICTRT 2004.

Table 5-11 Preliminary Criteria Describing Risk Levels Associated with Spatial Extent or Range of Population (ICTRT 2004)

Factor & Metric	Pop. Group	Very Low Risk	Low Risk	Moderate Risk	High Risk
Factor: Spatial extent or range of population **Metric**: Proportion of historical range occupies	A	Not attainable	Current spawning distribution mirrors historical (over 10 years compared to Intrinsic Potential mapping)	Historical range reduced: Absence of spawners from 25 to 50% of the habitat within the historical distribution (IP mapping)	Historical range reduced: Absence of spawners from 50% or more of the habitat within the historical distribution based in Intrinsic Potential analysis
Metric: Presence/absence of spawners in MSAs	B C D	Population support 3 or more MSAs **AND** Current spawning distribution mirrors historical (observations over 10 or more years compared to Intrinsic Potential mapping)	Historical rand reduced: Absence of spawners from 20% or less of the habitat of the historical distribution based on Intrinsic Potential analysis	Historical range reduced: Absence of spawners from 25 to 50% of the habitat of the historical distribution based on Intrinsic Potential analysis **OR** Absence of spawners from 25% or more of the historical MSAs	Historical range reduced: Absence of spawners from 50% or more of the habitat of the historical distribution based on Intrinsic Potential analysis **OR** Absence of spawners from 50% or more of the historical MSAs

Source: ICTRT 2004.

The number and spatial arrangement of the MSAs present in a subbasin impact the extinction risk for each fish population. The higher the number of MSAs present, the lower the risk of population extinction. Extinction risk is further reduced if the MSAs are not connected, thereby reducing risks associated with catastrophic events (ICTRT 2004).

Diversity

The ICTRT considers the concepts of "diversity" and "maintaining natural levels of variation" to be equivalent. The ICTRT analysis of diversity has four components:

1. Maintenance of natural genotypes and phenotypes
2. Maintenance of natural patterns of gene flow
3. Maintenance of occupancy in a natural variety of habitat types
4. Maintenance of the integrity of natural processes and selective pressures

The first component (maintenance of natural genotypes and phenotypes) is subdivided into maintenance of major life history strategies, e.g., anadromy vs. residency for rainbow/steelhead populations, maintenance of spring and summer runs for Chinook, and maintenance of “other” phenotypic characteristics, e.g., migration timing, age structure, size-at-age. The second component (maintenance of natural patterns of gene flow) is subdivided into risk associated with local and non-local spawners (hatchery and natural) and risk associated with a change in the spatial gaps between spawning aggregations.

Diversity, then, contains both environmental and biological components. Maintenance of natural patterns of gene flow are impossible if portions of the historical range have been blocked, just as occupancy of a natural variety of habitat types is impossible if historically distinctive habitats have been lost or degraded. Similarly, natural genotypic and phenotypic variability is impossible if genetically distinct population segments have been lost.

Currently, few of the diversity VSP criteria can be applied to any of the populations within the recovery area because some of the criteria have not yet been completely defined (including spawner composition, habitat diversity, and integrity of natural processes standards) and insufficient information exists to evaluate a population. In addition, the ICTRT has yet to develop a method of integrating risk factors across all diversity criteria or across VSP criteria of different types, for example, across abundance, productivity, spatial structure, and diversity parameters, to compute an “overall risk” assessment. Consequently, because populations cannot be defined fully for all four VSP parameters, abundance and productivity are currently the best criteria available to determine risk to salmonid populations.

The ICTRT (2004) has developed tables to assign diversity risk to all aspects of diversity risk. Those tables are not presented in this plan because most of the diversity criteria is too preliminary to be useful. The parameter has not been fully defined and information necessary to defining and understanding the parameter is lacking. Of the six components and subcomponents of diversity, only three can be applied to recovery populations with any degree of confidence: maintenance of major life history types, percent local hatchery spawners, and current/historical changes in gaps between spawning aggregations. Risks associated with the components could be quite large, but because risks cannot be assessed at this point, there is no way to estimate their size or importance. These components can be only approximated. An estimation of associated risks was described in Chapter 4.0.

Objectives (targets) have not been established for historical phenotypic factors like fecundity, age structure, and morphology, because these parameters will never be known. Instead, these parameters will be monitored for change over time as indicators of increased or decreased life history diversity. An objective of the monitoring program will be to ensure that human actions do not negatively impact species diversity (Chapter 8.0).

In general, viability increases as the number of life history patterns and the amount of phenotypic and genetic variation increase. Because it has been shown that some stocks of hatchery fish are less fit in the wild than naturally-spawned native fish, population viability is assumed to decrease if too many hatchery fish are allowed to spawn in the wild. The ICTRT has concluded that population risk increases with an increase in the proportion of hatchery fish on the spawning grounds. The risk is less if the hatchery fish are of local origin and greater if they are non-native or if the hatchery actively selects broodstock based on specific characteristics, such as size (Chilcote 2001; Flagg et al. 2000; Steward and Bjornn 1990).

The following general diversity/spatial structure planning targets have been established for each subbasin and population in the absence of the ICTRT scoring system:

- Where possible, expand current spawning distributions to match the historic condition as defined by the MSAs in each subbasin.

- Develop populations that are separated spatially so that risks due to catastrophic events are reduced.
- The similarity between current and historical patterns of juvenile rearing distribution, habitat usage, and life history types should be increased, insofar as the historical patterns can be reconstructed.

The assumption behind the planning targets is that life history diversity increases as more adults and juveniles occupy more areas at different times in a subbasin. Increased diversity results from the fish adapting to a wider range of habitat conditions. Focusing on increasing habitat usage in a subbasin also simplifies the monitoring program needed to track progress (Chapter 8.0).

In the future, the ICTRT will have a completed scoring system for determining when a population achieves the recovery objectives for spatial structure and diversity. Once completed, the scoring system will be reviewed by the RTT and the recovery plan will be revised as needed to ensure that the data needed to score each population is collected.

5.3.3 Bull Trout Recovery Goals

Bull trout recovery goals and targets for the Snake River Washington Recovery Unit (SRWRU), Umatilla-Walla Walla Recovery Unit (UWWRU), and Grande Ronde Recovery Unit (GRRU) were developed by the USFWS and fisheries co-managers in draft recovery plans for each unit.

The common goal for all of the bull trout recovery units is to "ensure the long-term persistence of self-sustaining, complex interacting groups of bull trout distributed throughout the species' native range, so that the species can be delisted" (USFWS 2002a).

To achieve that goal, the USFWS has identified objectives for all units:

- Maintain the current distribution of bull trout and restore distribution in previously occupied areas.
- Maintain stable or increasing trends in bull trout abundance.
- Restore and maintain suitable habitat conditions for all life stages and forms (resident and fluvial) of bull trout.
- Conserve genetic diversity and provide opportunity for genetic exchange.

Snake River Washington Recovery Unit (SRWRU)

It has been estimated that at least 50 to 100 spawners per year are needed to minimize potential inbreeding effects within local bull trout populations. In addition, a population size of between 500 and 1,000 adults in a core area is needed to minimize the deleterious effects of genetic variation from drift. Based on this and other criteria, USFWS established the following draft recovery criteria for the SRWRU:

- Distribution criteria will be met when the total number of stable local populations has increased to 3 in the Tucannon River Core Area (the Tucannon mainstem from Cummings Creek to Panjab Creek, the Panjab Creek watershed, and the Tucannon mainstem above Panjab Creek) and 2 in the Asotin Creek Core Area (the George Creek watershed and the North Fork Asotin Creek watershed). These local populations must be broadly distributed throughout the Tucannon River and Asotin Creek core areas. "Broadly distributed" implies that the local populations are able to access and are actively using habitat that fully provides for spawning, rearing, foraging, migrating and overwintering needs at recovered abundance levels.

- Trend criteria will be met when the overall bull trout population in the Snake River Washington Recovery Unit is accepted, under contemporary standards of the time, as stable or increasing, based on at least 10 years of spawning survey data.
- Abundance criteria will be met when the Tucannon River Core Area supports an average of 1,000 adult bull trout annually and when the Asotin Creek Core Area supports an average of 700 adult bull trout annually.
- Connectivity criteria will be met when migratory forms are present in most populations and when intact migratory corridors among all local populations in both core areas provide an opportunity for genetic exchange and diversity.

Grande Ronde Recovery Unit (GRRU)

The only GRRU bull trout population pertinent to the Snake River Salmon Recovery Region is the Wenaha River population[20]. All other local populations reside outside of the SE Washington recovery region. The draft recovery criteria identified by the USFWS for the GRRU are as follows:

- The distribution criterion will be met when bull trout are distributed among eight populations in the Grande Ronde Core Area and one in the Little Minam Core Area. In the Grande Ronde Core Area, local populations would include the Upper Grande Ronde complex, Catherine Creek, Indian Creek, the Minam River/Deer Creek complex, the Lostine River/Bear Creek complex, Hurricane Creek, Lookingglass Creek, and the Wenaha River. The potential status of bull trout in Menatchee Creek is relevant to this recovery plan. If the Menatchee Creek population is ultimately determined to be a core area, the distribution requirement would include it.
- The abundance criterion will be met when at least 6,000 adults are observed over all populations for at least two generations (10 to15 years). These fish should include both resident and fluvial life history forms, and should include 5,000 fish in the Grande Ronde Core Area and 1,000 fish in the Little Minam Core Area. The Wenaha River population is included in the Grande Ronde Core Area. The abundance goal for bull trout in the Grande Ronde Core Area entails securing (protecting) bull trout habitat and distribution in the Wenaha River.
- The abundance trend criterion will be met when adult abundance in the bull trout recovery unit is stable or increasing at or above the recovered abundance level for at least two generations (10 years).
- The connectivity criterion will be met when stream conditions in the mainstem Grande Ronde and at Snake River hydro projects have been corrected. No mention is made of obstructions in the Wenaha River.

Umatilla-Walla Walla Recovery Unit (UWWRU)

The draft recovery criteria identified for the UWWRU apply to both the Umatilla River and Walla Walla River, but only the Walla Walla River lies within the Snake River Salmon Recovery Region. Bull trout in the Walla Walla River have been divided into two core areas, the Walla Walla River Core Area and the Touchet River Core Area. The Walla Walla Core Area supports two local populations, the upper Mill Creek population, and the upper Walla Walla population (the North Fork and South Fork of the Walla

---

[20] Menatchee Creek is a potential bull trout core area within Washington State. It is not, however, currently classified as a core area because there is insufficient spawner survey data to determine if sufficient numbers of bull trout spawn in it to warrant classification as a core area (G. Mendel, WDFW, personal communication, Feb. 2005).

Walla River). The Touchet River Core Area supports three local populations, the North Fork Touchet River population, the South Fork Touchet River population and the Wolf Fork Touchet River population.

- The distribution requirement for the Walla Walla and Touchet Core Areas will be met when bull trout are distributed in all five local populations.
- The abundance requirement will be met for the Walla Walla Core Area when 1,500 to 3,000 spawning bull trout adults have been observed over a 10 to 14 year period. The abundance requirement for the Touchet River Core Area will have been met when 500 to 1,000 spawning bull trout adults have been observed over a comparable period.
- The abundance trend requirement will be met when the numbers of adult bull trout exhibit a stable or increasing trend for at least two generations (10 to 14 years) at or above the recovered abundance level for both core areas.
- Connectivity requirements will be met when:
  - The fluvial component of each local population is maintained, and
  - The impact of barriers to movement has been reduced to the point that fluvial fish can effectively move between spawning and wintering areas, and fish can move between local populations within both core areas, at least during certain seasons.

5.4 RESTORATION GOALS

The primary purpose of this recovery plan is to present implementable actions that can lead to the de-listing of populations of salmon, steelhead, and bull trout within the recovery area. However, residents and regional fish managers are clearly interested in more than de-listing. The ultimate goal of the fish restoration effort is to create conditions allowing the establishment of salmonid populations that are both viable, harvestable, and of sufficient abundance to meet other Congressionally mandated responsibilities Thus, de-listing salmonid populations is first step on the road to restoring populations within the recovery region.

The restoration goals summarized in Table 5-12 are aimed at achieving healthy, sustainable and harvestable salmonid populations. The goals are expressed in terms of adult abundance and exceed the values needed for ESA delisting and sustainability. The abundance goals in Table 5-12 were proposed in tribal recovery plans, the Lower Snake River Compensation Plan, and other documents. It is important to note that single rebuilding goals for each population, and the proportion of hatchery and naturally-produced fish that would comprise them, have not been agreed to by the fishery co-managers at this time.

Table 5-12 Restoration Goals Previously Proposed by Various Agencies and Tribes for Steelhead and Spring/Summer Chinook Populations within the Washington Snake River Recovery Area

Subbasin or Region	Species	Location	Source Plan or Process[1]	Total Return Objective	Natural Returns	Hatchery Returns	Broodstock Requirement (if specified)	Harvest Portion
Above Lower Granite Dam	Spring Chinook	Lower Granite Dam	CRFMP	35,000	25,000	10,000		
Entire Snake Basin	Spring Chinook		LSRCP	122,200	63,544	58,656		
Entire Snake Basin	Steelhead		LSRCP	114,800	59,700	55,100		
Entire Snake Basin	Fall Chinook		LSRCP	32,660	14,360	18,300		
Above Lower Granite Dam	Steelhead	Lower Granite Dam	CRFMP	62,200				
All of SE Washington	Steelhead	All of SE Washington	LSRCP	9,700	5,044	4,656		
Walla Walla	Spring Chinook	Entire Subbasin	SBP	5,000	2,000	3,000		2,441
	Spring Chinook	Entire Subbasin	TRP	5,000	2,000	3,000		2,500
	Spring Chinook	Entire Subbasin	SBS	5,500 [2]	3,000	2,500		2,000
	Spring Chinook	Entire Subbasin	HMP	8,625 [3]	4,500	4,125		3,000
	Steelhead	Entire Subbasin	SBP	11,000	3,000	8,000		7,680
	Steelhead	Entire Subbasin	TRP	11,000	3,000	8,000		7,680
	Steelhead	Entire Subbasin	WDG	1,600	NA	NA		NA
	Steelhead	Touchet R	1998 SaSI	600	600	NA		NA
	Steelhead	Walla Walla	1998 SaSI	NA	NA	NA		NA
	Steelhead	Walla Walla [4]	LSRCP	1,875	975	900		900
	Steelhead	Touchet R	LSRCP	1,562	812	750		750
	Steelhead	Walla Walla [4]	PPP	368	368	NA		NA
	Steelhead	Touchet R	PPP	1,022	1,022	NA		NA

(continued)

Table 5-12 Restoration Goals Previously Proposed by Various Agencies and Tribes for Steelhead and Spring/Summer Chinook Populations within the Washington Snake River Recovery Area (continued)

Subbasin or Region	Species	Location	Source Plan or Process[1]	Total Return Objective	Natural Returns	Hatchery Returns	Broodstock Requirement (if specified)	Harvest Portion
Tucannon	Spring Chinook	Entire Subbasin	Nez Perce Tribe	2,400 - 3,400	2,000	Undefined	160	1,200
	Spring Chinook	Entire Subbasin	TRP	3,000				
	Spring Chinook	Entire Subbasin	SBP	3,000				
	Spring Chinook	Entire Subbasin	NMFS 2005		750			
	Spring Chinook	Entire Subbasin	LSRCP	2,400	1248	1,152		
	Steelhead	Entire Subbasin	TRP	2,200				
	Steelhead	Entire Subbasin	SBP	3,400				
	Steelhead	Entire Subbasin	NMFS 2002		1,300			
	Steelhead	Entire Subbasin	SaSI 1998 & 2004		600			
	Steelhead	Entire Subbasin	LSRCP	1,823	875	948		
Asotin	Spring Chinook	Entire Subbasin	NMFS 2005		750			
	Steelhead	Entire Subbasin	NMFS 2002		400			
	Steelhead	Entire Subbasin	SaSI 2004		160			
Grande Ronde	Steelhead	Washington Portion	LSRCP	5,086	3,585	1,501		
	Steelhead	Entire subbasin	LSRCP	19,133	9,949	9,184		
	Steelhead	WA portion only	2001 PPP		1,662			
	Spring Chinook	Entire Subbasin	TRP	16,000				
	Spring Chinook	Entire Subbasin	SBP	16,000 (12,000 spawners)				4,000

(continued)

Table 5-12 Restoration Goals Previously Proposed by Various Agencies and Tribes for Steelhead and Spring/Summer Chinook Populations within the Washington Snake River Recovery Area (continued)

Subbasin or Region	Species	Location	Source Plan or Process[1]	Total Return Objective	Natural Returns	Hatchery Returns	Broodstock Requirement (if specified)	Harvest Portion
	Spring Chinook	Wenaha	NMFS 2005	750	750			
	Steelhead	Entire Subbasin	TRP	27,500				
	Steelhead	Entire Subbasin	SBP	27,500 (18,450 spawners)				9,050
	Steelhead	Entire Subbasin	NMFS 2002		10,000			

[1] Sources of spring Chinook and steelhead objectives are as follows:

LSRCP = (Bugert et al. 1990), the 1990 Lower Snake River Compensation Plan

SBP = 1990 use 2004 plans Subbasin Plans for appropriate subbasins. Grande Ronde (ODFW 1990), Tucannon (WDF 1990) and Walla Walla (CTUIR 1990).

TRP = (CRITFC 1995), the Tribal Restoration Plan, "Spirit of the Salmon"

SBS = (NPPC 2001), the 2001 Walla Walla Subbasin Summary. Reflects only CTUIR goals for steelhead, ODFW/CTUIR consensus for Chinook.

HMP = (CTUIR 2004), the 2004 CTUIR draft Walla Walla Hatchery Master Plan – CTUIR goals only

WDG = 1984 WA Dept. of Game goal (personal communication, Glen Mendel, WDFW, March 2005).

SaSI = (WDFW 1998), the 1998 Salmon and Steelhead Inventory by WDFW

SaSI = (WDFW 2004), the 2004 Salmon and Steelhead Inventory by WDFW

PPP = 2001 Potential Parr Production model results by WDFW (personal communication, Glen Mendel, WDFW, March 2005).

NMFS 2002 = (NMFS 2002), the 2002 interim abundance and productivity targets for Interior Columbia Basin

NMFS 2005 = (NMFS 2005), the 2005 interim abundance and productivity targets for Interior Columbia Basin Kevin check and add to references section

CRFMP = the expired Columbia River Fisheries Management Plan established interim management goals for fish passing

Lower Granite Dam, but did not specify goals specific to the Snake River or its tributaries

[2] CTUIR and ODFW only agreed

[3] CTUIR only goal.

[4] WA portion of the Walla Walla Basin only, excluding Touchet Basin