

Going Native: Evidence that High Flows Expand the Spatial Distribution Of Native Fish in the Yolo Bypass

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Background:

- The Yolo Bypass provides rare floodplain area to the North Delta region, critical as nursery habitat for native fishes.
- DWR monitoring since 1998 has shown that at least 15 native and 27 introduced fish species use the Yolo Bypass, both migratory and resident types.
- The Lisbon weir is a stationary structure that mutes tidal influence upstream and has the potential to effect fish communities.

Research Objectives/Questions:

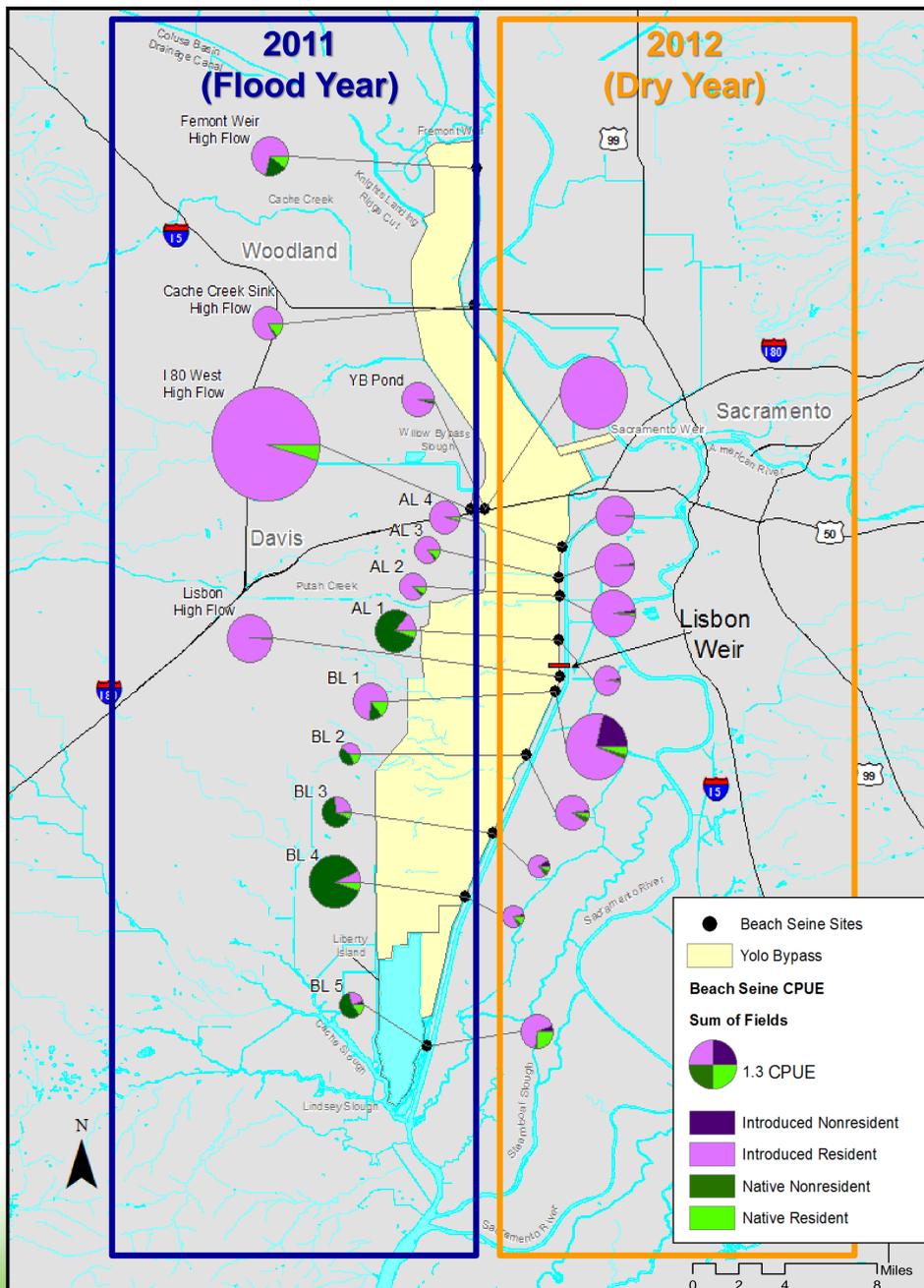
- How does species composition vary spatially within the Yolo Bypass? Specifically:
 - Does Lisbon Weir affect fish communities?
 - Are natives and introduced species distributed differently?
 - Are juveniles of resident and migratory fishes distributed differently?
- How does species composition and fish abundance compare between flooded and non-flooded years?

Methods:

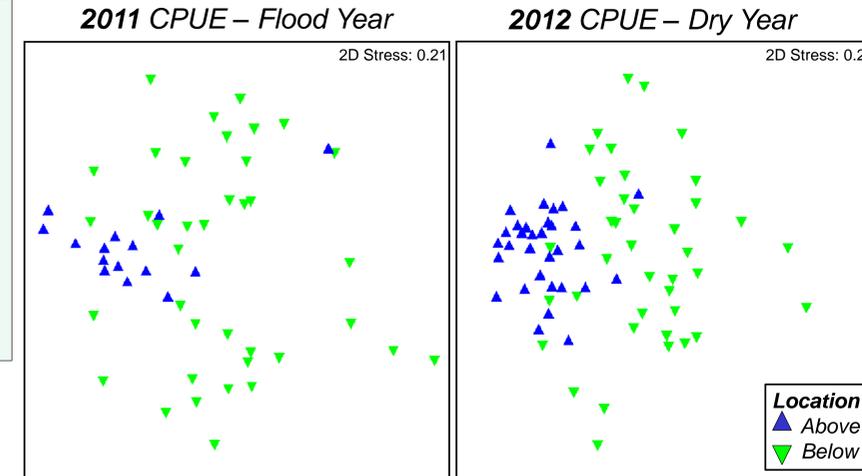
- All fish were collected using a 15 meter long x 1.2 meter tall seine net; transects averaged 30 meters in length, 5 meters wide, with variable depth.
- Beach seine sampling occurred bi-weekly at all sites within the Yolo Bypass, weekly when flooded.
- Additional sites were sampled during inundation: Fremont Weir, Cache Creek, I-80 causeway, and Lisbon.
- Catch data from March-June (native peak spawning and rearing period) 2011 and 2012 compares species composition in a flooded year (2011) and a non-flooded year (2012).

Results:

2011 and 2012 March – June Yolo Bypass Beach Seine CPUE



MDS plot of CPUE below and above Lisbon Weir



- Assemblages above and below Lisbon Weir were not significantly different in 2011 (Global R Statistic = 0.071, P value = 0.137).
- But were significantly different in 2012 (Global R Statistic = 0.345, P value = 0.001); indicating that high flows potentially reduce effects of Lisbon Weir on fish communities.
- Sacramento splittail was a significant driver in fish assemblage differences above Lisbon Weir in 2011, but not 2012.

Key Points:

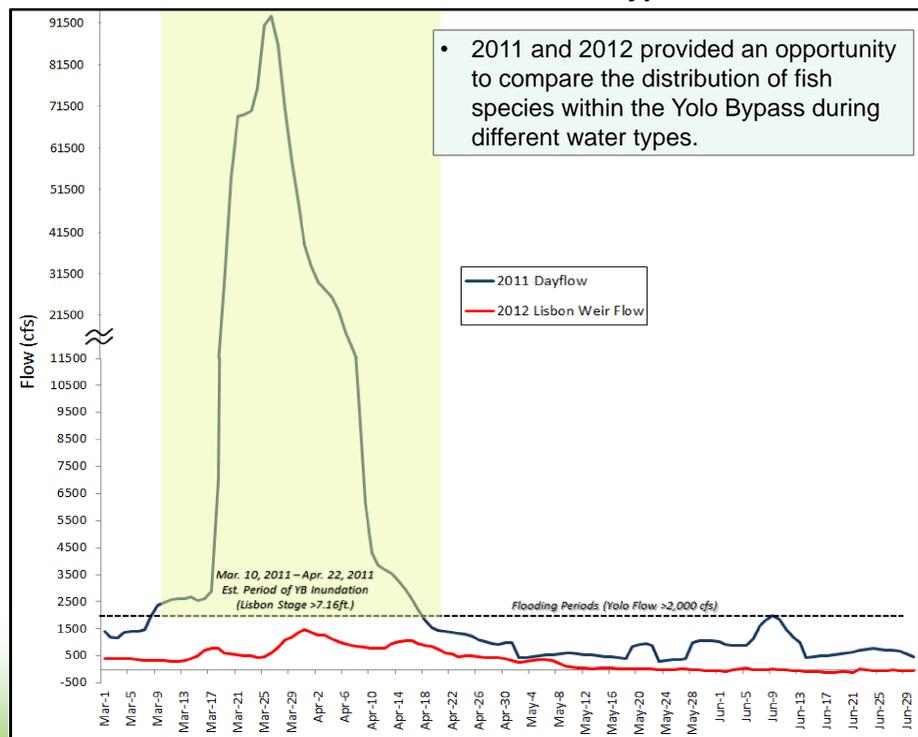
- Nonnative species dominate fish assemblages in the Yolo Bypass, but more variation in 2011 samples supports the importance of high flows for native species (57.87% native in 2011 CPUE and 7.01% native in 2012 CPUE).
- In both years, native fish are more prevalent below Lisbon Weir, while the catch of introduced fishes is greater above Lisbon Weir.
- High flow sites in 2011 indicated a wider distribution of native fishes within the Yolo Bypass during the flood year, and the utilization of floodplain habitat by juvenile Chinook salmon and Sacramento splittail.
- Low flows may provide better conditions for the spawning and recruitment of introduced centrarchids above Lisbon, apparent in an increased % catch of bluegill in 2012.

Acknowledgements:

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2011 and 2012 March – June Yolo Bypass Flow



- 2011 and 2012 provided an opportunity to compare the distribution of fish species within the Yolo Bypass during different water types.