YKFP Spring Chinook Supplementation Assessment

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Quantitative Objectives of the YKFP

- Increase harvest opportunities.
- Minimize genetic impacts to unsupplemented streams.
- Keep impacts to non-target taxa within containment objectives.
- Protect productive habitat and increase freshwater productivity/capacity of Basin.
- Disseminate important scientific findings.
- Increase natural production of target species while maintaining long-term fitness.

Harvest

- Tribal subsistence fisheries in the Yakima Basin have occurred in all years of the Program (1,191/yr).
- Sport fisheries in the Yakima Basin have occurred in 7 of the 11 years of HO returns (827/yr).
- Contributes to Columbia River Tribal, sport, and commercial fisheries (2,167/yr).

Minimize Genetic Impacts

- Out of Basin spawning ground recoveries have been minimal.
  - 2 Deschutes River, OR
  - 2 Cowlitz River, WA
  - 1 Wenaha River, OR
  - 8 Naches River, WA

Non-Target Taxa

- Robust monitoring program for non-target taxa of concern.
- See Gabe Temple's talk tomorrow.

Habitat

- Habitat protection, restoration, and tributary passage efforts are ongoing.
- Several habitat talks today and tomorrow.

Disseminate Data

- Many reports and publications have been produced by the YKFP.
- Many of the presentations today and tomorrow are YKFP efforts.

See www.ykfp.org or www.efw.bpa.gov for reports

Natural Production and Fitness

- Talks by Andy Dittman, Curtis Knudsen, Chris Johnson, Steve Schroder, and Todd Kassler all relate to this topic.
- And so will this one….

Indicators of Supplementation Success

- Total spawner abundance of the supplemented population should increase.
- Natural origin spawner abundance should increase.
- Productivity of supplemented population should remain the same or increase.

Based on Monitoring and Evaluation of Supplementation Projects (ISRP & ISAB, 2005)

Objectives

- Estimate spawning escapement, proportion hatchery fish, and age composition of spring Chinook that spawned in the upper Yakima River and Naches subbasins
- Identify suitable reference streams by comparing productivity and abundance before the onset of supplementation (pre 2001).
- Use a BACI to test the deltas (T-R) in the pre and post supplementation years.

Spawning escapement

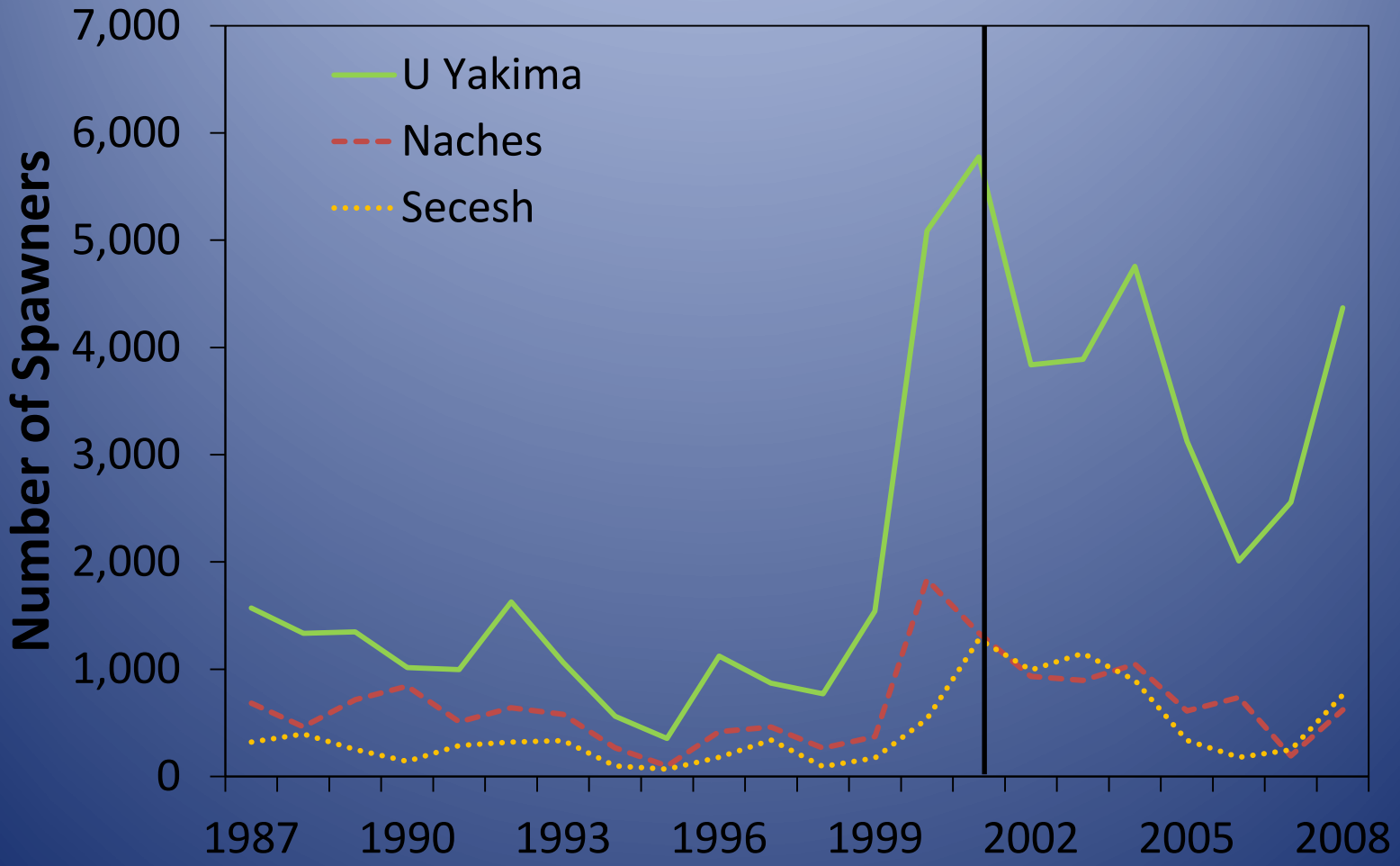
- YN conducts weekly census of redds from all available spawning habitat in both upper Yakima and Naches
- Use carcass recoveries adjusted for recovery probability bias based on Murdoch et al. (2010) to estimate sex ratio of the spawning population (i.e., fish per redd)
- Expanded total redds count by fish per redd to estimate spawning population.
- Sex ratios derived from carcasses were very similar and not significantly different to estimated escapement at Roza.
- Proportion of HO spawners derived from carcasses were very similar to and not significantly different than estimated escapement at Roza.

Potential Reference Populations

Natural origin abundance (spawners)

Population	Correlation coefficient (*r*)	*P*
Bear Valley Creek	0.101	0.744
Big Creek	0.012	0.968
Chamberlain Creek	0.584	0.059
E.F. Salmon River	0.087	0.779
Lemhi River	0.309	0.305
Loon Creek	0.042	0.892
Marsh Creek	0.019	0.951
Naches River	**0.928**	**<0.001**
Secesh River	**0.735**	**0.004**
Sulpher Creek	0.133	0.664
Valley Creek	0.121	0.694

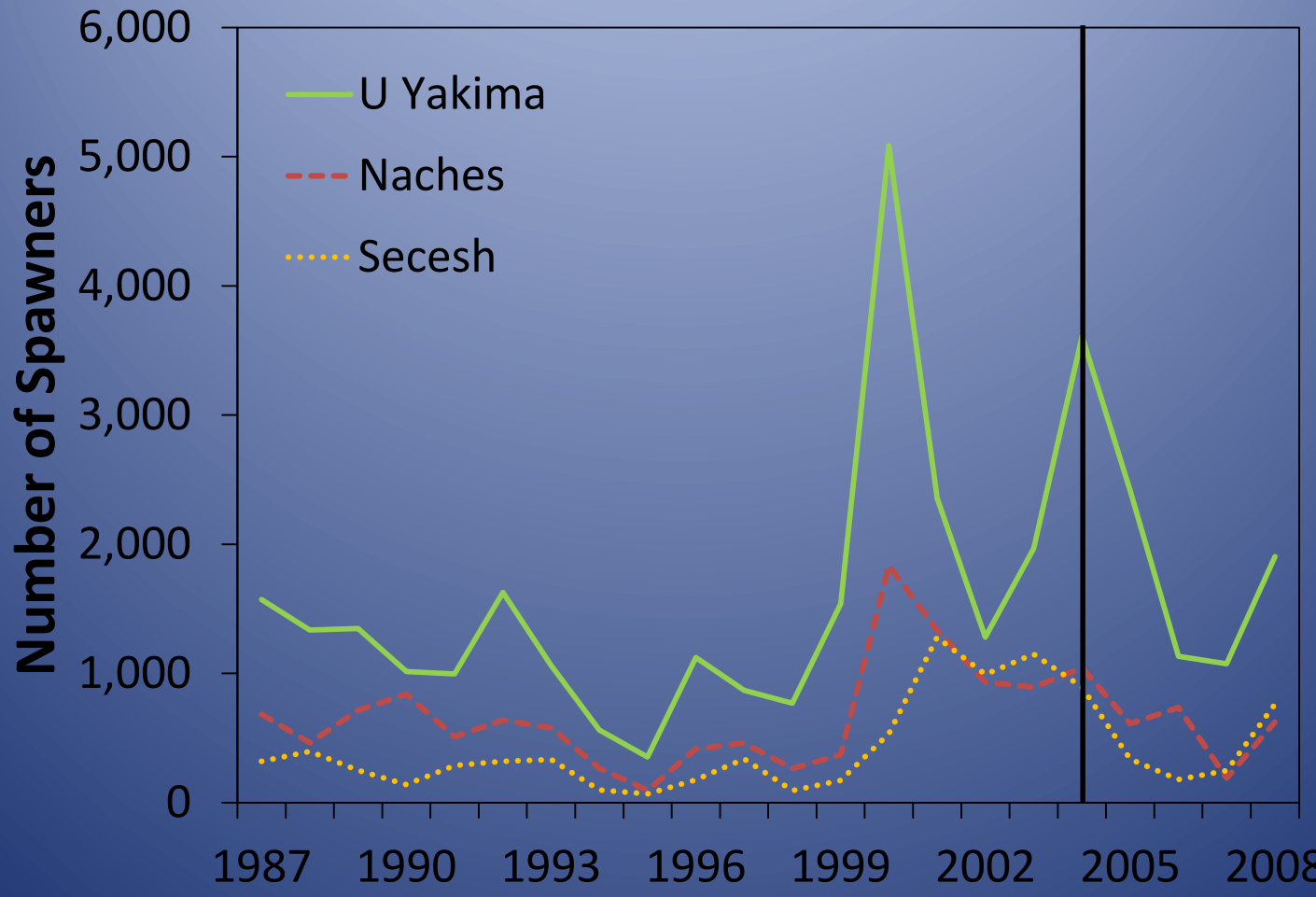
Total Spawner Abundance



Total Spawner Abundance BACI Results

Population	Origin	Pre Supp T-C	Post Supp T-C	Post-Pre	*P*
Naches River	All	794	3114	2320	<0.001
Secesh River	All	1124	3060	1937	<0.001

Natural Origin Spawner Abundance



Natural Origin Abundance BACI Results

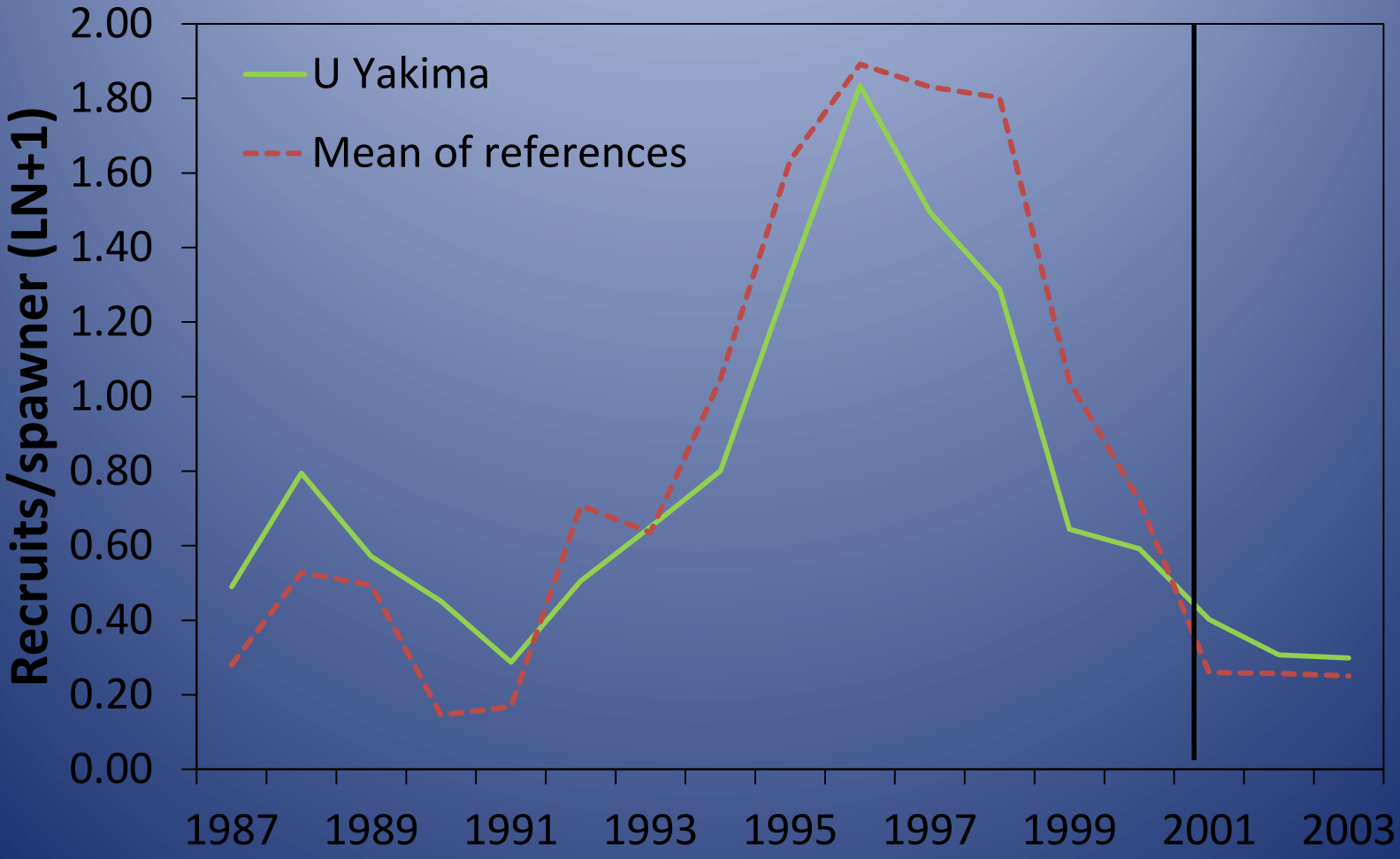
Population	Origin	Pre Supp T-C	Post Supp T-C	Post-Pre	*P*
Naches River	NO	797	1359	562	0.113
Secesh River	NO	1054	1544	490	0.314

Potential Reference Populations

Recruits/spawner (productivity)

Population	Correlation coefficient (*r*)	*P*
Bear Valley Creek	**0.942**	**<0.001**
Big Creek*	0.856	<0.001
Chamberlain Creek	0.554	0.060
E.F. Salmon River	**0.863**	**<0.001**
Lemhi River	**0.615**	**0.019**
Loon Creek*	0.634	0.015
Marsh Creek	**0.753**	**0.002**
Naches River	**0.938**	**<0.001**
Secesh River	**0.642**	**0.013**
Sulpher Creek	0.262	0.366
Valley Creek*	0.552	0.041

Productivity (recruits/spawner)



Productivity (recruits/spawner) BACI Results

Population	Pre Supp T-C	Post Supp T-C	Post-Pre	*P*
Bear Valley Creek	-0.092	0.103	0.195	0.258
E.F. Salmon River	-0.407	0.055	0.461	0.323
Lemhi River	-0.112	0.125	0.237	0.536
Marsh Creek	0.064	0.152	0.088	0.562
Naches River	0.026	-0.078	-0.104	0.342
Secesh River	-0.123	0.092	0.215	0.510

Caveats (no conclusions yet)

- Preliminary results to demonstrate methods
- Recruits are not adjusted for harvest – could have implications where there are regional or temporal differences in exploitation.
- Need to correct for density – supplemented (or unsupplemented) streams may be above capacity, potentially decreasing freshwater productivity.
- Several good reference populations for productivity, but must continue examining other populations or develop other metrics for abundance. For example, recalculate spawning escapement using the same methodology.
- Few years of data during the treatment period. Likely need many more to make firm conclusions.
- YKFP will be working with other researchers in the Upper Columbia and lower Snake to refine methodology to assess supplementation programs

Acknowledgements

- All carcass and redd surveys in the Yakima and Naches are performed by YN Fisheries personnel.
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