

Fish Presence in California's Yolo Bypass Floodplain

Kevin Reece, William Harrell, Ted Sommer California Department of Water Resources, Division of Environmental Services, West Sacramento

Key Points

- Over the past ten years we have conducted sampling to identify the timing and duration of migration for key species of management concern.
- Our efforts demonstrate that the Yolo Bypass represents an important fish habitat in the Sacramento-San Joaquin Delta.
- This study suggests that the floodplain functions as a migration corridor, and provides foraging, and spawning habitat.
- Although the Yolo Bypass provides a major adult fish migration corridor, better and more regular upstream passage is urgently needed.



Methods

We have used a suite of methods since 1998. Sampling by fyke trap or via beach seine was typically conducted from October-June, and a rotary screw trap was typically operated January-June.

Fyke Trap

- Sampled large-bodied fishes with a 10 ft diameter Fyke Trap.
- Deployed in flows under 5000 cfs and was checked 3-5 days per week.
- The last decade of sampling resulted in a catch of over 26,000 fish representing 29 species.

Rotary Screw Trap

- Sampled juvenile and small-bodied fishes with an 8 ft diameter Rotary Screw Trap.
- Operated 5-7 days per week with rare exceptions and was checked every 24-48 hours.
- The last decade of sampling resulted in a catch of over 268,000 fish representing 42 species.

Beach Seines

- Sampling occurred 2-4 times per month at 2 sites located in the tidal section of the drain, and a perennial pond in the floodplain.
- Physical and chemical parameters, Secchi depth, temperature, pH, dissolved oxygen, and conductivity were taken each day the we checked the traps.



Study Area

The Bypass is a leveed 24,000 ha (~59,000 acre) floodplain engineered to carry flood flows from the Sacramento River, Feather River, American River, Sutter Bypass and westside streams and drains. The system seasonally floods approximately three out of every five years and can approximately double the wetted area of the Delta. During peak flood events the lower Bypass can convey up to 14,000 m³/s (~500,000 cfs)--up to 75 percent of inflow from the Sacramento basin. Most flow enters the Bypass via Fremont and Sacramento Weirs (see map). The Toe Drain is a perennial tidal channel with a capacity of 100m³/s along the eastside of the Bypass, drains adjacent fields during low flow and agriculture periods and connects westside Bypass tributaries with tributaries of the North Delta.

Presence of Selected Fishes in Yolo Bypass

Yolo Bypass Monitoring '98-'08

Probable Presence: DFG, FWS data and published literature
Documented Presence: Yolo Bypass Monitoring Data

Solid color
Bordered

Documented presence, but definitive Run classification undeterminable due to timing overlap, potentially could be one of several runs.

| Fish Species | Life Stage | Sept | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | June | July | Aug |
|------------------------------------|----------------------|------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|-----|
| Fall-Run Chinook salmon | adult migration | | | | | | | | | | | | |
| FSC | peak adult migration | | | | | | | | | | | | |
| Late Fall-Run Chinook salmon | adult migration | | | | | | | | | | | | |
| FSC | peak adult migration | | | | | | | | | | | | |
| Winter-Run Chinook salmon | adult migration | | | | | | | | | | | | |
| FE/CE | peak adult migration | | | | | | | | | | | | |
| Spring-Run Chinook salmon | adult migration | | | | | | | | | | | | |
| | peak adult migration | | | | | | | | | | | | |
| Juvenile Chinook salmon, all races | fry/parr < 70mm | | | | | | | | | | | | |
| * | smolt ≥ 70mm | | | | | | | | | | | | |
| Steelhead trout | adult migration | | | | | | | | | | | | |
| FT | juvenile emigration | | | | | | | | | | | | |
| White sturgeon | adult | | | | | | | | | | | | |
| | juvenile | | | | | | | | | | | | |
| Green sturgeon | adult | | | | | | | | | | | | |
| Southern DPS-FT | juvenile | | | | | | | | | | | | |
| Northern DPS-FSC | | | | | | | | | | | | | |
| Sacramento splittail | adult | | | | | | | | | | | | |
| 1 | juvenile | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | |
| Pacific lamprey | adult | | | | | | | | | | | | |
| 3 | juvenile | | | | | | | | | | | | |
| Delta smelt | adult | | | | | | | | | | | | |
| FT/CT (CE not yet in effect) | juvenile | | | | | | | | | | | | |
| Longfin smelt | adult | | | | | | | | | | | | |
| CCS (CT not yet in effect) | juvenile | | | | | | | | | | | | |

Note: Our Rotary Screw Trap does not routinely begin sampling until early Jan (1 yr was started mid Dec) so species such as DSM/LFS/PL or juvenile CHN may be present before then. For the months of July-August we do not run our FYKE or Rotary Screw Trap.
* Size chart for juvenile salmon was developed for river systems, not floodplains, and due to increased growth rate on floodplains (Sommer 2001b) size criteria alone is not fully applicable and Run determination is at times questionable without DNA verification.

1 Adult splittail have been caught as early as Oct. 5, and as late as April 14. The trend is a migration pulse approximately 1 week following a flow pulse.

2 Juvenile splittail have been caught from Jan.2 to June30, but the majority are sampled in April and May.

3 Juvenile lamprey caught during the winter period are likely washed out during high flow events.

FE:ESA Endangered, FT:ESA Threatened, FSC:ESA Species of Concern, CT:CESA Endangered, CT:CESA Threatened, CCS:CESA Candidate Species

This chart displays the documented and probable presence of multiple fish species utilizing the Bypass as a migration, foraging, and/or spawning habitat.