

Fish Use of Oxbows Habitats in the Lower Snoqualmie Valley

Funded by the Snoqualmie Watershed Forum and the King Conservation District

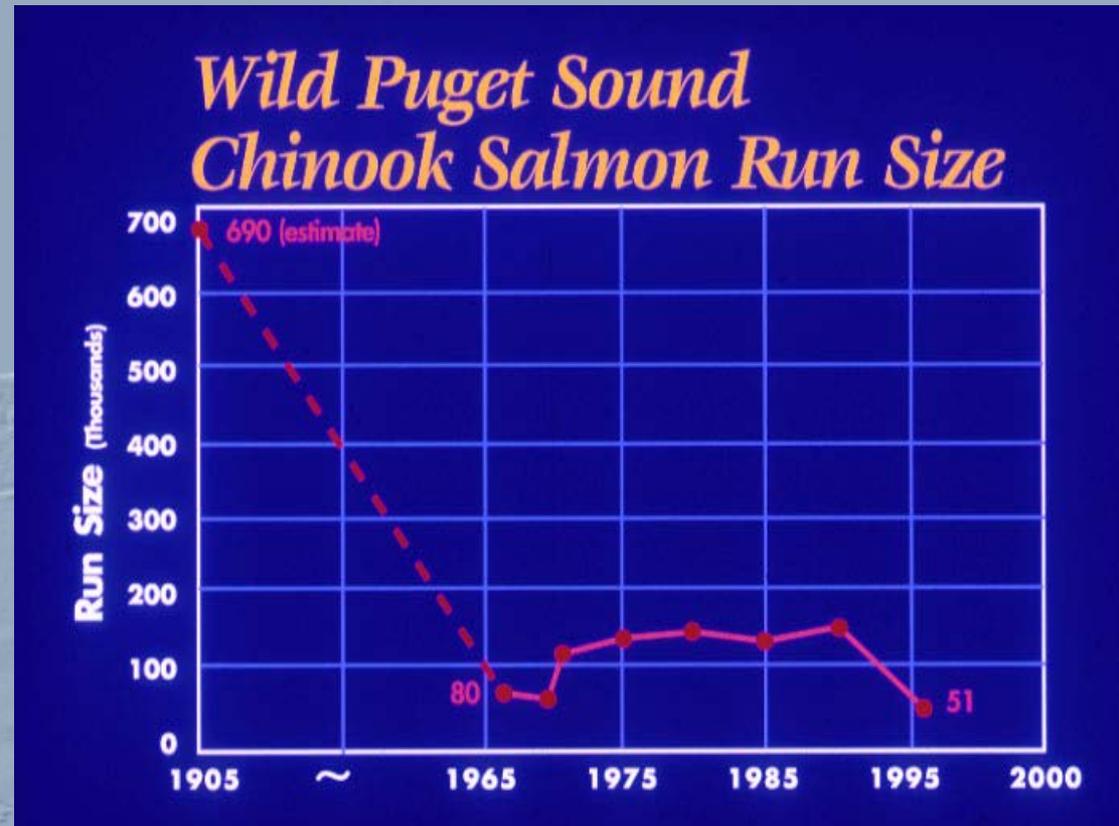


Chinook are listed as threatened?

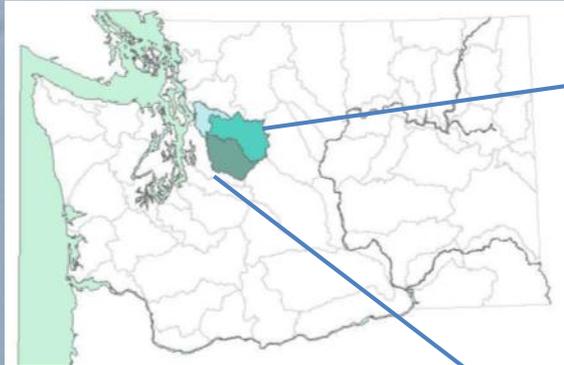
9 Puget Sound Chinook populations are believed to be extinct, including the early run population of the Snohomish

Snoqualmie Chinook population is ~ 5.7% of historic abundance

Skykomish Chinook population is ~3.4% of historic abundance



WRIA 7 - Snohomish



- 1,856 mi² (4,807 km²)
- Two Chinook stocks
- Salmon Habitat Conservation Plan completed in 2005

Strong focus on rearing habitat over next 50 years with a goal to reconnect 50 to 80% of off channel habitats

Salmon Plan Background

- The Salmon Habitat Plan has a goal of restoring 137 acres of off-channel habitat in the first 10 years
- The plan describes off-channel habitat as “side-channels, sloughs, ponds, and small tributary habitat within the floodplain”
- However, the Plan does not prioritize which types of off-channel habitats should be restored first—they are all equal

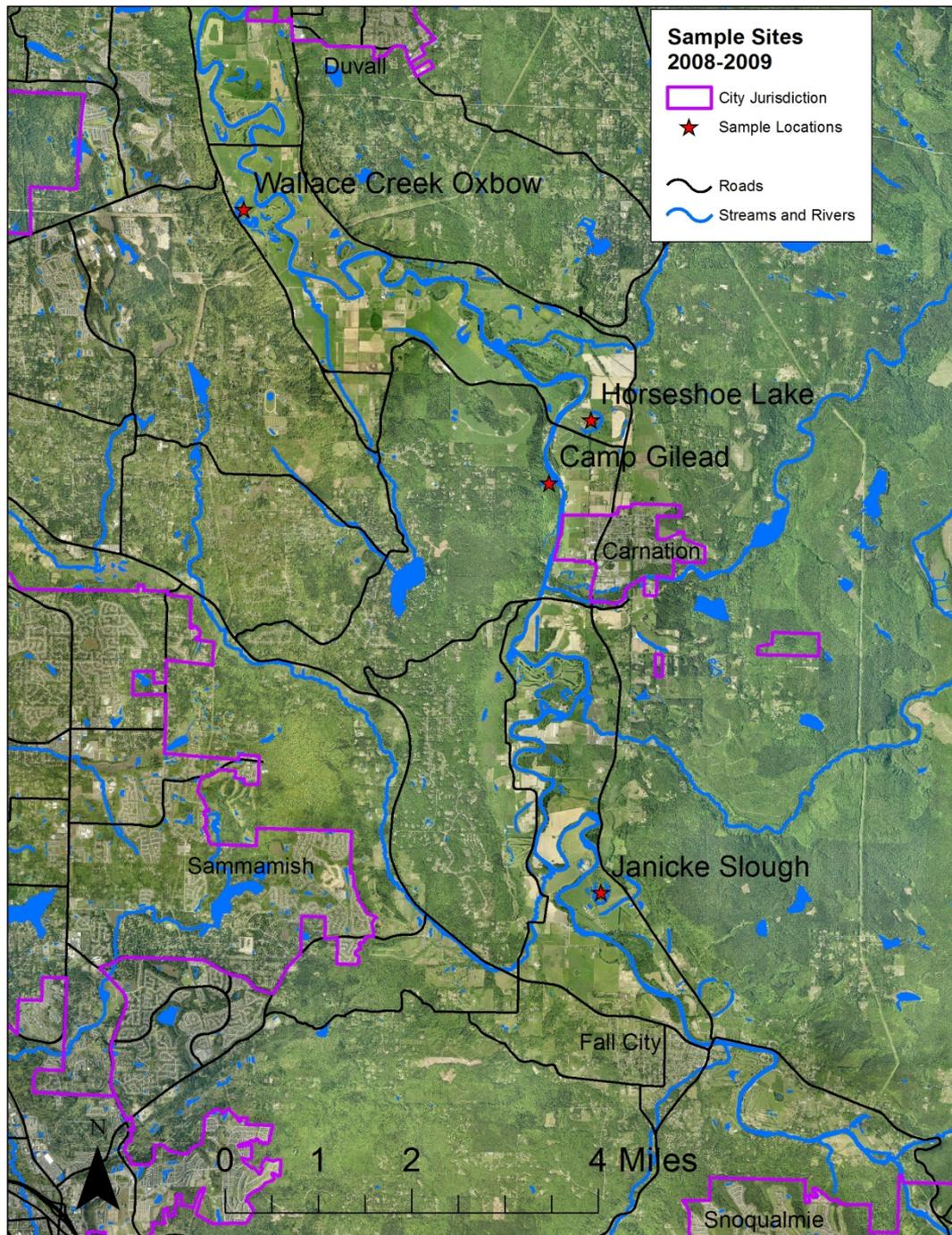
Salmon Plan Background, cont.

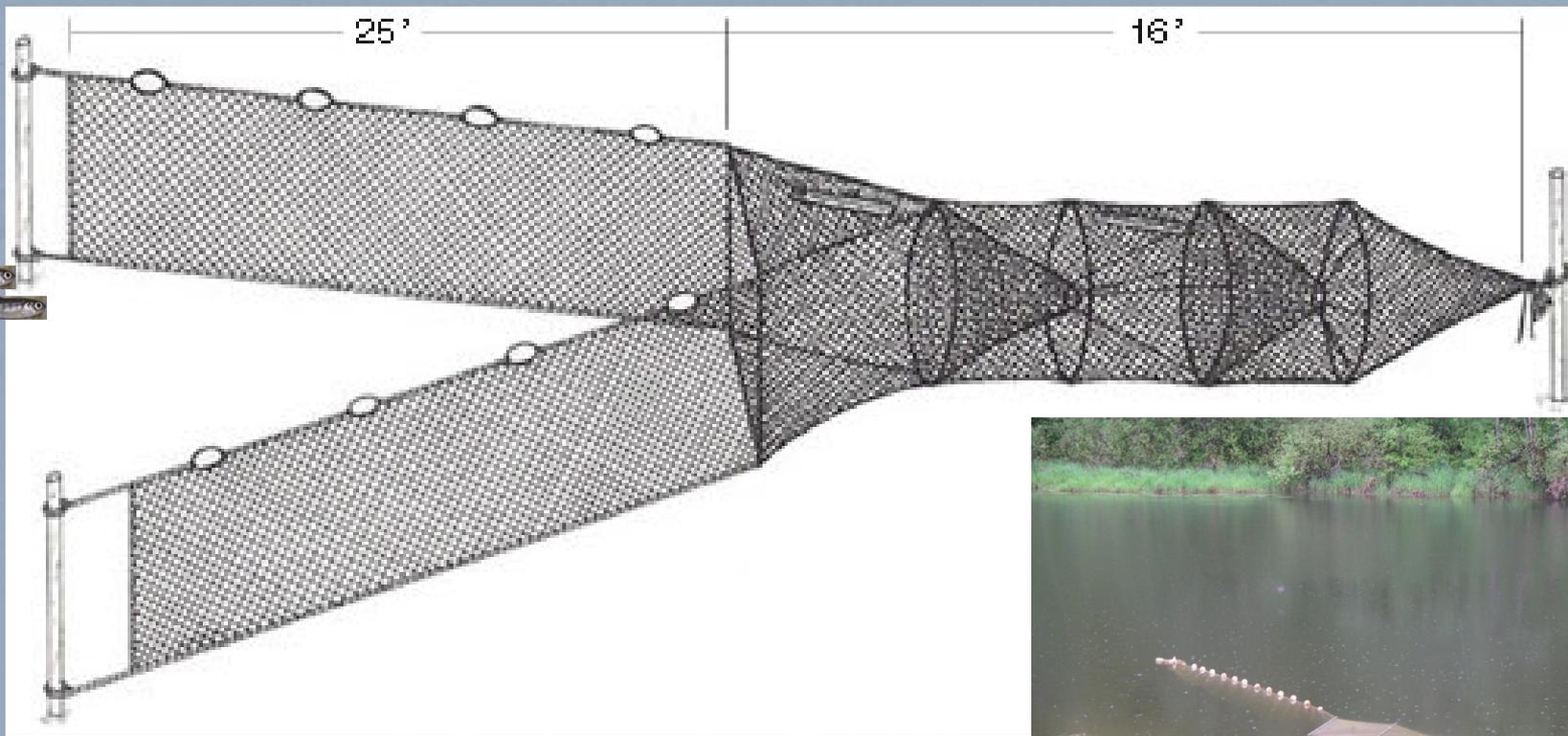
- 5 to 30% of returning adult Chinook utilized a yearling life history strategy
- We don't know what habitat yearling Chinook use
- Habitat use data gap was listed as a high priority for future validation monitoring
- Understanding the impacts of nonnative fish species was listed as low priority for validation monitoring

So, why sample oxbows?

The true origins of the project







Fyke nets

- Work well in ponds/lakes
- Fish need to be mobile in order to be captured
- Works well around snags and poor water clarity
- Require more time to 'soak' the nets than other methods



Sample Schedule

- Sampled each oxbow for 24 hours at a time
- Used 4 fyke nets at a time in different parts of each oxbow
- Sampled each oxbow 3 times in 2008 and 3 times in 2009
- Sampled later than typical (in April, June and July/August) to look for yearling Chinook

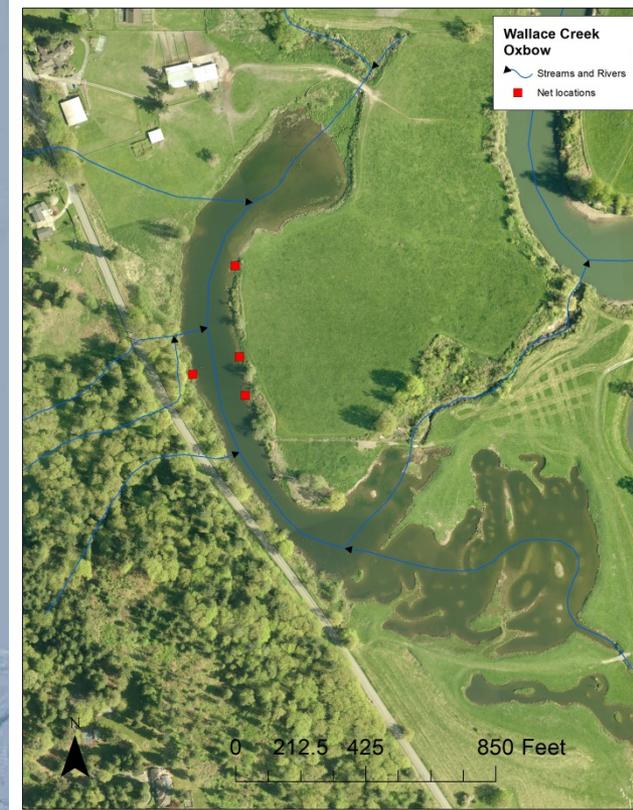


Wallace Creek Oxbow

- Year round inflow
- Spawning upstream of oxbow

	Wallace-08	Wallace-09
Native	14.0%	6.4%
Nonnative	86.0%	93.6%

- Largemouth bass juveniles were the most abundant species in both years
- Brown bullhead catfish, pumpkinseeds, and sculpins were encountered 5 out of 6 sample events



Horseshoe Lake

- Inflow ceases in mid-summer
- No spawning upstream

	Horseshoe-08	Horseshoe-09
Native	0.3%	9.5%
Nonnative	99.7%	90.5%

- Pumpkinseed was the most abundant species
- Brown bullhead catfish and pumpkinseeds were encountered 6 out of 6 sample events



Janicke Slough

- Inflow ceases in mid-summer
- No spawning upstream

	Janicke-08	Janicke-09
Native	10.5%	0.7%
Nonnative	89.5%	99.3%

- The most abundant species in 2008 was pumpkinseed, in 2009 largemouth bass juveniles
- Brown bullhead catfish and pumpkinseeds were encountered 6 out of 6 sample events



Camp Gilead

- Year round cold inflow
- Potential spawning upstream

	Gilead-08	Gilead-09
Native	13.0%	98.4%
Nonnative	87.0%	1.6%



- The most abundant species in 2008 was pumpkinseed, in 2009 3-spine stickleback
- Pumpkinseeds, coho, and sculpins were encountered 6 out of 7 sample events
- Chinook caught in 2009



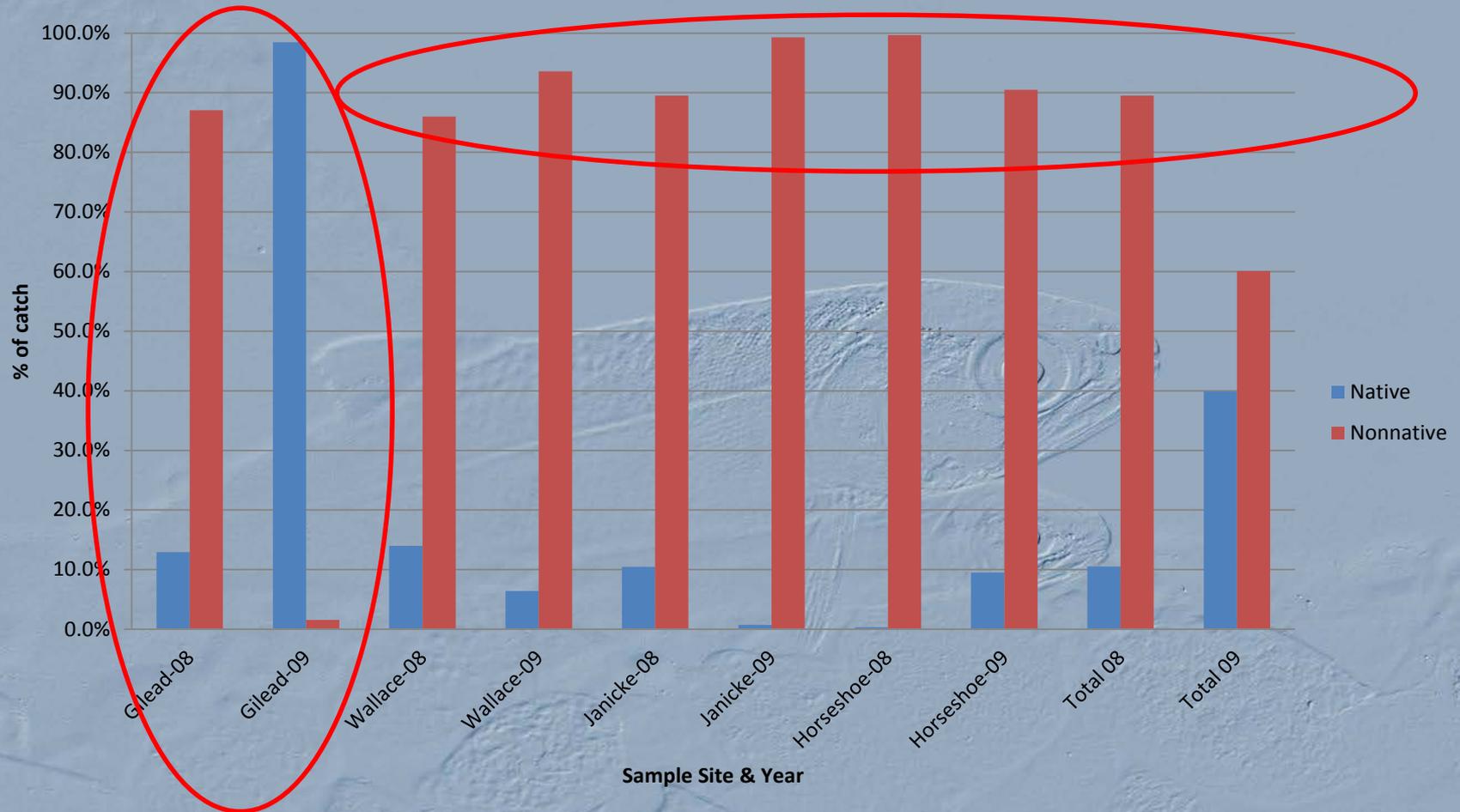
2008-before restoration
Impounded, disconnected pool



2009-after restoration
Water level driven by river stage

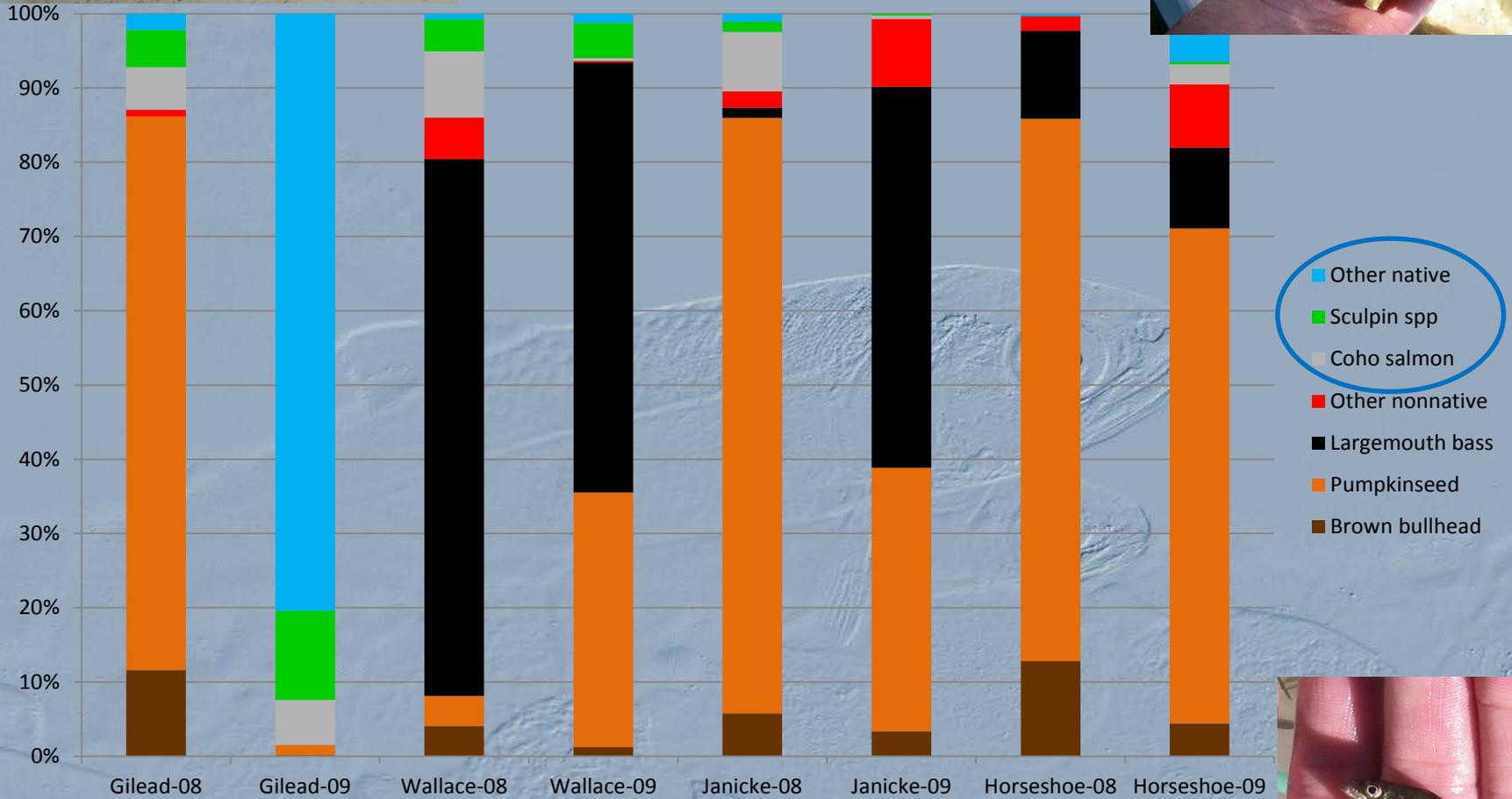


Percent of Catch of Native and Nonnative Species





nt Species by site



Summary Findings

- Nonnative species = 93% of all fish caught in the oxbows
- Very small numbers of salmonids used the oxbows from early spring through summer
- Juvenile coho salmon found early in the year, but generally not in the later summer samples
- No Chinook found in 2008, though they previously were found stranded in Camp Gilead
- In 2009, Chinook were freely using Camp Gilead
- Dramatic shift in species composition in Camp Gilead after restoration

1979 WDFW study-sampled 6 Snoqualmie oxbows, including Janicke and Horseshoe

1979 study

- 2 nonnative species
- 5 native species
- No pumpkinseeds, black crappie, or brown bullheads
- Most abundant species: largemouth bass and 3-spine stickleback

This study (30 yrs later)

- 7 nonnative species
- 15 native species
- Large numbers of pumpkinseed and brown bullheads, plus black crappie
- Most abundant species: largemouth bass and pumpkinseeds

2004 Study of Western WA shallow lakes- nonnative fish impacts on natives

- Brown bullheads, pumpkinseeds, and yellow perch diets have high overlap with juvenile coho salmon
- Black crappie, brown bullhead, & yellow perch eat juvenile coho at least in small amounts
- Largemouth bass on the other hand ate high numbers of juvenile coho and were responsible for 98% of the predation on juvenile coho

Bonar, Scott A., B. Bolding, M. Divens, and W. Meyer 2004. Effects of Introduced Fishes on Wild Juvenile Coho Salmon Using Three Shallow Western Washington Lakes.

Restoration Prioritization

- Restoration at Camp Gilead made an impressive positive change
- However, it is not a typical oxbow &
- The results of the restoration are not applicable to most other oxbows in the valley
 - It was artificially disconnected via a levee
 - It has a perennial cold water stream feeding it
 - Restoration changed the habitat from an oxbow to backwater channel

Restoration Prioritization, cont.

- As noted earlier, the Salmon Plan describes off-channel habitat as “side-channels, sloughs, ponds, and small tributary habitat within the floodplain”
- The Plan does not prioritize which types of off-channel habitats should be restored first

Restoration Prioritization, cont.

- Combining the findings from the all three studies, classic oxbow habitats should not be a high priority for off-channel habitat restoration for juvenile Chinook habitat.
- Most, if not all, of the oxbow habitats still need restoration of one form or another. They just should not be a high priority of Chinook habitat restoration efforts at this time

Outstanding Questions

- Can anything realistically be done to reduce the impact of the non-natives in oxbows.
 - *There are over 60 ponds & oxbows in just the Lower Snoqualmie's floodplain*
- Where are the yearling Chinook hiding?
 - *In late summer they have been found in small floodplain streams*
- *Can we design an affordable but comprehensive assessment of all late spring/summer off-channel habitats?*



Many Thanks

- Thanks to the Snoqualmie Forum for prioritizing the work back in 2005
- Thanks to the King Conservation District for funding the project
- Thanks to all the King County staff that helped with the field work and kept the project below budget

Questions?