Update on Yuba River Salmon: Monitoring Results, Restoration Progress and New Perspectives

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SRF Spring-run Chinook Symposium
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Update on Yuba River Salmon

I. Status and Background

II. New Study Results

III. Regulatory and Legal Processes

IV. Restoration Progress
Essential Background, part 1

- Spring-run Chinook are one of four types of “salmon” in the lower Yuba, including ESA-listed Central Valley Steelhead.
- Historic impacts from hydraulic mining sediments have drastically altered the riverine environment.
- The two lower Yuba River (LYR) dams are owned by the Army Corps:
  - Daguerre Point Dam (1906), Englebright Dam (1941).
  - Englebright Dam at RM 24 is a total barrier without fish passage
- The Yuba River Watershed has the most complex system of hydroelectric and water diversion infrastructure of any California basin.
  - Yuba-Bear Project (FERC# 2266) – Nevada Irrigation District
  - Drum-Spaulding Project (FERC# 2310) – PG&E
  - Yuba River Development Project (FERC# 2246) - YCWA
Essential Background, part 2

- Lower Yuba River flows are cold year-round due to deep outlet in New Bullards Bar Reservoir (1971) and releases from Narrows 2 (YCWA) and Narrows 1 (PG&E) for which Englebright Dam (USACE) is Forebay.

- Overall salmon abundance appeared good relative to other CV rivers over the last 30 years, especially with no in-river hatchery.

- Specific studies of genetics, behavior and interactions with the Feather River were missing, until recently.
The Lower Yuba River

Map from YCWA, Yuba Accord Monitoring and Evaluation Program Draft Report
Requirements of the River Management Team (Yuba Accord Fisheries Agreement, 2005)

- Monitoring and evaluating the effectiveness of the implementation of the Lower Yuba River Accord
- Evaluating the condition of fish resources in the Lower Yuba River
- Evaluating the viability of Lower Yuba River fall-run Chinook salmon and any sub-populations of the Central Valley steelhead and spring-run Chinook salmon ESUs …

www.yubaaccordrmt.com
Temperature in the Lower Yuba River is suitable for all life stages of Spring-run Chinook.
Daguerre Point Dam

- Debris control structure (btl. 1906-1911)
- Control for Diversions
- Fish Passage structures (c. 1965)
- VAKI River Watcher fish passage monitoring equipment
Chinook salmon = 2,533 fish

Chinook salmon = 5,378 fish

Chinook salmon = 6,469 fish

Chinook salmon = 7,785 fish
Acoustically-tagged Spring-run held throughout LYR (especially at Daguerre Dam plunge pool), then migrated to upper spawning locations in September.
Some Results

- No genetic differences detected between Yuba spring-run and fish from the Feather River Hatchery.

- Otolith analysis from 400 carcasses shows that up to 80% came from other rivers (Barnett-Johnson, in progress).

- Adipose fin-clipped fish make up 20-66% of both spring and fall runs.

- Limited to no spawning segregation with fall-run.

- 0.0007% of 680,000 tagged juveniles returned as adults (2007-2010)
Some Conclusions

- Spring-run salmon were extirpated from the Yuba River following the construction of Englebright Dam and have recolonized.

- Yuba River salmon populations are not independent from Feather River salmon populations.

- The Yuba River may be a “sink” to which many salmon from other rivers are attracted, and survival of smolts is low.

- The Yuba River is the most thoroughly studied river in the Central Valley, especially for physical habitat conditions.

- The Yuba River presents unique opportunities to:
  - Contribute to recovery of the CV spring-run Chinook Salmon ESU
  - Rehabilitate conditions supportive of diverse life history strategies
Regulatory and Legal Processes

- **Biological Opinion for Army Corps Dams**
  - 2007 BiOp remanded for inadequate scope of analysis
  - 2012 Jeopardy BiOp legally challenged by Yuba Co. Water Agency
  - Corps claims no authority for fish passage and other measures
  - NMFS extends date and offers “pending authority and funding”
  - Corps to re-initiate consultation for reduced scope of project

- **FERC Relicensing**
  - Yuba-Bear and Drum-Spaulding (2013) – DEIR under review; challenged for not including anadromous fish alternative.
  - Habitat Expansion Plan focused on improvements to the LYR

- **Other**
  - SWRCB
  - CDFW
Restoration Progress

- Yuba Salmon Forum
- NMFS reintroduction planning
- Gravel augmentation below Englebright
- Englebright Reach rehabilitation planning
- Hammon Bar Pilot Project
- Parks Bar to Marysville rehabilitation planning
The Yuba Salmon Forum

- Multi-party forum: NGOs, Agencies, Utilities/Licensees
- Chartered in 2010 with the goal of evaluating, planning and implementing as feasible, actions to restore salmon and steelhead in the Yuba River basin.
- YCWA has funded technical workgroup and consultants
- Final technical products currently under review for screening and evaluation:
  - Cost and elements of 7 major actions
  - Habitat availability in four upper Yuba areas:
    - North Yuba
    - Middle Yuba
    - South Yuba
    - Below New Bullards Bar Dam
Major Actions for Cost Estimation

1. Collect and Transport to the North Yuba
2. Collect and Transport to the Middle Yuba
3. Collect and Transport to the South Yuba
4. Removal of Englebright Dam
5. Notching of Englebright Dam
6. Ladder over Englebright Dam
7. Lower Yuba River Enhancements
The Yuba Accord does not remedy:

- Passage problems at Daguerre Point Dam
- Loss of historic spawning habitat
- Feather River hatchery
- Downstream limitations

*Pre-dams estimate*  
*Avg (1942-2005)*  
*2006*  
*2007-2009*

- Yuba River: Total Annual Returns Fall-Run Salmon
  - Approximately 10% of the Central Valley's historic run of 1 million salmon may…
Water Temperature is the limiting factor for available habitat.
New FERC licenses will result in cooler water temperatures for the South Yuba and Middle Yuba Rivers

South Yuba River from below
Lake Spaulding Dam (RM 40.8) to above Lake Englebright (RM 0.1)
Daily Average Water Temperature (°C)
for Flow Scenarios on July 5, 2008

Run Name: AG082211
Revision Date: 9/7/2011
Englebright Dam Reach

- Devoid of spawning gravel but for pilot injections by the Army Corps in 2007, 2010, 2012 (10,000 tons total).
- Total gravel deficit of 60,000 – 100,000 tons. BiOp calls for 15,000 tons annually.
- Shotrock from construction of Narrows 2 facility limits potential for restoration.
- BiOp requires Army Corps to plan restoration of entire reach. PG&E and DWR want to fund it as mitigation for Oroville (Habitat Expansion Plan).
- USFWS funded development of project alternatives (in progress).
Park Bar to Marysville (18 miles)
Marking, harvesting and soaking cuttings, 2011.
Two planting methods: pods by excavator, and single cuttings by stinger.
April 27, 2012 –
Planting Area A at 10,000 cfs.
March 2012, following inundation. Note captured woody material and deposited sand.
Hammon Bar
First-year before and after photos
Next Steps for Habitat Enhancement Planning

- Geomorphic and Ecological Flows Analysis
- Depth to Water Mapping
- Grading and Large Wood Placement Alternatives
- Land Ownership Assessment
- Site Selection and Evaluation
Big Questions for Yuba River Spring-run

1. To what extent will Lower Yuba River rehabilitation and enhancement actions benefit to ESA listed salmonids?
   • Less costly than reintroduction to the upper Yuba River watershed
   • Is a segregation structure necessary to achieve full benefits?
     o would allow cultivation of source stock for reintroduction
2. What can we expect from a reintroduction program that relies on collect and transport?
   • Reduction in short-term extinction risk?
   • Acceptable and sustainable long-term program?
3. Is volitional fish passage to the upper Yuba technically and economically feasible?
   • Near-term answers may not be conclusive
4. Will federal agencies (Army Corps and NMFS) resolve ESA conflicts over operation of dams, diversions and hydropower?
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