

Steelhead and Hatchery Reform



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Talking Points

- SSMP Highlights
- WFC Lawsuit
- PSHAAC Recommendations
- Monitoring Tools
- Wrap up-Questions

Statewide Steelhead Management Plan Priorities

- Conservation of wild steelhead populations
- Hatcheries operate in a manner consistent with watershed planning objectives
- Hatchery Reform is a science-driven redesign to achieve two goals:
 - Conserve naturally spawning populations
 - Support sustainable fisheries
- Establishment of Wild Steelhead Management Zones.
 - No hatchery reared steelhead will be planted
 - Sol Duc River became the first WSMZ in 2011
- Ensure primary population's gene flow is <2%

Fish and Wildlife Commission Hatchery and Fishery Reform Policy

“...to advance the conservation and recovery of wild salmon and steelhead by promoting and guiding the implementation of hatchery reform.”

- Use the principles, standards and recommendations of the HSRG
 - pHOS, PNI, pNOB
- Designate programs as Conservation or Harvest

WFC Lawsuit

- 6 Early Winter (Chambers Creek) programs affected
 - Dungeness, Kendall, Marblemount, Whitehorse, Snohomish, Soos
- No releases into anadromous waters until NOAA permits secured.
- No releases into Skagit (Marblemount) for 12 years
 - Will discuss an integrated program.
- All PS HGMPs reviewed by WFC before submittal
- Won't pursue additional lawsuits for 2.5 years

Puget Sound Hatchery Action Advisory Committee (PSHAAC)

- Established in 2011 to provide advice on the best approaches to meet the hatchery reform goals in the Puget Sound
- Concluded in April 2012 and the final report was released in February 2013
- Developed recommendations for WSMZ designations for some key populations that met the SSMP policy

PSHAAC Recommendations

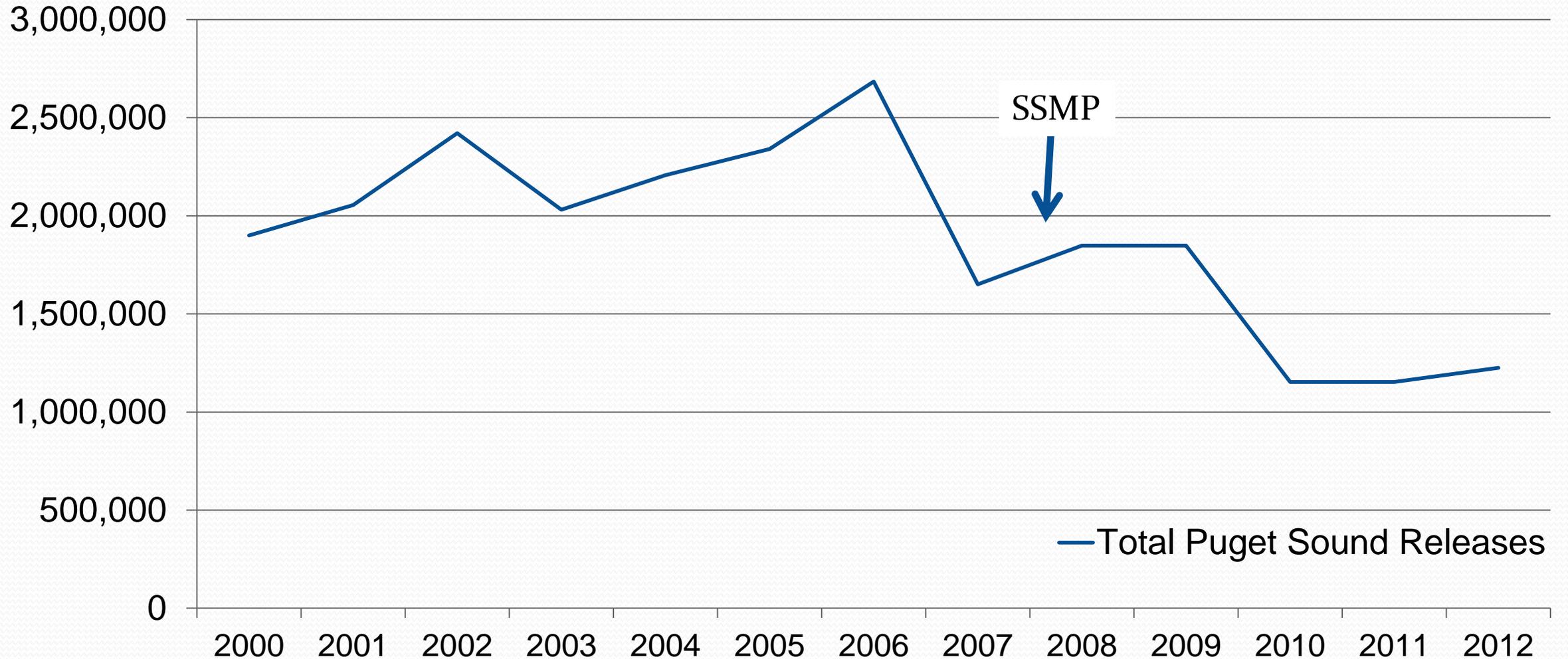
- General recommendations of the Committee discussed for all Puget Sound steelhead populations were:
 - Continued support of WDFW's new policy direction for steelhead, associated with the SSMP.
 - Investigate additional protections for the early component of wild winter steelhead.
 - Develop a better understanding of the relative importance of resident rainbow trout to the steelhead populations located in the same basin.
- *Steelhead Hatchery Benefits and Priorities*
 - The steelhead hatcheries in the Snohomish basin were shown to have the greatest economic benefit within the Puget Sound (Wegge 2009)¹.
 - PSHAAC identified these programs (Tokul, Reiter, and Wallace) as the highest priority programs to retain into the future.

¹ Wegge, T. 2009. Methods for estimating region economic impacts of Washington hatchery programs: technical memorandum. TCW Economics. Sacramento, California. 10 pp.

Hatchery Changes

- Production reduced by 50%
- Discontinuation of out-planting in locations without acclimation and adult trapping facilities in 2008/2009
- Discontinuation of recycling adult fish (in some areas)
 - USGS study
- Discontinuation of egg transfers between basins
- Implementation of a January 31 egg take cut-off for all Early Winter steelhead programs
- Mark 100% of hatchery releases
- Release strategy to minimize residualization

Total Puget Sound Steelhead Releases 2000 to 2012



Monitoring Plan

- The WDFW Genetics lab is just about complete in developing single nucleotide polymorphism “SNPs” baseline for Puget Sound and Lower Columbia steelhead.
- SNPs offers a greater ability to detect Hatchery x Wild hybrids than the typical microsatellite approach.
- WDFW will implement a genetic monitoring program to measure hybridization between segregated hatchery (Chambers Creek winter and Skamania summer) steelhead and wild populations.

Tools

- AHA
- Introgression
- Gene Flow Model

All H Analyzer (AHA)

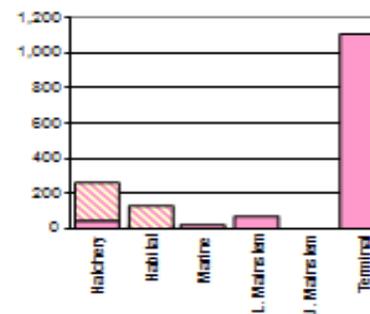
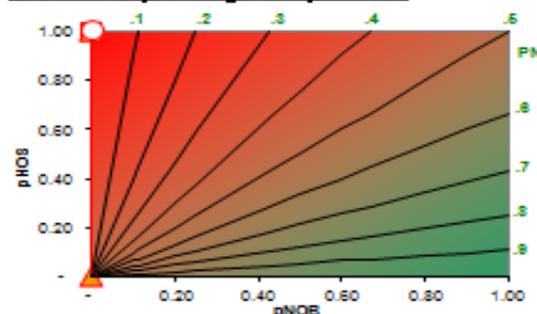
Apply & Recalculate

Population (Ctrl + Page Up/Down to Scroll)

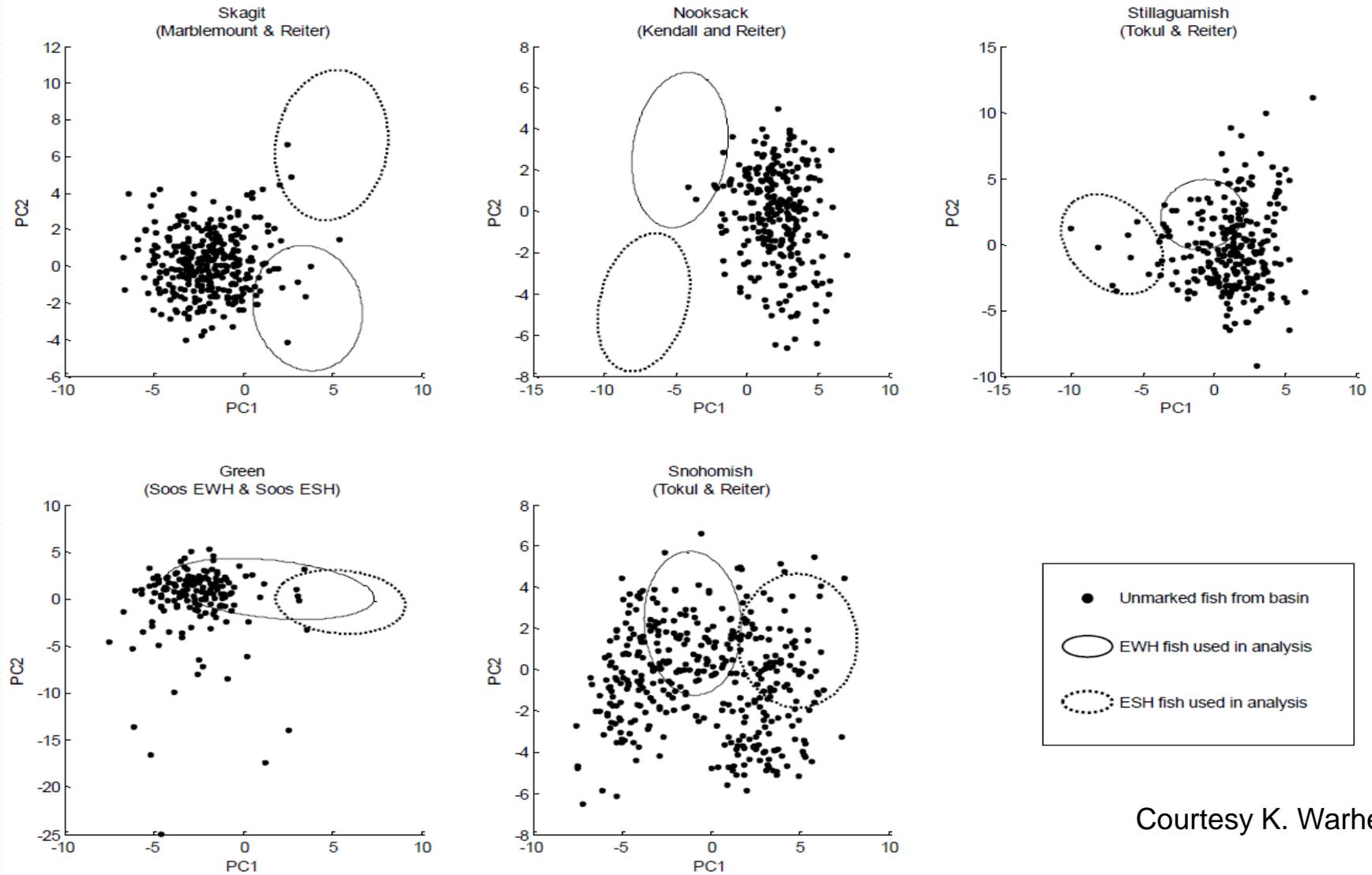
Subregion/Subbasin		Species/Race		Population Management Intent:		
Washougal		Summer Steelhead		Avoid adverse impact to recovery of listed species. Maintain hatchery program. Provide broodstock.		
Washougal Summer Steelhead (Skamania-Hatchery)		Hatchery Strategy:			NA	
		Population Recovery Designation:			NA	
		Historic			Current	
Habitat	Productivity (Adult)	Ad. Capacity	0.01	0	0.01	0
	Min NOR Escape	% Kelt	1		1	0.15
	Smolt Productivity	Sm. Capacity	0	0	0	0
Hydro	Ocean Surv. Baseline SAR	Vary? (Y/N)	0.060	0.060	0.060	0.060
	Juv Passage Surv.	Adult Passage	1.00	1.00	1.00	1.00
	Adjusted Productivity	Adj. Capacity	0.01	0	0.01	0
Harvest	Harv - Marine		NORs	HORs	0.005	0.005
	Harv - L. Mainstem		NORs	HORs	0.040	0.040
	Harv - U. Mainstem		NORs	HORs		
	Harv - Terminal		NORs	HORs	0.070	0.700
Total Exploitation Rate		NORs	HORs	0.112	0.713	
Hatchery	Broodstock Composition		pNOB-Goal	pHOS-Goal	pNOB	pHOS
	Purpose		PNI	pHOS-Realized		100%
	Type		Const/Harv/Both	Int/Seg/Step/None	Harv	Seg
	Broodstock by Source		Local	Imported	42	60,300
	Brood Exported (from HOR Surplus)		Export Goal/Realized	Smolt Release Strays	100	100
	Destination for HOR Returns		% to Hatchery	% to Nat. Spawn.	75%	25%
Productivity of Hatchery Fish		Recruits/Spawner	Fitness? [Y/N]	35.5		
Patterns Update	Patterns shown here are assigned to the population from the AHA or ROL file. Red cells indicate patterns are not assigned to this population/scenario in the rollout application. The pattern needs to be added to the application, or a different pattern should be assigned to this population in the ROL/AHA file.		Habitat ---->		LCR_C&SF Habitat	
			Hydro ---->		Current Hydro	
			Harvest -->		Current Harvest	
			Hatchery			

412
112

Realized Spawning Composition



PCA of SNPs



Courtesy K. Warheit

Gene Flow Calculation

$$\text{Gene flow} = \frac{b}{b + a(1 - q)(1 - o_N) + (1 - q)^2 o_N^2}, \text{ where}$$

$$a = o_N + q(o_H - o_N)$$

$$b = k_1(aq(1 - o_H) + q^2 o_H^2) + k_2 q(1 - q)o_N o_H$$

Conclusion

- Where do we go from here?
 - Refine monitoring plan
 - Continue to monitor introgression
 - Make program changes as necessary based on monitoring results
 - Get all programs (HGMPs) permitted

Questions?

