Puget Sound Steelhead Advisory Group

Date: February 1, 2018
Time: Noon - 7PM
Location: Lynnwood Embassy Suites

1) **Introduction**

2) **Review Provisional Central and South Puget Sound Portfolio**

3) **Potential 2018 Skagit Steelhead Fishery (Edward Eleazer)** (12:15–1:00)
   - What public comments have been provided to the Department?
   - What additional suggestions do advisors have for a rule regarding the time, area, and manner for the potential fishery?

4) **Potential Skagit Hatchery Steelhead Program** (1:00-1:15)
   - Review requests for additional information and modifications to draft preliminary analysis.

5) **Summer Steelhead Hatchery Programs** (1:15- 1:45)
   - Review letter from NOAA Fisheries and response from the Department.
   - Review performance of current programs and alternative options.

6) **Northern Cascades MPG Steelhead** (2:00-3:30)
   - Review iterative approach to developing a portfolio of conservation objectives, sustainable fisheries, and artificial production programs.
   - What is our proposed delisting scenario?
   - What are our aspirational objectives for Northern Cascades recreational fisheries?
   - Would an artificial production program help achieve conservation or fishery objectives?

Dinner – Provided (3:30-4:30)

7) **Northern Cascades MPG Steelhead (continued)**(4:30-6:35)

8) **Looking Ahead** (6:35-6:40)

9) **External Messages** (6:40-6:45)
   - What are the 3-5 messages regarding this meeting that we want to provide to other interested stakeholder?

10) **Public Comment** (6:45-6:50)

11) **Thoughts on Meeting** (6:50-7:00)

Appendix 1. Summary of public support for WSGB candidate populations or basins.

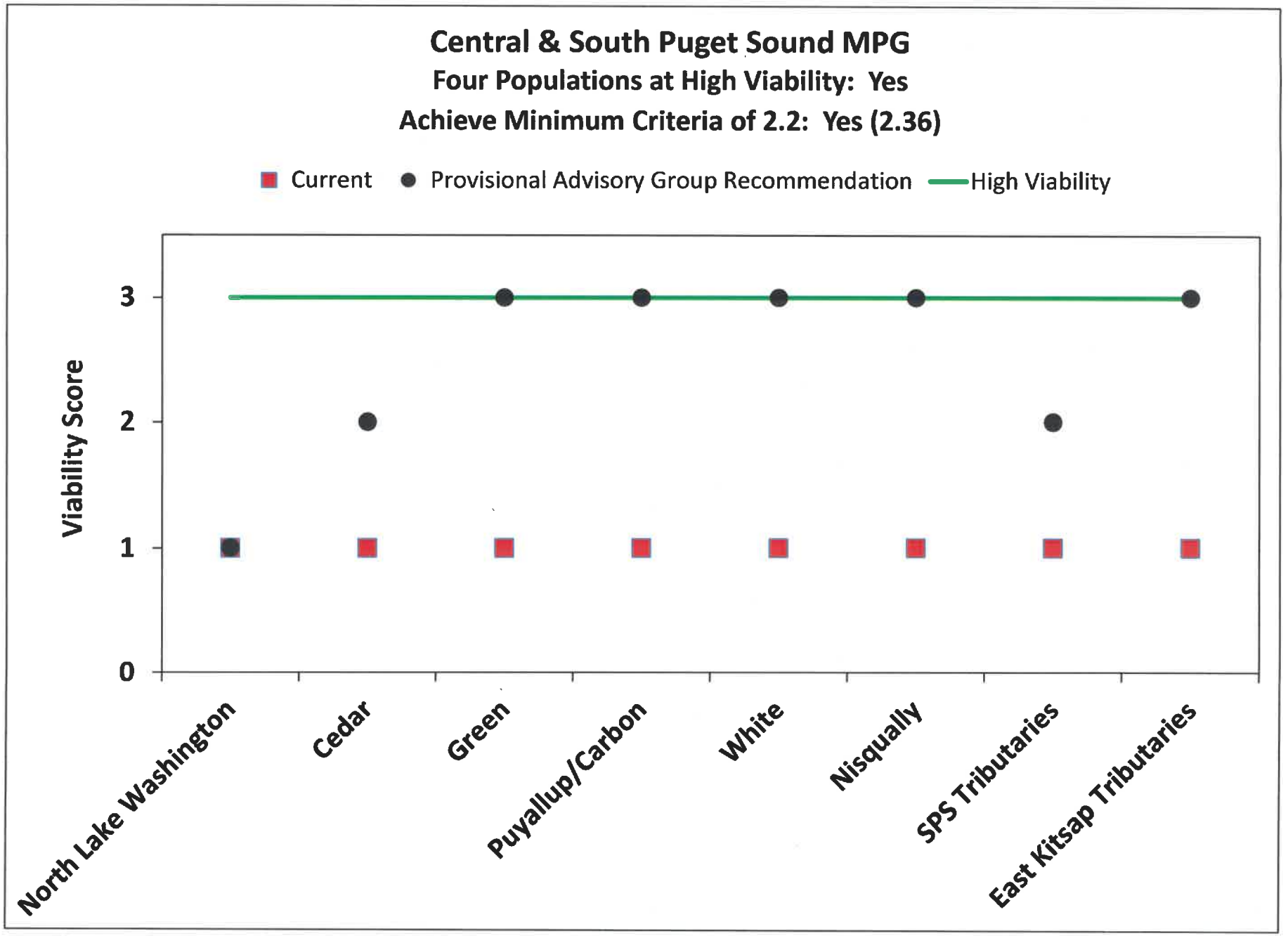
MPG	Watershed	Strongly support						Support						Nuetral						Disagree						Strongly Disagree						Support Ratio
		Online	Card	Pre-fill	WSC	Oral	Total	Online	Card	Pre-fill	WSC	Oral	Total	Online	Card	Pre-fill	WSC	Oral	Total	Online	Card	Pre-fill	WSC	Oral	Total	Online	Card	Pre-fill	WSC	Oral	Total	
NC	Skagit	215	29	-	224	21	489	8	1	-	-	-	9	3	1	-	-	-	4	3	-	-	-	-	3	23	26	36	-	5	90	5.4
NC	Sauk	70	4	36	224	22	356	5	-	-	-	-	5	1	-	-	-	-	1	-	3	-	-	-	3	2	53	-	-	-	55	6.2
NC	Deer Creek	10	19	36	-	2	65	3	-	-	-	-	3	1	4	-	-	-	5	-	8	-	-	-	8	5	14	-	-	-	19	2.5
NC	Samish	14	14	36	-	-	64	6	2	-	-	-	8	1	10	-	-	-	11	-	8	-	-	-	8	2	6	-	-	-	8	4.5
NC	Snoqualmie	15	30	-	-	1	45	-	2	-	-	-	2	2	5	-	-	-	7	-	3	-	-	-	3	11	4	36	-	-	51	0.9
NC	Tolt	9	27	-	-	-	36	1	3	-	-	-	4	2	3	-	-	-	5	1	2	-	-	-	3	10	7	36	-	-	53	0.7
NC	NF Skykomish	11	21	-	-	-	32	6	-	-	-	-	6	-	7	-	-	-	7	2	6	-	-	-	8	11	10	36	-	-	57	0.6
NC	Pilchuck	4	19	-	-	-	23	5	4	-	-	-	9	-	6	-	-	-	6	1	10	-	-	-	11	7	6	36	-	1	50	0.5
NC	South Fork Nooksack	14	8	-	-	-	22	3	1	-	-	-	4	2	12	-	-	-	14	2	11	-	-	-	13	1	11	36	-	-	48	0.4
C&S PS	Puyallup/Carbon	115	20	-	224	17	376	9	2	-	-	-	11	1	5	-	-	-	6	2	2	-	-	-	4	11	24	36	-	-	71	5.2
C&S PS	White	30	20	-	224	16	290	6	2	-	-	-	8	3	8	-	-	-	11	-	3	-	-	-	3	2	12	36	-	-	50	5.6
C&S PS	Nisqually	25	4	36	-	3	68	7	4	-	-	-	11	1	2	-	-	-	3	1	5	-	-	-	6	2	35	-	-	-	37	1.8
C&S PS	Green River	3	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SFJ/HC	Elwha	190	14	-	224	22	450	4	1	36	-	-	41	-	1	-	-	-	1	-	3	-	-	-	3	5	41	-	-	-	46	10.0
SFJ/HC	West Hood Canal	7	6	36	-	1	50	9	1	-	-	-	10	-	7	-	-	-	7	-	8	-	-	-	8	-	21	-	-	-	21	2.1
SFJ/HC	Skokomish	7	25	-	-	-	32	2	1	-	-	-	3	3	3	-	-	-	6	2	3	-	-	-	5	5	9	36	-	-	50	0.6
SFJ/HC	Sequim/Discovery Bay	6	19	-	-	-	25	-	3	-	-	-	3	1	10	-	-	-	11	-	1	-	-	-	1	1	6	36	-	-	43	0.6
SFJ/HC	East Hood Canal	5	12	-	-	1	18	1	4	-	-	-	5	-	7	-	-	-	7	1	6	-	-	-	7	1	11	36	-	-	48	0.4
SFJ/HC	South Hood Canal	2	13	-	-	1	16	-	1	-	-	-	1	3	4	-	-	-	7	-	1	-	-	-	1	1	2	36	-	-	39	0.4
SFJ/HC	Strait of Juan de Fuca Indpt Tribs.	3	11	-	-	-	14	-	3	-	-	-	3	1	3	-	-	-	4	-	2	36	-	-	38	3	3	-	-	-	6	0.4

Table 1. Estimated number of spawners for Puget Sound populations, watersheds, or index areas. All are winter run populations except the Tolt amd North Fork Skykomish. Consult SCoRE for more information on estimates (https://fortress.wa.gov/dfw/score/score/). Draft: January 31, 2018

Year	Nooksack	Samish	Skagit	Stillaguamish Index	Stillaguamish Total	NF Skykomish Summer	Tolt Summer	Pilchuck	Snohomish Skykomish	Snoqualmie	North Lake Wash.	Cedar
1978			5,757									
1979		224	2,982									
1980		80	5,288									
1981		142	4,308					490	1,297	1,167		
1982			9,609					657	2,242	1,261		
1983			7,732					779	1,843	2,536		
1984			8,963					930	3,197	2,305	614	636
1985		1,052	8,603	1,542			140	1,706	3,082	1,748	250	224
1986			11,098	2,226			84	1,644	4,076	2,070	916	900
1987		836	8,305	1,892			88	1,416	3,628	2,420	716	456
1988		606	13,194	1,222				1,424	4,710	1,610	270	588
1989		244	11,854	1,718			60	1,650	3,618	1,810	380	306
1990		106	10,017					1,124	2,896	1,478	308	406
1991			5,818	950			45	968	3,136	1,832	227	394
1992			7,514				108	1,582	4,760	2,246	45	554
1993			6,900	1,178			202				40	144
1994		941	6,412	1,118			161	1,308	4,014	1,848	6	64
1995		918	7,656	1,556			151	1,588	4,130	2,004	0	126
1996		797		1,094			170				2	232
1997							213				4	616
1998		586	7,448	1,185			366	1,558	4,132	2,004	8	576
1999		617	7,870	917			214	1,270	2,937	2,164	4	216
2000		676	3,780	463			185	590	1,558	674		48
2001		908	4,584	630			167	462	1,265	1,395		42
2002		859	5,394	354			115	279	1,166	789		38
2003		915	6,818	660			198	696	1,915	988		20
2004	1,592	930	7,332	740	3,002		34	1,522	3,404	1,506		44
2005		597	6,382	462	1,874		68	604	2,850	1,060		22
2006		791	6,757	674	2,734		114	580	3,038	1,856		32
2007		494	4,242		2,726		50	976		992		8
2008		432	4,887	306	1,241		52	646				4
2009	772	434	2,502	120	487		86	344				0
2010	1,901	697	3,981	372	1,509	82	116	294	732	662		2
2011	1,774	1,028	5,462	362	1,501	14	68	552	1,150	664		4
2012	1,747	524	6,185	340	1,371	22	122	848	876	792		0
2013	1,805	916	8,727	514	2,085		126	1,036	1,008	614		8
2014	1,521	680	9,084	362	1,469		124	676	1,188	822		0
2015	2,081	1,876	8,644	566	2,296		56	1,008	940	966		6
2016	1,840	1,456	7,918	684	2,775		16	822	1,312	986		10
2017	1,714	862	6,380	428	1,736		62	644	888	460		0
2007-2016	1,684	854	6,163	403	1,746	39	82	720	1,029	812		4
2012-2016	1,799	1,090	8,112	493	1,999	22	89	878	1,065	836		5

1/ Green River estimates include spawners returning from wild stock broodstock program beginning in 2005.
2/ White River estimates include spawners returning from wild stock broodstock program beginning in 2008.
3/ Nisqually River estimates includes tributary spawners beginning in 2004.
4/ West Hood Canal spawner estimate do not include all rivers (Little Quilcene, Hamma Hamma, Duckabush, and Dosewallips) in each year, and include adult supplementation releases beginning in 2002.
5/ South Hood Canal spawner estimates include only the Tahuya River before 1998, and the Tahuya and Union rivers beginning in 1998.
6/ East Hood Canal spawner estimates include only the Dewatto before 2008, and the Dewatto and Big Beef Creek beginning in 2008. Dewatto spawner estimates include adult supplementation releases beginning in 2011.
7/ Skokomish River spawner estimates include adult supplementation releases beginning in 2011.
8/ Strait of Juan de Fuca Tributaries estimates do not include all creeks in each year.

Year	Green 1/	White 2/	Puyallup-Carbon	Nisqually 3/	West Hood Canal 4/	South Hood Canal 5/	East Hood Canal 6/	Skokomish 7/	Sequim-Discovery	Dungeness	SJDF Tribs. 8/
1978	1,077								140		
1979	1,385								78		
1980	1,566			1,972					120		
1981	1,083			1,782		94	12		128		
1982	2,121			3,807		86	34	822	109		
1983	1,526	349	1,892	2,705		44	22	659	52		
1984	2,188	1,019	1,219	1,304		172	86	777	131		139
1985	2,286	1,039	1,432	1,599		185	102	968	154		145
1986	2,778	887	2,880	1,620		142	32	866	61		105
1987	1,685	727	1,602	2,022		119	3	546	72		118
1988	2,378	1,762	1,634	1,916		102	23	742	71	438	138
1989	1,916	1,424	1,930	3,817		142	22	1,444	29	429	60
1990	1,484	708	1,242	1,853		164		370	12	408	78
1991	944	768	1,130	642		122		729	34	423	91
1992	1,868	1,033	1,280	2,618		73		172	51	292	100
1993	1,702	574	1,022	993		75	40		30	338	
1994	1,782	507	1,124	804		77	18	473	41	337	
1995	2,198	637	1,509	987	92	78	22	398	45		128
1996	2,500	540	828		63	92	39		139	261	89
1997	1,882	396	992	882	114	144	11		73		183
1998	2,284	440	763	700	73	171	28	373	64		410
1999	2,480	626	1,076	530	178	405	15	311	55		298
2000	1,694	598	651	411	148	241	23	261	166		413
2001	1,402	570	477	240	113	206	19	286	58		242
2002	1,068	614	326	353	328	146	30	156	28		196
2003	1,615	309	287	350	254	103	18	132	90		147
2004	2,359	338	501	936	279	226	39	233	40		150
2005	1,298	238	162	217	133	114	23		15		89
2006	1,955	299	462	885	167	269	53	231	22		330
2007	1,452	300	509	442	240	196	28	354	34		181
2008	833	230	401	720	274	159	107	252	8		49
2009	304	186	241	289	98	68	20	502	16		87
2010	423	609	472	760	103	89	15	319	10		193
2011	855	593	329	297	225	58	98	424	34	410	100
2012	392	593	233	265	156	94	66	499	21		147
2013	656	605	447	699	121	76	258	1,028	50	564	163
2014	997	617	531	593	121	43	31	614	8		171
2015	1,622	556	926	1,126	145	90	160	1,338	24	618	250
2016	2,145	805	1,563	2,035	170	75	66	1,126	13		152
2017	1,002	432	672	616	38	29	77	619	39		32
2007-2016	968	509	565	723	165	95	85	646	22	531	149
2012-2016	1,162	635	740	944	143	76	116	921	23	591	177


Central & South Puget Sound MPG
Four Populations at High Viability: Yes
Achieve Minimum Criteria of 2.2: Yes (2.36)
Current
Provisional Advisory Group Recommendation
High Viability
Viability Score
3
2
1
0
North Lake Washington
Cedar
Green
Puyallup/Carbon
White
Nisqually
SPS Tributaries
East Kitsap Tributaries

Puget Sound Steelhead Advisory Group Recommendations

Provisional Central & South Puget Sound Portfolio

Draft January 31, 2018

Population or Watershed	Run Timing	Designation	Fishery		Integrated Hatchery			Segregated Hatchery			Rationale for Provisional Recommendation
			Early Timed (angler days)	Native-Timed (angler days)	Purpose	PNI Limit (Proposed)	Proposed Program Size	Purpose	DGF Limit (Proposed)	Proposed Program Size	
North Lake Washington	Winter	Stabilizing	440 [1/]						- (High)	30,000	Designation informed by limited numbers of natural-origin spawners, 90% lowland, and 13% public land. Pilot hatchery program evaluated after collection of monitoring information.
Cedar River	Winter	Contributing			Conservation	Reintroduction	25,000-50,000				Designation informed by limited number of natural-origin spawners. Initiate conservation program with 20-45 adults from Green River population when Green River population is consistently (one cycle) exceeding spawner objective (2,000).
Green River	Winter	Primary		Mark Selective (3,100 angler days)	Conservation /Harvest	0.67 (0.67)	100,000 (winter)				Designation informed by average number of spawners and intrinsic potential (both the largest for this MPG) and 51% of watershed in public ownership. Initiate winter steelhead catch-and-release fishery and transition to mark-selective fishery in a manner consistent with achieving conservation objectives.
			C&K Summer (3,500 angler days)[4/]					Harvest	0.02 (0.02)	97,000 (summer)	PSSAG has not discussed this program?
White River	Winter	Primary		C&R (1,500 angler days)[5/]	Conservation /Harvest	0.67 (0.94)	60,000 (winter)				Designation informed by intrinsic potential (second largest for this MPG) and 60% of watershed in public ownership. Initiate winter steelhead catch-and-release fishery in a manner consistent with achieving conservation objectives
Puyallup/ Carbon River	Winter	Primary									Designation informed by intrinsic potential (fourth largest for this MPG).
Nisqually River	Winter	Primary		C&R (> 3,100 angler days) [7/]							Designation informed by intrinsic potential (third largest for this MPG), 43% public land, and presence of water storage may reduce effects of climate change. Previously designated as Wild Steelhead Gene Bank.
South Puget Sound	Winter	Contributing	C&K (500 angler days) [8/]					Harvest	- (High)	50,000	Designation informed by 8% public lands and 98% lowland hydrology. Initiate hatchery program in Deschutes River, which does not have an indigenous steelhead run, when hatchery upgrade completed.
East Kitsap	Winter	Primary									Designation informed by PSSAG support for providing for a diversity of habitat types and support of local groups for habitat restoration.

[1/] Assumes an average SAR of 0.50% (Green average for outmigration years 2000-2012), a 35% recreational harvest rate, and an average catch of 0.12 steelhead per angler trip.

[2/] Assumes runsize of 1,500 natural-origin fish, 5% allowable exploitation rate, 10% release mortality rate, and an average encounter of 0.12 steelhead per angler trip.

[3/] Assumes runsize of 2,000 natural-origin fish, 550 hatchery-origin fish, 5% allowable exploitation rate, 10% release mortality rate, and an average encounter rate of 0.12 steelhead per angler trip.

[4/] Assumes 2001-2012 average catch of 417 and an average encounter rate of 0.12 steelhead per angler trip.

[5/] Assumes runsize of 730 natural-origin fish, 5% allowable exploitation rate, 10% release mortality rate, and an average encounter of 0.12 steelhead per angler trip.

[6/] Assumes runsize of 974 natural-origin fish, 600 hatchery-origin fish, 5% allowable exploitation rate, 10% release mortality rate, and an average encounter of 0.12 steelhead per angler trip.

[7/] Assumes runsize of 1,500 natural-origin fish, > 5% allowable exploitation rate, 10% release mortality rate, and an average encounter of 0.12 steelhead per angler trip.

[8/] Assumes an average SAR of 0.12% and an average catch of 0.12 steelhead per angler trip.

Acronyms:

DGF. Demographic gene flow.

C&K. Recreational catch and keep fishery.

C&R. Recreational catch and release fishery.

Skagit River Basin wild steelhead fishery

Public Meeting(s)

Mill Creek-January 12, 2018

Sedro Woolley-January 16,2018

Agenda

Welcome/Introductions

Review of Skagit FRMP

Break Out Session-discussion of fishery regulations, time, and area of proposed fisheries.

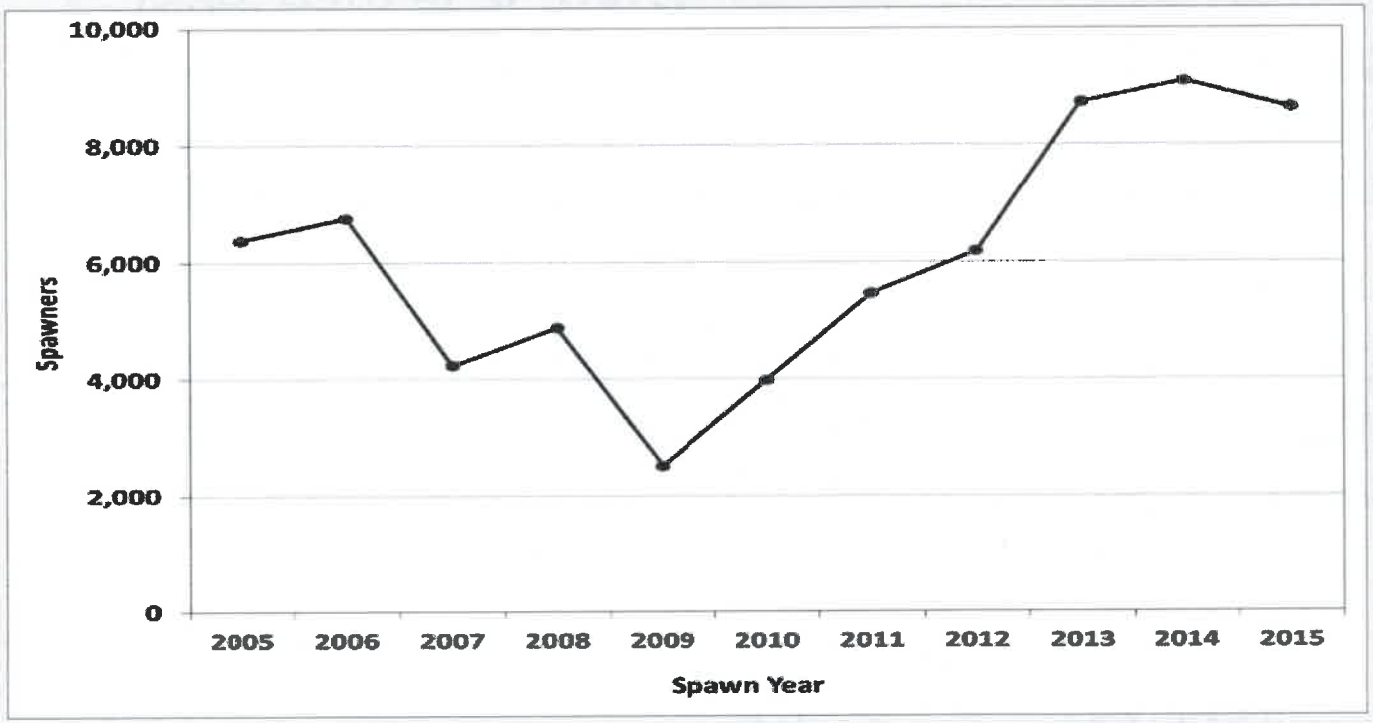
Summary/Next Steps

Skagit FRMP

The Skagit FRMP submitted by co-managers, covers fishery management activities for natural origin Skagit River steelhead in the Skagit River watershed for five years beginning in 2018.

Historically, the Skagit Basin has maintained the largest steelhead natural origin population and has been one of the most productive steelhead basins in the Puget Sound Steelhead DPS (Busby et al. 1996; Hard et al. 2007).

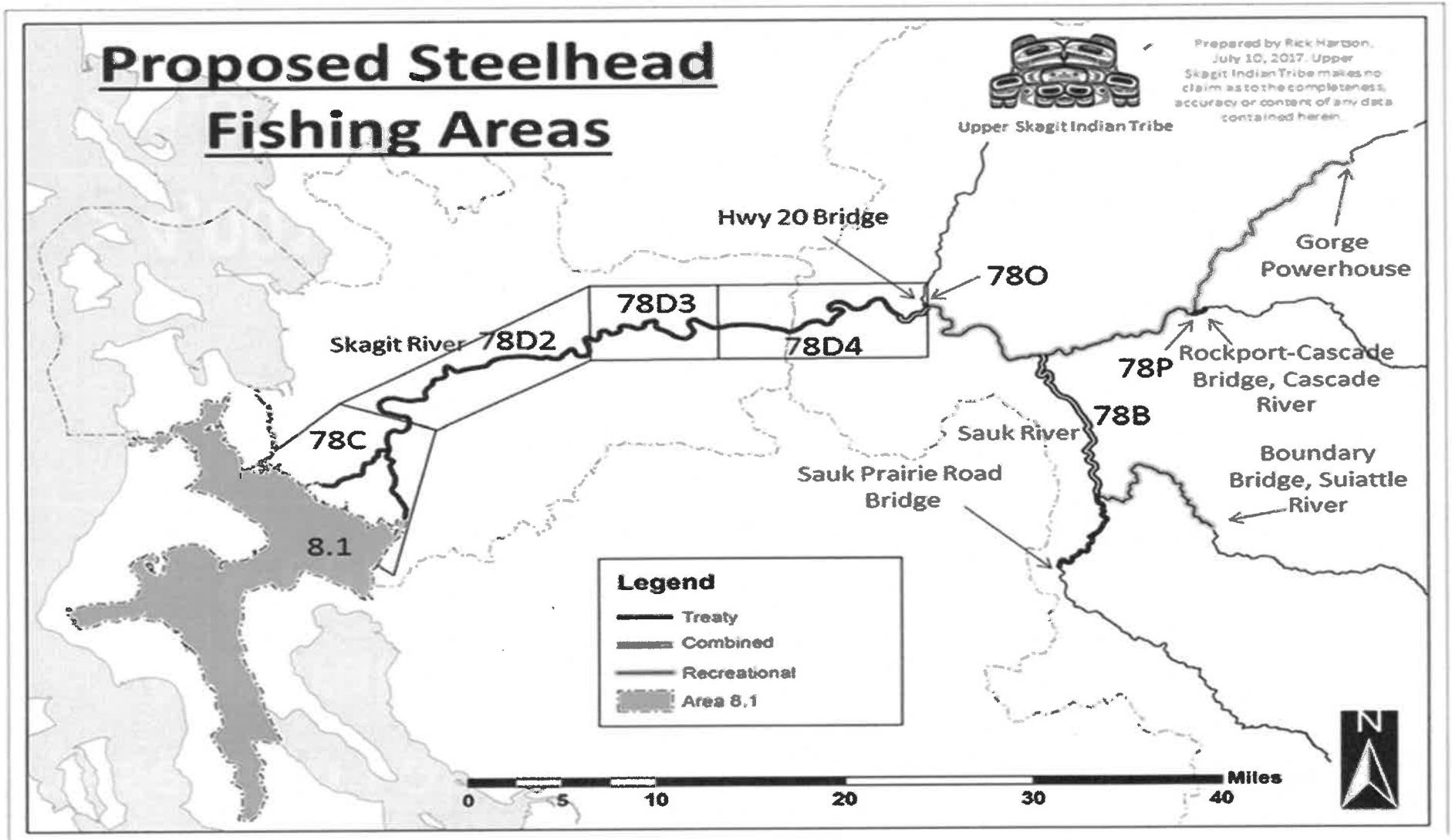
Steelhead Spawners in the Skagit River from 2005 to 2017



2016: 7,926

2017: 6,380

Preseason Forecast for Natural Origin Steelhead	Allowable Harvest Impact Rate
≤ 4,000	4%
≥ 4,001 to ≤ 6,000	10%
≥ 6,001 to ≤ 8,000	20%
≥ 8,001	25%


Proposed Steelhead Fishing Areas
Upper Skagit Indian Tribe
Prepared by Rick Hartson, July 10, 2017. Upper Skagit Indian Tribe makes no claim as to the completeness, accuracy or content of any data contained herein.
Hwy 20 Bridge
78O
Gorge Powerhouse
78D3
Skagit River
78D2
78D4
78P
Rockport-Cascade Bridge, Cascade River
78B
Sauk River
78C
Boundary Bridge, Suiattle River
Sauk Prairie Road Bridge
8.1
Legend
Treaty
Combined
Recreational
Area 8.1
0
5
10
20
30
40
Miles
N

Washington Wild Future: A Partnership for Fish and Wildlife

- *Catch and release steelhead fishery on the Skagit River*

- *To manage this fishery, additional biologist capacity is necessary to conduct a creel survey of the catch and release fishery for 2 months (February-March) in the Skagit River from the Dalles Bridge in Concrete to the Cascade River Road (24.2 miles) and on the Sauk River from the mouth to the Sauk Prairie Road Bridge (20.1 miles).*

Shaping the Fishery Questionnaire

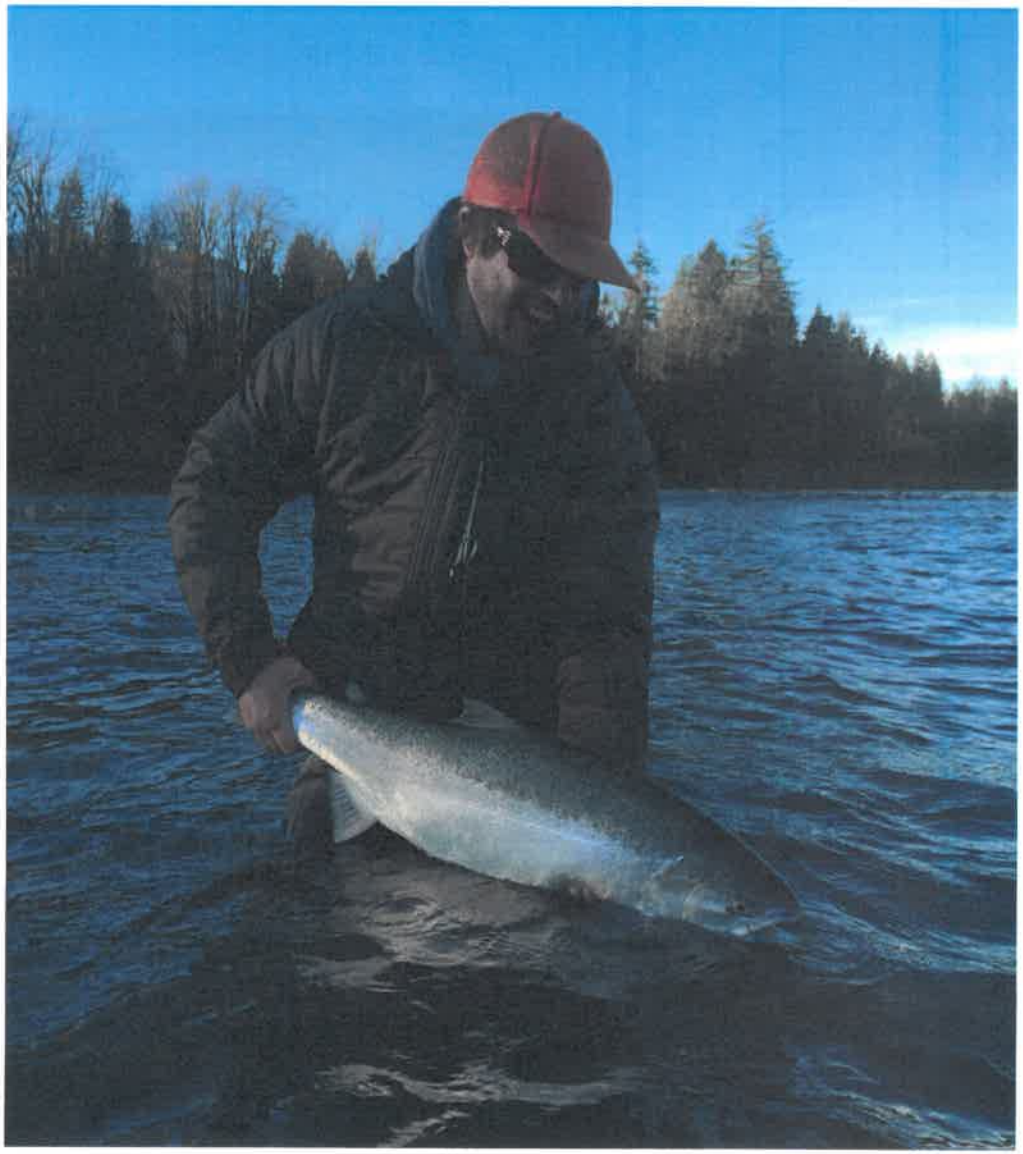
During the previous Catch and Release (C&R) Fishery for WSH on the Skagit and Sauk rivers, the following rules were in place:

- *-**Skagit River**: March 1-April 30. Open from the Dalles Bridge in Concrete, to the Marblemount Bridge. Selective gear rules, no fishing from a boat while under power.*

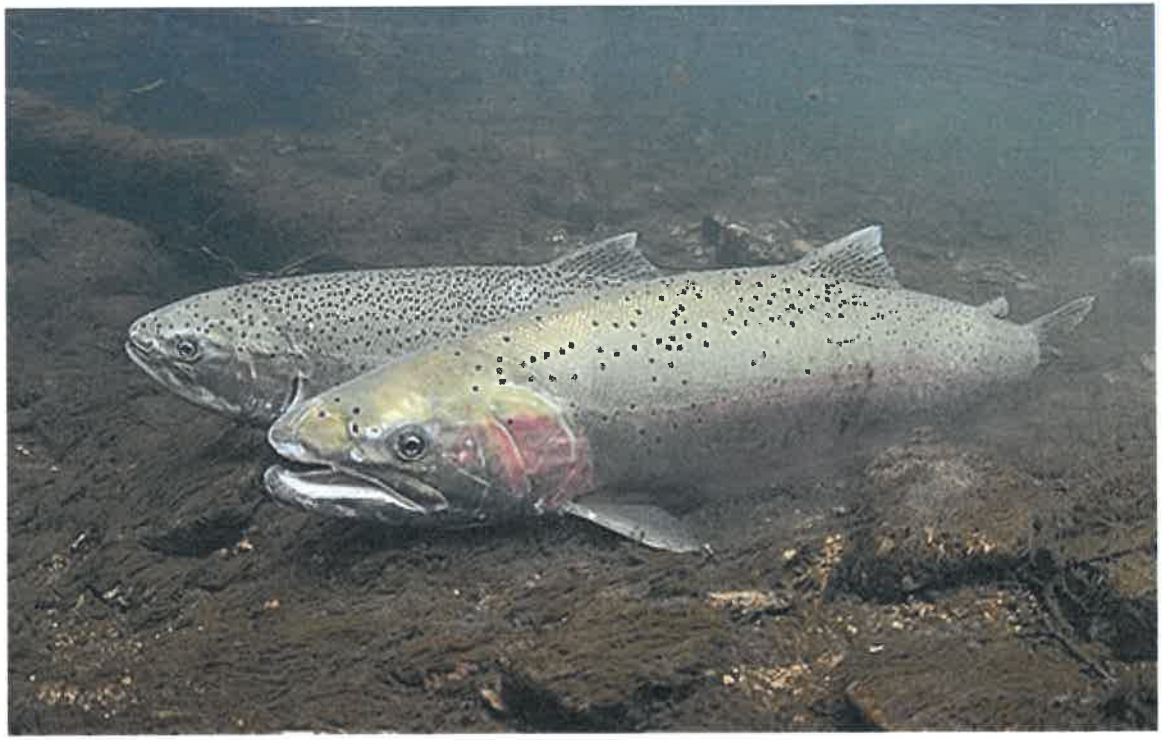
- *-**Sauk River**: March 1-April 30. Open from the mouth to the Darrington (Sauk Prairie Rd.) Bridge. Selective gear rules, no fishing from a boat while under power.*

Shaping the Fishery Questionnaire

- Your input will help shape the fishery
- Our Value: To minimize impacts to the wild steelhead, while providing a quality fishery into the future



Wrap-up/Next steps



Mill Creek Meeting

Sedro Meeting

General opinion about the Skagit steelhead catch and release fishery regulations where we left off in 2009

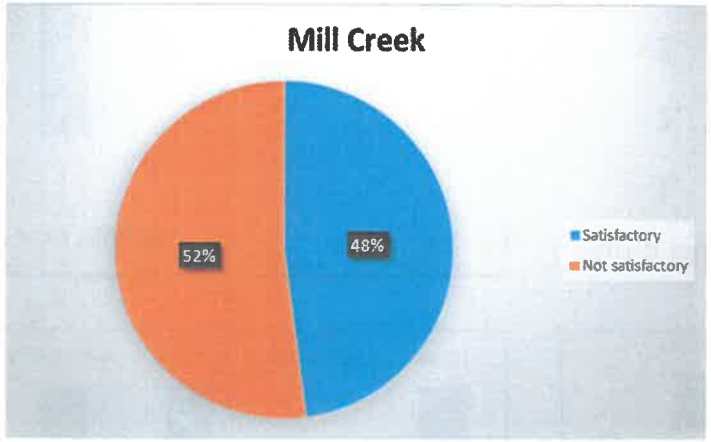
Here's where we were

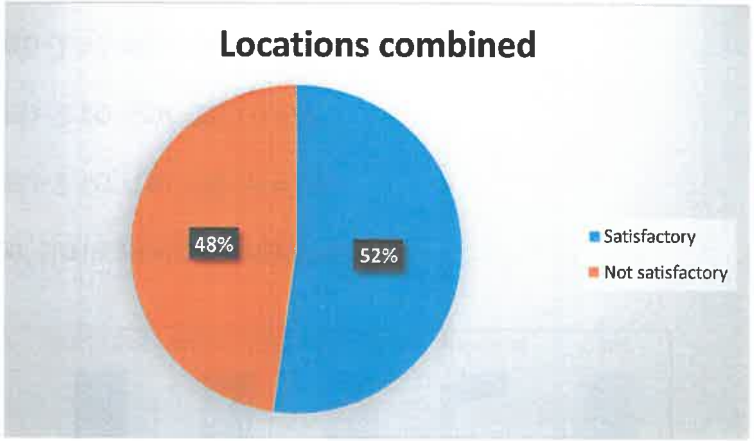
Skagit River

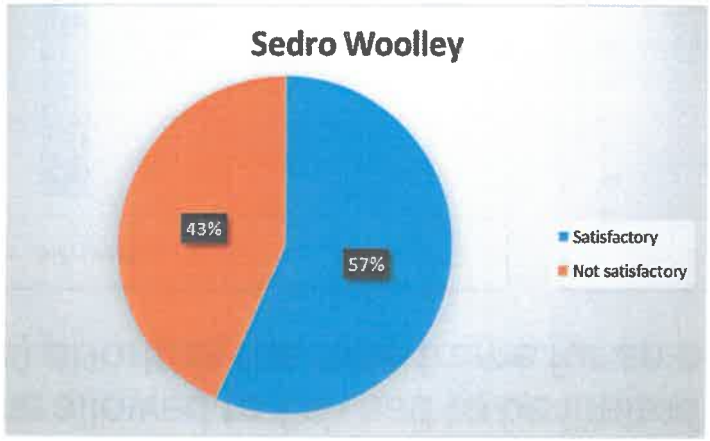
- *March 1-April 30.*
- *Open from the Dalles Bridge in Concrete to the Marblemount Bridge.*
- *Selective gear rules*
  - *No fishing from a boat while under power.*

Sauk River

- *March 1-April 30.*
- *Open from the mouth to the Darrington (Sauk Prairie Rd.) Bridge.*
- *Selective gear rules*
  - *no fishing from a boat while under power.*





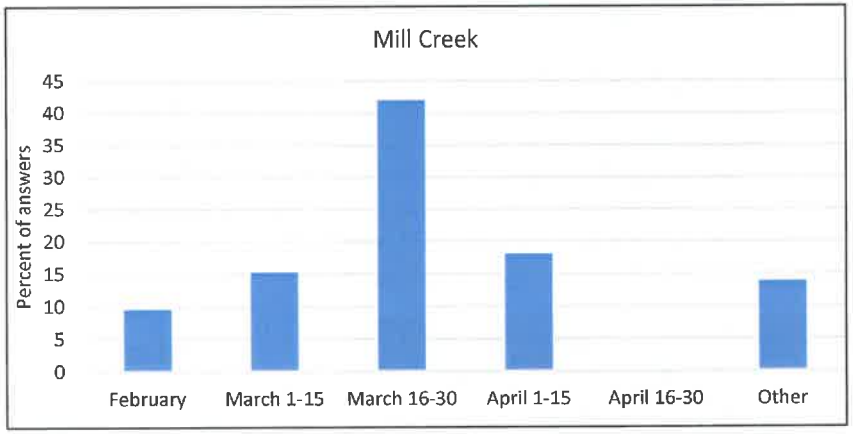


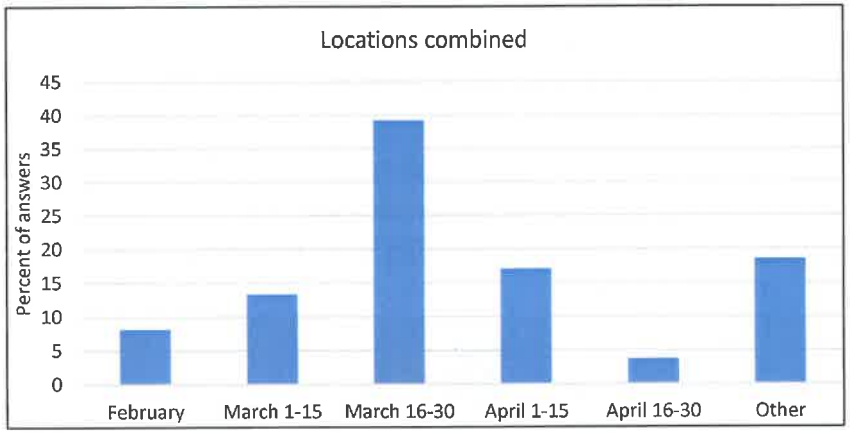
Top reasons the regulations were unsatisfactory

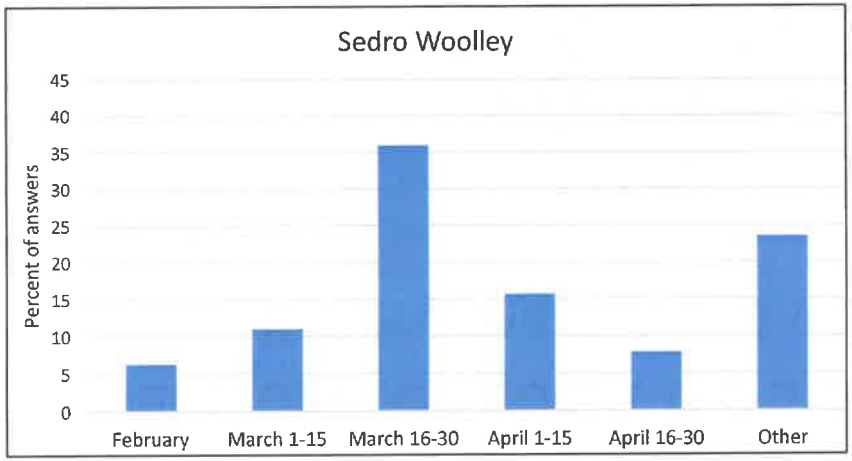
1. Needed more restrictions on boat fishing and gear type (n=19)
2. More restrictions in general needed (n=11)
3. There were too many restrictions on boats (n=7)
4. There should have been more area open (n=5)
5. The season was too short (n=4)

Comments regarding now and into the future:
83 different comments provided spanning budget, limiting effort, tribal issues, and more.

Question 1: If the *time* allowed to fish had to be limited due to the Forecast Tier, I (anglers) prioritize the time frame for an open C&R fishery as...



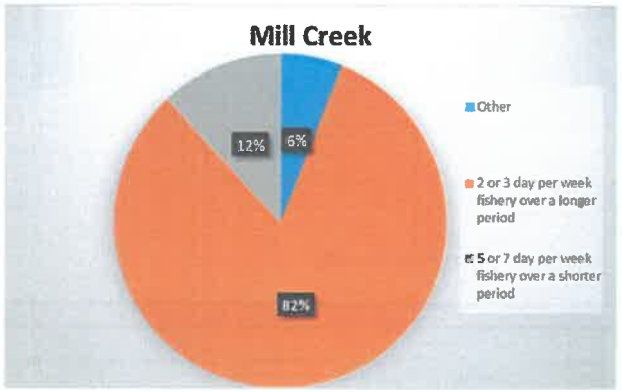


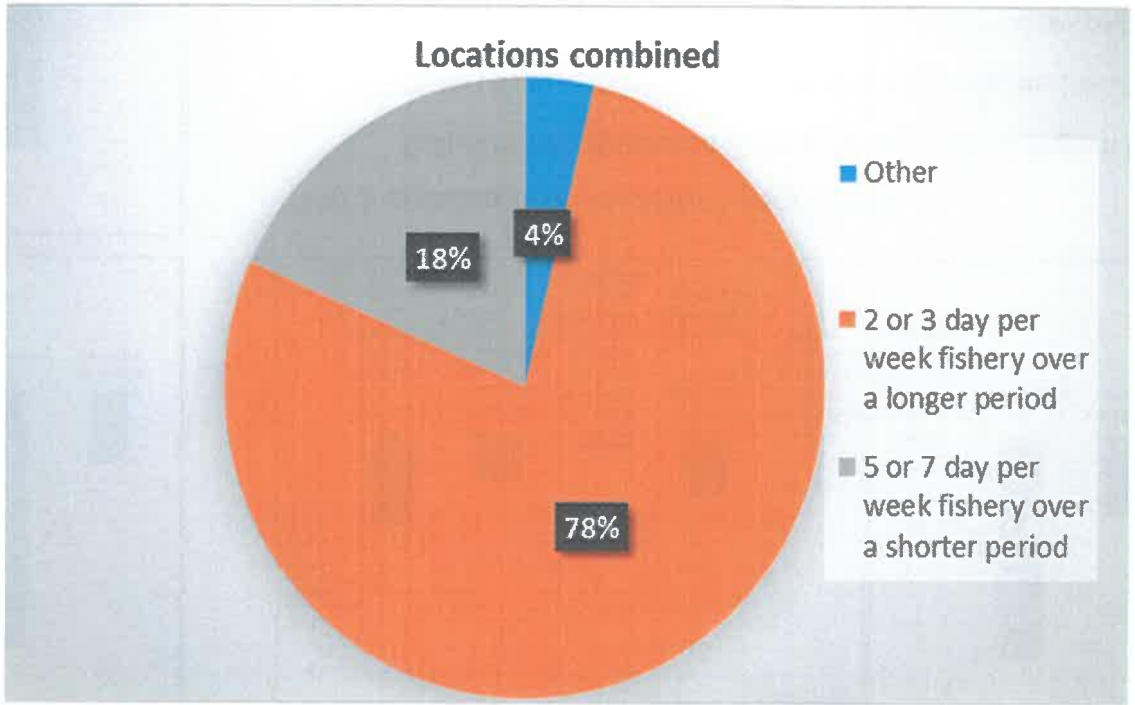


Top 5 other time periods recorded

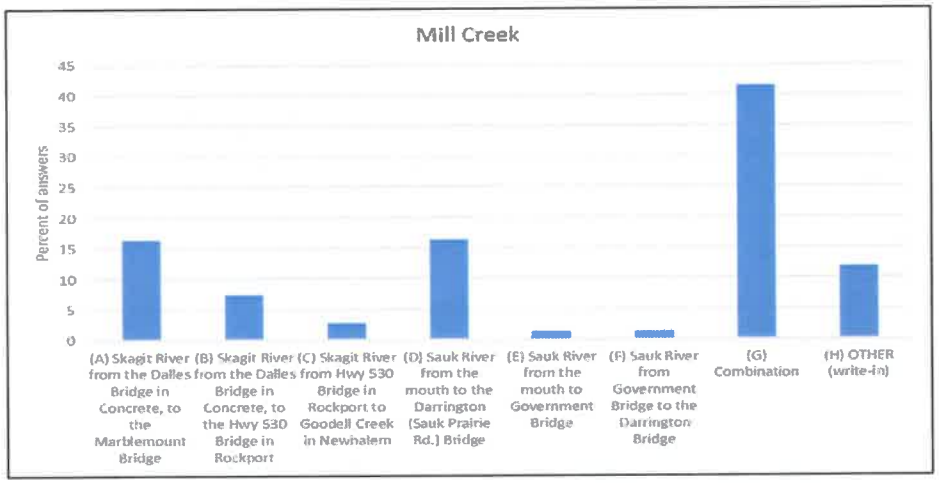
1. Feb-1 to Apr-30 (n=10)
2. Feb-1 to Apr-15 (n=2)
3. Feb-1 to Apr-30 (n=2)
4. Mar-1 to Apr-30 (n=2)
5. Mar-16 to Apr-15 (n=2)

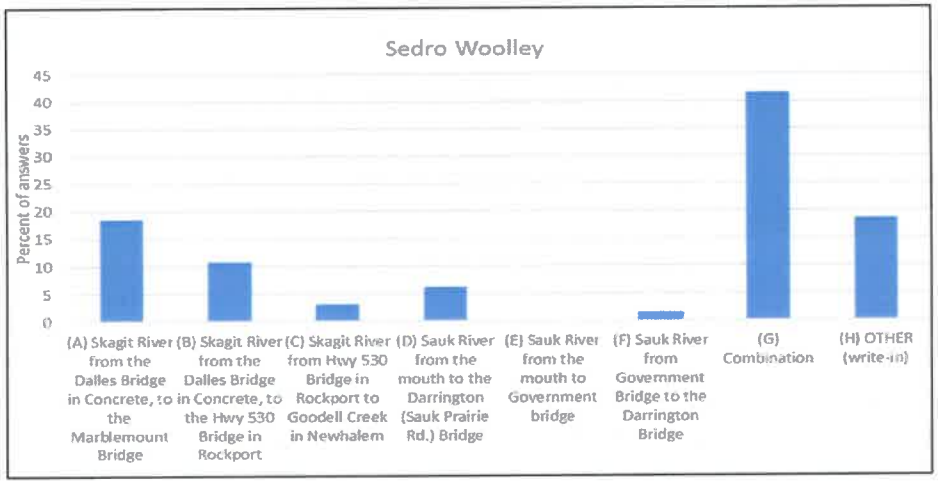
Question 2: If the *time* allowed to fish had to be limited due to the Forecast Tier, I would prefer...

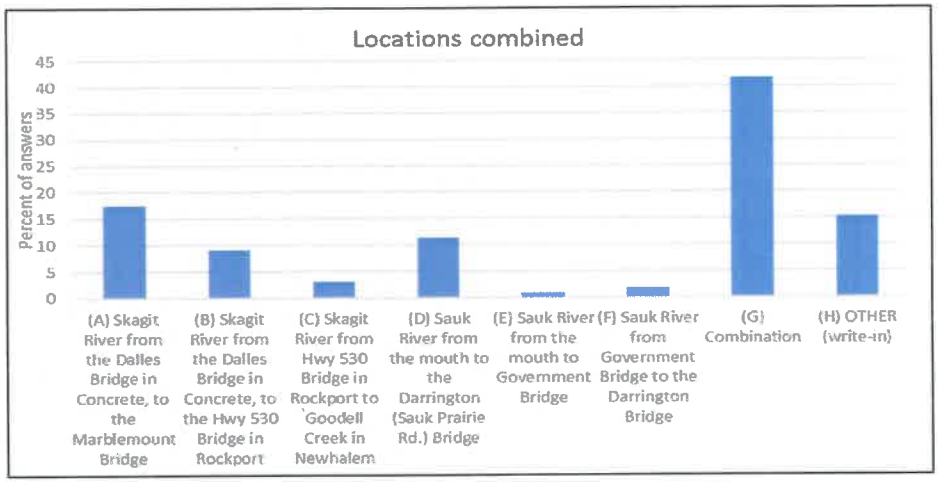




Question 3: If the *place* allowed to fish had to be limited due to the Forecast Tier, I would prefer:



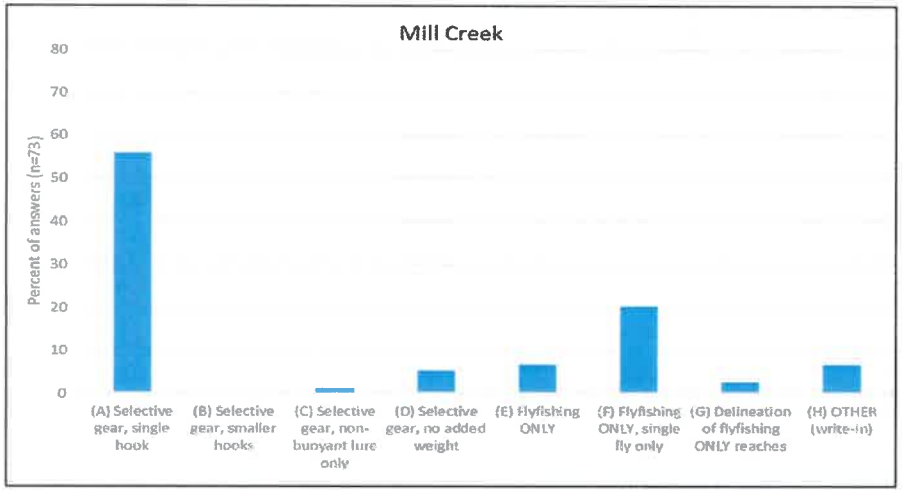


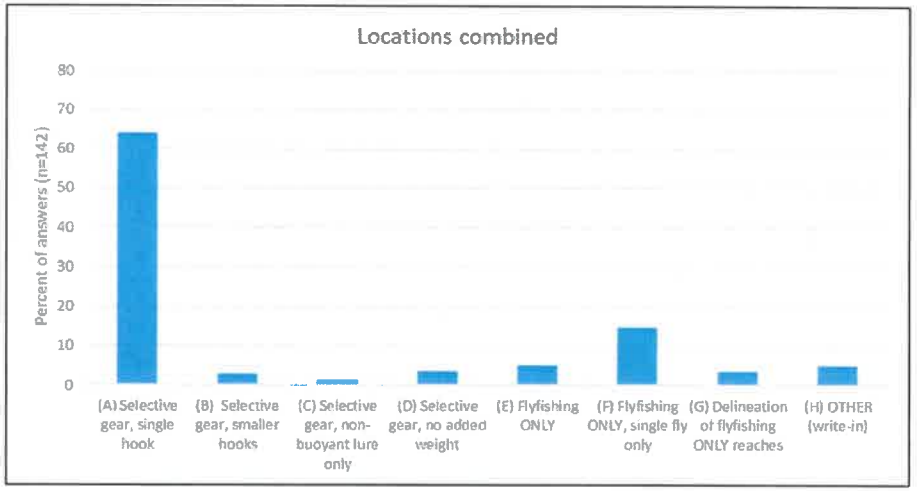


Top 5 combination locations requested:

1. Dalles to Marblemount & Sauk mouth to Darrington (n=19)
2. Dalles to Rockport & Sauk mouth to Darrington (n=11)
3. Dalles to Rockport & Sauk mouth to Govt bridge (n=6)
4. Dalles to Marblemount & Sauk mouth to Govt bridge (n=5)
5. Entire River (n=5)

Question 4: If the *manner* had to be limited due to the Forecast Tier, I would prefer...





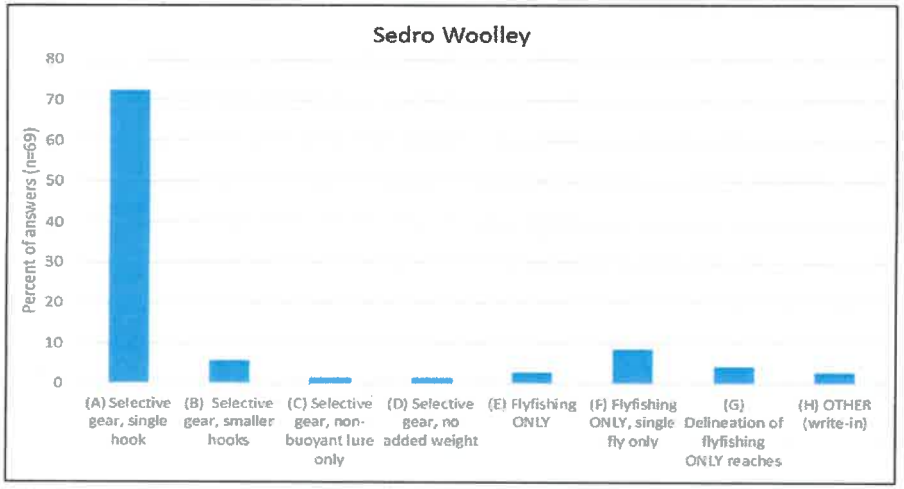


Image credit: http://www.steelheader.net

Image credit: http://www.baitnhook.com

Image credit: http://www.flyfishinginsidernewsletter.com

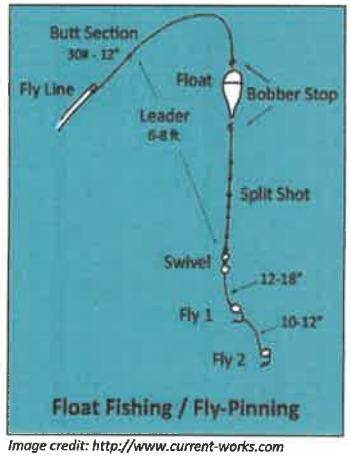
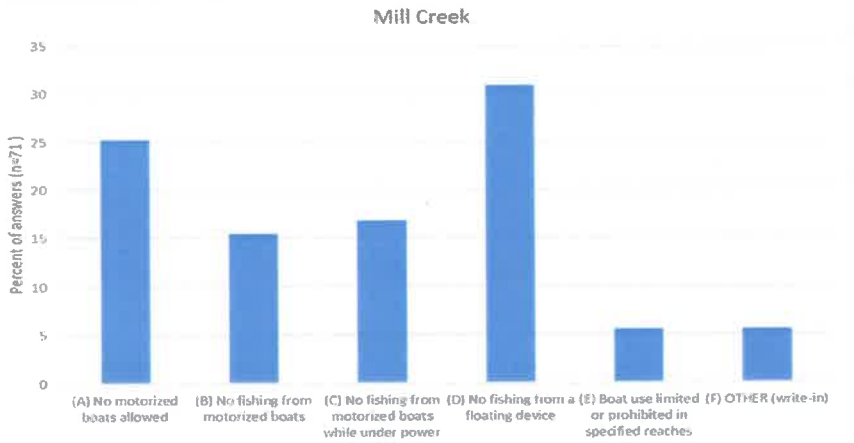
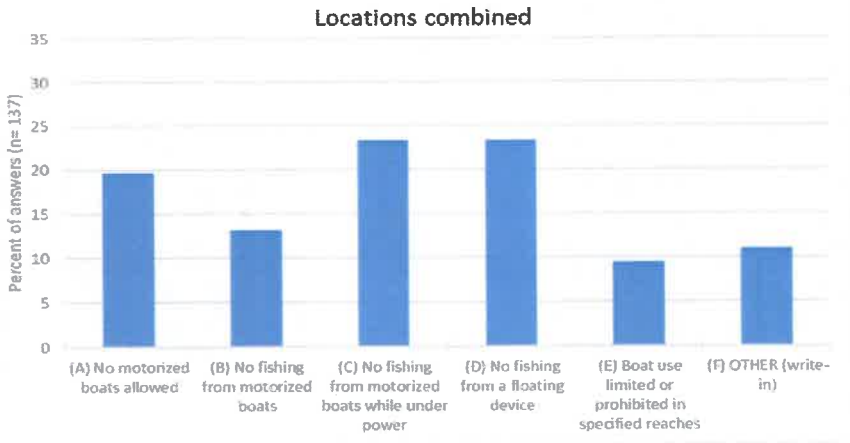
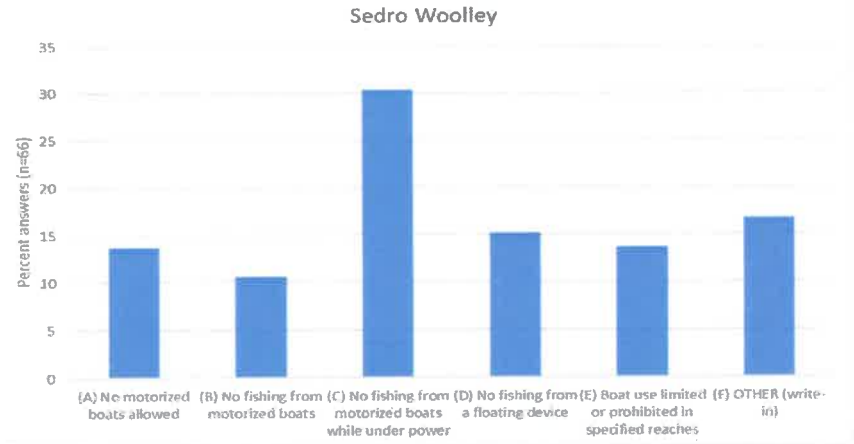


Image credit: http://www.current-works.com

Question 5: If the manner had to be limited due to the forecast Tier, I would prefer...







Top manner comment written for "other"

1. No boat restriction (n=4) and no restriction on boat fishing (n=3)
   a) Inferred these commenters meant they do not want any boat restrictions.
      i. However for the first comment phrase, a natural pause after "no boat" or adding an A at the beginning changes the meaning.
   b) American Disability Act concerns regarding limiting boat fishing noted between this section and miscellaneous write-in section

Skagit winter steelhead average spawn timing 2012-2017

Table 1. Average percent of spawning of Skagit winster steelhead by half-month time period. Redds were counted by ground and aerial surveys. All new redds were counted and marked during ground based surveys and all visible redds were counted during aerial surveys.

			March		April		May		June		July
Stream	Reach	Years included	1 - 15	16 - 31	1 - 15	16 - 30	1 - 15	16 - 31	1 - 15	16 - 30	1 - 15
Skagit	Shovelspur to Marblemount	2012, 2013, 2015 - 2017	0.00	3.9	9.8	17.3	34.1	24.5	10.4	0.00	
Skagit	Marblemount to Sauk	2012, 2013, 2015 - 2017	0.00	1.8	13.2	27.1	30.5	19.6	5.6	2.30	
Skagit	Sauk to Baker	2012 - 2017	0.01	2.6	14.3	19.6	28.5	26.6	7.9	0.3	0.00
Skagit	Baker to Hwy 9	2012 - 2017	0.01	3.7	13.6	22.6	34.3	20.3	5.3	0.2	0.00
Sauk	Darrington to Suiattle	2012 - 2017	0.01	2.6	9.4	26.2	31.3	22.3	7.0	1.1	0.01
Sauk	Suiattle to Government Bridge	2012 - 2017	0.01	2.8	10.8	25.3	30.4	21.7	7.6	1.4	0.02
Sauk	Government Bridge to Mouth (Skagit)	2012 - 2017	0.01	4.0	14.6	28.1	27.8	18.8	5.8	0.8	0.01

Follow-up Questions and Analyses
Potential Skagit River Integrated Hatchery Program
January 31, 2018

Tasks from January 22, 2018 PSSAG Meeting

1) What residual and stray rates have been observed in the Elwha River?
2) How would broodstock be collected across the entire run timing if broodstock are collected from above the Sauk River? Isn't it likely that fish are holding in that area prior to moving to spawning locations?
3) Provide analysis regarding the potential interbreeding of precocious males from the hatchery program with natural-origin spawners.
4) What would a recreational fishery season look like with and without the potential hatchery program? What would be the associated program costs and economic benefits?
5) What would be the likelihood and potential effects of amplifying certain spawn- or run-timing components of the Skagit steelhead population?
6) What would be the likelihood and potential effects of localized areas of higher pHOS?
7) How would a rebuilding trajectory be affected by the potential hatchery program and associated fisheries?

Department Identified Tasks

8) Correct error in how fitness loss was modelled (i.e., set parameter value to 1.0 rather than 0.80)

Skagit System Cooperative
P.O. Box 368 LaConner, WA 98257-0368 Ph. (206) 466-3450

April 17, 1985

MAY 1 1985

Chuck Phillips, Regional Fisheries Biologist
Washington Department of Game
16018 Mill Creek Blvd.
Bothell, WA 98011

Dear Chuck:

Enclosed please find two copies of the Memorandum of Understanding regarding our steelhead broodstock project. I believe that this language reflects the agreements we made at our April 15 meeting.

If all is OK, please sign each copy and send one back to us.

Thank you for your prompt attention to this matter. I'm glad that we could work this out so that it is beneficial to everyone involved.

Sincerely,

Doreen M. Maloney

Doreen Maloney, Chairman
Skagit System Cooperative

cc: Lorraine Loomis
Lawrence Joseph
Steve Fransen

Brood	Release Number	Source
85	"Poor"	3/7/88 Memo
86	"Poor"	3/7/88 Memo
87	16,224	Database, 10/22/90 Memo
88	?	None Reported in Database
89	All Died	7/24/89 Memo
90	9,890	Database

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding between the Washington Department of Game (WDG) and the Skagit System Cooperative (SSC) is entered into to guide the development of a cooperative steelhead trout rearing/release research program in the Skagit River Basin.

This is a research program to evaluate the feasibility of using native stock for steelhead enhancement. Adult broodstock from the native run will be captured each of the first three brood years. Broodstock will be ripened and spawned at the Upper Skagit hatchery near Sedro Woolley. Juveniles will be reared at this facility until transfer to Sulphur Creek rearing ponds in the Baker River drainage. Marked smolts will be released in the lower Baker River, and returning adults will be recaptured and enumerated at the Baker River fish trap.

This program is an experiment. Many eventualities will be impossible to predict at this time. The specific conditions set forth below attempt to anticipate most of these. The principal objective is to develop a hatchery broodstock with December and January river entry timing from the native run and the broodstock developed for production use is required to have an earlier than normal maturation and spawning date. Whereas the native run demonstrates peak spawning in May, a requirement of this program will be to develop a stock that spawns prior to March 15. The earlier time of spawning allows additional time for bringing smolts to a larger size, prevents the development of a mixed stock fishery, and ensures that the cross breeding of hatchery and wild fish is minimized.

It is also an objective of the program to enumerate adult returns. Smolt to adult survival, run timing, spawning time, and eventual contributions to the fishery will be compared to the Chambers Creek hatchery steelhead used in the Skagit system. To be considered successful the returning fish from this program must:

1. Have the same return timing as the Chambers Creek stock;
2. Exhibit substantially the same spawning timing as the Chambers Creek stock;
3. Have a smolt to adult survival rate that exceeds

Skagit River plants of Chambers Creek smolts;

4. Produce hatchery smolts in one year that are larger than ten per pound by June 1.

Specific conditions of this Memorandum of Understanding follow:

1. WDG will issue SSC any necessary permits for off-reservation fish culture activities under its jurisdiction.

2. The smolt release level for the first three broods is targeted at 40,000. This is expected to require approximately 50,000 eggs and may be adjusted if necessary. Broodstock capture will be coordinated with WDG.

   Broodstock may be captured by hook and line, fish trap, or gillnet. Up to 20 female and 15 male steelhead will be captured. The earliest ripening fish will be spawned until 50,000 eggs are obtained. Fish not used for spawning will be returned to the Skagit River, so they may seek natural spawning areas.

   SSC would prefer to kill-spawn the broodstock in conformance with standard salmon hatchery practice. WDG expressed an interest in live-spawning the fish. This can be done if WDG participates and demonstrates the process and arranges the transportation of spent fish back to the Skagit River.

3. Juvenile steelhead are defined as smolts when they attain a size of ten fish per pound, or greater, by June 1 of the release year. Smolts will be released no later than June 1, however it is preferred that the fish reach that size and are released between April 15 and May 15. Grade-offs of under-sized fish will not be released into the Skagit River, its tributaries, or any anadromous fish waterway. Alternative strategies include release into a landlocked body of water, a semi-natural rearing area, or some other mutually agreeable alternative.

4. Locations: All fish culture activities in this program

are intended to be conducted within the Skagit River Basin. Adult holding and spawning, egg incubation and initial juvenile rearing are intended to occur at the Upper Skagit tribal hatchery. Advanced rearing is intended at Sulphur Creek, tributary to Shannon Reservoir in the Baker drainage. Rearing of steelhead will not displace the Baker Reservoir rainbow trout program. Smolts will be released in the Baker River downstream of Lower Baker Dam. Adult steelhead will be recaptured at the Baker River fish trap.

Much of the Steelhead rearing and adult return will occur in the Baker Basin. The parties declare that this fish culture activity is not considered a mitigative action for any loss of, or damage to, anadromous fish habitat due to the Baker River hydro-electric projects.

5. Because of their expected late run timing and unknown return rates, smolts produced in this program are not to be counted as part of the hatchery smolt release used for pre-season estimation of harvestable numbers of hatchery fish.

However, any fish from this program that are caught in either party's fishery will be allocated to that party's share as provided under the rulings of US vs. Washington, except as provided below for Baker River returns.

6. WDG is committed to providing harvestable surplus steelhead to the treaty and non-treaty fishery and will manage the fishery with this in mind, as well as the need to protect a native run spawning escapement.

Steelhead that are not caught by either the commercial or recreational fisheries are expected to return to the Baker River trap, with the exception of a few strays. All trap returns will be transferred to adult holding ponds at the Upper Skagit hatchery. Broodstock will be ripened and spawned there. Excess fish that are surplus, or the proceeds thereof, to brood stock needs will be distributed in a manner that reflects a 50:50 treaty/non-treaty sharing.

Fish distributed in this process are not counted against either party's share. The non-treaty product will be utilized for steelhead management and enhancement in the Skagit Basin. The treaty product will be utilized to fullfil Ceremonial and Subsistence, fisheries enhancement, or other needs as determined by the SSC tribes.

7. That sharing, distribution, and utilization of fish surplus to broodstock needs in the preceeding section (section 6), shall be for this project only and shall not be construed as the Skagit System Cooperative tribe's or WDG's overall position on allocation of hatchery surplus fish, nor shall the sharing, distribution and utilization of fish surplus to brood stock needs in this MOU establish any precedent for the parties' positions on sharing, distribution, and utilization of hatchery surplus fish for other or future hatchery progams.

8. Tagging and/or marking of the fish are essential to evaluation of the program. Specific details are to be coordinated by the parties and implemented by SSC.

9. This is a cooperative program with both parties committed to the objectives. WDG's direct participation may at times be limited by manpower constraints, however. WDG and SSC will together review the program annually and develop recommendations for its subsequent management. This memorandum expires three years after the first brood return unless specifically renewed.

10. This Memorandum may be modified at any time by the mutual agreement of the parties.

WDG 5/6/85 Date SSC 4-18-85 Date

Skagit System Cooperative
P.O. Box 368 LaConner, WA 98257-0368 Ph. (206) 466-3450

MEMORANDUM

TO: Chuck Philips, WDW Regional Biologist

FROM: Jim Gibson, SSC Biologist

DATE: October 22, 1990

SUBJ: Lake Shannon Net Pens, Winter Steelhead

==========

Enclosed please find a summary of the Skagit Native Hatchery Steelhead Program for the brood year 1987.

The fish were released May 9, 1988 in lower Baker River at 8/pound. They returned to the terminal area as 2-salts this season at a return rate of 4%. We will be looking for 3-salt returns this season. Additional information regarding rearing and returns can be found in the summary. If you have any comments or questions give me a call.

50,000 Chambers Steelhead were transferred in from South Tacoma last week. Everything went well and the fish are feeding aggressively, thanks for your help. The steelhead have been ad clipped, however, I would like to individually mark this group of fish with either a left or right ventral clip. Let me know if there are any steelhead being released next spring that will have a ventral clip or if you have any other suggestions I would appreciate your input.

SUMMARY

SKAGIT NATIVE HATCHERY STEELHEAD PROGRAM
BROOD YEAR 1987

Broodstock Capture
4-10-87 through 4-24-87 Hook and Line

Spawning
5-6-87 34,000 eggs 5,666 eggs/female

Ponding
6-26-87 29,000 fry

Transfer to Lake Shannon
7-17-87 At 825/pound

Growth Summary
6-26-87 to 5-9-88
(see record summary and growth curve)

Fish Health Examination
8-28-87 (see report)
Treated with TM-50 17 days prior to exam

8-28-87 treated with TM-50 for 10 more days and administered formalin bath

4-20-88 TM-100 treatment, days unspecified

Fish Released
5-9-88 (see planting record)
Number: 16,224
Size: 8/pound
Mark: RV Clip
Site: Lower Baker River

Fish Returned 1990
Baker Trap: 626 (see trap returns)
Commercial Catch: 1
Sport Catch: 25 expanded
Total Return: 652
Average:
length= 66 cm
weight= 6.7 lb
(see length/weight sample)

Return To Terminal Area: 4% 2-Salt

Skagit System Cooperative
P.O. Box 368 LaConner, WA 98257-0368 Ph. (206) 466-3450

March 7, 1988

MAR 08 RECD

Chuck Phillips
Jim Johnston
Washington Department of Wildlife
16018 Mill Creek Blvd.
Mill Creek, WA 98012

Dear Sirs:

The SSC plans to continue the native steelhead broodstock experiment begun in 1985. Although the first two broods yielded very poor results, the 1987 brood has done very well.

The SSC Board has advised me our egg collection goal for the 1988 brood is 40,000. Therefore, I am requesting a broodstock collection permit to capture up to 18 female and 18 male steelhead from the Skagit River, valid for the months of March and April 1988. This number of fish maintains the number of eggs taken, per female captured, at the same ratio that worked so well for us last year. The intent is to spawn only once and operate with whatever eggs are taken that day. All activities will be in accordance with the WDG/SSC MOU of 1985.

All males and all unspawned or live-spawned females will be returned to the Skagit River. Fish will probably be captured by hook and line again.

Sincerely,

Steve Fransen

Steve Fransen

SF/mm
STHDBRD.M3

A copy was sent to Jim at his Bellingham address —

Skagit System Cooperative
P.O. Box 368 LaConner, WA 98257-0368 Ph. (206) 466-3450

2cc 856 5501

MEMORANDUM

TO: Jim Johnston
FROM: Jim Gibson JG
DATE: July 24, 1989
SUBJ: Final Report: Wild Steelhead Program

==========

Skagit System Cooperative collected native steelhead broodstock from the Skagit River (Hamilton area) in March/April and out of the Baker Trap in May. All fish were transferred to the hatchery at Upper Skagit for ripening.

DATE	FEMALE	MALE	COMMENTS
3-30-89	4	4	Transferred from Skagit River
4-11-89	20	10	Transferred from Skagit River
4-21-89	0	2	Transferred from Baker Trap

The two males from the Baker trap had fungus on them, they died the following week. Twenty-four females and fourteen males were available for spawning.

DATE	FEMALE	MALE	COMMENTS
5-10-89	10	6	Spawned

Total egg take 56,700. Females were kill spawned for virology examination, all other fish were returned to the river (see fish health report).

DATE	COMMENTS
6-01-89	Eye up- 54,000 eggs remaining (95% survival)
6-15-89	Hatch complete
6-25-89	Mechanical failure- flow to incubator interrupted, fish died.

The fish had approximately one week before button up.

9/3/92

Skagit River Wild Steelhead Programs
Summary of Raw Data Files by Jim Johnston

Brood Stock Collection Year	# Adults Collected	# EGGS TAKEN	DATE PLANTED	Number Planted	Size at Planting	Plant site Remark
1980	5 males 4 Females	20,000	5/15/81	6346	8.9/lb	Mainstem
1981	8 males 3 Females	18,000	5/10/82	1769	7.1 – 9.3/lb	Mainstem
1982	20 males 15 Females	101, 325	4/26/83	10,289	9.5	Mainstem
			12/30/82	14,958	23.2/lb	Into Barnaby S
1983	19 males 19 Females	144,489	6/13/84	~~21,700~~	10/lb	Mainstem
			5/04/04	51,360	32/lb	Into Barnaby S
1984	24 males 16 Females	47,084 ~~28,798~~	3/21/85	7,254	62/lb	Barnaby S
			5/22/85	13,131	9/lb	Mainstem Sk
1985	18 males 18 Females	88,000	10/20/85	55,043	172/lb	Scatter Plant in Underseede tribs – Alder Cr.
1986	14 males 10 females	52,000	10/04/86	43,900	145/lb	Mid Section Sk Mainstem Scatter Plant in 3 sites fr Jet boats.
1987	17 males 11 females	69,496	9/15/87	62,606	140/lb	Mid-Section Skag mainstem Scatter Plant fm Jet boat
			~~3/09/88~~	~~36~~		
1988	15 males 20 females	70, 985	11/19/88	8448	128/lb	Jones Cr.
			11/19/88	38144	128/lb	O'Toole Cr.
1989	14 males 9 females	52,000	11/25/89	7956	306/lb	Jones Cr
			11/25/89	3978	306/lb	O'Toole Cr
1990	18 males 11 females	73,000	11/03/90	8370	93/lb	Jones Cr
			11/03/90	29226	93/lb	O'Toole Cr
			11/03/90	6300	93/lb	Skagit Mains near O'Toole
1991	17 Males 12 Females	74,930	11/18/91	8304	346/lb	Jones Cr.
			11/23/91	12802	346/lb	O'Toole Cr
			11/23/91	2422	346/lb	Brickyard Cr. after impassible culv removed.
1992	No Broodstock collection due to expected low return of Wild SH Run.					

CURT SMITCH
Director

STATE OF WASHINGTON

DEPARTMENT OF WILDLIFE

408 Arbutus Place
Bellingham, WA 98225
March 16, 1990

Dean Knight
Sedro Woolley Wildcat Steelhead Club
2000 Grip Road
Sedro Woolley, WA 98284

Dear Dean:

The other day you asked for a written review of the Skagit River wild steelhead fry planting program. Hopefully this brief will answer any questions you or other club members may have.

The current fry planting of wild steelhead fry in Jones and O'Toole Creeks is designed to answer the question of whether fry plants "work". Planting steelhead fry in the Skagit River system, that had wild fish for parents, is nothing new. From 1912 through 1920, the old U.S. Bureau of Fisheries took tens of millions of eggs from wild steelhead, hatched them at Birdsview and scatter planted the fry in many streams in the system. Smith and Anderson in 1921 reviewed the program and wrote, "....takes of eggs in general since 1912 indicate that the streams trapped by the U.S. Bureau of Fisheries do not yield a very large supply of fish, and that there is a gradual decrease in the numbers." The Bureau had to quit; they had damn near wiped out the wild adult returns and therefore couldn't get enough eggs to keep the program going.

In the late 1930's the then Washington Department of Game decided to try fry planting again. In 1941 Meigs and Pautzke wrote the following to describe the use of steelhead fry plants: "Artificial propagation appears to contribute very little towards the maintenance of steelhead trout populations."

The Department of Game again tried fry plants in 1949 and attempted to evaluate the returns using marked fish. Large fry, were planted in May in the upper Samish River. Survival of the fry to the time they returned to the Samish as adults for the two test groups released was one-tenth of one percent and three-tenths of one percent (see the table below).

#Fry	Size of Fry	#Return as Adults	Percent Survival
10,659	35/lb	15	0.1
5,000	27/lb	17	0.3

Obviously, fry plants can't be considered a booming success based on results of the efforts and studies above, but do wild fry fare any better on their own, without human "help"? Studies of wild

steelhead fry survival rates tend to confirm that they have much better survival than fry reared in hatcheries for a time before release. On the Keogh River in B.C. a steelhead study found that 7400 wild fry produced a return of 164 adults, or a 2 percent survival rate from fry to adult. That six to twenty times better that the hatchery fry survival rate.

I know many people believe that, because egg to fry survival is so much higher in a hatchery compared to egg to fry survival of naturally spawning fish, there just has to be more adults produced in the long run from the hatchery fry plants. In the table below I have included data from some good wild fish survival studies (Keogh River, B.C. and Snow Creek, WA) that show why that is not the case.

Life Stage	Natural Production	Hatchery Plant
Number of Adult Females	20	20
Adult Handling Mortality	0	1 (5%)
Total Eggs after Mort.	100,000	95,000
Egg to Sept/Oct Survival	8,000 (8%)	47,500 (50%)
Sept/Oct to Smolt Survival	1,360 (17%)	950 (2%)
Smolt to Adult Survival	177 (13%)	124 (13%)

As you can see the increased survival from egg to Sept/Oct for the fish protected in the hatchery prior to planting as fry that Sept/October is indeed much greater than the survival of the wild fry during the same period (50 percent versus 8 percent). However, once the hatchery fish are planted they experience much higher mortality than their wild cousins from that Sept/Oct planting until they go to sea a year and a half later. Hatchery life protected the weak fish as well as the strong ones, and once planted in the streams those weak fish die; just as they would have done had they been produced in the wild. You just can't get around Mother Nature enforcing the law of survival of the fittest. As you can see, the artificial planting program led in the example above to a 30 percent reduction in the number of adults.

Since several members of the club wanted to see if the above example holds true on the Skagit, we started the Jones/O'Toole Creek fry plant test. Since we have been conducting spawning ground surveys on both of those streams since 1985 we have an opportunity to see if fry plants in those creeks significantly increase the returning adult numbers.

Jones Creek was chosen because the number of redds counted in the stream has remained fairly constant from year to year and if there is an increase in redds due to fry planting it should be easier to detect than in many other Skagit tributaries. The number of fry needed to seed Jones Creek is approximately 8000.

O'Toole Creek was chosen because what we planned for massive fry plants there couldn't hurt it much. O'Toole Creek has a very low population of wild steelhead and the impact upon them of a

large number of hatchery reared fry would not have a significant impact on the Skagit River as a whole. Studies have shown that if fry are planted at a rate exceeding 0.7 fry per square meter of creek they will drive the wild fry from the area and later die themselves from over-crowding. The end result is less fish than if you hadn't fry planted. However, since some club members wanted to see that proven, we chose O'Toole for the massive plants (40-50,000 fry).

To analyze the success or failure of the fry planting program, we will compare the number of redds observed in the years prior to anticipated returns of fry planted fish as adults (1985 through 1992) to years when fry return as adults (1993 to 1996). Since we only plan on planting these two streams for 4 years, we will also be able to see if the number of redds decline in the years after adults from fry plants are no longer returning. We will also need to adjust the data to account for long term increases in Skagit River wild steelhead as the runs for the whole system recover in the years ahead.

In the years we do not fry plant Jones and O'Toole Creeks, fry from the broodstock collection program will be planted in mainstem areas, or tributaries we know from the previous year's spawner surveys were under-seeded.

Our first plants in Jones and O'Toole occurred in fall, 1988 when 8448 fry were planted in Jones and 38,144 fry were planted in O'Toole. In 1989 we found how hazardous hatcheries can be to fish survival when we wound-up with 8000 fry for Jones but only 4000 for O'Toole. Hopefully this next year can see higher survival for our fish. The same number of fry need to be planted in each stream, each year. The same planting sites need to be hand seeded with fry each year right after the fall drought period ends. If we change these practices then we no longer have a study.

To get the number of fry we need for this program requires the capture of 15 to 20 female and 20 to 25 male adult steelhead during the broodstock collection program each spring. The fish are live spawned at Barnaby Slough and the eggs or fry are taken to Marblemount Hatchery for rearing till release time.

Well, Dean, I hope this has answered the questions you had about the program and where it's going. Let me close by telling you, while some club members and I might argue over the effectiveness of fry planting now and then, I have been very impressed with everyone's dedication to seeing that this project is done properly. Thanks for your help.

Sincerely,

Jim Johnston

Skamania-Origin Summer Steelhead Programs in Snohomish and Stillaguamish Rivers

January 31, 2018

Summer Steelhead Natural Populations

- The Technical Recovery Team identified four historical populations of summer steelhead: a) Deer Creek and Canyon Creek in the Stillaguamish River basin; and the 2) North Fork Skykomish and the Tolt River in the Snohomish River basin.
- The number of spawners is difficult to estimate because of the remoteness of the spawning reaches and challenges in counting redds. However, the populations are believed to have a small number of spawners.

Summer Steelhead Programs in the Snohomish and Stillaguamish Rivers

- Use a highly domesticated broodstock that originated from the lower Columbia River (Skamania stock).
- Planned release is 70,000 smolts in the Stillaguamish River (Whitehorse Ponds Hatchery) and 116,000 smolts in the North Fork Skykomish River (Reiter Ponds Hatchery).
- Estimated proportion effective hatchery contribution (PEHC)(measure of gene flow):

Likely Hatchery Source	Population	Run Type	PEHC
Reiter Ponds	Pilchuck	Winter	2%
	NF Skykomish	Summer	95%
	Snohomish/Skykomish	Winter	5%
	Snoqualmie	Winter	3%
	Tolt	Summer	68%
Whitehorse Ponds	Stillaguamish (smolt trap)	Winter	17%
	Deer	Summer	0%
	Canyon	Summer	0%

- Recreational summer-run steelhead fisheries in the Snohomish River Basin are popular, with an average catch of 2,650 fish per year from 2006-2015. The average annual catch in the Stillaguamish River basin during the same time period was 102 fish.

NOAA Fisheries

- The January 2017 biological opinion for Mitchell Act programs (primarily lower Columbia River) required the termination of steelhead programs using broodstock that originated from Puget Sound (Chambers Creek origin).
- Rob Jones May 2017 presentation to the PSSAG included a bullet "Say no to broodstocks originating from outside a DPS".
- NOAA letter of July 21, 2017:
  - Concluded that the previous operation of these programs reduced the abundance, productivity, diversity, and spatial structure of ESA-listed steelhead. More specifically, the 2016 biological opinions for early winter steelhead indicated that the Reiter Ponds program negatively affected winter and summer natural steelhead populations in the Snohomish

River, and that the Whitehorse Hatchery program was likely to adversely affect the natural-origin steelhead populations in the Stillaguamish River.

- Recommends that the comanagers review the "effects of these programs" and encourages "the timely development of alternatives to using segregated Skamania broodstock".
- Willing to work with us to develop hatchery programs that are "structured to best serve both fisheries and the recovery of listed Puget Sound steelhead".

WDFW Letter of September 15, 2017

- Letter stated "we intend to initiate discussions with the co-managers with the expectation that the current programs will be replaced. We believe that there are alternatives that will maintain fishing opportunities for summer steelhead while advancing the conservation of Puget Sound steelhead".

Potential Options for Consideration by the PSSAG

- **Reiter Ponds**
  i. Replace with integrated summer steelhead harvest program. Collect broodstock at Sunset Falls, rear at Reiter Ponds, and release above Sunset Falls.
  ii. Eliminate Skamania-origin summer steelhead program.
  iii. Replace with winter steelhead conservation program.
  iv. Replace with summer steelhead conservation program.

- **Whitehorse Ponds**
  i. Eliminate Skamania-origin summer steelhead program.
  ii. Replace with winter steelhead conservation program.
  iii. Replace with summer steelhead conservation program.

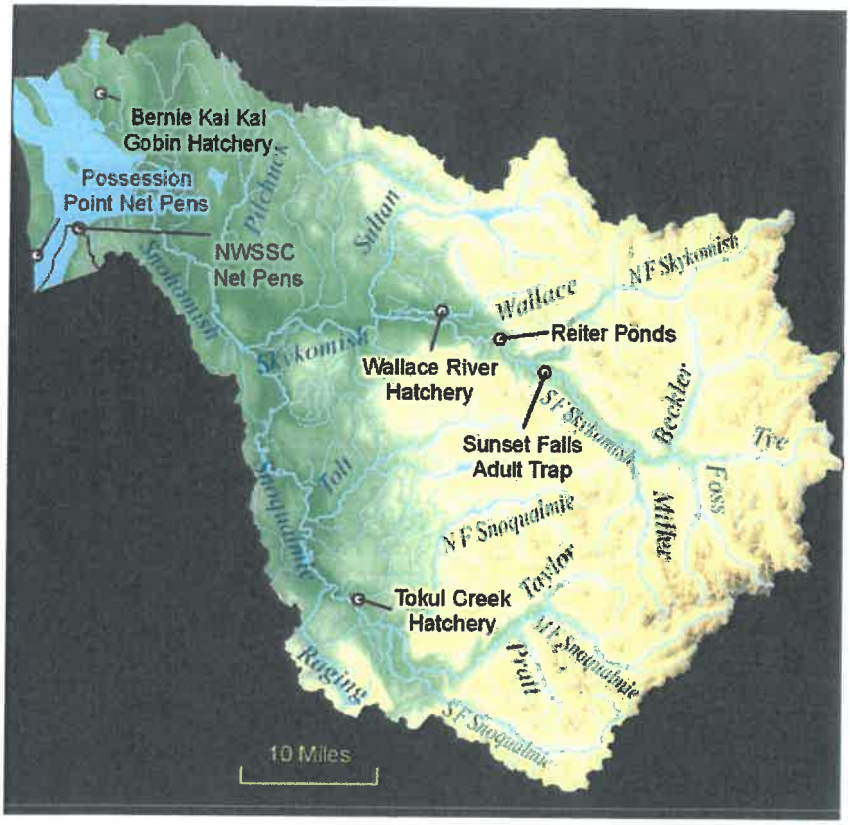


Figure 1. Snohomish River basin and artificial production programs.

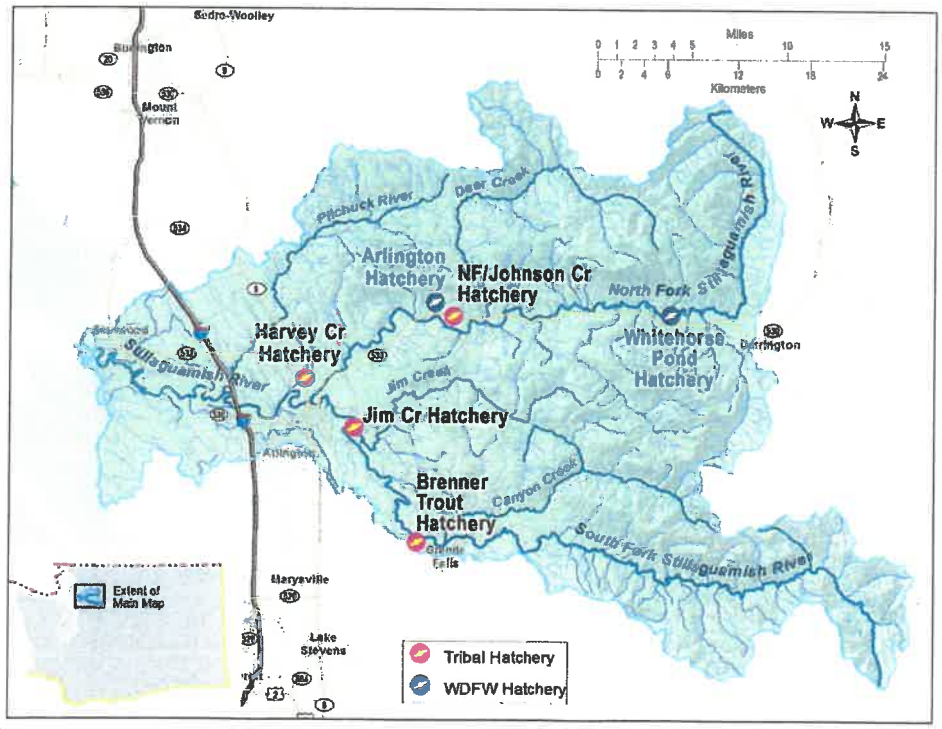
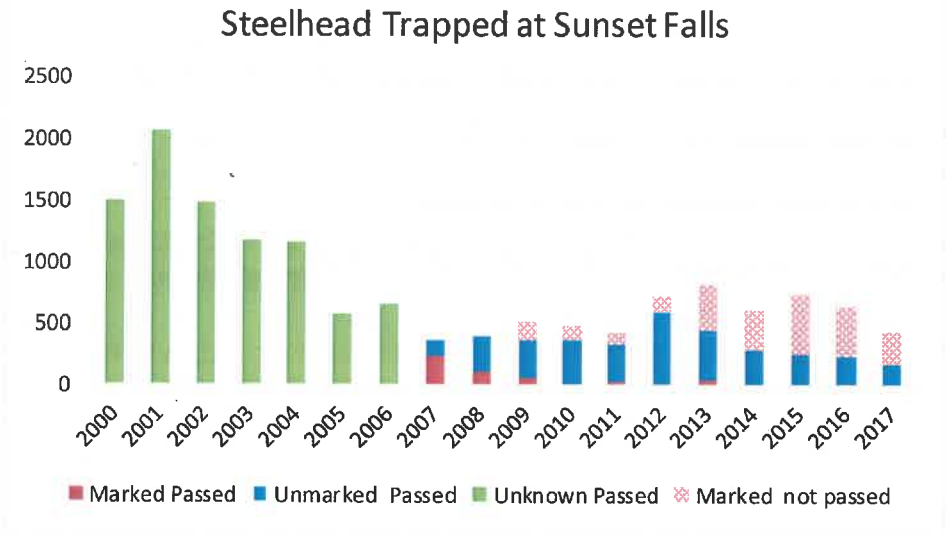


Figure 2. Stillaguamish River basin and artificial production programs.

South Fork Skykomish Summer Steelhead

Sunset Falls is located on the South Fork of the Skykomish about 2.5 miles above the confluence with the mainstem Skykomish. Historically Sunset Falls and the two falls above it were an anadromous barrier. There is a trap and haul facility that has been operated since 1958 that transports summer steelhead and other anadromous fish above the falls. The trap is operated approximately mid-July through mid-December. The great majority of steelhead are passed in July and August.

Run Size - As of 2009 only adipose intact (unmarked) steelhead have been intentionally passed above the falls (a few have managed to get through on years with large pink runs). The average number of steelhead passed, from 1958 through 2009 was 757/year, the average from 2005 through 2009 was 505/year, and in the years since only adipose intact (unmarked) steelhead are intentionally passed above the falls (2009-2017) an average of 337/year are passed. There is a declining trend and in 2017 just 164 steelhead were passed above Sunset Falls.



Above Sunset Falls, Highway 2 follows the South Fork and Tye and there are also roads up the Beckler, Miller and Foss. This area is a lot more accessible than the NF Skykomish. There is extensive spawning habitat that includes the mainstem SF (~17 miles), major drainages such as the Miller (~16 miles), Beckler (~13 miles), Foss (~12 miles), and Tye Rivers (~10 miles) as well as numerous smaller tributaries.

Evenson Estate Studies - John Evenson, a member of the Steelhead Trout Club left money in his will to fund a Skykomish River Summer Run Research Program to determine productivity of South Fork Skykomish steelhead. Some of the work that has been done to date with this money includes;

- **Age Data** - Scales were collected in 2014 at the Sunset Falls Trap and Haul from 249 unmarked steelhead. 179 fish were aged successfully for both freshwater age and saltwater age, The majority, 55.9% were age 2.2, 29.6% were age 3.2. 14 of the 249 fish were repeat spawners, 5.6%

FW and SW Age	Total Aged =	179	
Age Reading	Total Age	Sum of Fish	
2.1	3	1	0.6%
2.2	4	100	55.9%
2.3	5	8	4.5%
3.1	4	7	3.9%
3.2	5	53	29.6%
4.2	6	1	0.6%
2.2S	5	4	2.2%
2.2S1	6	1	0.6%
2.3S	6	1	0.6%
3.2S	6	3	1.7%

Total natural origin fish sampled =	249	
Repeat spawners=	14	5.62%

- **Document spawning -** Helicopter surveys were flown at peak spawn timing in 2012 and 2013. Redds were documented in the mainstem Stillagaumish, Beckler, Miller, and Foss.

- **Genetic characterization** -Genetic samples were taken from 118 unmarked adult steelhead in 2014. Ken Warheit did an analysis of these samples and they matched Reiter fish.

  The Steelhead Trout Club collected tissue samples from resident rainbow in 2012 and 2013. These fish were analyzed by Todd Seamons. The south fork rainbow looked similar genetically to the South Fork steelhead (Reiter). There were several samples collected above Alpine Falls on the Tye that looked like Red Band rainbow.

- **Measure fallback over the falls -** At least one fish fell back and went through the trap and haul a second time in 2014 when genetic samples were being taken.

Additional studies being done on the South Fork –The Snohomish PUD has a proposed hydro project on the South Fork above Canyon Falls. They are conducting a number of studies looking at the potential impacts of the project on fish. Some of these studies include;

- PIT tag study on adult steelhead going upstream through the trap and haul to look at repeat spawners.
- Studies looking at survival of adults and juveniles going over the falls at different flow levels.
- If hydro facility gets permitted and built there will be a way to monitor downstream smolt migration.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
1201 NE Lloyd Boulevard, Suite 1100
PORTLAND, OREGON 97232-1274

July 21, 2017

Dr. Jim Unsworth, Director
Washington Department of Fish and Wildlife
600 Capital Way North
Olympia, Washington 98501-1091

Dear Director Unsworth:

NOAA's National Marine Fisheries Service (NMFS) is currently reviewing hatchery and genetic management plans (HGMPs) for Puget Sound salmon and steelhead hatchery programs under the Endangered Species Act (ESA) and National Environmental Policy Act (NEPA). NMFS is aware that the Washington Department of Fish and Wildlife (WDFW) operates summer steelhead programs in the Stillaguamish (Whitehorse Ponds) and Snohomish (Reiter Ponds) River basins but, to date, updated HGMPs for these two programs have not been submitted to NMFS for review and approval.

NMFS recognizes the importance of these summer steelhead hatchery programs to fisheries in Puget Sound. Fishing for steelhead in summer months adds to the variety of opportunities for recreational and tribal fishermen in a part of the state where steelhead fishing typically occurs during the winter months. However, NMFS continues to have concerns about the use of Skamania steelhead broodstock in the Stillaguamish and Snohomish River basins.

Skamania summer steelhead are derived from a highly domesticated broodstock developed in hatchery programs located in tributaries to the Lower Columbia River. The broodstock was subsequently transplanted for use in Puget Sound hatcheries. The Puget Sound Technical Recovery Team considered use of out-of-DPS steelhead as a key risk factor (Hard et al. 2015) in their analysis of steelhead populations and Distinct Population Segment (DPS) viability. The production and release of hatchery-origin Skamania stock early summer steelhead into the Snohomish basin has negatively affected the abundance, diversity, spatial structure, and productivity of the winter and summer steelhead natural populations ss described in our biological opinion completed in 2016 for the WDFW's Reiter Ponds and Tokul Creek hatchery early winter steelhead programs (NMFS 2016a). A key technical document cited in our opinion, completed by Dr. Ken Warheit of the WDFW Molecular Genetics Laboratory, concluded that genetic impacts to the two native summer steelhead populations in the Snohomish Basin have been so large that they are now considered feral populations of Skamania-stock fish (Warheit 2014). In a second biological opinion (NMFS 2016b), we concluded that production and release of Skamania steelhead was likely to adversely affect the abundance, diversity, spatial structure, and productivity of the natural-origin steelhead populations in the Stillaguamish basin. Although the precise effects of Skamania steelhead production on the two native Stillaguamish summer steelhead populations are still unknown, given the small sizes of any extant population(s), historical hatchery fish release strategies, and the long term duration of the

Skamania program, genetic diversity effects may potentially be similar to those observed for the native Skykomish summer steelhead populations. WDFW has noted that Skamania hatchery programs pose a high potential genetic risk (Scott and Gill 2008).

NMFS encourages you to work with the tribal co-managers, the Ad Hoc Puget Sound Steelhead Advisory Group, and other interested stakeholders to review the effects of these programs on the listed summer steelhead populations in the Snohomish and Stillaguamish basins prior to submitting updated HGMPs for the Reiter and Whitehorse Ponds summer steelhead programs Specifically, we hope that this review will encourage the timely development of alternatives to using segregated Skamania broodstock in the Snohomish and Stillaguamish basins.

We value the work that WDFW has done to date to evaluate the effects of the Skamania summer steelhead hatchery programs (e.g., Warheit 2014), and we look forward to working with you, the tribal co-managers, and other parties to determine how hatchery programs in the Stillaguamish and Snohomish River basins can be structured to best serve both fisheries and the recovery of listed Puget Sound steelhead.

If you have any questions, please contact Allyson Purcell, Acting Branch Chief for Anadromous Production and Inland Fisheries, at (503) 736-4736.

Sincerely,

Barry A. Thom
Regional Administrator

cc: Jim Scott, WDFW
Mike Crewson, Tulalip Tribes
Ray Fryberg, Tulalip Tribes
Jason Griffith, Stillaguamish Tribe
Lorraine Loomis, Northwest Indian Fisheries Commission
Allyson Purcell, NMFS
Tim Tynan, NMFS

Citations

Hard, J.J., J.M. Myers, E.J. Connor, R.A. Hayman, R.G. Kope, G. Luchetti, A.R. Marshall, G.R. Pess, and B.E. Thompson. 2015. Viability criteria for steelhead within the Puget Sound distinct population segment. U.S. Department of Commerce, NOAA Tech. Memo. NMFS-NWFSC-129.

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NMFS. 2016b. Endangered Species Act - Section 7 Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Consultation for Three Hatchery and Genetic Management Plans for Early Winter Steelhead in the Dungeness, Nooksack, and Stillaguamish River basins under Limit 6 of the Endangered Species Act Section 4(d) Rule. NMFS Consultation Number: WCR-2015-2024.

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Warheit, K. I. 2014. Measuring reproductive interaction between hatchery-origin and wild steelhead (*Oncorhynchus mykiss*) from northern Puget Sound populations potential affected by segregated hatchery programs. Unpublished Final Report. Washington Department of Fish and Wildlife.

State of Washington
DEPARTMENT OF FISH AND WILDLIFE
Mailing Address: P.O. Box 43200, Olympia, WA 98504-3200 • (360) 902-2200 • TDD (360) 902-2207
Main Office Location: Natural Resources Building, 1111 Washington Street SE, Olympia, WA

September 15, 2017

Barry Thom
Regional Administrator
National Marine Fisheries Service, West Coast Region
1201 NE Lloyd Boulevard, Suite 1100
Portland, OR 97232-1274

Dear Mr. Thom:

The Washington Department of Fish and Wildlife (Department) has received your letter of July 21, 2017, regarding summer steelhead hatchery programs currently operating on the Stillaguamish (Whitehorse Hatchery) and Snohomish (Reiter Ponds) rivers.

I would like to begin by summarizing the Department's understanding of the key points of the letter. The National Marine Fisheries Service (NMFS) notes that the initial source of broodstock for these programs was the lower Columbia River and, after generations of breeding in the hatchery, the fish are more adapted to reproduce successfully in the hatchery than in the natural environment. In addition, genetic analysis of natural-origin steelhead from these basins indicates that previous hatchery practices, including off-station releases, resulted in a substantial number of returning hatchery-origin adults mating with natural-origin summer steelhead.

NMFS has concluded from these observations and other information that the previous operation of these programs reduced the abundance, productivity, diversity, and spatial structure of Endangered Species Act (ESA)-listed steelhead. More specifically, the 2016 biological opinions for early winter steelhead indicated that the Reiter Ponds program negatively affected winter and summer natural steelhead populations in the Snohomish River, and that the Whitehorse Hatchery program was likely to adversely affect the natural-origin steelhead populations in the Stillaguamish River.

As a consequence, your letter of July 21 encouraged the Department to work with the tribal co-managers in the timely development of alternatives to using segregated Skamania broodstock in the Snohomish and Stillaguamish basins.

The Department is concerned by the potential loss of fishing opportunities that could arise from the elimination of these programs. The Reiter Ponds program, in particular, supports valuable tribal and recreational fisheries, with a recreational catch of approximately 2,650 fish per year

from 2006-2015. With natural populations of summer steelhead depressed to relic levels, no opportunities for summer steelhead fishing will be possible in the foreseeable future without hatchery programs.

However, we are heartened by your recognition of the importance of the summer steelhead fisheries, and your willingness to work with the co-managers to develop alternatives that serve both fisheries and the recovery of listed Puget Sound steelhead. The Department strongly supports the conservation of steelhead, our State Fish, to healthy levels. It is evident from the status reviews and recovery planning documents that recovery of Puget Sound steelhead will not occur absent significant improvements in habitat protection and restoration, and actions that result in improving the survival of steelhead smolts as they migrate through Puget Sound. We encourage NMFS to complete the recovery plan for Puget Sound steelhead to guide recovery actions and support the speedy implementation of recovery actions focused on Puget Sound steelhead.

Your letter concludes by recommending that we develop alternatives to the current programs prior to the submission of hatchery genetic management plans for the Whitehorse Hatchery and Reiter Ponds. Consequently, we intend to initiate discussions with the co-managers with the expectation that the current programs will be replaced. We believe that there are viable alternatives that will maintain fishing opportunities for summer steelhead while advancing the conservation of Puget Sound steelhead.

Again, I would like to reiterate our appreciation for NMFS's willingness to work with the tribal co-managers and other parties to develop alternative programs that best serve both fisheries and the recovery of listed Puget Sound steelhead.

Sincerely,

James Unsworth, Ph.D.
Director

cc: Ray Fryberg, Tulalip Tribes
Mike Crewson, Tulalip Tribes
Jason Griffith, Stillaguamish Tribe
Lorraine Loomis, Northwest Indian Fisheries Commission
Allyson Purcell, National Marine Fisheries Service
Tim Tynan, National Marine Fisheries Service
Jim Scott, Washington Department of Fish and Wildlife
Ron Warren, Washington Department of Fish and Wildlife

Northern Cascades Planning Template

Draft January 31, 2018

Introduction

The Puget Sound Steelhead Advisory Group is developing a portfolio of conservation objectives, fishery strategies, and hatchery strategies for Puget Sound steelhead. In developing this portfolio, the group recognizes that underlying habitat issues must be addressed to restore Puget Sound steelhead, and the importance of an integrated all-H recovery strategy. The advisory group anticipates that the completed portfolio will subsequently inform the development of a recovery plan and discussions of the Washington Department of Fish and Wildlife (WDFW) with the co-managers regarding fishery management and hatchery programs.

Within the advisory group, the portfolios will be developed through an iterative process that begins with the identification of conservation objectives (referred to as a delisting scenario), aspirational fishery objectives, and initial proposals for artificial production programs that may be helpful in achieving the conservation or fishery objectives. The proposed fishery management and artificial production programs are then evaluated for consistency with the conservation objectives, and the iterative process repeated until the fishery and artificial production strategies are aligned with the conservation objectives (Fig. 1).

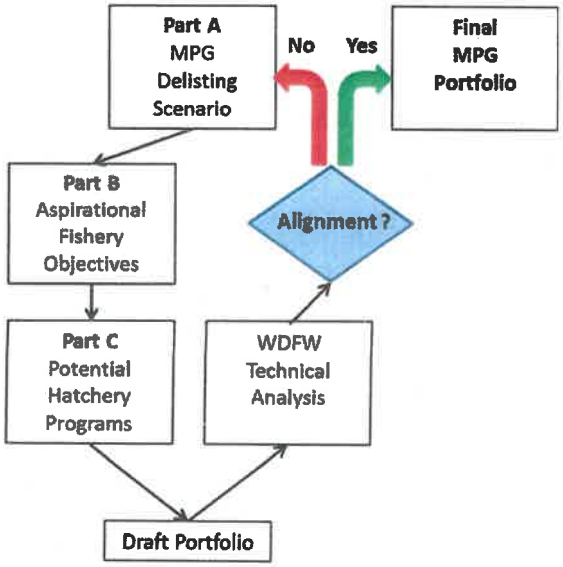

Figure 1. Iterative process used by the advisory group to align fishery and hatchery strategies with delisting scenario.

Part A. Delisting Scenario

A delisting scenario is a combination of population designations that meets Technical Recovery Team (TRT) guidance for a viable Distinct Population Segment (DPS). The scenario represents one of many possible combinations of populations and conservation objectives that could meet DPS and Major Population Group (MPG)-level viability criteria. Different scenarios may fulfill the biological requirements for delisting but can have unique implications for various stakeholders. Selection of a scenario for incorporation into the recovery plan is in part a policy decision based on scientific, biological, social, cultural, political, and economic considerations (drawn with modification from Lower Columbia Salmon Recovery and Subbasin Plan (2004)).

The Lower Columbia Salmon Recovery Plan (2010) provides the following description of the population designations:

a. ***Primary populations*** are targeted for restoration to high (95-99% probability) or very high (> 99%) viability. These populations are the foundation of salmon recovery. Primary populations are typically the strongest extant populations and/or those with the best prospects for protection or restoration. These typically include populations at high or medium viability during the listing baseline.
b. ***Contributing populations*** are those for which some improvement will be needed to achieve a stratum-wide average of medium viability (75 – 94% probability). Contributing populations might include those of low to medium significance and viability where improvements can be expected to contribute to recovery. Varying levels of improvement are identified for contributing populations. Some contributing populations are targeted for substantial improvements whereas more limited increases are identified for others.
c. ***Stabilizing populations*** are those that would be maintained at baseline levels. These are typically populations at very low viability during the listing baseline. Stabilizing populations might include those where significance is low, feasibility is low, and uncertainty is high. While stabilizing populations are not targeted for significant improvement, substantive recovery actions will typically be required to avoid further degradation.

Task

Our first ask is to develop an initial proposal for a delisting scenario for the Northern Cascades MPG. Review Table 1 ("Factors to consider in the designation of Northern Cascades populations as Primary, Contributing, or Stabilizing") and designate each of the populations as Primary, Contributing, or Stabilizing.

In order to achieve the draft viability criteria for the MPG, a proposed delisting scenario should identify at least two summer populations and five winter populations as Primary (highest viability category) and the geometric mean score of all population designations for the MPG must be at least 2.20. In designating summer and winter populations as Primary, the TRT considered the mixed run timing populations (e.g., Sauk summer/winter) as winter populations.

The spreadsheet "Northern Cascades Delisting Scenario" can be used to compute the geometric mean score and plot the delisting scenario.

Population	Contribution to Delisting	Comments
Drayton Harbor (W)		
Nooksack (W)		
S. Fk. Nooksack (S)		
Samish/Bellingham (W)		
Skagit (S/W)		
Nookachamps (W)		
Baker (S/W)		
Sauk (S/W)		
Stillaguamish (W)		
Deer (S)		
Canyon (S)		
Snohomish/Skykomish (W)		
Pilchuck (W)		
N. Fk. Skykomish (S)		
Snoqualmie (W)		
Tolt (S)		

Table 1. Factors to consider in the designation of Norther Cascades populations as Primary, Contributing, or Stabilizing.
Draft: January 31, 2018

Population or Watershed	Run Type	NOAA Intrinsic Potential (IP) [1/]	Average Spawners (2007-2016)	NOAA Viability Assessment P(Viable) [2/]	Past Segregated Hatchery Gene Flow [3/]	% Public Land	Hydrology [4/]
Drayton Harbor	Winter	4,852	Not Available	Moderate	-	< 1%	100% Lowland
Nooksack	Winter	44,091	1,680	Moderate	1% (W) 0% (S)	40%	31% Lowland 22% Highland 17% Snow
S.F. Nooksack	Summer	2,273	Not Available	Moderate	0% (W) 0% (S)	59%	41% Snow 30% Highland 23% Rain & Snow
Samish/ Bellingham	Winter	6,386	854	Moderate	5% (W) 0% (S)	19%	50% Lowland 41% Rain
Skagit	Summer/Winter	129,551	6,163	Moderate	4% (W) 1% (S)	61%	47% Highland 18% Snow 13% Rain & Snow
Nookachamps	Winter	2,462		Moderate	2% (W) 0% (S)	31%	45% Lowland 40% Rain
Baker [5/]	Summer/Winter	10,056		Moderate	-	90%	46% Highland 22% Snow 19% Rain
Sauk	Summer/Winter	46,460		Low-Moderate	3% (W) 0% (S)	94%	54% Highland 21% Snow
Stillaguamish	Winter	38,236	1,746	Low	1% (W) 17% (S)	59%	35% Rain 33% Lowland 14% Rain & Snow
Deer	Summer	3,144	Not Available	Moderate	0% (W) 0% (S)	70%	44% Snow 28% Rain & Snow
Canyon	Summer	243	Not Available	Moderate-High	0% (W) 0% (S)	62%	44% Snow 36% Rain & Snow

Table 1. Factors to consider in the designation of Northern Cascades populations as Primary, Contributing, or Stabilizing (cont.)
Draft: January 17, 2018

Population or Watershed	Run Type	NOAA Intrinsic Potential (IP) [1/]	Average Spawners (2007-2016)	NOAA Viability Assessment P(Viable) [2/]	Past Segregated Hatchery Gene Flow [3/]	% Public Land	Hydrology [4/]
Snohomish/ Skykomish	Winter	42,779	1,029	Moderate	0% (W) 5% (S)	79%	45% Lowland 21%Rain 13% Rain & Snow
Pilchuck	Winter	10,386	720	Low	2% (W) 2% (S)	35%	56% Lowland 35% Rain
N.F. Skykomish	Summer	1,325	39 [6/]	Moderate	1% (W) 95% (S)	100%	61% Highland 27% Snow
Snoqualmie	Winter	33,479	812	Moderate	4% (W) 3% (S)	56%	28% Rain 24% Lowland 18% Highland
Tolt	Summer	641	82	Moderate	0% (W) 68% (S)	42%	31% Snow 31% Rain & Snow 26% Rain

[1/] Source: Viability Criteria for Steelhead within the Puget Sound Distinct Population Segment, Table B-1, Puget Sound Technical Recovery Team 2013.

[2/] Source: Viability Criteria for Steelhead within the Puget Sound Distinct Population Segment, Fig. 57, Puget Sound Technical Recovery Team 2013.

[3/] Estimates of PEHC are for historical segregated programs and do not generally reflect program changes implemented with approved Hatchery Genetic Management Plans.

[4/] Source: Identifying Historical Populations of Steelhead Within the Puget Sound Distinct Population Segment, Appendix 4, Puget Sound Technical Recovery Team 2013.

[5/] Regarding this historical population, the TRT states "Many of the TRT members and reviewers considered the Baker River DIP to have been extirpated, although resident *O. mykiss* in the Baker River Basin may retain some of the historical genetic legacy of this population." Identifying Historical Populations of Steelhead Within the Puget Sound Distinct Population Segment, page 74, Puget Sound Technical Recovery Team 2013.

[6/] Infrequent and incomplete surveys likely result in an underestimate of spawners.

Part B. Aspirational Objectives for Recreational Fishery

The aspirational objectives describe the desired future state for recreational fisheries. Aspirational objectives may not be achievable, particularly in the short-term, given conservation or resource constraints. Nevertheless, they are important to initiate the discussion of our vision for the future of Puget Sound steelhead. Through an iterative process we will "true up" our aspirational objectives with the conservation framework of the delisting scenario.

In developing the aspirational objectives, it may be helpful to recall several of the objectives the advisory group has identified:

1) describes a path toward diverse and sustainable recreational fishing opportunities, with benchmarks to assess our progress;
2) recognizes the importance of steelhead and steelhead fisheries to our rural communities, preservation of our cultural heritage, and state economy;
3) promotes greater understanding of steelhead populations through an experimental approach, and recognizes that adaptive management will be required to be successful;
4) is not constrained by previous fishery and hatchery management approaches;
5) identifies watershed-specific strategies for fisheries and artificial production programs designed to achieve specific seasons and fishery types in a manner consistent with achieving conservation objectives; and
6) enjoys broad support among stakeholders interested in steelhead, including anglers and those interested in steelhead as a part of the Puget Sound ecosystem.

Task

Our second task is to identify our aspirational objectives for recreational fisheries. Although there are many types of recreational fisheries, perhaps the two broadest categories are catch-and-release and catch-and-keep. For catch-and-release fisheries, please identify the months for the fishery and the approximate angler days (i.e., 1000 anglers each fishing 10 days would be 10000 angler days). For catch-and-keep fisheries, please identify the months for the fishery and the approximate catch.

As you consider options, it may be helpful to review the coarse scale assessment of the fishery and hatchery strategies that were previously developed for Hood Canal (see notes from June 1, 2017 meeting).

Population	Catch-and-Release			Catch-and-Keep		
	Directed at Wild Steelhead?	Months	Angler Days	Directed at Wild Steelhead?	Months	Catch
Drayton Harbor (W)						
Nooksack (W)						
S.F. Nooksack (S)						
Samish/ Bellingham (W)						
Skagit (S/W)						
Nookachamps (W)						
Baker (S/W)						
Sauk (S/W)						
Stillaguamish (W)						
Deer (S)						
Canyon (S)						
Snohomish/ Skykomish (W)						
Pilchuck (W)						
N.F. Skykomish (S)						
Snoqualmie (W)						
Tolt (S)						

Notes

NOAA's criteria for limit 5 may help inform the development of the aspirational objectives for the recreational fishery. The 4(d) rule is under the Fishery and Hatchery tab of your notebook. Several key concepts are provided below:

- Proposed management actions must recognize the significant differences in risk associated with viable and critical population threshold states and respond accordingly to minimize the long-term risks to population persistence. Harvest actions impacting populations that are functioning at or above the viable threshold must be designed to maintain the population or management unit at or above that level. For populations shown with a high degree of confidence to be above critical levels but not yet at viable levels, harvest management must not appreciably slow the population's achievement of viable function. Harvest actions impacting populations that are functioning at or below critical threshold must not be allowed to appreciably increase genetic and demographic risks facing the population and must be designed to permit the population's achievement of viable function, unless the plan demonstrates that the likelihood of survival and recovery of the entire ESU in the wild would not be appreciably reduced by greater risks to that individual population.
- Set escapement objectives or maximum exploitation rates for each management unit or population based on its status and on a harvest program that assures that those rates or objectives are not exceeded. Maximum exploitation rates must not appreciably reduce the likelihood of survival and recovery of the ESU. Management of fisheries where artificially propagated fish predominate must not compromise the management objectives for commingled naturally spawned populations.
- Display a biologically based rationale demonstrating that the harvest management strategy will not appreciably reduce the likelihood of survival and recovery of the ESU in the wild, over the entire period of time the proposed harvest management strategy affects the population, including effects reasonably certain to occur after the proposed actions cease.

Part C. Potential Artificial Production Programs to Meet Fishery or Conservation Objectives

An artificial production program is a management action to help achieve fishery or conservation objectives. As discussed above for the aspirational objectives for the recreational fishery, we will need to "true up" our proposed hatchery programs with the conservation framework of the delisting scenario.

In general, a segregated hatchery strategy will only be appropriate for a catch-and-keep fishery, while an integrated hatchery strategy may be used for a conservation program, for a catch-and-keep fishery, or for a catch-release-fishery.

In evaluating options for hatchery programs, it may be helpful to recall several of the objectives the advisory group has identified:

1) Contributes to the conservation and recovery of Puget Sound steelhead;
2) is informed by our scientific understanding of steelhead and the factors affecting their abundance, productivity, diversity, and spatial structure;
3) promotes greater understanding of steelhead populations through an experimental approach, and recognizes that adaptive management will be required to be successful;
4) is not constrained by previous fishery and hatchery management approaches; and
5) identifies watershed-specific strategies for fisheries and artificial production programs designed to achieve specific seasons and fishery types (catch and release, catch and keep, rivers with no hatchery production).

Task

Our third task is to assess if an artificial production program might help achieve our conservation and aspirational fishery objectives. Please indicate in the tables below whether a hatchery program should be initially considered as a management action.

Note that at least one population must be identified as a Wild Steelhead Gene Bank. Candidates identified by the Puget Sound Hatchery Action Advisory Group are listed in the handout "Guidance for Selection of Wild Steelhead Gene Banks".

Population	No Hatchery Releases	Conservation Program	Catch-and-Keep Hatchery Strategy		Catch-and Release Integrated Strategy
			Integrated	Segregated	
Drayton Harbor (W)					
Nooksack (W)					
S.F. Nooksack (S)					
Samish/ Bellingham (W)					
Skagit (S/W)					
Nookachamps (W)					
Baker (S/W)					
Sauk (S/W)					
Stillaguamish (W)					
Deer (S)					
Canyon (S)					
Snohomish/ Skykomish (W)					
Pilchuck (W)					
N.F. Skykomish (S)					
Snoqualmie (W)					
Tolt (S)					

Notes

1) Guidance Dependent on Biological Phase of Population. An important consideration in developing and evaluating hatchery conservation programs is the status, or biological phase, of the population. The HSRG (2014) defined four biological phases (Preservation, Re-colonization, Local Adaptation, and Full Restoration) for a population and provided the following guidance regarding the objectives of an associated hatchery conservation program.

Table 3-3. Biological phases of restoration and objectives for different ecosystem conditions.

Biological Phases	Ecosystem Conditions	Objectives
Preservation	Low population abundance; habitat unable to support self-sustaining population; ecosystem changes pose immediate threat of extinction	Prevent extinction; retain genetic diversity and identity of existing population
Re-colonization	Underutilized habitat available through restoration and improved access	Re-populate suitable habitat from pre-spawning to smolt outmigration (all life stages)
Local Adaptation	Habitat capable of supporting abundances that minimize risk of extinction as well as tribal harvest needs; prevent loss of genetic diversity; and promote life history diversity	Meet and exceed minimum viable spawner abundance for natural-origin spawners; increase fitness, reproductive success and life history diversity through local adaptation
Full Restoration	Habitat restored and protected to allow full expression of abundance, productivity, life-history diversity, and spatial distribution	Maintain viable population based on all viable salmonid population (VSP) attributes using long-term adaptive management

Source: On the Science of Hatcheries, HSRG, 2014.

2) Guidance Dependent on Population Designation. The Department and Hatchery Scientific Review Group (2014) have provided the following guidance for broodstock management for programs designated as Primary, Contributing, or Stabilizing (pHOS – proportion hatchery-origin spawners; PNI – proportionate natural influence).

Hatchery Program Strategy	Population Designation	PNI	Effective pHOS	Gene Flow[1/]
Integrated	Primary Contributing Stabilizing	≥ 0.67 ≥ 0.50 1/	< 0.30 < 0.30 2/	NA
Segregated	Primary Contributing Stabilizing	NA	< 0.05 < 0.10 2/	< 0.02 < 0.04 2/

1/ Department guidance for segregated steelhead programs.

2/ Standards for Stabilizing populations are situation specific.