

APPENDIX B

Current Harvest Authorities, Regulations, and Impacts

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IN-REGION HARVEST

The stocks addressed by this recovery plan currently are harvested in fisheries both within and beyond the recovery area, although to a much more limited extent compared to harvests of the previous century. In-region fisheries include recreational fisheries for salmon and steelhead in Washington and Idaho. Treaty Indian ceremonial and subsistence (C&S) fisheries are conducted in the Snake River watershed and are regulated by the individual tribes. In-region tribal commercial fisheries have not occurred in recent history and are not planned in the near future. Fisheries within the recovery region are very restricted in order to protect ESA-listed stocks.

Salmon Fisheries

State-managed recreational fisheries that impact listed stocks are addressed and authorized under the Endangered Species Act 4(d) and Section 10 processes. Washington recreational fisheries that may impact Snake River listed stocks are addressed in a Fisheries Management and Evaluation Plan (FMEP) proposed by Washington Department of Fish and Wildlife currently undergoing review by NMFS (WDFW 2001). The FMEP objectives incorporate the general salmon and steelhead management objective of the Lower Snake River Compensation Plan (LSRCP), which is to provide hatchery-origin salmon and steelhead for harvest opportunities in a manner that does not jeopardize the survival and recovery of listed steelhead or salmon in the Snake River Basin in Washington. The FMEP covers the Snake River Management Area (SRMA), which is similar, but not identical, to the recovery region in this Plan. The SRMA includes the anadromous portions of the Snake River and its tributaries, including the Tucannon River, Asotin Creek, and Grande Ronde River and their tributaries within the State of Washington only. The specific objectives of the FMEP are:

- Return adult hatchery salmon and steelhead to meet mitigation goals of the LSRCP and provide harvest opportunities. Annual mitigation goals are 18,300 fall Chinook, 1,152 adult spring Chinook to the Tucannon River, and 3,006 returning adult steelhead to the SRMA. (1,500 to Grande Ronde, 500 to Snake mainstem, 875 to Tucannon, and 130 to Asotin).
- Minimize adverse genetic or stock effects from the harvest augmentation/mitigation program on wild steelhead in the basin, or elsewhere. Maximize harvest of hatchery steelhead to minimize straying or natural spawning by hatchery produced steelhead.
- Maintain recreational stream fishing opportunities for anglers to catch trout or other species. Minimize the adverse effects of these fisheries on listed wild steelhead, salmon, or bull trout and use harvest as a means to minimize the potential competition or predation effects of introduced gamefish on listed salmonids.

The FMEP notes that any harvest of listed stocks is the result of incidental or indirect take. All recreational fisheries for salmon and steelhead in the SRMA are selective fisheries targeting hatchery fish. Impacts to listed stocks may occur by catch and release during selective fishing, or during fisheries targeted at trout or warmwater species (WDFW 2001).

From 1977 to 2000, salmon-directed sport fisheries were not allowed in the SRMA with the exception of some limited fisheries for jack salmon, because Snake River salmon populations were at such low levels that WDFW was concerned that salmon-directed fisheries would have adverse effects on wild stocks. Beginning in 2001, WDFW authorized a spring Chinook fishery in the Snake River Basin targeted at

hatchery stocks in the month of May, which coincides with peak migration of hatchery fish. Wild fish (not marked with a clipped adipose fin) had to be released. The FMEP states that WDFW will consider implementing salmon fisheries directed at hatchery stocks, if Snake River salmon populations are at levels which would preclude adverse impacts on wild stocks, and in cooperation with treaty tribes and local and federal governments. The 2001 spring Chinook fishery was implemented with the expectation that the total Columbia and Snake recreational impact would not exceed 2 percent of the Snake River spring Chinook population. Future salmon-directed fisheries may not be managed in conjunction with Columbia River fisheries (WDFW 2001).

In 2003 and 2004, WDFW allowed a sport fishery targeting spring Chinook salmon on the Snake River under emergency in-season procedures. The original 2003 season was April 26 through May 31, seven days per week, in the area from the Texas Rapids boat launch upstream to the USACE boat launch (approximately one mile) upstream of Little Goose Dam. The preseason estimated harvest target was 700 hatchery adult spring Chinook, with an allowable ESA impact of 75 wild fish mortalities. Assuming a 10percent mortality rate on released fish, this allowed for 750 wild adult encounters. The daily limit for the original season consisted of one hatchery (adipose fin-clipped) spring Chinook salmon (adult or jack) per day, with a minimum size of 12 inches. In-season tracking of the upriver spring Chinook return and estimates of harvest in lower river fisheries indicated a larger than predicted return, which allowed the fishery to be extended through June 15. During the extension from June 1 to June 15, the daily limit was increased to two hatchery fish per day. Anglers were required to use barbless hooks, with no more than 5/8 inch from point to shank throughout the fishery. Using angler interviews and estimates of total effort, investigators estimated that a total of 796 spring Chinook adults and jacks were harvested, and 799 were released. By applying a 10 percent mortality rate to the number of wild adults released, it was estimated that the ESA impact level was a total of 41 wild adult spring Chinook, compared to the allowable impact of 75 (Trump and Mendel 2003).

In 2004, the Snake River recreational spring Chinook fishery was scheduled to open April 16 and run through May 31. Two areas of the Snake River were open in 2004: 1) the area from the Texas Rapids boat launch upstream to the USACE boat launch (approximately one mile) upstream of Little Goose Dam (Little Goose fishery), and 2) the area from the mouth of Wawawai Creek (approximately three miles) upstream of Lower Granite Dam to Red Wolf Bridge in Clarkston (Lower Granite fishery). The preseason run estimate was 57,800 spring Chinook at Lower Granite Dam with about 25percent estimated to be of wild origin. The estimated harvest target was 2,000 hatchery adult spring Chinook, with an allowable ESA impact of 116 wild fish mortalities (0.2 percent ESA impact on wild Chinook estimated at Columbia River mouth). Assuming a 10 percent mortality rate on released fish, this allowed for 1,156 wild adult encounters. These fisheries were open seven days per week, with a daily limit of two hatchery Chinook salmon (adult or jack) per day, with a minimum size of 12 inches. Anglers were required to use barbless hooks, with hooks of no more than 5/8 inch from point to shank. Based on in-season monitoring, the estimated run size was reduced from 360,700 to approximately 200,000 fish. Estimates of harvest in lower river fisheries and the reduced run size prediction indicated the 2 percent ESA impact for non-tribal fisheries had been achieved, forcing the closure of the season on May 7. For the Lower Granite fishery, angler interviews sampled no harvested Chinook. For the Little Goose fishery, an estimated 1,245 spring Chinook adults and jacks were harvested, and 357 were released. The estimated ESA impact level was a total of 34 adult spring Chinook, well below the allowable impact of 116 wild adults (Trump and Mendel 2004).

The State of Washington sport fishing rules effective May 1, 2004 through April 30, 2005 (WDFW 2004a) include a new rule for freshwater fisheries in 2004 which makes it unlawful to totally remove salmon or steelhead from the water if it is unlawful to retain those salmon or steelhead. Anglers are

advised to use special precautions to minimize handling (and therefore hook-and-release mortality) of fish that must be released.

The Idaho sport fisheries are authorized under a Section 10(a)(1)(B) permit issued by NMFS for takes of endangered/threatened species. The permit constitutes authorization for implementation of the IDFG General Fishing Regulations, the Anadromous Salmon Fishing Regulations, and the Steelhead Fishing Regulations. The permit for 2004 authorizes a spring Chinook season in the recovery region on the Snake River roughly coinciding with the Idaho/Washington boundary from mid-April until the end of May or until either the annual incidental take quota is reached or the harvest objective is attained. This fishery targets the early arriving, unlisted, hatchery-produced Chinook salmon destined for Rapid River Hatchery and Hells Canyon Dam. The annual incidental take quota is determined using a sliding scale, based on the predicted return to Lower Granite Dam of naturally-produced listed spring Chinook. The harvest rate on this stock would vary between 0 percent and 2 percent under the sliding scale (NMFS 2002a). The State of Idaho regulations for 2004 provided for a limited spring Chinook salmon season from April 24 until further notice or May 31, whichever comes first, in the area from Lewiston up to a point near the mouth of the Grande Ronde River. The daily bag limit is 2 adipose fin-clipped (hatchery) Chinook. All salmon with a non-clipped adipose fin must be released immediately, and barb-less hooks are required (IDFG 2004).

The Idaho/Washington boundary fishery for Chinook impacts listed spring/summer Chinook, but does not impact listed sockeye, fall Chinook, or steelhead because these runs occur later in the year than the April-May fishery. The May 31 (or earlier) closure of this fishery is designed to limit exposure of listed spring/summer Chinook destined for the Imnaha and Grande Ronde Rivers. For the 2002 fishery, NMFS estimated that the boundary area fishery would catch and release 570 listed spring/summer Chinook with a mortality of 57 fish (NMFS assumes a 10percent catch and release mortality for selective salmon fisheries). The total impact for all Idaho sport Chinook fisheries for 2002 was estimated to be 1,800 fish caught and released, with a mortality of 180 fish. This represents 0.57 percent of the naturally-produced spring/summer Chinook projected to cross Lower Granite Dam in 2002. NMFS concluded that this fishery would not substantially affect the abundance, population growth rate, spatial structure, or diversity of listed spring/summer Chinook (NMFS 2002b).

Limited tribal C&S fisheries targeted at salmon occur within the Snake River Basin, but most of these fisheries are outside the recovery area in Idaho and Oregon. For 2004, the Nez Perce Tribe and the Confederated Tribes of the Umatilla Indian Reservation proposed a joint fishery on the Tucannon River that would harvest 2 non-listed hatchery spring/summer Chinook and 2 listed hatchery spring/summer Chinook, out of a predicted return of 488 listed hatchery fish. No listed wild fish were expected to be taken. Also in 2004, the Nez Perce Tribe proposed to harvest spring/summer Chinook in the mainstem Snake above the mouth of the Clearwater River. The proposed harvest was 1,045 non-listed hatchery fish, 8 listed hatchery fish from a predicted return of 397, and 31 listed wild fish from a predicted return of 26,786 (C. LeFleur, personal communication).

Steelhead Fisheries

The States of Washington and Idaho allow in-region recreational fisheries directed at steelhead. In Washington, regulations direct harvest on surplus hatchery fish while protecting wild fish. Wild steelhead release regulations were adopted by WDFW for this region beginning in 1986. Area closures and fishery timing are used to optimize wild steelhead protection in the recreational fishery. The FMEP states that the upper Tucannon River watershed, and all tributaries to Tucannon and Grande Ronde rivers are closed to steelhead fishing to protect important natural spawning and rearing areas. Also, steelhead fishing is closed in Asotin Creek to protect wild steelhead in the Basin. WDFW discontinued the release of hatchery

steelhead in the Asotin watershed to protect wild populations and to provide a wild steelhead refuge area (WDFW 2001).

The WDFW sport fishing regulations for 2004-2005 include the following special rules for steelhead fishing in streams of the recovery region. In addition, the statewide rules require release of all wild steelhead year-round, and steelhead required to be released may not be totally removed from the water (WDFW 2004a):

Asotin Creek, including all tributaries: closed to fishing for steelhead.

Grande Ronde River

from mouth to County Rd. Bridge: release all steelhead.

from County Rd. Bridge to Oregon state line and all tributaries: steelhead fishing allowed November 1 to April 15, min. size 20", Daily limit 3 hatchery steelhead. Barb-less hooks required. Tributaries closed to fishing for steelhead.

Mill Creek

from mouth to Roosevelt St. Bridge: steelhead fishing allowed June 1 - August 31, 3 hatchery steelhead may be retained; and September 1 - April 15.

from Roosevelt St. Bridge upstream: closed to fishing for steelhead.

Palouse River: steelhead fishing is allowed year-round, min. size 20", daily limit 2 hatchery steelhead.

Pataha Creek: steelhead may be retained June 1 - October 31, min. size 20", daily limit 2 hatchery fish. Selective gear rules are in effect upstream from city limits of Pomeroy.

Snake River: steelhead may be retained September 1 - March 31, daily limit of 2 hatchery fish, barb-less hooks required.

Touchet River

from mouth to confluence of North and South Forks: steelhead fishing allowed November 1 - April 15, daily limit 3 hatchery steelhead and brown trout combined. Barb-less hooks required.

tributaries: closed to fishing for steelhead.

Tucannon River

from mouth to Tucannon Hatchery Bridge: steelhead fishing allowed June 1 - October 31, daily limit of 3 hatchery steelhead and selective gear rules apply upstream of Turner Rd. bridge (selective gear rules require artificial flies or lures with a single barb-less hook - no bait); and November 1 - April 15, daily limit of 3 hatchery steelhead, barb-less hooks required.

upstream of Tucannon Hatchery Bridge: closed to fishing for steelhead.

Walla Walla River

from mouth to Touchet River: steelhead fishing allowed June 1 - March 31, daily limit of 3 hatchery steelhead, barb-less hooks required.

from Touchet River to Oregon state boundary and all tributaries, except Mill Creek and Touchet River: steelhead fishing is allowed June 1 - October 31, daily limit of 3 hatchery steelhead; and November 1 - April 15, daily limit of 3 hatchery steelhead, barb-less hooks required, and all tributaries closed to fishing for steelhead.

The most recent published data on Washington steelhead sport catch is for the 2000-2001 season. The catch of marked and unmarked summer steelhead in the Snake mainstem and the Grande Ronde, Tucannon, and Walla Walla rivers, is reported as follows.

Table B-1 Catch of Marked and Unmarked Summer Steelhead in Washington Rivers, 2000-2001

		Marked	Unmarked	Total
Snake River	Below Ice Harbor Dam	114	4	118
	Ice Harbor Dam to Lower Monumental Dam	1,766	49	1,815
	Lower Monumental Dam to Little Goose Dam	2,721	106	2,827
	Little Goose Dam to Lower Granite Dam	1,153	13	1,166
	Lower Granite Dam to Clarkston	3,295	141	3,436
	Snake River above Clarkston	4,255	110	4,365
	Snake River System Totals	13,304	423	13,727
Grande Ronde		5,320	70	5,390
Tucannon River		594	18	612
Walla Walla River	Mill Creek	15	0	15
	Touchet River and North Fork	422	18	440
	Walla Walla River	987	22	1,009
	Walla Walla System Totals	1,424	40	1,464

Source: WDFW 2004b.

Based on creel surveys and hooking mortality calculations, the WDFW FMEP estimates that up to 3 percent of the wild steelhead may be lost due to hook and release mortality in the recreational steelhead fisheries on the Snake River, Tucannon River, and Grande Ronde River (Table B-2). Creel surveys also indicate that Chinook salmon are caught at less than 0.1 percent of the steelhead catch (Tables B-3 and B-4), and that sockeye salmon are not taken by steelhead anglers in the Snake River (WDFW 2001).

Trout and other resident fish fisheries in the region also may impact wild salmon and steelhead populations. Trout fisheries have the potential to impact juvenile listed salmonids, but time and area restrictions have been implemented by WDFW to reduce impacts. The trout season is open June 1 to October 31 but closed during the height of the smolt outmigration, which occurs prior to June 1. Selective fishing rules are in place in the upper Tucannon River, Pataha Creek, Asotin Creek, and in the Grande Ronde River. These rules require the use of flies or lures and prohibit bait, among other restrictions. Plants of hatchery trout for put-and-take fisheries are restricted to areas that will minimize impacts on salmon and steelhead smolts. Data are not available on the impact of resident fish fisheries on salmon and steelhead, but based on knowledge of the local fisheries, WDFW expects that these impacts are minor (Table 5) (WDFW 2001).

Table B-2 Wild Steelhead Incidental Harvest Mortality (Exploitation) from Snake River Mainstem and Tucannon and Grande Ronde River Fisheries Based On Creel Surveys and Catch Record Cards (CRC) From the 1997 to 2000 Steelhead Fisheries

River Reach	Wild (W) SH Released ¹	Hatchery (H) SH Caught ¹	Total H Kept	Proportion of W to H Kept	CRC Harvest SH ²	Estimated W Handled (Proportion of CRC)	Hooking Mortality (5.1%)	% Wild Hook & Release Mortality Based on CRC
IHR-LMO								
1999-2000	29	69	65	0.45	1,419	633	32	2.3%
1998-1999	30	100	97	0.31	953	295	15	1.6%
1997-1998	93	261	247	0.38	2,721	1,025	52	1.9%
LMO-LGO								
1999-2000	113	425	391	0.29	3,186	921	47	1.5%
1998-1999	43	268	364	0.12	2,075	245	13	0.6%
1997-1998	64	623	591	0.11	4,354	471	24	0.6%
LGO-LGR								
1999-2000	44	169	161	0.27	1,654	452	23	1.4%
1998-1999	22	119	110	0.20	531	106	5	1.0%
1997-1998	17	166	158	0.11	1,247	134	7	0.5%
LGR-Clarkston								
1999-2000	4	12	12	0.33	2,136	712	36	1.7%
1998-1999	11	53	50	0.22	1,399	308	16	1.1%
1997-1998	3	62	60	0.05	2,289	114	6	0.3%
Clarkston-OR								
1999-2000	128	255	214	0.60	3,067	1,834	94	3.1%
1998-1999	131	479	431	0.30	2,654	807	41	1.6%
1997-1998	51	490	407	0.13	4,468	560	29	0.6%
Tucannon								
2000-2001	39	90	60	0.63	N/A	N/A	N/A	N/A
1999-2000	49	199	116	0.42	1,140	482	25	2.2%
1998-1999	18	49	29	0.62	290	180	9	3.2%
1997-1998	32	303	146	0.22	748	164	8	1.1%
Grande Ronde								
2000-2001	8	39	17	0.47	N/A	N/A	N/A	N/A
1999-2000	8	7	2	4.00	2,064	8,256	421	20.4%
1998-1999	5	31	8	0.63	1,470	919	47	3.2%
1997-1998	0	4	2	0.00	4,597	0	0	0.0%
Total	941	4,273	3,738	0.25	44,462	11,193	571	1.3%

¹ Data Collected from creel surveys conducted during the 1997/1998 to 1999/2000 steelhead fisheries.

² Data collected from catch record cards from the 1997/1998 to 1999/2000 steelhead fisheries.

IHR = Ice Harbor Dam. LMO = Lower Monument Dam. LGO = Little Goose Dam. LGR = Lower Granite Dam. SH = Steelhead
Source: WDFW 2001.

Table B-3 Incidental Catch of Salmon in the Snake River Mainstem Steelhead Fisheries Based on Creel Survey Data and Evaluation of CRC

River Reach	Chinook Salmon Released ¹	Hatchery (H) SH Caught ¹	Total H Kept	Proportion of Chinook to H Kept	CRC Harvest of Steelhead ²	Estimated Chinook Handled (Proportion of CRC)	Hooking Mortality (5.1%)
IHR-LMO							
2000-2001	1	130	127	0.008	N/A	N/A	N/A
1999-2000	N/A	69	65	0.000	1,419	N/A	N/A
1998-1999	0	100	97	0.000	953	0	0
1997-1998	0	261	247	0.000	2,721	0	0
LMO-LGO							
2000-2001	0	138	134	0.000	N/A	N/A	N/A
1999-2000	N/A	425	391	0.000	3,186	N/A	N/A
1998-1999	0	268	364	0.000	2,075	0	0
1997-1998	8	623	591	0.014	4,354	60	3
LGO-LGR							
2000-2001	0	54	54	0.000	N/A	N/A	N/A
1999-2000	N/A	169	161	0.000	1,654	N/A	N/A
1998-1999	0	119	110	0.000	531	0	0
1997-1998	9	166	158	0.057	1,247	71	4
LGR-Clarkston							
2000-2001	1	19	18	0.056	N/A	N/A	N/A
1999-2000	N/A	12	12	0.000	2,136	N/A	N/A
1998-1999	0	53	50	0.000	1,399	0	0
1997-1998	0	62	60	0.000	2,289	0	0
Clarkston-OR							
2000-2001	117*	803	625	0.187	N/A	N/A	N/A
1999-2000	N/A	255	214	0.000	3,067	N/A	N/A
1998-1999	9	479	431	0.021	2,654	55	3
1997-1998	2	490	407	0.005	4,468	22	1

¹ Data collected from creel surveys conducted during the 1997/1998 to 2000/2001 steelhead fisheries.

² Data collected from catch record cards from the 1997/1998 to 1999/2000 steelhead fisheries.

* This unusually high number is attributed to an unusually high number of jack salmon (up to 90% of the salmon caught in the creel) milling near the confluence of the Clearwater River and Snake River, and the high concentration of steelhead fisherman in the area. This area was where a majority of the steelhead angling was concentrated during the creel survey, and is where most of the steelhead were being caught in the Snake River mainstem.

IHR = Ice Harbor Dam. LMO = Lower Monument Dam. LGO = Little Goose Dam. LGR = Lower Granite Dam. SH = Steelhead.

Source: WDFW 2001.

Table B-4 Incidental Catch of Salmon in the Tucannon and Grande Ronde Steelhead Fisheries Based on Creel Survey Data and Evaluation of CRC

River	Chinook Salmon Released ¹	Hatchery (H) SH Caught ¹	Total H Kept	Proportion of Chinook to H Kept	CRC Harvest of Steelhead ²	Estimated Chinook Handled (Proportion of CRC)	Hooking Mortality (5.1%)
Tucannon							
2000-2001	1	90	60	0.017	N/A	N/A	N/A
1999-2000	N/A	199	116	0.000	1,140	0	0
1998-1999	0	49	29	0.000	290	0	0
1997-1998	0	303	146	0.000	748	0	0
Grande Ronde							
2000-2001	0	39	17	0.000	N/A	N/A	N/A
1999-2000	N/A	7	2	0.000	2,064	0	0
1998-1999	0	31	8	0.000	1,470	0	0
1997-1998	0	4	2	0.000	4,597	0	0

¹ Data collected from creel surveys conducted during the 1997/1998 to 2000/2001 steelhead fisheries.

² Data collected from catch record cards from the 1997/1998 to 1999/2000 steelhead fisheries.

Source: WDFW 2001.

In Idaho, the Section 10 permit granted by NMFS authorizes a steelhead fishery on the Snake River below Hells Canyon Dam, opening on September 1 and closing on April 30. Only non-listed, hatchery-produced steelhead with a missing adipose fin may be harvested. Wild fish must be released immediately. An incidental take of listed steelhead and fall Chinook salmon from hook and release mortality is authorized annually from 2002 to 2004 for this fishery. No listed spring/summer Chinook are expected to be present during spring or fall steelhead fishing (NMFS 2002a). The 2004 Idaho sport fishing regulations allow a spring steelhead season from January 1 through April 30 and a fall season from September 1 through December 31, on the Snake River below Hells Canyon Dam (including the portion which lies within the recovery area). The daily bag limit is 3 adipose fin-clipped steelhead, and barb-less hooks are required. Anglers also may fish for steelhead on a catch-and-release basis August 1 through December 31 in this area (IDFG 2004).

In the Biological Opinion on the Issuance of the Section 10 Incidental Take Permit, NMFS estimates that 3.25 percent of the wild steelhead entering Idaho each year are incidentally killed in steelhead fisheries targeting unlisted hatchery fish. IDFG believes this estimate to be biased high, because fisheries are limited to times and areas where unlisted hatchery fish are most common and sanctuaries have been created which are closed to fishing where wild fish predominate. Specific information on the impact of the steelhead fishery in the region (on the Snake River above Lewiston and along the Washington-Idaho border) is not provided (NMFS 2002b).

Table 5 Anticipated Encounters (Take) and Estimated Mortality to Listed Stocks Per Fishery, in the SRMA

Affected Stock	Status	Escapement Goal	Fisheries ¹										Total AE	Total EM
			Steelhead		Salmon ²		Res. Trout		Whitefish		Others			
			AE ³	EM ⁴	AE	EM	AE	EM	AE	EM	AE	EM		
Tucannon Summer Steelhead	Depressed	600	275	14	0	0	1,500 parr (15 adult equiv.)	77 par (<1 adult equiv.)	0	0	12 par (<1 adult equiv.)	0	1,512 parr 275 adults	77 par <15 adults
Asotin Creek Summer Steelhead	Depressed	160	0	0	0	0	500 par (5 adult equiv.)	26 parr (<1 adult equiv.)	0	0	2 parr (<1 adult equiv.)	0	502 par 0 adults	26 parr
Snake River Summer Steelhead	N/A	N/A	2,900	148	0	0	1,000 parr (10 adult equiv.)	51 parr (<1 adult equiv.)	0	0	20 parr (<1 adult equiv.)	0	1,020 parr 2,900 adults	51 parr 148 adults
Grande Ronde Summer Steelhead	Depressed	N/A	3,050	156	0	0	1,000 parr (10 adult equiv.)	51 parr (<1 adult equiv.)	0	0	10 parr (<1 adult equiv.)	0	1,010 parr 3,050 adults	51 parr 156 adults
Tucannon Spring Chinook	Depressed	N/A	1	0	N/A	N/A	170 parr (1.7 adult equiv.)	8 parr (<1 adult equiv.)	0	0	12 parr (<1 adult equiv.)	0	182 parr 1 adult	9 parr <1 adult
Asotin Spring Chinook	Critical	N/A	0	0	N/A	N/A	0	0	0	0	2 parr (<1 adult equiv.)	0	2 parr	<1 parr
Snake River Chinook Spring/Summer	Depressed		5	0	N/A	N/A	170 parr (1.7 adult equiv.)	8 parr (<1 adult equiv.)	0	0	20 parr (<1 adult equiv.)	0	190 parr 5 adults	10 parr <1 adult
Snake River Chinook Fall	Depressed	2,500 ⁵	165 ⁶	8	N/A	N/A	500 parr (5 adult equiv.)	26 parr (<1 adult equiv.)	0	0	20 parr (<1 adult equiv.)	0	520 parr 165 adults	26 parr 9 adults
Snake River Sockeye	N/A	N/A	0	0	N/A	N/A	5 parr (<1 adult equiv.)	0	0	0	2 parr (<1 adult equiv.)	0	7 parr	<1 parr

¹ The anticipated encounters for the resident trout, whitefish, and other fisheries are based of SWAGS and professional judgment and knowledge of the local fisheries and angling tendencies. Data are not available for these fisheries' impacts on salmon and steelhead.

Resident trout fisheries in Idaho may impact juvenile steelhead, however state regulations are more restrictive in important production areas. River areas that are rarely occupied by steelhead are open under general fishing regulations, accessible production and rearing areas are covered by “Wild Trout” regulations with a 2-fish limit, and most important production areas are restricted to catch and release fishing with artificial flies and lures with single, barb-less hooks. The encounter rates are expected to be less than 10 percent and mortality rates very low, with an overall population impact in the range of 0.1 to 0.2 percent (NMFS 2002b).

Bull Trout Fisheries

In 1998, the USFWS listed bull trout in the Columbia River Basin as threatened under the ESA. In 2000, WDFW completed a bull trout and Dolly Varden management plan (WDFW 2000), which is intended to be consistent with recovery of bull trout related to the ESA. The goal of the management plan is “To restore/maintain the health and diversity of bull trout and Dolly Varden stocks and their habitats to/at self-sustaining levels that would allow recreational utilization within resource protection guidelines.” Under the plan, recreational fisheries will only be allowed on healthy stocks with surplus production. The plan’s fishery management implementation strategy is as follows:

- “Directed sport fisheries on char will only be allowed on healthy stocks with harvestable surplus. Minimum size limits will be set based on life history type to ensure that a full age- class of females spawn at least once prior to recruitment into the fishery. This will be defined as the youngest age class with a majority (more than 50 percent) of mature females. Directed fisheries will not be allowed on stocks with depressed, critical, or unknown status.
- “Fishing closures for all species will be implemented in areas and times when there is a need to protect critical spawning and rearing native char and when abundance is so low that a stock can’t tolerate incidental harvest.
- “Selective gear restrictions (e.g., use of single barb-less hooks and bait restrictions) for all species will be implemented in areas and times when there is a need to protect critical spawning and rearing char.”

The plan also includes an implementation strategy for monitoring char fisheries:

- “Native char harvest will be monitored by Department Fish and Wildlife Officers during routine and emphasis patrols.
- “The Department may conduct creel surveys to estimate the harvest of native char in directed fisheries and incidentally caught in other fisheries.
- “The Department will determine the feasibility of expanding the current catch record card for recording harvest of native char species.
- “Conduct angler surveys periodically to determine anglers’ knowledge, opinions, and preferences regarding native char management.”

The current Washington sportfishing rules require the release of Dolly Varden/bull trout year-round, except where retention is specifically authorized in the Special Rules. The Special Rules authorize Dolly Varden/bull trout sport fisheries only in a few streams and lakes of the state, and none are authorized within the recovery region (WDFW 2004). In Idaho, the Fish and Game Commission in 1993 declared that bull trout may no longer be harvested anywhere in the State. Idaho rules state that protected fish

species may not be removed from the water, and any caught must be released immediately, unharmed (IDFG 2004).

While there are no currently authorized fisheries for bull trout within the region, there may continue to be harvest-related impacts to bull trout. The USFWS draft recovery plan for bull trout states that angler-related threats could occur due to mis-identification, intentional poaching, or hook and release mortality associated with authorized fisheries. Bull trout may be caught incidentally by anglers fishing for steelhead, resident trout and whitefish (USFWS 2002). Hooking mortality of adult bull trout is known to occur in the Tucannon River during the spring steelhead fishery, but catch rates and mortality estimates have not been quantified. Beginning in 2002, WDFW contacts anglers to determine if they have caught and released bull trout while fishing for steelhead. This information will be used to derive estimates of bull trout abundance and hooking mortality (USFWS 2002).

OUT-OF-REGION HARVEST

Current harvests outside the recovery region, which impact one or more of the stocks addressed in this recovery plan, occur in the ocean and in the Columbia River. Ocean fisheries include non-Indian commercial and sport salmon fisheries off Alaska, Canada, Washington, Oregon, and California, and treaty Indian commercial fisheries off Washington. Columbia River fisheries include non-Indian commercial net fisheries in the spring and fall below Bonneville Dam, recreational fisheries from the mouth of the Columbia to the mouth of the Snake River, and treaty Indian commercial and C&S fisheries above Bonneville Dam. All of these fisheries are strictly controlled to limit impacts to depressed natural and hatchery stocks and ESA-listed stocks, including those addressed by this plan.

Ocean fisheries: Ocean salmon fisheries are governed by the Pacific Salmon Treaty between the Governments of Canada and the U.S. and by the Pacific Coast Salmon Plan prepared by the Pacific Fishery Management Council (PFMC) and implemented by the NMFS. In 1999, the U.S. and Canada agreed on a framework for Chinook fishing regimes for 1999 through 2008. Northern British Columbia and Southeast Alaska fisheries affect far-north migrating Chinook stocks originating in Washington, Oregon, and Idaho, including Columbia and Snake River fall, spring, and summer stocks (PFMC 2004a). Under the agreement, all Chinook fisheries off Southeast Alaska, British Columbia, and the U.S. are to be reduced by specified percentages relative to a base period. For fisheries that are regulated under the individual stock based management approach, which includes U.S. fisheries and some Canadian fisheries, the agreement established obligations to reduce harvest rates on depressed Chinook stocks by 36.5 percent for Canadian fisheries and 40 percent for U.S. fisheries, relative to levels observed during 1979 through 1982. This obligation must be taken into account during U.S. ocean and inside fisheries pre-season management planning processes (PFMC 2004a). The new agreement was reviewed by NMFS under Section 7 of the ESA, and in its biological opinion of November 1999, NMFS determined that the new agreement meets the requirements of the ESA (NMFS 2000).

The PFMC's Salmon Plan manages commercial, recreational, and treaty Indian ocean salmon fisheries off the States of Washington, Oregon and California. This Plan contains fishery management objectives only for Chinook, coho, pink (odd-numbered years), and any salmon species listed under the ESA that is measurably impacted by Council fisheries. The Plan contains no objectives for even-numbered year pink salmon, chum, sockeye, steelhead, or sea-run cutthroat, because catches of these species are inconsequential to rare in Council fisheries (PFMC 2003). Of the stocks addressed by this recovery plan, only one has any significance to Council area ocean salmon fisheries: Snake River fall Chinook. The conservation objective for this stock in the PFMC ocean salmon plan is to meet NMFS' ESA consultation standard, which is to achieve a 30percent reduction from the 1988-1993 average adult equivalent age-3

and age-4 exploitation rate for all ocean fisheries (PFMC 2003). The Lyons Ferry Hatchery fall Chinook stock represents Snake River fall Chinook. Snake River fall Chinook are present in ocean fisheries from central California to southeast Alaska, with the greatest contribution to Canadian fisheries. The primary impacts in Council area fisheries are north of Cape Falcon, Oregon, but also extend to Pigeon Pt., California (PFMC 2004b).

The total ocean landings of Chinook of all stocks from the U.S./Canada border to Cape Falcon averaged 338,400 during the 1976-1980 period. Due to restrictive regulations designed to protect weak stocks, landings declined significantly in the mid-1990s; in 1994, the landings totaled only 4,500 fish. Landings have increased since that time but not to the levels prior to 1980. In 2002, a total of 181,300 Chinook were landed in this area (PFMC 2004a).

Prior to the 2004 fishing season, NMFS provided guidance to the Council on protective measures for species listed under the ESA. For Snake fall Chinook, the guidance was to achieve the consultation standard described above. The NMFS guidance also included Snake River spring/summer Chinook, but prescribed no specific standard, since this stock is a rare occurrence in U.S. ocean fisheries (PFMC 2004c). For the 2004 ocean salmon season, the Snake River fall Chinook standard constrained fisheries north of Cape Falcon. Management objectives for Chinook fisheries in this area are to comply with ESA consultation standards, meet treaty Indian sharing obligations, and to the extent possible, provide for viable ocean and in-river fisheries while meeting natural stock escapement objectives and hatchery fall Chinook brood stock needs. Lower Columbia River and Bonneville Pool hatchery fall Chinook historically have been the major contributors to ocean fishery catches in the Council area north of Cape Falcon. The adopted Chinook quotas in this area for 2004 are 44,500 for commercial troll, 44,500 for recreational, and 49,000 for treaty Indian commercial troll. All NMFS consultation standards for ESA-listed stocks are expected to be met by the Council's adopted management measures for 2004 (PFMC 2004d). In 2003, the Snake River fall Chinook standard did not constrain Council-area fisheries, primarily because of restrictions in other fisheries, especially ocean troll fisheries in Canada (PFMC 2004a).

Ocean exploitation rates on Snake River fall Chinook were reduced by an average of 38percent from 1996 to 1999. Weak stock management constraints in Canada and in the U.S. can in some years reduce harvest rates beyond the standards in the Pacific Salmon Treaty and the ESA consultation standard for Snake River fall Chinook. Given all of these constraints, NMFS and the Federal Caucus stated that they do not foresee the need for additional management actions in ocean fisheries with respect to Columbia Basin stocks (NMFS 2000).

Columbia River Fisheries

River fisheries include all-citizen and treaty Indian commercial fisheries, recreational fisheries, and treaty Indian ceremonial and subsistence (C&S) fisheries. The all-citizen commercial fishery occurs on the mainstem and in selected off-channel fishing areas below Bonneville Dam, while the treaty Indian commercial and C&S fisheries occur above Bonneville Dam. Recreational fishing occurs throughout the Columbia River Basin. Commercial fishing seasons in the mainstem are established by the Columbia River Compact comprised of the Washington Fish and Wildlife Commission and the Oregon Fish and Wildlife Commission. The Columbia River tribes regulate treaty Indian C&S fisheries in the mainstem and tributaries. Recreational fishing regulations are established separately by the management agencies of Washington and Oregon, but are usually identical in concurrent Columbia River waters. All of these fisheries are constrained by the ESA and management agreements negotiated by the parties to *U.S. v. Oregon* (WDFW and ODFW 2002).

Columbia River fisheries can impact all of the Snake River stocks addressed by this recovery plan, with the exception of bull trout. Impacts can include catches in directed salmon and steelhead fisheries as well as bycatch in non-salmonid fisheries. Fisheries in the Columbia Basin are generally divided into a winter/spring/summer season and a fall season, reflecting the timing of the runs. NMFS has conducted Section 7 consultations and prepared biological opinions for both of these seasons based on management agreements negotiated by the parties to *U.S. v. Oregon*.

Winter/spring/summer season: The most recent biological opinion on the winter/spring/summer fisheries was prepared in March 2001 and then supplemented in July 2003. The 2001 BO is based on an Interim Agreement negotiated by the parties regarding management of the winter, spring and summer season fisheries. Some elements of the Agreement were to be in effect for 3 years (2001-2003 seasons), while a harvest rate schedule for upriver spring Chinook was to apply for the next 5 years (through 2005). After 2003, the parties were to have negotiated a revised Columbia River Fish Management Plan (CRFMP), which expired in July 1999. At the time of this writing, the revised CRFMP was still in progress. The principal feature of the Interim Agreement was establishment of allowable harvest rates for listed Snake River and Upper Columbia River spring Chinook stocks based on a sliding scale of abundance. The Agreement also set specific harvest rate limits for Snake River summer Chinook and sockeye (NMFS 2001).

The action area of the BO encompasses the Columbia River and its tributaries from the mouth up to Wanapum Dam, and in the Snake River up to the Washington/Idaho border. This consultation addresses the vast majority of fishery-related impacts to Snake River spring/summer Chinook, Snake River sockeye, and Upper Columbia River spring Chinook. The following fisheries were considered (NMFS 2001):

Non-Indian Fisheries

Commercial

- Winter commercial sturgeon
- Winter commercial salmon
- Experimental commercial salmon - tooth net
- Commercial spring Chinook - select area
- Smelt commercial/test fishery
- Commercial anchovy and herring bait fishery
- Area 2S commercial shad
- Washougal Reef commercial shad
- Commercial sockeye

Recreational

- Spring Chinook - mainstem Columbia River
- Spring Chinook - mainstem Snake River
- Spring Chinook - select area
- Steelhead - mainstem Columbia
- Spring Chinook/steelhead - Ringold
- Smelt
- Shad
- Sockeye

Sturgeon
Warmwater species

Test and Assessment Fisheries

Sturgeon tagging stock assessment
Research on effects of selective fishing gear

Non-Treaty Indian Subsistence Fisheries

Spring Chinook Indian subsistence fishery - Wanapum Tribe

Treaty Indian Fisheries

Commercial winter season gillnet
Spring and summer commercial and C&S mainstem fisheries
Commercial shad
Tributary fisheries
C&S and commercial dipnet smelt
Commercial sturgeon set line

The All-H paper (NMFS 2000) established a 9 percent cap on harvest rate for fisheries affecting Snake River and Upper Columbia River spring Chinook, but the Interim Agreement established a sliding scale harvest rate which varies from 5.5 percent to 17 percent depending on the size of the aggregate run as well as the Snake River run (Table B-6). The BO supported the Interim Agreement approach because it would 1) remain in effect for multiple years, 2) establish harvest rates both above and below 9 percent and would be at least as protective as the 9 percent rate over the long term, and 3) adequately protect listed fish. The expected total harvest rate on Snake River spring Chinook for the 2001 winter/spring/summer fisheries was less than or equal to 15 percent based on a predicted run size of 364,600 (Table B-7). The Interim Agreement also establishes harvest rate limits for summer Chinook stocks, including those returning to the Snake River. Non-Indian and treaty Indian fisheries are limited to harvest rates of less than 1 percent and 5 percent, respectively. These rates are consistent with assumptions in the All-H paper. Actual harvest rates averaged less than 2 percent over the last 10 years. The expected total harvest rate on Snake River summer Chinook for the 2001 fisheries was 1.7 percent. NMFS concluded that the Interim Agreement was sufficiently protective of Snake River spring/summer Chinook, and that the fisheries in 2001, and in future years as managed by the Interim Agreement, are not likely to jeopardize the continued existence of Snake River spring/summer Chinook (NMFS 2001).

Table B-6 Harvest Rate Schedule for Upriver Spring Chinook

Total Columbia River Mouth Run Size	Snake River Run Size	Tribal Proposed Harvest Rate	States Normal Harvest Rate	Total Harvest Rate	State wild Limited Rate
<25,000	<2,500	5.0%	<0.5%	<5.5%	<0.5%
25,000	2,500	5.0%	0.5%	5.5%	0.5%
30,000	3,000	5.0%	1.0%	6.0%	0.5%
40,000	4,000	6.0%	1.0%	7.0%	0.5%
50,000	5,000	7.0%	1.5%	8.5%	1.0%
75,000	7,500	7.0%	2.0%	9.0%	1.5%
100,000	10,000	8.0%	2.0%	10.0%	

Total Columbia River Mouth Run Size	Snake River Run Size	Tribal Proposed Harvest Rate	States Normal Harvest Rate	Total Harvest Rate	State wild Limited Rate
130,000	13,000	9.0%	2.0%	11.0%	
200,000	20,000	10.0%	2.0%	12.0%	
250,000	25,000	11.0%	2.0%	13.0%	
300,000	30,000	12.0%	2.0%	14.0%	
350,000	35,000	13.0%	2.0%	15.0%	
364,600	39,300	13.0%	2.0%	15.0%	
400,000	40,000	14.0%	2.0%	16.0%	
450,000	45,000	15.0%	2.0%	17.0%	

If the Snake River wild forecast is <7.5% of the total run size the more conservative harvest rate would be used.

If the Upper Columbia wild forecast is less than 1,000, then the total harvest rate would be restricted to 9% or less.

Whenever wild fish restrict harvest to 9% or less, then non-Indian fisheries would transfer 0.5% harvest rate to treaty fisheries. In no event would non-Indian fisheries go below 0.5% harvest rate.

In the event the total forecast is less than 25,000 or the Snake River forecast is less than 2,500, the states would keep their harvest rate below 0.5% and attempt to keep the harvest rate as close to zero as possible while maintaining minimal fisheries target in other harvestable species.

Source: NMFS 2001.

Table B-7 Projected Harvest Rates in Fisheries Proposed for the 2001 Winter/Spring/Summer Season in the Columbia River on Salmonid Species Listed Under the Endangered Species Act

ESU	Max ¹	Exp ²	Max	Exp	Max	Exp
Lower Columbia River Chinook ³	≤12.0%	1.5%	0.0%	0.0%	≤12.0%	1.5%
Upper Willamette Spring Chinook	≤10.0%	≤10.0%	0.5%	0.0%	≤10.5%	≤10.0%
Upper Columbia Spring Chinook	≤2.0%	≤2.0%	13.0%	13.0%	≤15.0%	≤15.0%
Snake River Spring Chinook	≤2.0%	≤2.0%	13.0%	13.0%	≤15.0%	≤15.0%
Snake River Spring/Summer Chinook	<1.9%	<1.9%	12.4%	12.2%	14.3%	14.0%
Snake River Sockeye	≤1.0%	0.9%	7.0%	4.1%	≤8.0%	5.0%
Lower Columbia River Steelhead	≤2.0%	1.2%	4.9%	1.6%	≤6.9%	2.8%
Upper Willamette Steelhead	≤2.0%	0.2%	0.0%	0.0%	≤2.0%	0.2%
Mid-Columbia River Steelhead	≤2.0%	0.4%	7.7%	3.6%	≤9.7%	4.0%
Upper Columbia River Wild Steelhead	≤2.0%	0.6%	7.6%	3.8%	≤9.6%	4.4%
Upper Columbia River Hatchery Steelhead	≤6.0%	4.5%	5.6%	2.7%	≤11.6%	7.2%
Snake River Steelhead	≤2.0%	0.2%	5.7%	2.7%	≤7.7%	2.9%

¹ Maximum (Max) refers to the upper limit of proposed impacts.

² Expected (Exp) refers to a point estimate of expected impacts under proposed fisheries.

³ Spring returning component only. No impacts to fall-returning component are expected in this time frame.

Source: NMFS 2001.

Most impacts on steelhead occur in the fall season fisheries. The expected total harvest rate on Snake River steelhead in the 2001 winter/spring/summer fisheries was 2.9 percent (Table B-6), most of which was expected to occur in the tribes' summer season fishery. Most of these impacts are on A-run steelhead. NMFS concluded that the fisheries managed in 2001, and in future years under the Interim Agreement, would not jeopardize the continued existence of Snake River steelhead (NMFS 2001).

The expected total harvest rate on Snake River sockeye for the 2001 fisheries was 5 percent, and the maximum allowable harvest rate is 8 percent (Table 7). No additional impacts were expected in the fall season fisheries because of migration timing. The BO noted that the actual harvest rate averaged substantially less than 8 percent in recent years. NMFS concluded that the fisheries managed in 2001, and in future years under the Interim Agreement, would not jeopardize the continued existence of Snake River sockeye (NMFS 2001).

Estimated numbers of Snake River wild spring and summer Chinook entering the Columbia River, harvest, dam passage loss, and escapement from 1986 to 2002 are presented in Tables B-8 and B-9. For spring Chinook, the 2002 run size of 60,233 and the total in-river harvest of 7,907 were the highest levels for the 1986-2002 period (ODFW and WDFW 2003a). Harvest rates varied between 5.1 percent and 14.5 percent for the period. For summer Chinook, harvest rates have averaged roughly 1 to 2 percent since 1990 (Table B-8). For both spring and summer Chinook, dam passage losses significantly exceeded harvest. Snake River sockeye run size reached a period high of 447 fish in 2000, declining to 57 in 2002 (Table B-10). Sockeye harvest impacts were zero throughout the 1990s and totaled 3 fish in 2002

In 2002, the States of Washington and Oregon implemented the first full fleet commercial spring Chinook selective tangle net fishery. In this fishery, tangle nets allow live capture of fish and the release of all steelhead and unmarked Chinook. The incidental mortality rate on steelhead exceeded the allowable level in the original consultation of 2001, so NMFS re-initiated consultation and prepared a supplemental BO in July 2003 to address this issue. The impacts of concern were to winter steelhead stocks and therefore did not affect Snake River steelhead (NMFS 2003a).

Table B-8 Columbia River Fisheries and Passage Loss Impacts on the Adult Snake River Wild Spring Chinook Run and Escapement, 1986-2002

Year	Snake River	Non-Indian Fisheries Mortality ¹		Treaty Indian Catch ²		Fisheries Total ³		Bonn.-L.Gr. Passage Loss		Snake River Escapement ⁴	
	Wild Run Size	No.	%	No.	%	No.	%	No.	% ⁵	No.	% ⁵
1986	12,984	270	2.1	800	6.2	1,070	8.2	4,343	37.6	7,567	62.4
1987	12,265	191	1.6	818	6.7	1,009	8.2	2,749	24.3	8,504	75.7
1988	14,356	987	6.9	1,034	7.2	2,021	14.1	3,332	27.0	8,999	73.0
1989	6,981	177	2.5	563	8.1	740	10.6	2,851	45.7	3,388	54.3
1986-1989 Average	11,646	406	3.3	804	7.0	1,210	10.3	3,319	33.7	7,115	66.3
1990	6,084	323	5.3	424	7.0	747	12.3	1,624	30.3	3,710	69.7
1991	5,450	230	4.2	352	6.5	582	10.7	2,404	49.3	2,463	50.7
1992	16,198	272	1.7	1,035	6.4	1,307	8.1	3,343	22.5	11,542	77.5
1993	7,740	62	0.8	502	6.5	564	7.3	992	13.8	6,180	86.2
1994	2,067	90	4.3	110	5.3	200	9.7	354	18.9	1,514	81.1
1990-1994 Average	7,508	195	3.3	485	6.3	680	9.6	1,743	27.0	5,082	73.0
1995	1,791	1	<0.1	109	6.1	110	6.1	918	54.6	764	45.4
1996	3,897	2	0.1	211	5.4	213	5.5	2,164	58.8	1,519	41.2
1997	4,750	2	<0.1	345	7.3	347	7.3	2,117	48.2	2,286	51.8
1998	9,620	9	0.1	549	5.7	558	5.8	3,889	42.9	5,174	57.1
1999	1,366	1	0.1	69	5.1	70	5.1	699	53.9	597	46.1
1995-1999 Average	4,285	3	0.1	256	5.9	259	6.0	1,957	51.7	2,068	48.3
2000	5,741	11	0.2	362	6.3	373	6.5	2,036	37.9	3,332	62.1
2001	27,579	332	1.4	3,613	13.1	3,945	14.5	5,108	21.7	17,195	78.3
2002	60,233	1,147	1.9	6,760	11.2	7,907	13.1	13,618	26.0	34,488	74.0

¹ Includes incidental mortalities in the mainstem steelhead sport fishery; Corbett and Select Area fisheries; Area 2S shad commercial fisheries; April sport fishery extension during 1986, 1989, 1990, 1993, and 1994; 2001 Snake River sport fishery; and fisheries above Bonneville Dam during 2001 and 2002.

² Includes winter season commercial sales and spring C&S catches.

³ Individual columns may not add up to total column because of rounding.

⁴ Includes Lower Granite Dam passage and Tucannon River wild escapement.

⁵ Percentage of Zone 6 escapement.

Source: ODFW and WDFW 2003.

Table B-9 Columbia River Fisheries Impact on the Adult Snake River Wild Summer Chinook Run and Escapement, 1986-2002

Year	Snake River	Non-Indian Fisheries Mortality ¹		Treaty Indian Catch ²		Fisheries Total ¹		Bonn.-L.Gr. Passage Loss		Snake River Escapement ³	
	Wild Run Size	No.	%	No.	%	No.	%	No.	% ⁴	No.	% ⁴
1986	3,478	29	0.8	147	4.2	176	5.1	618	17.8	2,684	77.1
1987	3,342	29	0.9	170	5.1	199	6.0	1,288	38.5	1,855	55.5
1988	3,286	18	0.5	156	4.8	174	5.3	1,305	39.7	1,807	55.0
1989	3,124	4	0.1	11	0.3	15	0.5	810	25.9	2,299	73.6
1986-1989 Average	3,308	20	0.6	121	3.6	141	4.2	1,005	30.5	2,161	65.3
1990	4,359	7	0.2	19	0.4	26	0.6	991	22.7	3,342	76.7
1991	3,550	4	0.1	33	0.9	38	1.1	546	15.4	2,967	83.6
1992	533	3	0.6	2	0.4	5	0.9	88	16.5	441	82.7
1993	4,169	29	0.7	58	1.4	87	2.1	0	0	4,082	97.9
1994	246	1	0.5	3	1.2	4	1.6	60	24.4	183	74.4
1990-1994 Average	2,441	9	0.4	23	0.9	32	1.3	207	121.1	2,203	86.7
1995	496	1	0.1	14	2.9	15	3.0	138	27.8	343	69.2
1996	2,717	12	0.4	83	3.1	95	3.5	706	26.0	1,916	70.5
1997	5,533	7	0.1	62	1.1	70	1.3	327	5.9	5,137	92.8
1998	4,166	7	0.2	72	1.7	79	1.9	1,175	28.2	2,913	69.9
1999	2,004	5	0.2	33	1.7	38	1.9	383	19.1	1,584	79.0
1995-1999 Average	2,983	6	0.2	53	2.1	59	2.3	546	21.4	2,379	76.3
2000	4,094	3	0.1	24	0.6	27	0.066	0	0	4,067	100
2001	12,566	19	0.2	71	0.6	90	0.72	0	0	12,175	100
2002	4,433	12	0.3	81	1.8	93	2.1	789	18.2	3,552	81.8

¹ Includes mortalities in commercial shad and sockeye fisheries and the summer steelhead sport fishery.

² Includes commercial sockeye and C&S catches.

³ Wild fish portion of passage at Lower Granite Dam.

⁴ Percentage of Zone 6 escapement.

Source: ODFW and WDFW 2003.

Table B-10 Estimated Number of Sockeye Entering the Columbia River, Mainstem Harvest, and Escapement, 1980-2002

Year	Return to Columbia River Mouth ¹	Non-Indian Fisheries Mortality	Bonn. Dam	Treaty Indian Catch		Dam Counts		Snake River Sockeye			
				Comm.	C&S	Priest Rapids ²	Snake River ³	At River Mouth	Non-Indian Impacts	Treaty Indian Impacts	Lower Granite Esc. ⁴
1980	58,886	4	58,882	14	622	52,055	36	41	0	0	96
1981	56,037	0	56,037	7	1,500	51,460	142	154	0	0	218
1982	50,319	100	50,219	130	645	40,461	174	215	0	1	211
1983	100,628	83	100,545	1,849	1,500	89,808	216	241	0	4	122
1984	161,886	9,345	152,541	22,485	2,131	114,757	105	148	9	21	47
1985	200,747	32,213	166,340	49,393	576	118,541	24	41	7	10	35
1986	59,963	1,840	58,123	4,272	2,400	43,084	20	28	2	2	15
1987	145,546	28,553	116,993	39,460	100	76,578	13	25	5	7	29
1988	99,779	17,632	79,714	30,990	0	51,135	22	43	8	13	23
1989	47,477	36	41,884	38	2,100	45,299	4	4	0	0	2
1990	49,754	173	49,581	2	2,714	46,331	1	1	0	0	0
1991	76,484	3	76,481	5	3,266	71,245	9	10	0	0	8
1992	85,000	8	84,992	5	2,180	77,737	2	2	0	0	1
1993	84,273	64	80,178	7	5,013	79,172	17	18	0	0	12
1994	12,679	1	12,678	0	472	11,800	3	3	0	0	2
1995	9,178	1	8,773	0	445	8,727	5	5	0	0	4
1996	30,280	25	30,255	0	1,414	27,981	4	4	0	0	0
1997	46,939	12	46,927	0	2,046	42,729	2	2	0	0	2
1998	13,220	2	13,218	0	425	10,015	3	4	0	0	3
1999	17,878	1	17,877	0	704	15,282	16	19	0	0	16
2000	93,754	363	93,391	145	2,765	83,587	400	447	2	1	400
2001	116,623	1,690	114,933	5,580	1,720	103,528	45	51	1	3	45
2002	49,629	19	49,610	0	2,500	44,530	51	57	0	3	51

¹ Upriver run is larger of (Bonn. Count + Zones 1-5 harvest) or (Priest Rapids Dam count + Snake River count + Zones 1-6 harvest).

² Counts have been adjusted from the actual 24-hour counts to 16-hour counts in 1992-1998 to maintain a consistent database.

³ Ice Harbor Dam counts – since 1992, video counts at Lower Granite Dam were used (adjusted for 1989 and 1991 average conversion between Ice Harbor Dam and Lower Granite Dam). Kokanee-size fish are not included.

⁴ Prior to 1992, Lower Granite Dam counts may include kokanee. Beginning in 1992, video counts at LWG were used to identify true sockeye.

Source: ODFW and WDFW 2003.

For the winter/spring/summer fisheries of 2004, the Interim Agreement for 2001 and the corresponding NMFS BO still apply since the new CRFMP had not been completed when the Compact adopted regulations in February 2004. The Joint Staff Report summarizes the expected 2004 impacts as follows (ODFW and WDFW 2004):

“A sliding scale harvest matrix is currently in effect for upriver spring Chinook. Based on the current matrix and a river mouth run size forecast of 360,700 upriver spring Chinook, the total harvest rate on Snake River and Upper Columbia wild spring Chinook will be 15 percent with 2 percent allocated to non-Indian fisheries and 13 percent allocated to treaty Indian fisheries. In 2004, non-Indian fisheries will include selective sport and commercial spring Chinook fisheries where the release of non-adipose fin-clipped Chinook will be required, in accordance with the Willamette River Chinook FMEP. Release mortality impacts will be estimated and monitored inseason to ensure that impacts do not exceed 2 percent of the upriver spring Chinook run. Impacts on listed summer Chinook are not to exceed 1 percent in non-Indian fisheries and 5 percent in treaty Indian fisheries as per the Interim Management Agreement. Impacts to listed sockeye will vary depending on run size which will be updated inseason. Impacts to steelhead in non-Indian fisheries will occur as released mortalities during selective sport and commercial fisheries. Currently impacts to listed wild steelhead are not to exceed 2 percent; however, at the time this report was written the states had submitted a Biological Assessment to the NOAA Fisheries that would allow for increased impact rates on wild winter steelhead.”

Fall season: The most recent BO on the fall season fisheries was prepared in July 2003 for the 2003 fall season and expired on December 31, 2003. The BO is based on the 2003 Management Agreement negotiated by the parties to *U.S. v. Oregon* and the associated biological assessment. Fall season fisheries impact stocks addressed by this recovery plan, including Snake River fall Chinook and Snake River steelhead. There are no expected impacts to sockeye (NMFS 2003b).

The action area for purposes of the BO is the Columbia River upstream from its mouth to Wanapum Dam including its tributaries. Fisheries addressed by the BO run from August 1 to December 31, 2003 and include (NMFS 2003b):

Non-Indian Fisheries

Non-Indian Commercial Fisheries

- Mainstem commercial salmon/sturgeon fisheries
- Fall commercial fishery - Select Areas
- Smelt Commercial Fishery/Test Fishery*
- Commercial anchovy and herring bait fishery*

Non-Indian Recreational Fisheries

- Mainstem steelhead/salmon fishery
- Warmwater species fishery
- Tributary salmon and steelhead fisheries
- Select area recreational fisheries*
- Sturgeon recreational fishery*

Non-Indian Test/Assessment Fisheries

Sturgeon Tagging Stock Assessment
Fall selective gear test fishery*

Non-Indian Treaty Subsistence Fishery

Wanapum Tribe subsistence fishery

Treaty Indian Fisheries

Zone 6 Fishery

Hanford Reach Fishery

Tributary Fisheries

Little White Salmon River
Klickitat River
Deschutes River*
John Day River
Umatilla River
Walla Walla River
Yakima River
Snake River Basin*

* No anticipated impacts to ESA-listed salmonids.

With regard to Snake River fall Chinook, the state and tribal parties proposed to manage their fisheries with a harvest rate cap of 31.29 percent. This represents a 30 percent reduction in harvest rate relative to the 1988-1993 base period, consistent with the consultation standard previously established by NMFS in 1996. The harvest rate cap was to be allocated 8.25 percent to non-Indian fisheries and 23.04 percent to tribal fisheries. This stock was expected to be the limiting stock in the fall 2003 fisheries. The actual harvest rate on Snake River fall Chinook in the Columbia River since 1996 is 28 percent. The exploitation rate on this stock from ocean and river fisheries combined declined from an average of 69 percent for the 1980-1995 period to 46 percent for the 1996-2002 period (Table B-11). Based on harvest rate reductions, improvements in juvenile and adult passage conditions, increased abundance in recent years, and hatchery supplementation, NMFS concluded that the proposed 2003 fall fisheries were not likely to appreciably reduce the likelihood of survival and recovery of Snake River fall Chinook (NMFS 2003b).

Table B-11 Annual Total Adult Equivalent Exploitation Rates (Ocean and Inriver Fisheries Combined) for Selected Columbia River Fall Chinook Stocks and Inriver Treaty Indian Harvest Rates for Snake River A- and B-Run Steelhead

Return Year	Snake River Fall Chinook	Lower Columbia River Tules (Coweeman River)	Lower Columbia River Brights (N. Fork Lewis River)	Snake River A-Run Steelhead	Snake River B-Run Steelhead
1980	65%	85%	70%		
1981	68%	76%	42%		
1982	63%	77%	48%		
1983	66%	63%	43%		
1984	76%	72%	58%		
1985	73%	62%	58%	19.3%	31.0%
1986	77%	73%	68%	12.6%	26.7%
1987	77%	72%	68%	14.7%	37.2%
1988	82%	84%	71%	16.1%	23.5%
1989	78%	68%	47%	14.9%	35.0%
1990	79%	67%	41%	14.1%	21.6%
1991	68%	69%	60%	14.4%	30.0%
1992	64%	66%	60%	15.2%	26.3%
1993	65%	60%	55%	14.6%	19.2%
1994	51%	34%	44%	9.7%	18.6%
1995	46%	36%	39%	10.0%	18.4%
1996	40%	26%	19%	8.6%	35.0%
1997	51%	39%	31%	10.0%	18.4%
1998	44%	29%	22%	8.4%	15.5%
1999	50%	45%	22%	7.8%	8.9%
2000	48%	40%	26%	4.3%	13.2%
2001	40%	39%	31%	3.8%	11.5%
2002	52%	49%	33%	2.7%	
Mean 80-95	69%	67%	55%		
Mean 96-02	46%	38%	26%		
Mean 85-97				13.0%	26.0%
Mean 98-02				5.0%	11.0%

Source: NMFS 2003b.

Estimated numbers of threatened Snake River wild fall Chinook entering the Columbia River, harvest, dam passage loss, and escapement during 1986-2000 are presented in Table B-12. In-river harvest rate varied from 18.2 percent to 63.7 percent during the period, and the harvest rate for 2000 was 28.58 percent. Passage loss was approximately the same magnitude as harvest (ODFW and WDFW 2003b).

Table B-12 Estimated Columbia River Returns and Lower Granite Dam Escapement of Snake River Wild Fall Chinook Adults, 1986-2000¹

Year	Columbia River Return	Mainstem Harvest	Harvest Rate %	Passage Loss	BON-LGR Conversion Rate %	Lower Granite Escapement
1986	3,440	1,953	56.8	952	32.4	449
1987	2,295	1,309	57.1	554	33.7	253
1988	4,811	3,605	63.7	973	29.3	368
1989	2,527	1,444	57.1	569	36.5	295
1990	665	353	53.1	162	36.4	78
1991	2,261	908	40.2	1,035	23.5	318
1992	1,555	409	26.3	597	47.9	549
1993	1,620	450	27.8	428	63.4	742
1994	1,055	192	18.2	457	47.0	406
1995	1,223	232	19.0	641	35.3	350
1996	1,957	516	26.4	802	44.3	639
1997	2,048	659	32.2	592	57.4	797
1998	864	230	26.6	328	48.3	306
1999	2,739	831	30.34	1,003	47.5	905
2000	1,977	565	28.58	555	60.7	857

¹ Estimates for 2001, 2002 and projections for 2003 are not available because run reconstruction analyses were not completed at the time this report was written.

Source: ODFW and WDFW 2003.

For Snake River steelhead, the proposed maximum (and expected) harvest rates in the fall 2003 fisheries were as follows (NMFS 2003b):

	Non-Indian	Treaty Indian	Total
A Run	≤2% (1.0%)	5.6%	7.6% (6.6%)
B Run	≤2% (1.7%)	15% (14.9%)	17% (16.6%)

The harvest rate on Snake River A-run steelhead averaged 13 percent from 1985 to 1997; the average rate declined to 5 percent for the 1998-2002 period (Table 10). The BO notes that B-run steelhead are at risk because of their depressed status and also are most vulnerable to fisheries due to their later timing, larger size, and upstream location. A-run steelhead are subject to lower harvest rates because of their smaller size and earlier timing (NMFS 2003b). B-run steelhead are thought to be produced only in the Clearwater and Salmon River systems of Idaho. The stocks of concern in this recovery plan are A-run fish.

Both the tribes and the states have taken actions to reduce steelhead catch rates. In 2002, the tribes instituted an 8-inch minimum mesh size requirement for the gillnet fishery in order to keep steelhead impacts low. In the non-Indian fishery, commercial harvest of steelhead has been prohibited since 1975. Time, area, and gear restrictions limit handling and mortality of steelhead in the non-Indian gillnet fishery to less than 1 percent of the run. Sport harvest is restricted to fin-clipped hatchery steelhead, and anglers have been required to release natural-origin steelhead in the Columbia River since 1986 (NMFS 2003b).

An analysis associated with the FCRPS BO provided a pessimistic perspective on the status of steelhead stocks, particularly for Snake River B-run fish. In addition, the severe drought of 2001 was expected to

have a negative impact on adult returns in 2003 and 2004. On the other hand, improved ocean conditions in the last several years have resulted in increased run sizes. The BO states that “For now, NMFS is satisfied that steelhead harvest rates have been substantially reduced in recent years, that further actions are being taken to reduce harvest, and that the expected impacts associated with this year’s fisheries are sufficiently low to avoid jeopardizing the species.” For the long term, NMFS’ objective is to develop a management plan that is more responsive to changes in abundance. Such a plan could provide the basis for a programmatic BO that would cover the management of fall season fisheries for the foreseeable future (NMFS 2003b).

SUB-BASIN HARVEST ASSESSMENTS

Sub-basin plans have been drafted by local conservation districts for the Lower Snake River Mainstem, Asotin, Tucannon, and Walla Walla sub-basins. Appended to each plan are aquatic assessments prepared by WDFW that analyze the effects of harvest and other activities on sub-basin salmon and steelhead populations. The following paragraphs summarize the harvest information included in these aquatic assessments.

The Lower Snake River Sub-basin aquatic assessment includes an assessment of harvest on steelhead. Hatchery steelhead released at Lyons Ferry Hatchery with coded wire tags (CWTs) between 1990 and 2001 were used as a surrogate for wild steelhead in nearby tributaries to evaluate their harvest locations. The CWT analysis shows that the impacts of the Columbia River net fisheries on steelhead have been substantially reduced since the ESA listings for steelhead. Columbia River net fisheries accounted for 16.5 percent to 30.1 percent of the CWT recoveries prior to listings, and less than 6.1 percent since the listings. The highest recoveries were at Snake River traps and in the Snake River sport fishery. Since sport harvest is restricted to adipose clipped steelhead, the relatively high percentage of recoveries is not reflective of the sport fishery impacts on unmarked wild steelhead. Harvest rates on naturally produced A-run steelhead in the Columbia Basin averaged about 18 percent in the 1980s, 15 percent in the 1990s, and 4 to 6 percent in the 2001-2002. Juvenile steelhead/rainbow trout may be harvested as resident trout in the tributaries in this sub-basin during June through October of each year. Resident trout fisheries are closed during the peak of the juvenile salmon and steelhead out-migration in the Snake River (April, May and early June). Trout bag limits in the tributaries are 2 fish per day with minimum size limit of 8 inches (WDFW 2004c).

The Asotin Sub-basin plan includes harvest assessments for steelhead and spring Chinook. For steelhead, the assessment includes the following summary (WDFW 2004d):

“Examination of the available assessment information suggests degraded habitat and out of basin effects are likely the factors that are currently most limiting the steelhead population in Asotin Creek. Hatchery releases and fisheries have likely had effects on steelhead in Asotin Creek, but their effects have been substantially reduced in the past 5-10 years as hatchery releases and harvest have been restricted. Hatchery fish are no longer stocked in Asotin Creek, although hatchery effects on the steelhead likely continue at a low level (as either genetic effects from past hatchery returns or current spawning by small numbers of hatchery strays from outside the Asotin Basin). Harvest effects are now limited to incidental harvest in sport fisheries or salmon net fisheries in the Snake or Columbia rivers, and as a small number of juveniles in trout fisheries within the Asotin Creek sub-basin.”

The summary of harvest and hatchery impacts on spring Chinook in the Asotin Sub-basin plans is as follows (WDFW 2004d):

“Examination of the available assessment information suggest degraded habitat and out of basin factors are likely the factors that are currently most limiting Chinook in Asotin Creek. Hatchery releases and fisheries have likely had deleterious effects on the Chinook in Asotin Creek. Stray hatchery fish may have a genetic effect on any native spring Chinook that remain in Asotin Creek. However, hatchery fish may be contributing to Chinook abundance and persistence in the Asotin sub-basin. Hatchery steelhead and trout are no longer stocked in Asotin Creek and trout fisheries have been restricted within the sub-basin. Unmarked Chinook salmon are legally protected from harvest in sport fisheries within the Snake River Basin. Harvest effects are now limited to harvest in the lower river or ocean fisheries which are restricted to an ESA impact of no more than 2 percent. A small amount of hooking mortality may occur within the Asotin Creek sub-basin during trout or other fisheries. Consequently, out of basin and habitat restoration within the sub-basin should be emphasized to increase salmonid populations.”

The Tucannon Sub-basin plan includes harvest assessments for steelhead, spring Chinook, and fall Chinook. CWT analysis for steelhead revealed that Columbia River net fisheries harvested an average of 28.6 percent of the hatchery steelhead from the Tucannon River for the 1992-1995 release years, while the average was reduced to 6.4 percent after ESA restrictions were imposed on the net fisheries for 1997-2000. CWT recoveries were highest in the Snake River sport fishery. Since sport harvest is restricted to adipose clipped steelhead, the high recoveries are not reflective of the sport fishery impacts on unmarked wild steelhead. Juvenile steelhead may be harvested as trout in the Tucannon sub-basin during June through October, but resident trout fisheries are closed during the peak of the juvenile salmon and steelhead out-migration. Trout bag limits are 2 fish per day with a minimum size of 8 inches. Selective gear restrictions (no bait, single barb-less hooks, etc.) are in place in certain sections of the sub-basin and some reaches are closed to minimize mortality on wild steelhead (WDFW 2004e).

For Tucannon River spring Chinook, CWT analysis demonstrated that sport harvest of hatchery fish outside the Tucannon sub-basin increased in recent years, but unmarked naturally produced Chinook would not experience similar harvest since anglers must release unmarked fish. No Tucannon Hatchery spring Chinook are expected to be harvested in lower Columbia River sport fisheries after the 2000 release year, since WDFW no longer clips hatchery spring Chinook released in the Tucannon River in an effort to exclude them from selective fisheries in the lower Columbia. Out of basin harvest of hatchery fish ranged from 0 to 1.6 percent for ocean fisheries, 0-6.0 percent for Columbia River net fisheries, 0 to 18.9 percent for sport fisheries, and 0 to 18.9 percent for tribal ceremonial fishing. There are no fisheries for spring Chinook downstream of or near the mouth of the Tucannon River. Tribal fisheries may be initiated in the Tucannon within the next year or two (WDFW 2004e).

No tagged hatchery fall Chinook have been released in the Tucannon River, but a CWT analysis using Lyons Ferry sub-yearling fall Chinook released in the Snake River from 1985-1990 found that harvest outside the Snake River basin accounted for 72 percent of the CWT recoveries. In recent years, ocean and Columbia River fall Chinook harvest rates have been reduced by 30 percent compared to the 1988-1993 base period. Fisheries for adult fall Chinook have not occurred in the Snake River since 1976, except for a limited fishery in 1988. Fall Chinook adults and jacks occasionally are caught during the fall and winter steelhead fisheries in the Snake and lower Tucannon rivers. Juvenile fall Chinook migrate to the ocean at a relatively small size so few of these fish would likely be caught by trout or warmwater anglers in the Snake River Basin (WDFW 2004e).

The Walla Walla sub-basin plan includes a harvest assessment for steelhead. No fisheries in the Walla Walla sub-basin target Chinook, and it is illegal to retain Chinook in the Oregon and Washington portions of the basin. CWT analysis using hatchery steelhead released in the Walla and Touchet rivers estimated that Columbia River net fisheries harvested an average of 10.3 percent of the hatchery steelhead with CWTs from the Walla Walla River and 9.2 percent from the Touchet River for the 1993-1996 release

years. Average net fishery harvest of Touchet River hatchery steelhead declined to 2.2 percent after ESA restrictions were imposed on the net fisheries for the 1997-1999 release years. Total harvest recovery averaged 60.2 percent for the Walla Walla releases and 51.4 percent for the Touchet releases. Out-of-basin harvest recovery rates were 26.5 percent and 12.7 percent for the Walla Walla and Touchet rivers, respectively. Out-of-basin harvests declined for the Touchet River releases from 19 percent (1993-1996) to 6.5 percent (1997-1999). Juvenile steelhead may be harvested as trout in the Walla Walla sub-basin during June through October in Washington, and from late May through October in Oregon. Resident trout fisheries are closed during the peak of the juvenile salmon and steelhead out-migration. Trout bag limits in the Washington portion of the Walla Walla Basin are 2 fish per day with a minimum size of 8 inches. Oregon allows 5 trout per day with an 8-inch minimum size. Selective gear restrictions are in effect to minimize mortality of wild steelhead in the Touchet River upstream of Dayton and in Mill Creek upstream of Roosevelt, and for Walla Walla River and tributaries upstream of the state line in Oregon. Fisheries for hatchery steelhead are allowed only in the Walla Walla River up to the confluence of the North and South forks, in the Touchet up to confluence of the North and South forks, and in Mill Creek from the mouth to 9th Avenue (WDFW 2004f).

HARVEST DATA GAPS

For ocean salmon fisheries, the Pacific Fishery Management Council lists the following as the three highest priority research and data needs (PFMC 2000):

- “A more accurate assessment of total fishing-related mortality of natural stocks of coho and Chinook. Fishery management regimes designed to reduce impacts through non-retention or selective fishing depend for success on unbiased estimates of non-catch mortality.
- “Advances in genetic stock identification, otolith marking, and other techniques may make it feasible to use a variety of stock identification technologies to assess fishery impacts and migration patterns. The increasing necessity for weak-stock management puts a premium on the ability to identify naturally reproducing stocks and stocks that contribute to fisheries at low rates. The coded-wire tag marking system is not suitable for these needs...
- “Encourage development of probabilistic habitat-based models that incorporate environmental variation to establish harvest policies and enable risk assessment for fishing strategies. Overfishing definitions are required to relate to a measure of maximum sustainable yield. MSY for salmon is related to productivity, which varies annually in freshwater and the marine environment. Techniques for evaluating productivity, or survival, in freshwater and marine habitats are needed to set appropriate harvest targets and associated conservation guidelines such as escapement floors and overfishing definitions.”

Appendices to the draft Walla Walla and Tucannon subbasin plans contain the following information on research, monitoring, and evaluation opportunities related to fisheries (Table B-13).

Table B-13 Research, Monitoring, and Evaluation Opportunities Related to Fisheries

		Current Effort	Desired Future Effort
In-basin harvest	Tucannon Subbasin	Limited coverage using creel surveys plus catch records from volunteers. No trout fisheries monitored.	Stratified randomized creel surveys of entire subbasin plus increased volunteer involvement if fisheries expand.
	Walla Walla Subbasin	Limited coverage using creel surveys plus catch records from volunteers.	Stratified randomized creel surveys of entire subbasin plus increased volunteer involvement.
Out-of-basin harvest	Tucannon Subbasin	Randomized creel surveys plus CWT and PIT tag estimates of harvest.	Increased spatial and temporal coverage and consistency in survey methodologies.
	Walla Walla Subbasin	Randomized creel surveys plus CWT and PIT tag estimates of harvest.	Increased spatial and temporal coverage and consistency in survey methodologies.
Hooking rate	Tucannon Subbasin	Limited coverage using creel surveys plus catch records from volunteers.	Stratified randomized creel surveys of entire subbasin plus increased volunteer involvement if fisheries expand.
	Walla Walla Subbasin	Limited coverage using creel surveys plus catch records from volunteers.	Stratified randomized creel surveys of entire subbasin plus increased volunteer involvement.
Handling mortality	Tucannon Subbasin	Derived from literature based hooking mortality applied to estimated handle rate from creel surveys.	A hooking/handling mortality study should be conducted if fisheries expand.
	Walla Walla Subbasin	Derived from telemetry mortalities.	The current effort is sufficient.

Sources: WDFW 2004g and 2004h.

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