Wallace Weir and Colusa Basin Drain - Fish Salvage Operations

Colusa Basin Drain and Wallace Weir Fish Trapping and Relocation Efforts (courtesy of CDFW)

Due to various anthropogenic impacts to California's natural waterways, migration cues for anadromous fish species have been disrupted and lead to increased straying into man made drainages found within the Yolo Bypass (Bypass) and Colusa Basin Drain (CBD). Some of the fish observed in these drainages are threatened and endangered species such as winter and spring-run Chinook salmon, Central Valley Steelhead and Green sturgeon. As such, salvage efforts are necessary to aid in recovery and give stranded individuals a chance to reach spawning grounds and contribute to the spawning population. The data gathered from these salvage efforts has provided the California Department of Fish and Wildlife a better understanding of the specific environmental triggers that lead to adult straying into the Bypass and CBD. This data also helps to inform water management decisions and restoration efforts in the Bypass.

About | Methods | Data Access | Reporting | Map | Contacts

Background

In 2013, a large number of adult Chinook salmon were observed within Colusa Basin Drain (CBD) in various agricultural diversions and drainages. Because fish that enter these drainages are unable return to the Sacramento River, the Department of Fish and Wildlife (DFW) implemented rescues within the Colusa Basin canals and over 312 salmon were rescued. Analysis showed that a large portion of the rescued salmon were endangered winter-run Chinook salmon.

There has been a great deal of effort to examine environmental conditions

and water operations which caused Chinook salmon to become entrained in the CBD during 2013. Numerous anadromous fish species have been documented in the Yolo Bypass (Bypass) following high flow events that overtop Fremont Weir. This is likely due the attraction caused by the large volume of water conveyed through the bypass during an over topping event. Anadromous species observed in the bypass after such overtopping events include state and federally listed species:

Downstream view of Wallace Weir.

- Central Valley winter-run Chinook salmon – State and Federally listed as endangered
- Central Valley spring-run Chinook salmon – State and Federally listed as threatened
- Central Valley Steelhead – State listed as threatened
- Southern Distinct Population Segment of North American Green Sturgeon – Federally listed as threatened

Other native anadromous species that are listed as species of special management concern by the state and are also targeted for rescue and salvage efforts include:

- Central Valley fall-run Chinook salmon
- Central Valley late fall-run Chinook salmon
- White sturgeon

The rescues that occurred in spring of 2013 occurred after a prolonged period of below average flows in the Sacramento River and without any over topping event at the Fremont Weir suggesting there may be strong attraction cues into the CBD occurring during periods outside of flood conditions. Possible entry points into the CBD watershed include: the Knights Landing Ridge Cut (KLRC) via the Tule Canal originating in the Cache Slough complex, and the Sacramento River through the Knights Landing Outfall Gates (KLOG). Irrigation returns and flood runoff from the west side of the Central Valley drain into the CBD which conveys water to KLOG, where a portion of these flows can be discharged into the Sacramento River under most conditions. The remainder of the water drains into the KLRC. If stage height of the Sacramento River at Knights Landing is greater than approximately 27 feet, then the outfall gates are closed and all flows in the CBD are directed into the KLRC, which ultimately discharges into the north Sacramento-San Joaquin Delta. It is believed that both flow routes have the potential to attract anadromous species into the CBD though KLOG and have been identified as far back as the 1970's as entry points into the CBD.

To address the issue of entrainment into the CBD watershed and to better understand conditions resulting in entrainment, DFW designed and has annually installed a resistance board style fish weir and an associated fish trap in the CBD approximately 14 miles upstream of the town of Knights Landing. To better document utilization of the two potential entry points for fish into the CBD and increase the overall ability to capture salmonids, other locations in Yolo bypass were evaluated for capturing entrained fish. The DFW, in coordination with the California Department of Water Resources (DWR), installed a 10' by 20' fyke trap in the KLRC, downstream from a water control structure known as Wallace Weir in the Yolo Bypass on 22 January 2014. This site was selected primarily as a location to target and rescue fish entering the CBD through the KLRC and because of good access across a range of conditions in the Yolo Bypass.

These efforts provided guidance for design and installation of a much larger and permanent collection facility at Wallace Weir. An effort put forth by multiple agencies was made to make improvements to Wallace Weir as partial implementation of the National Marine Fisheries Service (NMFS) Biological Opinion and Conference Opinion for the long term operations of the State Water Project (SWP) and Central Valley Project (CVP), and Reasonable and Prudent Action (RPA) I.7.1 (reduce or prevent migratory delays in the Yolo Bypass for anadromous species).

Improvements to Wallace Weir include an increase in the top elevation of the berm by 3' from its previous design, armoring the up and downstream sides of the berm with rip rap, an improved water control structure, and the addition of a fish collection facility operated by the California Department of Fish and Wildlife to salvage adult salmonids and sturgeon from the KLRC. These improvements allow for more control over flows going through the weir under a broader range of conditions and also allows for salvage efforts to occur under a broader range of flows. Salvage efforts will be easier to execute with the new collection facility compared to the fyke trap used downstream of Wallace Weir in previous seasons. The collection facility includes a crowding rack that concentrates fish into a holding area with a floor brail that staff can lift up from the bottom of the collection facility to the surface of the facility. Staff can then remove fish from the holding area to

a work up station where they will be processed. Improvements to the weir also include a modified concrete box culvert with automated Obermyer gates to control flows and metal pickets downstream of the gates to block upstream fish passage.

Future implementation of restoration projects throughout the Bypass, such as Wallace Weir, will help water operations in the bypass to comply with the NMFS 2009 Biological Opinion and Conference Opinion for the long term operations of the SWP and CVP and the requirements of RPA I.7.1.