2014/2015 Puget Sound Steelhead Harvest

Management Report

Washington Department of Fish and Wildlife

and

The Puget Sound Indian Tribes

March 2016

This report was developed by the Washington Department of Fish and Wildlife and the Puget Sound Indian Tribes to summarize harvest of wild Puget Sound steelhead in marine and freshwater areas during the 2014/2015 management season. The report also contains preliminary estimates of spawning escapements for each management unit, if available, and a brief description of escapement and catch monitoring that occurred. The managers expect this report to satisfy the reporting requirements stipulated in the Biological Opinions issued by the National Marine Fisheries Service, which authorized harvest-related mortality of listed Puget Sound steelhead for management year 2014/2015.

Preseason Planning

Annual steelhead harvest management plans for the 2014/2015 management cycle were developed pre-season for the Nooksack, Samish, Skagit, Snohomish/Stillaguamish, Green, Puyallup, Nisqually, Hood Canal and Dungeness management units. These plans provided forecasts of hatchery and wild steelhead for some management units and an expected freshwater terminal runsize harvest rate for other management units (i.e. Nisqually River winter steelhead) and harvest management strategies that would be implemented to harvest surplus hatchery steelhead or winter chum and limit the incidental take of wild steelhead. The incidental take statement in the Biological Opinion regarding 2014/2015 fisheries limited wild steelhead impacts such that the average, terminal harvest rate for five wild winter steelhead management units (Skagit, Snohomish, Green, Puyallup and Nisqually) would not exceed 4.2%. For the other management units, fisheries management measures and harvest impacts were expected to not exceed those implemented in recent seasons. The Biological Opinion also authorized harvest of up to 325 steelhead (i.e. an aggregate number comprised of unknown proportions of wild and hatchery-origin steelhead from Puget Sound and British Columbia) in Puget Sound marine pre-terminal fisheries.

Harvest Summary

Estimates of winter steelhead harvest in tribal fisheries, summarized below (Table 1), are based on a preliminary accounting of tribal landings that occurred between November 1, 2014 and May 31, 2015. Catch estimates are provided for all terminal areas where tribal landings occurred. Sampling of catch enabled estimation of the number of wild steelhead. Net drop-out mortality is not included in this accounting; by convention it has been estimated to be 2% of the landed catch. Hooking mortality in recreational fisheries was estimated as 10% of the estimated number of encounters with wild steelhead. The number of encounters is estimated from the length of the recreational season, expressed as a proportion of the total run timing.

Wild steelhead mortalities associated with the 2014/2015 tribal and recreational fisheries in the Skagit, Snohomish, Green, Puyallup and Nisqually rivers (management units) were lower than projected pre-season; their average was 0.92% (Table 1). The following summary discussion focuses on the five management units for which a maximum, average incidental mortality rate of 4.2% was specified in the incidental take statement of the current Biological Opinion rate.

Table 1. Incidental harvest and hooking mortalities in terminal fisheries and escapement of wild steelhead in Puget Sound, 2014/2015 management year. Except for Skagit River which accounts for harvest from July 1- June 30, accounts for steelhead harvest during the winter timeframe (November-May). **Legend:** Tribal Terminal, Tribal Marine, non-Tribal Terminal (in table) Marine (in text), Total T+NT Terminal

Management Unit	Tribal Catch		Recreational Estimates		Total Mortality Estimate	Escapement	Terminal Harvest Rate[h/]	
	Total	Wild	Encounters	Hooking Mortality			Estimated	Preseason Estimate
Nooksack[a/]	126 enc.	60 enc. (50 morts)				2,081		
Samish	0	0				1,876		
Skagit[b/]	173	77	473 ~~298~~ 300	31	108 107	8,644	*0.89% tribal* 1.25 1.22%	4.7%
Stillaguamish	0	0				566[/c]		
Snohomish	8	1	289 281	28	29 29	2,914	*0.03% tribal* 1.00 0.99%	4.00%
Lk. Washington/Cedar River	0	0				*4*[/d]		
Green	24	2	175 151	15	17 17	1,622	*0.12% tribal* 1.05 1.04%	1.69%
Puyallup	0	0	52 52	5	5 5	926	*0.0% tribal* 0.54%	1.13%
White	1	1			1	556[/e]		
Nisqually[f/]	1	1	81 80	8	9 8	1,126	*0.08% tribal* 0.79%	3.00%
Skokomish	13	13			13	1,338		
East Hood Canal						160		
West Hood Canal						219		
South Hood Canal						90		
Dungeness	7	7				618		
Elwha	0	0				1,450 (1,260 HOR, 190 NOR) [g/]		
Sequim Pt Townsend						24 Snow Creek		
Port Angeles						150 Morse Creek 99 MacDonald Creek		
						Sum 4.59/5 = 0.92% 0.93%		

[a/] The Nooksack River 'Tribal Total' catch includes harvested/landed fish and encountered fish released from tangle-net selective fishery conducted by Lummi fishers with an 18.5% release mortality. Wild catch depicts encounters and mortalities associated with releases.

[b/] Skagit River: 19 Hatchery steelhead caught during the May-October time period are included. Estimated recreational hooking mortality from Chinook and sockeye fisheries included.

[c/] Stillaguamish estimate represents only un-expanded index reach survey data. Expanded estimate is 2,296.

[d/] Substantial uncertainty exists whether observed redds in Cedar River were steelhead produced or cutthroat trout from Lake Washington.

[e/] Includes returns from wild broodstock program; broodstock numbers removed.

[f/] Due to low runsize numbers the late chum season closed approximately 4 weeks earlier than normal.

[g/] DIDSON Multi-beam Sonar Estimates - Denton, K.P., McHenry, M., Moses, R., Ward, E., Stefankiv, O., Wells, W., and Pess G., 2015 Elwha River Steelhead Escapement Estimate Based on DIDSON/ARIS Multi-Beam SONAR Data. Prepared for the Lower Elwha Klallam Tribe, 33 p.

[h/] Harvest rate estimates are subject to rounding error.

Tribal Fisheries

In general, the tribal terminal-area fisheries that impact listed steelhead operated as specified in the pre-season annual management plans. Wild steelhead mortality associated with these fisheries was lower than the number projected pre-season. The following discussion focuses on the five management units for which the incidental take statement in the Biological Opinion specified a harvest rate. Wild steelhead impacts in other basins within Puget Sound are also presented.

In the Skagit River, total kelt adjusted (8.6% kelt adjustment rate) wild harvest mortality from July 1, 2014 to June 30, 2015 in the steelhead-directed fishery, C&S fishery, test fishery and incidental mortality in the spring Chinook and sockeye fisheries was **77**, compared with the pre-season projection of 396 without net drop out. A portion of the steelhead impacts in Skagit River are attributed to release mortalities from a tangle-net fishery (18.5% release mortality rate). ***Tribal Terminal***

The stock composition of wild winter steelhead harvested in tribal fisheries conducted in Areas 8A and 8D is approximated by referring to the post-season, reconstructed abundance of the Snohomish and Stillaguamish returns, and assumptions about the composition of catch in sub-areas of 8A. The estimated mortality of Snohomish wild winter steelhead was **1**, substantially lower than the pre-season projection of 60. ***Tribal Terminal***

The winter steelhead fishery in Duwamish/Green River closed December 31, 2014. The estimated preseason mortality was projected at 6 wild fish. **Two** wild winter steelhead were harvested. ***Tribal Terminal***

The Puyallup tribal fishery directed at chum salmon was conducted as planned in November and December. Incidental harvest of wild winter steelhead, projected to be 5, was **zero**. ***Tribal Terminal***

The Nisqually tribe's coho fishery operated during early November with the winter chum-directed fishery opening November 23 and closing for the season on December 29, 2014 for chum conservation concerns. **One** wild (unmarked) steelhead was harvested during these fisheries. Two (3% of pre-season runsize) steelhead were anticipated to be harvested during the 2014/2015 season. ***Tribal Terminal***

Tribal steelhead catch in other rivers was low or zero during the 2014/2015 season. There were 126 winter steelhead (60 estimated wild steelhead encounters with **50** mortalities) encountered in the Nooksack River during the winter steelhead management period (Nov-May) and incidentally during the C&S fishery for spring Chinook. There were **13** wild steelhead harvested in the Skokomish River. **Seven** winter steelhead of unknown origin were harvested in Dungeness River/Dungeness Bay (Area 6D). No steelhead were harvested in the Elwha River during 2014/2015. ***Added to Tribal Marine Impacts***

Marine Waters - Tribal and Recreational Fisheries

Preliminary tribal catch in pre-terminal marine waters (Areas 4B, 5, 7, 7A and 7B) during management year 2014/2015 was **53** steelhead. The Swinomish Tribal Community fishery occurs partly in Area 8 (and Area 78C) and the harvest is accounted for in the Skagit River management unit. The Stillaguamish – Snohomish terminal winter steelhead fishery occurs in Areas 8A and 8D and this harvest is accounted to those management units. For the summer period (May – October) of 2014, **three** steelhead were caught in Area 8D; one in June and two in July. There was **one** steelhead caught in September in Area 9A.

Tribal Marine correction 54 steelhead = 17 fish (Area 5) + 6 fish (Area 7) + 1 fish (Area 7A) + 30 fish (7B). Pers. comm. via phone with Chris James (NWIFC) and Alan Chapman (Lummi Nation) on May 23, 2016.

The April 2014 to March 2015 steelhead catch estimate for marine recreational fisheries (Areas 6, 8-1, 9 and 10; no harvest in other Areas; Appendix A) was **22**. The majority of the sport caught fish, 18, were caught in Marine Area 9. All the fish were identified as marked. ***Non-Tribal Marine***

The total treaty and non-treaty pre-terminal April 2014 to March 2015 marine harvest of 75 (53 treaty and 22 non-treaty harvest) was substantially less than the 325 allowed by the Biological Opinion incidental take statement for steelhead.

Tribal Marine 54 (4B, 5, 6, 7A, 7B) + 3 (8D) + 1 (9A) = 58

Adjacent Tribal Marine: Nooksack 50 + White 1 + Skokomish 13 + Dungeness 7 = 71

58 + 71 =129 Total Tribal Marine

129 Tribal Marine + 22 non-Tribal Marine = 151 total marine impacts T + NT

Recreational Fisheries

Recreational winter steelhead fisheries in the Puget Sound DPS were conducted as described in the pre-season, annual management plans and the *2014/2015 Washington Sport Fishing Rules, May 1, 2014 to June 30, 2015*. For the 2014/2015 season, WDFW did need to implement several emergency freshwater fishing rules in the Puget Sound DPS. The emergency rules closed sections of rivers in the vicinity of hatchery facilities, because of insufficient broodstock (egg-take) needs. In general, these emergency rules were repealed once egg-take needs were met. The waters closed to fishing around WDFW's Tokul Creek Hatchery were opened to sport fishing four weeks earlier than anticipated, because broodstock requirements had been met earlier than expected. Also, the Nisqually River recreational chum salmon fishery was closed a little over three weeks earlier than anticipated for chum salmon conservation concerns. The

Puget Sound winter steelhead emergency sport fishing rules that were put into place for the 2014/2015 season can be found at the following WDFW webpages:
https://fortress.wa.gov/dfw/erules/efishrules/erule.jsp?id=1526 (Nooksack River - closure)
https://fortress.wa.gov/dfw/erules/efishrules/erule.jsp?id=1525 (Whatcom Creek – closure)
https://fortress.wa.gov/dfw/erules/efishrules/erule.jsp?id=1524 (Cascade River – SH daily limit increase)
https://fortress.wa.gov/dfw/erules/efishrules/erule.jsp?id=1523 (Tokul Creek – early SH opening)
https://fortress.wa.gov/dfw/erules/efishrules/erule.jsp?id=1533 (Nooksack River – reopening)
https://fortress.wa.gov/dfw/erules/efishrules/erule.jsp?id=1534 (Whatcom Creek – reopening)
https://fortress.wa.gov/dfw/erules/efishrules/erule.jsp?id=1535 (Nisqually River – closure)

The Samish River was closed to all fishing January 1, 2015 to protect all returning wild steelhead. Winter steelhead smolt releases were discontinued in 2008, very few hatchery-origin steelhead were anticipated to stray into the Samish River.

The majority of the Nooksack River system closed on February 1, 2015 except for the North Fork Nooksack River from the mouth to Maple Creek which closed to all fishing on February 16, 2015, which is in the vicinity of Kendall Creek hatchery.

In the Skagit River, catch-and-release mortality was estimated at 31, compared with the pre-season projection of 33. Wild steelhead encounters in the fishery were estimated at 300.

The estimated catch-and-release mortality of Snohomish River wild winter steelhead was 28, based on an estimated 281 encounters for the season. The estimate is higher than the pre-season projection of 18.

The estimated catch-and-release mortality in the Green River winter steelhead fishery was 15, approximately twice the preseason estimate of 7 fish. The 15 fish mortality is based on an estimated 151 encounters.

Five recreational fishery wild steelhead catch-and-release mortalities were estimated during the Puyallup River chum salmon directed sport fishery, based on an estimated 52 encounters with wild steelhead.

Incidental catch-and-release wild steelhead mortality was estimated at 8 during the late-chum directed fishery in the Nisqually River, based on an estimated 80 encounters. Hatchery steelhead smolts are not released into the Nisqually River.

Winter Steelhead Escapement and Runsize Estimates

Surveys of wild steelhead escapements were conducted in all the Management Units. However some estimates were index estimates or partial system estimates. The 2015 preliminary wild winter steelhead escapement estimates for the Skagit, Snohomish, Green, Puyallup and Nisqually are total system estimates (Table 1). Wild steelhead escapement estimates for 2015 for the Snohomish, Green, Puyallup and Nisqually rivers (management units) were below the escapement goals used for determining the potential wild surplus for planning the 2014/2015 season. The Skagit River wild steelhead escapement estimate exceeded the 6,000 fish escapement objective for allowing directed fisheries, by 2,644.

High flow and turbidity influenced survey accuracy and frequency in many systems, so all estimates should be considered minimums. Following are further notes on estimates for other rivers:

- Historical escapement estimates are available for Nooksack winter steelhead for only five previous years; 2004 (estimate 1,582), 2010 (estimate 1,897), 2011 (estimate 1,747), 2012 (estimate 1,747), 2013 (1,805), and 2014 (1,521). For 2015, the estimate (2,081) is based on extensive tributary surveys and survey data collection from the mainstem, North, Middle, and South forks.

- The Stillaguamish estimate listed represents only un-expanded index reach survey data. An expanded escapement estimate of 2,296 was developed.

- The Lake Washington/Cedar River steelhead escapement estimate for 2015 was 4. There is uncertainty regarding whether the observed redds in 2015 were constructed by cutthroat trout from Lake Washington spawning in Cedar River or steelhead, which may have been strays from the Green River DIP. Recent steelhead escapements have dropped precipitously beginning in the early 1990's, with three years of zero escapement in the past 8 years.

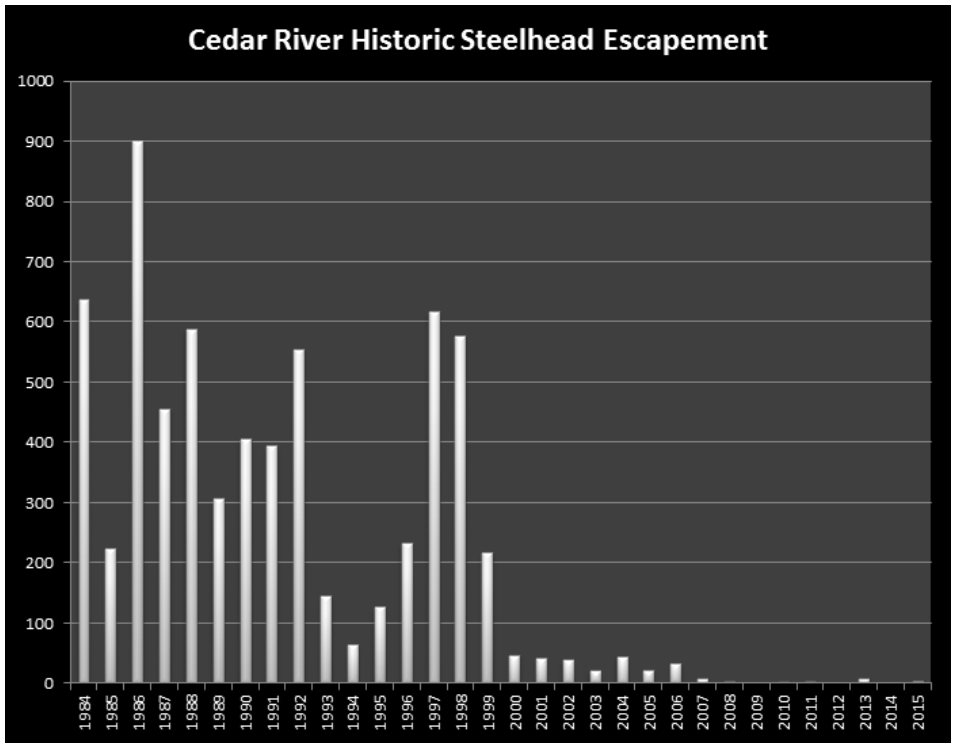

Figure 1. Historic steelhead spawning estimates for the Cedar River 1984-2015.

- The Skokomish estimate is based on standard surveys of the North Fork, South Fork and tributaries which are thought to comprise most of the suitable steelhead spawning habitat.

- The East Hood Canal estimate is based on surveys in the Big Beef Creek and Dewatto River.
- The West Hood Canal estimate is based on surveys in the Hamma Hamma River, Duckabush River, Dosewallips River, and Big/Little Quilcene River.
- The South Hood Canal estimate is based on surveys in the Union and Tahuya rivers.
- The Sequim-Port Townsend estimate comprises the adult count (24) at the Snow Creek weir; no other streams were surveyed.
- For 2015 the wild steelhead escapement for the Dungeness River was estimated at 618.
- The 2015 Elwha River the wild steelhead escapement estimate (NOR) was 190 based on DIDSON multi-beam SONAR data.
- The 2015 wild steelhead escapement for streams within the Port Angeles Management Unit are 150 fish in Morse Creek and 90 fish in MacDonald Creek.

Based on preliminary estimates of terminal harvest mortality and escapement, 2014/2015 terminal run-size was higher than forecast for seven of the nine Puget Sound management units (Table 2).

Table 2. Preliminary accounting of the terminal runsize of wild winter steelhead compared to forecasted levels for eight Puget Sound management units, 2014/2015.

Management Unit	Forecast	Observed
Skagit	9,130	8,751
Snohomish	1,973	2,943
Green	766	1,659[a/]
Puyallup	532	931
Nisqually	595	1,135
Skokomish	717	1,351
East Hood Canal	113	160
West Hood Canal	238	219
South Hood Canal	68	90

[a/] Fish taken for broodstock included.

There are no estimates of summer steelhead escapement or abundance for the South Fork Nooksack or Stillaguamish management units.

Wild summer steelhead escapement surveys were conducted in the Snohomish management unit. The South Fork Tolt River escapement was estimated at 56. Summer steelhead escapement in the North Fork Skykomish was estimated to be 72 fish.

Harvest Monitoring

For the 2014/2015 season the harvest of winter-run (and summer-run) steelhead by the sport fishery harvest was estimated from the Catch-Record-Cards. The preliminary harvest of winter (2014/2015) and summer (2014) steelhead can be found in Appendix A. The attached draft estimates show no wild steelhead being harvested in the Puget Sound DPS. Phone surveys of anglers have shown that close to 100% of all unmarked fish recorded onto Catch-Record-Cards by respective anglers are released by recreational anglers. Phone surveys also indicated that some anglers were confused about the statewide "Wild Steelhead Release" rule, particularly on the Columbia River (Eric Kraig, WDFW personnel communication).

A limited creel survey was conducted on the Green River from December 16, 2014 through January 31, 2015 between Interstate 405 and the City of Tacoma Diversion Dam at RM 60.9. Low angler turnout resulted from extraordinarily wet conditions with high river flows. During the creel survey 145 anglers were interviewed over the 20 surveyed days. Anglers kept 4 adipose fin-clipped steelhead, released 1 adipose fin-clipped fish, and caught-and-released 39 adipose fin-intact steelhead. Most of the adipose fin-intact fish were caught on the last two days of the season when flows finally dropped.

Recreational Chinook and Sockeye Creel Surveys

There was one non-intensive Chinook salmon recreational creel survey conducted in the Puget Sound DPS in 2015. The creel survey was conducted on the Skokomish River. There were no encounters with steelhead during the fishery (Mark Downen, WDFW personnel communication).

In June 2014, the Skagit River sockeye salmon sport fishery was creel surveyed. During the June 14 through June 29 intensive survey, anglers reported to WDFW creel surveyors: four wild and two hatchery steelhead released. An interviewed angler did show surveyors a harvested wild steelhead thinking the fish was a sockeye (Brett Barkdull, WDFW personnel communication).

Tribal Fisheries

Commercially retained tribal steelhead harvest is accounted on commercial sales receipts (fish tickets) and recorded in the TOCAS database. The majority of catch taken during the 2014/2015 season in the Nooksack, Skagit, Stillaguamish-Snohomish, Green, Puyallup, and White, and Nisqually terminal fisheries was sampled to determine the hatchery-wild composition. Scales are collected from wild catch, when feasible, to quantify age composition, and this information is utilized in forecasting.

In addition to winter steelhead catch accounted in Table 1, a small number of steelhead were also caught outside of the winter accounting period in a small number of rivers with hatchery summer steelhead; the Green River accounted for the majority (86) of the summer catch. Numbers of steelhead caught in the Skagit River outside of the conventional winter accounting period are provided above, because the Skagit management unit encompasses summer and winter steelhead populations.

Appendix A - 2014-2015 Puget Sound Steelhead Sport Harvest Estimates from Catch Record Cards (01/21/2016, E. Kraig, WDFW)

System	Water	Race	Mark	2014									2015			Total
				Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
Marine Water *	Area 6: E Juan de Fuca	W	Marked										1			1
	Area 8-1: Skagit Bay-Saratoga Psg.	W	Marked										1			1
	Area 9: Admiralty Inlet	S	Marked		2	2	3		3							10
		W	Marked	2								3	3			8
	Area 10: N Puget Sound	S	Marked						2							2
	Marine Water Totals	S	Marked		2	2	3		5							12
		W	Marked	2								3	5			10
Burley Cr. System *	Burley Creek (Kitsap Co.)	S	Marked					4		8						12
Clallam R. System *	Clallam River	W	Marked									12	6			18
Deep Cr. System (Clallam) *	Deep Creek (Clallam Co.)	W	Marked										9			9
Dungeness R. System *	Dungeness River	W	Marked								6	9	28	3		46
Green-Duwamish R. Sys *	Green (Duwamish River) (King Co.)	S	Marked			39	21	19	13							92
		W	Marked								40	55	51			146
	Soos Creek	S	Marked				7	2								9
	Green-Duwamish R. Sys Totals	S	Marked			39	28	21	13							101
		W	Marked								40	55	51			146
Hoko R. System *	Hoko River	W	Marked								11	146	86	13	7	263
Lyre R. System *	Lyre River	W	Marked									3	3			6
Nooksack R. System *	Nooksack River, No. Fork	W	Marked								3		55	6		64
	Nooksack River, So. Fork	W	Marked										3			3
	Nooksack River, below North Fork	W	Marked								3	3	37			43
	Nooksack R. System Totals	W	Marked								6	3	95	6		110
Puyallup R. System *	Puyallup River	W	Marked									9				9
	White (Stuck) River	W	Marked										3			3
	Puyallup R. System Totals	W	Marked									9	3			12
Pysht R. System *	Pysht River	W	Marked									9	9			18
Salt Cr. System *	Salt Creek (Clallam Co.)	W	Marked									12				12
Samish R. System *	Samish River	W	Marked									3				3
Sekiu R. System *	Sekiu River	W	Marked									12	3			15
Skagit R. System *	Cascade River	S	Marked						3	3						6
		W	Marked								17	166	156	17		356
	Sauk River	S	Marked							2						2
	Skagit River	S	Marked						4	1						5
		W	Marked								3	13	13	3		32
	Skagit R. System Totals	S	Marked						7	6						13
		W	Marked								20	179	169	20		388

Appendix A - 2014-2015 Puget Sound Steelhead Sport Harvest Estimates from Catch Record Cards continued (01/21/2016, E. Kraig, WDFW)

System	Water	Race	Mark	2014									2015			Total
				Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
Snohomish R. System *	Pilchuck River (Snohomish System)	W	Marked									13	7			20
	Skykomish River	S	Marked			1,775	302	87	77	55						2,296
		W	Marked								39	928	635	36		1,638
	Skykomish River, No. Fork	S	Marked			55	10	32	13	16						126
		W	Marked								3	88	59			150
	Skykomish River, So. Fork	S	Marked			6	10	13								29
		W	Marked									3	7			10
	Snohomish River	S	Marked			93	6	6								105
		W	Marked								10	137	62			209
	Snoqualmie River	S	Marked			19		3	3	3						28
		W	Marked								10	446	182			638
	Tokul Creek	W	Marked									505	749	91		1,345
	Tolt River	W	Marked								3	16	13			32
	Wallace River	S	Marked				6		6	13						25
		W	Marked								3	156	81	7		247
	Snohomish R. System Totals	S	Marked			1,948	334	141	99	87						2,609
		W	Marked								68	2,292	1,795	134		4,289
Stillaguamish R. System *	Canyon Creek	S	Marked			4										4
		W	Marked										9			9
	Stillaguamish R, No. Fork	S	Marked			12		4		12						28
		W	Marked								12	37	25	3		77
	Stillaguamish R, So. Fork	W	Marked										3			3
	Stillaguamish R. System Totals	S	Marked			16		4		12						32
		W	Marked								12	37	37	3		89
Whatcom Cr. System *	Whatcom Creek	W	Marked									9	6			15
PUGET SOUND REGION TOTALS	PUGET SOUND REGION TOTALS	S	Marked		2	2,005	365	170	124	113						2,779
		W	Marked	2							163	2,793	2,305	179	7	5,449