Colusa Basin Drain Fish Stranding and Rescues

Workshop Notes and Comments

Prepared by
Thomas Cannon
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Representing
California Sportfishing Protection Alliance
Colusa Basin Winter Run Salmon Rescue Meeting

July 18, 2013

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Photo 1: Fish Rescue on Logan Creek, May 31, 2013.

Mike Hendrick photo showing trap below a large weir structure in the Colusa Basin that had blocked adult salmon.
Introduction

A workshop-meeting was held in Sacramento on July 18, 2013 on the subject of salmon stranding and rescues in the Colusa Basin during spring 2013. Several hundred winter-run chinook salmon were found stranded and rescued in the Colusa Basin Drain canal system on the west side of the Sacramento Valley. Many hundreds more were observed and could not be rescued and are presumed to have died. The meeting attendees included agency personnel and landowners with knowledge of the system. The topics discussed included a summary of the events, the possible origins of the fish, and potential short and long term solutions to the problem.

The Problem

While adult salmon along with many other fish have been observed trapped in the Colusa Basin system in the past this was the first attempt to assess the number involved at a wide array of locations with a concerted effort. Most of the adult chinook salmon rescued were eventually determined to be winter run, which are listed as endangered by the State and federal governments. The number involved is believed to be a substantial portion of this year's run estimated at around 1000 fish at spawning grounds above Redding. The adult salmon had traveled up the Drain canals for 40-70 miles before being blocked at weirs with no hope of escape. (See map below.)
Source

Three possible places of entry were suggested:

1. The Yolo Bypass via the Knights Landing Ridge Cut (KLRC) - the KLRC flows into the northern Bypass unobstructed in winter. This was considered a likely source given the Fremont Weir overflowed from the Sacramento River into Yolo Bypass in late December and early January potentially attracting adult salmon migrating up from the Bay-Delta. The Colusa Basin also flooded (from local west valley sources) causing 500-3000 cfs flows into the Yolo Bypass during the winter via the KLRC.

2. The Knights Landing Outfall Gates (KLOG) - the KLOG at Knights Landing on the Sacramento River are open in non-flood periods between the Colusa Basin Drain (CBD) and the Sacramento River. The gates have recently been rebuilt. Hydraulic conditions in the gate outfalls were such that salmon could swim through the gates on occasion during this winter.

3. Connections between the Basin and the Sacramento River may have occurred during high water. No specific routes were identified, although they are known to occur.

Solutions

Several short-term and long-term options were discussed:

1. Upgrading the rescue program in the Colusa Basin to capture more of the fish, hopefully earlier in the season before the fish become delayed and stressed in the lower flows and warmer waters of spring. With no definitive understanding of the source of fish as yet this seemed a necessary short-term solution to plan for implementing this coming winter.

2. Capturing the fish in the Yolo Bypass at Lisbon Weir in the center of the Bypass, or at Wallace Weir at the exit of the KLRC at the north end of the Bypass before they enter the Colusa Basin also was suggested.
3. Operating the KLOG to limit salmon passage into the CBD was also suggested. The gates could be closed or operated in a hydraulic range that would preclude passage. Exclusion structures at the entrance to the gates were also discussed for short or long term solutions.

4. There seemed to be general agreement that the proposed long-term planned passage fixes at the Fremont Weir prescribed in the OCAP Biological Opinion and BDCP would necessarily include an exclusion weir on the outlet of the KLRC.

5. Another long-term option was to provide some sort of natural outlet channel to the Sacramento River near the top of the Colusa Basin.

My Assessment

I was taken aback as to how this was thought to be a "new" problem, when in fact the issues have been around for at least two decades. The issues are in fact much larger and more involved than just the Yolo Bypass and its connection to the Colusa Basin. The Sutter Bypass and its connection to the Butte Basin and the Sacramento River via the Colusa, Moulton, and Tisdale weirs is also a huge problem. The Sutter-Butte issues are even more acute and better understood, making the lack of attention there by this worksop even more onerous and disconcerting.

The simple issue in wet years or high flow periods of drier years like this last December is that winter-run and spring-run chinook salmon, steelhead, and green and white sturgeon have serious choices to make when they reach the mouth of the Yolo Bypass at Cache Slough in the Delta and at the mouth of the Sutter Bypass across from the Fremont Weir just north of Sacramento on the Sacramento River. With most of their destination flow coming out of the two Bypasses they are likely to make the bad choice of going up the Bypasses where the odds of survival and eventual spawning in their natal rivers are close to nil.
The Central Valley Project Improvement Act (CVPIA) of 1992 had a section called the Anadromous Fish Restoration Program (AFRP - Sec 3406b of the Act) that dealt directly with these issues. The Final AFRP Plan (USFWS 2001) also specifically recognized these issues:

"15. Evaluate juvenile and adult chinook salmon stranding in Sutter Bypass and behind Tisdale, Moulton, and Colusa weirs during periods of receding flows on the upper mainstem Sacramento River."

"1. Install an adult exclusion device at the Knights Landing outfall for Colusa Basin Drain as an interim action pending completion of Colusa Basin Drain Evaluation 1."

In a recent progress report on the Act (USFWS 2010), progress was noted as "not addressed":

The 1993 Restoring Central Valley Streams: A Plan for Action. California Department of Fish and Game (CDFG 1993) included a measure to install barriers to upstream migration into the Colusa Drain and Sutter Bypass.


2 http://www.fws.gov/stockton/afrp/ws_projects.cfm?code=BUTTC#documents

The CBD issue was also brought up in 2000: Attachment E - Colusa Basin Drain Discussion Paper⁴: "Anecdotal observations are plentiful that chinook salmon migrate up the CBD beginning in mid-August, specifically in the vicinity of the Delevan National Wildlife Refuge. Documentation is not available. In 1988 or 1989, a fish passage facility was installed at Maxwell Irrigation District’s Delevan weir. The fish passage facility provides salmon access to the CBD and tributaries upstream from the weir. An employee at the Delevan National Wildlife Refuge has seen adult salmon trapped in the fields that were flooded with water from the Glenn-Colusa canal. In addition, a resident who lives on Walker Creek, tributary to Willow Creek, has often seen adult salmon in the creek. The resident said the creek is spring-fed, although the local warden has seen it dry in September."

The CALFED Program also addressed the issue more than a decade ago in PROGRAMMATIC ACTION 1B: "Develop a cooperative program to construct a weir or screen at the lower end of the Knights Landing Ridge Cut Canal to keep adult salmon and steelhead from migrating upstream into the Colusa basin drain. Page 326" (CALFED 2001⁵)

In more recent salmon restoration plans the issue is addressed generally or even matter-of-factly as in the following action from the Central Valley Salmon Recovery Plan (NMFS 2009⁶):

2.4.5.3 Implement projects that improve fish passage between the Sacramento River and flood bypasses.

2.4.12.1 Install effective adult fish passage facilities at Sutter Bypass weirs that currently impede adult passage (e.g., Tisdale Weir).

2.4.13.1 Install effective adult fish passage facilities at Yolo Bypass weirs that impede adult passage (e.g., Fremont Weir).

In the more recent Bay Delta Conservation Plan (BDCP) there is a Conservation Measure (CM) 2:

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⁵ http://www.calwater.ca.gov/content/Documents/ERPP_Vol_3.pdf
⁶ http://swr.nmfs.noaa.gov/recovery/cent_val/Appendix_C-Priority_2_Recovery_Actions_and_Implementation_Schedule.pdf
"The purpose of this conservation measure is to improve upstream and downstream fish passage, reduce straying and stranding of native fish, increase availability of floodplain fish rearing and spawning habitat, and stimulate the food web in the Yolo Bypass and to investigate the potential for food web export from the Yolo Bypass to the Delta. The conservation measure requires the preparation and implementation of a Yolo Bypass Fishery Enhancement Plan (YBFEP) that details the specific actions to be implemented to achieve the biological objectives of this measure. Key benefits to covered fish species include reduced migratory delays and loss of salmon, steelhead, and sturgeon at Fremont Weir."

"Westside Option. The YBFEP will include a feasibility study and evaluation of a gated channel to provide flows into Yolo Bypass along the west side. Potential flow sources are the Sacramento River, Colusa Basin Drain or Sacramento River flows through Knights Landing Ridge Cut, or augmentation of other western tributaries. Some modification of the existing configuration of the discontinuous channels along the western edge of the Yolo Bypass may also be required. If effective at meeting biological objectives, this option could be included in the implementation of the conservation measure."

The OCAP Biological Opinion for the CVP (NMFS 2009) includes Action I.7:

"Reduce Migratory Delays and Loss of Salmon, Steelhead, and Sturgeon at Fremont Weir and Other Structures in the Yolo Bypass. Objective: Reduce migratory delays and loss of adult and juvenile winter-run, spring-run, CV steelhead and Southern DPS of green sturgeon at Fremont Weir and other structures in the Yolo Bypass."

Modification of the Knights Landing Ridge Cut was also considered in the Yolo Bypass Salmonid Habitat Restoration and Fish Passage Implementation Plan Long-Term Operation of the Central Valley Project and State Water Project Biological Opinion Reasonable and Prudent Alternative Actions I.6.1 and I.7:

"The Knights Landing Ridge Cut (KLRC) would be modified as it currently provides no exit path for upstream-migrating fish. Three potential options for modification are construction of a temporary weir at the outflow end of the existing channel to both allow the downstream passage of water and prevent the upstream passage of fish; realignment of the outflow point into the existing Cache Creek Settling Basin (CCSB), which already is equipped with a high wall weir that prevents the upstream passage of fish; and blocking passage further downstream of the junction of KLRC and the Bypass."

7 http://www.water.ca.gov/fishpassage/docs/yolo2.pdf
Winter and spring run use of the Sutter Bypass is also clearly noted by NMFS: http://swr.nmfs.noaa.gov/hcd/dist2.htm. (See map above.)

In 2011 it became apparent that many adult green sturgeon were also stranded in the Bypasses along with adult salmon. http://www.apple-democrat.com/articles/sturgeon-105680-fish-green.html 2011. Similar news features were presented in the Sacramento Bee and other news outlets.

NMFS recently commented:

"During high flow or flood events water is diverted into the Sutter and Yolo bypasses. Adult winter-run Chinook salmon migrating upstream may enter these bypasses, where their migration may be delayed or blocked by control structures." (NMFS 2009)

Conclusion

The meeting ended with no specific direction or call for agency action other than the suggestion for followup by volunteer subgroups. CDFW stated that they will plan for a more comprehensive rescue effort in Colusa Basin next year.

Again, this lack of action seemed quite disconcerting with many questions unanswered.

1. What will happen to all the sturgeon that enter the two Bypasses?

2. What about the blockage of adult salmon and steelhead below the Moulton, Colusa, and Tisdale weirs in the Sutter-Butte Basin? (In past decades CDFG rescued these fish with large specially built nets.)

3. Why not block and trap fish at the outlet of the Knights Landing Ridge Cut at Wallace Weir (willing landowners) in the Yolo Bypass before they go up and get

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lost in the myriad of hot polluted channels of the Colusa Basin? Why wait until April-May when its too late? These fish are at the outlet of the Ridge Cut at Wallace Weir in the Yolo Bypass from Dec-Mar. This option is also the only viable solution for protecting green sturgeon.

4. Why not simply close the Knights Landing Outfall Gates when fish might pass into the Colusa Basin Drain from the Sacramento River?

5. Why has nothing been done, especially at the Fremont Weir?

It would seem imperative given the apparent risks to winter run salmon, spring run salmon, steelhead, and green sturgeon to address the problem immediately and not wait yet another year.

I recommend making immediate modifications to the Wallace Weir (see map below) within its permit constraints to block and trap salmon, steelhead, and sturgeon beginning this fall with fall-run chinook salmon. Such an emergency action is not dissimilar to the rescue efforts undertaken in the Colusa Basin this past spring. The present configuration of the weir can handle up to 2000 cfs of flow from the Ridge Cut. Hopefully this capacity can be upgraded to handle potentially higher flows this winter (last winter's high was 3,000 cfs).

Traps may set at multiple outlets from the weir and fish transferred the short two miles by good Yolo Bypass levee road to the Sacramento River. The landowners and weir operators are willing participants. The site must be dealt with in any case by the team designing the Fremont Weir fix. In the event the weir is overtopped or washed away by flood flows, at least some of the season's fish passage into the Colusa Basin can be stopped and diverted to the Sacramento River.