
From: Miranda, Javier@DWR <Javier.Miranda@water.ca.gov>
Sent: Tuesday, May 28, 2019 10:10 AM
To: Ford, John@DWR; Stuart, Jeff@NOAA
Cc: Reeve, Matthew@DWR; Pacheco, Victor@DWR; Brumbaugh, Steven@DWR; Wilkinson, Chris@DWR
Subject: RE: Fish Facility Questions from NMFS
Attachments: SEIS_2017_FINAL 02062019.pdf

John and Jeff,
Here is the requested report. Let me know if you have any questions on it.

Javier

From: Ford, John@DWR
Sent: Tuesday, May 28, 2019 7:18:10 AM
To: Reeve, Matthew@DWR
Cc: Pacheco, Victor@DWR
Subject: FW: Fish Facility Questions from NMFS

Since Steve's on vacation, forwarding to you.

From: Ford, John@DWR
Sent: Tuesday, May 28, 2019 7:15 AM
To: Brumbaugh, Steven@DWR <Steven.Brumbaugh@water.ca.gov>
Cc: Pacheco, Victor@DWR <Victor.Pacheco@water.ca.gov>; Wilkinson, Chris@DWR <Christopher.Wilkinson@water.ca.gov>
Subject: FW: Fish Facility Questions from NMFS

Steve,

Can you please forward the information to Jeff, that he needs for the Bi Op.

THX!

From: J. Stuart - NOAA Federal <j.stuart@noaa.gov>
Sent: Monday, May 27, 2019 5:33 AM
To: Ford, John@DWR <John.Ford2@water.ca.gov>
Subject: Re: Fish Facility Questions from NMFS

Morning Mike,

Happy Memorial Day!. I have a favor to ask you. Could you (or Steve) send me a copy of Javier's report from this year cited in your descriptions of the facility efficiency. I couldn't find it on DWR's web page. Trying to make sure we have copies of everything that is cited in the BiOp.

1. J. Miranda. 2019. Skinner Evaluation and Improvement Study 2017 Annual Report. California Department of Water Resources, Bay-Delta Office. Technical Report; February 2019.

Thanks,

Jeff

On Fri, Mar 8, 2019 at 7:59 AM Ford, John@DWR <John.Ford2@water.ca.gov> wrote:

Katrina,

The information below was graciously provided by Steven Brumbaugh of DWR's Bay-Delta Office.

Please make sure the info gets into the ROC BA as it addresses the questions NMFS and USFWS has raised.

Thanks

What is the current louver efficiency?

Louver efficiency estimates for Chinook Salmon developed in the past 10 years are largely consistent with the findings of the original testing program for the Skinner Fish Facility (Skinner 1974) and used by DFW to calculate loss. A summary of the findings of several contemporary studies are outlined below:

1. K. Clark, M. Bowen, R. Mayfield, K. Zehfuss, J. Taplin, and C. Hansen. 2009. Quantification of Pre-Screen Loss of Juvenile Chinook Salmon in Clifton Court Forebay. Department of Water Resources, Bay-Delta Office. Technical Report; March 2009.
 - a. Steelhead: This study determined efficiency for steelhead trout using releases of PIT tagged steelhead released at the Skinner Fish Facility trash rack. The study reported two estimates of efficiency; 74% (17 to 100 %) and 82% (19 to 100%). The latter value incorporates an estimate of emigration from the study area (e.g. "swim out") which was documented in the study.
2. G. Castillo, J. Morinaka, J.Lindberg, R.Fujimura, B. Baskerville-Bridges, J. Hobbs, G. Tigan, and L. Ellison. 2012. Pre-screen loss and fish facility efficiency for Delta Smelt at the South Delta's State Water Project, California. San Francisco Estuary and Watershed Science, 10(4).
 - a. Delta Smelt: This study used releases of cultured, Calcein-marked juvenile and adult Delta Smelt released at the Skinner Fish Facility trash rack. Adult Delta Smelt efficiency was reported to range from 36% to 89%, while juvenile efficiency ranged from 24% to 30%.
3. V. Wunderlich. 2015. Clifton Court Forebay Predation Study: 2013 Annual Progress Report. 2015. California Department of Water Resources, Bay-Delta Office. Technical Report, September 2015.
 - a. Fall-run Chinook Salmon: This study utilized releases of PIT tagged, fall-run Chinook Salmon released at the Skinner Fish Facility in April and May of 2013. Efficiency was reported as 74% (ranging 71% to 76%).
4. J. Miranda. 2019. Skinner Evaluation and Improvement Study 2017 Annual Report. California Department of Water Resources, Bay-Delta Office. Technical Report; February 2019.
 - a. Chinook Salmon: This study utilized releases of PIT and acoustic tagged fall and late-fall run Chinook Salmon released at the Skinner Fish Facility trash rack. Efficiency was reported as 81.7% (ranging 77.9% to 86.2%) and 55.0% (54.3 and 55.7%) for "Salmon" and "Striped Bass" Operating Criteria, respectively.

What are our current estimates of prescreen loss?

Pre-screen loss estimates for Chinook Salmon developed in the past 10 years are largely consistent with the historical studies outlined in Gingras (1997) which ranged from 63-99%. A summary of the findings of several contemporary studies are outlined below:

1. K. Clark, M. Bowen, R. Mayfield, K. Zehfuss, J. Taplin, and C. Hansen. 2009. Quantification of Pre-Screen Loss of Juvenile Chinook Salmon in Clifton Court Forebay. Department of Water Resources, Bay-Delta Office. Technical Report; March 2009.
 - a. Steelhead: This study calculated pre-screen loss rates from paired releases of PIT and acoustic tagged fish released at the CCF radial gates and at the Skinner Fish Facility trash rack. Pre-screen loss was calculated as $82\pm 3\%$ and $78\pm 4\%$ (when adjusted for emigration from CCF).
2. G. Castillo, J. Morinaka, J. Lindberg, R. Fujimura, B. Baskerville-Bridges, J. Hobbs, G. Tigan, and L. Ellison. 2012. Pre-screen loss and fish facility efficiency for Delta Smelt at the South Delta's State Water Project, California. San Francisco Estuary and Watershed Science, 10(4).
 - a. Delta Smelt: This study used releases of cultured, Calcein-marked juvenile and adult Delta Smelt released at the CCF radial gates and at the entrance to the Skinner Fish Facility. Pre-screen loss of adult Delta Smelt ranged from 89.9% to 100%. Pre-screen loss of juvenile Delta Smelt was 99.9%.
3. V. Wunderlich. 2015. Clifton Court Forebay Predation Study: 2013 Annual Progress Report. 2015. California Department of Water Resources, Bay-Delta Office. Technical Report, September 2015.
 - a. Fall-run Chinook Salmon: This study utilized releases of PIT tagged, fall-run Chinook Salmon released at the radial gates and the Skinner Fish Facility in April and May of 2013. A pre-screen loss rate of 81.14% was reported, ranging from 41% to 100%.
4. J. Miranda. 2016. Preliminary SWP Chinook Salmon Survival Estimates for WY 2016. California Department of Water Resources, Bay-Delta Office. Technical Memorandum; December 2016.
 - a. Chinook Salmon: This study utilized PIT tagged late-fall and fall run Chinook Salmon released at the CCF radial gates from January through May of 2016. Monthly estimates of mean Pre-screen Loss ranged from 75% to 91%, with a season mean estimate of 91%.
5. J. Miranda. 2019. Skinner Evaluation and Improvement Study 2017 Annual Report. California Department of Water Resources, Bay-Delta Office. Technical Report; February 2019.
 - a. Chinook Salmon. This study utilized releases of PIT and acoustic tagged fall and late-fall run Chinook Salmon released at the CCF radial gates and at the head of the Skinner Fish Facility. Pre-screen loss was estimated as 77.16% for all races combined. Pre-screen loss was estimated as 56.07% (26.1% to 88.5%) for late-fall run Chinook Salmon, and 92.1% (92.1% to 98.5%) for fall run Chinook Salmon.

What are the current louver cleaning procedures and operations, including whether exports will be shut down if louvers are damaged, cleaning takes too long, or other maintenance scenarios where the facilities are not capable of salvaging fish?

The Skinner Fish Facility was built with a modular design including multiple primary louver bays that can be isolated, two secondary channels, and two holding tank buildings. Under most circumstances, this design effectively mitigates fish losses as a result of routine maintenance and cleaning, and mechanical breakdowns. Maintenance, cleaning, and breakdowns normally result in a reduction in overall available capacity rather than exports without salvage.

However, in the event of an unplanned outage (e.g. a power loss), attempts are made to immediately rectify the issue through either changes in the configuration of the facility (e.g. changing bays) or backup systems (e.g. alternate power source) and DFW is notified. In the event of an unplanned outage lasting greater than 1 hour, DFW is immediately consulted and/or Banks exports may be temporarily halted.

Planned outages are typically scheduled to avoid periods of unscreened water export. For example, major maintenance activities are scheduled in the spring during a 1 week complete shutdown of Banks Pumping Plant coinciding with NMFS 2009 BiOp RPA Action IV.2.1 (previously VAMP). During other periods, export capacity of the facility is reduced accordingly.

How often does cleaning of primary louvers and secondary bypasses occurs and timeframes?

The duration and frequency of louver cleaning operations fluctuates significantly due to a number of factors including pumping schedule, high fish counts, flow rates, debris loads, environmental factors, and staffing. In general:

1. Cleaning of individual primary louver bays is performed weekly. It takes a minimum of 2 hours to clean each bay, and bays are isolated during cleaning to prevent fish losses. Cleaning is performed by lifting individual louver panels using a gantry crane and pressure washing them from both front and back.
2. Cleaning of the secondary channels is performed twice weekly and is also used as a predator flush. It generally takes 30-60 minutes to clean each secondary bay. During cleaning, each channel is dewatered and the louver or screen panels are pressure washed from each side using a fire hose. After the panels have been washed, the primary bypass valve(s) at the head each bay are opened rapidly to flush predators and debris into a holding tank for removal.

What are the current collection handling, trucking, and release operations, and post release survival and mortality?

The effects of Collection, Handling, Trucking, and release operations have been evaluated in a number of studies at the SDFPF, as outlined below. No attempt has been made to quantify post-release survival due to logistical challenges and because it likely fluctuates wildly based on a number of factors including, but not limited to, the number of fish being released, season, and frequency of release.

1. P. Raquel. 1989. Effects on Handling and Trucking on Chinook Salmon, Striped Bass, American Shad, Steelhead Trout, Threadfin Shad, and White Catfish Salvaged at the John E. Skinner Delta Fish Protective Facility. Interagency Ecological Program. Technical Report 19; August 1989.
 - a. Chinook Salmon: This study found that survival rates for Chinook Salmon were never less than 98% and in most cases was 100%. The loss equation used by DFW to calculate SWP losses utilizes this 2% value.
 - b. Steelhead trout: Showed no detrimental effects from the handling and trucking process.
2. J. Morinaka. 2013. Acute mortality and injury of Delta Smelt Associated with Collection, Handling, Transport, and Release at the State Water Project Fish Salvage Facility. Interagency Ecological Program. Technical Report 89, November 2013.
 - a. Adult Delta Smelt: Mean survival rates at 0 and 48 hours after exposure to the CH only or full CHTR process were high, averaging above 93%. No significant differences in survival were detected at 48 hours among control, CH, and CHTR groups.
3. J. Miranda and R. Padilla. 2010. Evaluation of Injury and Mortality in a Fish Release Pipe. California Department of Water Resources, Bay-Delta Office. Technical Report; July 2010.
 - a. Chinook Salmon: This study found that survival of juvenile Chinook Salmon exposed to a mock salvage release was 99.2%, 97.4%, and 98.4% in trials with no debris, moderate debris, and heavy debris, respectively. There was no significantly detectable effect on survival from the release process.
 - b. Adult Delta Smelt: This study found that survival of Adult Delta Smelt exposed to a mock salvage release was 98.7%, 97.1%, and 95.2% in trials with no debris, moderate debris, and heavy debris, respectively. There was no significantly detectable effect on survival from the release process.

Steven Brumbaugh

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From: Harrison, Katrina <kharrison@usbr.gov>
Sent: Wednesday, March 6, 2019 12:36 PM
To: REYES, RENE <rreyes@usbr.gov>; Ford, John@DWR <John.Ford2@water.ca.gov>
Subject: Fish Facility Questions from NMFS

Hi Rene -

NMFS and USFWS have questions on the fish facility operations for the ROC on LTO. In particular, they have the following questions. Can you perhaps draft some answers? Just an email response is fine. Also, can one of you help me get these same answers for the Skinner Fish Facility?

What is the current louver efficiency?

What are our current estimates of prescreen loss?

What are the current louver cleaning procedures and operations, including whether exports will be shut down if louvers are damaged, cleaning takes too long, or other maintenance scenarios where the facilities are not capable of salvaging fish?

How often does cleaning of primary louvers and secondary bypasses occur and timeframes?

What are the current collection handling, trucking, and release operations, and post release survival and mortality?

Thank you so much!

Katrina Harrison
Bay-Delta Office
Bureau of Reclamation
Office: (916) 414-2425
Cell: (916) 606-8793

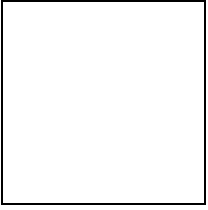
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Jeffrey S. Stuart, M.S.
Fishery Biologist

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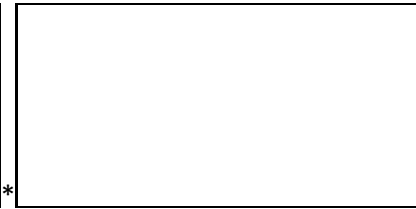
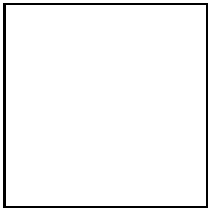
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