

GUIDANCE DOCUMENT

LTO 012

Delta Cross Channel Operations and Fall/Winter Closures

LTO Implementation

July 1, 2021

I. PURPOSE

This document provides implementation guidance on the Delta Cross Channel (DCC) Operations and Fall/Winter Closures pursuant to 4.10.5.3 of the U.S. Bureau of Reclamation's (Reclamation) Proposed Action, and the U.S. Fish and Wildlife's and NOAA's National Marine Fisheries Service's (NMFS) Biological Opinions and Incidental Take Statements (ITS). The scope of guidance includes the deliverables, schedule, and processes to develop and implement the DCC Operations and Fall/Winter Closures. The primary deliverables are notes from the Salmon Monitoring Team (SaMT), assessments of potential DCC operations, and documentation of the operations decisions.

II. DCC Operations and Fall/Winter Closures

This section provides the applicable verbatim language from the Proposed Action, USFWS ITS, and NMFS ITS.

Proposed Action:

4.10.5.3 Delta Cross Channel

The DCC is a controlled diversion channel between the Sacramento River and Snodgrass Slough. When DCC gates are open, water is diverted from the Sacramento River through a short excavated channel into Snodgrass Slough and then flows through natural channels for about 50 miles to the vicinity of Banks and Jones Pumping Plants.

Reclamation operates the DCC in the open position to (1) improve the movement of water from the Sacramento River to the export facilities at the Banks and Jones Pumping Plants; (2) improve water quality in the central and southern Delta; and (3) reduce salinity intrusion rates in the western Delta. During the late fall, winter, and spring, the gates are often periodically closed to protect out-migrating salmonids from entering the interior Delta and to facilitate meeting the D-1641 Rio Vista flow objectives for fish passage. In addition, whenever flows in the Sacramento River at Sacramento reach 20,000 to 25,000 cfs (on a sustained basis), the gates are closed to reduce potential scouring and flooding that might occur in the channels on the downstream side of the gates.

Reclamation proposes to operate the DCC gates to reduce juvenile salmonid entrainment risk beyond actions described in D-1641, consistent with Delta water quality requirements in D-1641. From October 1 to November 30 Reclamation proposes to operate the DCC gates consistent with past operations. If during this period Knights Landing Catch Index or Sacramento Catch Index are greater than three fish per day Reclamation proposes to operate in accordance with Table 4-13 and Table 4-14 to determine whether to close the DCC gates and for how long.

From December 1 to January 31, the DCC gates will be closed, except to prevent exceeding a D-1641 water quality threshold.

If drought conditions are observed (i.e. fall inflow conditions are less than 90% of historic flows) Reclamation and DWR will consider opening the DCC gates for up to 5 days for up to two events within this period to avoid D-1641 water quality exceedances. Reclamation and DWR will coordinate with USFWS, NMFS and the SWRCB on how to balance D-1641 water quality and ESA-listed fish requirements. Reclamation and DWR will conduct a risk assessment that will consider the Knights Landing RST, Delta juvenile fish monitoring program (Sacramento trawl, beach seines), Rio Vista flow standards, acoustic telemetered fish monitoring information as well as DSM2 modeling informed with recent hydrology, salinity, and tidal data. Reclamation will also consider the cumulative entrainment from prior years. Reclamation will share this information with WOMET to describe how fish responses may be altered by DCC operations. If the risk assessment determines that survival, route entrainment, or behavior change to create a new adverse effect, or a greater range of an adverse effect, not considered under this proposed action, Reclamation will not open the DCC. During a DCC gates opening between December 1 and January 31, the CVP and SWP will divert at Health and Safety pumping levels.

From February 1 to May 20, the DCC gates will be closed consistent with D-1641. From May 21 to June 15, Reclamation will close the DCC gates for a total of 14 days during this period consistent with D-1641. Reclamation and DWR's risk assessment will consider the Knights Landing RST, Delta juvenile fish monitoring program (Sacramento trawl, beach seines), Rio Vista flow standards, acoustic telemetered fish monitoring information as well as DSM2 modeling informed with recent hydrology, salinity, and tidal data. Reclamation will evaluate this information to determine timing and duration of the gate closure.

Table 4-13. Delta Cross Channel October 1–November 30 Action

Action Triggers	Action Response
Water quality criteria per D-1641 are met and either the Knights Landing Catch Index or Sacramento Catch Index is greater than 5.0 fish per day	Within 48 hours, close the DCC gates and keep closed until the catch index is less than three fish per day at both the Knights Landing and Sacramento monitoring sites
Water quality criteria per D-1641 are met, either Knights Landing Catch Index or the Sacramento Catch Index are greater than 3.0 fish per day but less than or equal to five fish per day	Within 48 hours of trigger, DCC gates are closed. Gates will remain closed for 3 days
Water quality criteria per D-1641 are met, real-time hydrodynamic and salinity modeling shows water quality concern level targets are not exceeded during	Within 48 hours of start of LMR attraction flow release, close the DCC gates for up to 5 days
28-day period following DCC closure and there is no observed deterioration of interior Delta water quality	(dependent upon continuity of favorable water quality conditions)
Water quality criteria per D-1641 are met, real time hydrodynamic and salinity modeling shows water quality concern level targets are exceeded during 14-day period following DCC closure	No closure of DCC gates

Action Triggers	Action Response
The KLCI or SCI triggers are met but water quality criteria are not met per D-1641 criteria	Monitoring groups review monitoring data and provide to Reclamation. Reclamation and DWR determine what to do with a risk assessment

Table 4-14. Water Quality Concern Level Targets

Water Quality Concern Level Targets (Water Quality Model simulated 14-day average Electrical Conductivity)	Water Quality Concern Level Targets (Water Quality Model simulated 14- day average Electrical Conductivity)
Jersey Point	1800 umhos/cm
Bethel Island	1000 umhos/cm
Holland Cut	800 umhos/cm
Bacon Island	700 umhos/cm

USFWS ITS

Delta Cross Channel

Reclamation uses the DCC to divert Sacramento River water into the south Delta via the north and south forks of the Mokelumne River. Historical operation of the DCC was shown to route juvenile Chinook salmon smolts into the interior Delta, which lowered their survival (Newman and Rice 2002; Newman and Brandes 2010). In response to this research, SWRCB D-1641 required DCC gate closures that were expanded upon by NMFS (2009).

According to the BA, under without action conditions, DCC gates are permanently closed. Under the Proposed Action, the DCC gates would usually be closed during delta smelt's reproductive season; however, Reclamation has proposed to open the DCC gates during low inflow conditions to help meet D-1641 salinity requirements. Reclamation would use modeling to predict when D-1641 salinity standards would be exceeded and open the DCC to avoid the exceedances.

Adult delta smelt and their progeny have occasionally been collected in the vicinity of the DCC (Merz et al. 2011), but the Service considers this a transiently used area. Opening or closing the DCC gates may change the dispersal path of some delta smelt, but it is not known whether there is a consequence, such as a change in predation risk or likelihood of successful spawning. Given that Reclamation does not propose to operate the DCC gates very frequently and the Service does not have information indicating DCC operation impacts delta smelt, effects to the species are not anticipated for any life stage.

NMFS ITS

13.3.5.2 Delta Cross Channel Gates

ESA-listed fish may be taken in the forms of injury, harm, or death when the Delta Cross Channel gates are open and listed fish are present. Listed fish would be exposed to altered flows and diverted into the central and south Delta and reasonably expected to result in increased routing time, exposure to predation, higher water temperatures, and lower quality habitat.

Migration of juvenile salmonids from the Sacramento River is monitored via the Knights Landing Index and the Sacramento Catch Index. Based on catch indices at these locations, Reclamation will open or close the Delta Cross Channel gates to protect migrating fish as they arrive at the Delta Cross Channel gates. These numeric triggers are applied to protect all listed species. Indices are to follow normal rounding rule to the tenth³². NMFS cannot precisely quantify and track the amount of individuals that are reasonably expected to be taken per species because there are no site-specific monitoring programs available at the Delta Cross Channel that would allow for quantification. The ecological surrogate is the frequency and duration of opening the Delta Cross Channel gates in the October through January time period. Because of the causal relationship of gate opening to exposure of increased stressors within and between life stages, frequency and duration of opening may be used as a surrogate for the amount or extent of take for listed salmonids. The anticipated level of take will be exceeded if the number or duration of openings exceed those described in the proposed action.

32 Normal Rounds digits 1,2,3, and 4 down. Rounds digits 5,6,7,8, and 9 up.

RPM 5: Reclamation and DWR shall minimize the impact of the amount or extent of incidental take of listed species during operations of the Bay-Delta Division.[...]

d. Reclamation shall incorporate the following terms and conditions related to Delta Cross Channel gate operations:

i. In order to streamline the decision process for implementing Delta Cross Channel gate closures based on the Knights Landing Catch Index and the Sacramento Catch indices, Reclamation and DWR shall follow normal rounding rule to the tenth. The catch indices shall be 3.0 fish per day and 5.0 fish per day.

III. DELIVERABLES

Deliverables resulting from this effort follow the coordination described in Appendix C of the Proposed Action, and include SaMT meeting notes and review/comments on preliminary assessments. A sample SaMT meeting agenda is included in the Final OMR Management Guidance Document which describes the expected meeting topics and contents for the meeting notes. Section IV herein describes the processes to achieve the deliverables.

IV. PROCESS

Reclamation and/or DWR will convene and ensure facilitation is provided for the SaMT meetings. This includes:

- Meeting scheduling and coordination,
- Developing agenda and distributing to SaMT,
- Coordinating preparation of presentation materials for SaMT,
- Taking notes, and
- Timely posting online of notes and reports (including a DCC gate operations section in the OMR Seasonal Report and Annual Report on the Long Term Operations of the Central Valley Project and State Water Project).

A. Salmon Monitoring Team

The SaMT will include representatives from Reclamation, DWR, USFWS, NMFS, CDFW, and the State Water Resources Control Board (SWRCB). The SaMT will have a kick-off meeting in early October and meet as necessary until regular weekly meetings begin November 1 through June 30 of the water year, typically on Tuesday. DCC Operations and Fall/Winter closures will

be discussed as part of the standard agenda during these meetings as needed. The SaMT will follow the agenda and process laid out in the Old and Middle River (OMR) Management Guidance Document. The SaMT's seasonal process related to discussions of DCC gate operations and Fall/Winter closures includes:

October 1 to November 30:

If during this period Knights Landing Catch Index or Sacramento Catch Index are greater than three fish per day, Reclamation proposes to operate in accordance with Tables 4-13 and 4-14 (*see Tables above*) to determine whether to close the DCC gates and for how long. In the event that D-1641 water quality criteria are likely to be exceeded, Reclamation and DWR will provide water quality modeling information to SaMT to help inform the discussion of risk to listed fish. As provided in Tables 4-13 and 4-14, if the KLCI or SCI triggers are met but water quality criteria are not met per D-1641 criteria, SaMT will review monitoring data and provide advice to Reclamation. Reclamation and DWR may then prepare a preliminary assessment for review/edits by the SaMT. The following provides definitions of key terms used in Table 4-13 above:

Catch Indices: Juvenile Chinook salmon at or above the minimum winter-run size based on the length-at-date model used at a particular sampling location, and below the maximum size considered by the length-at-date model, on a given sampling date, are considered "older juveniles".

- *The Knights Landing Catch Index (KLCI):* based on reported catch of older juveniles at the Knights Landing rotary screw trapping location and is calculated as the total catch of older juveniles (adjusted, as necessary, for partial cone operations) divided by the number of "trap days" (adjusted, as necessary, for downtime resulting from, for example, debris removal) since the last sampling event. This calculation for older juveniles/trap-day is implemented as $[(\text{total number of older juveniles} / \% \text{ cone sampling effort}) / \text{total hours fished}] * (24 \text{ hours fished/trap day})$.
- *The Sacramento Catch Index (SCI):* Both the Sacramento trawl (at Sherwood Harbor) and the Sacramento seine data are used to derive the SCI. The reported catch of older juvenile Chinook salmon are used to generate a SCI; a separate index for the seine data and a separate index for the trawl data.
 - The seine version of the catch index is standardized to eight hauls; therefore, the index is calculated as: $(\text{total number of older juveniles captured} / \# \text{ hauls}) * 8$. The Sacramento Seine route is based on eight sites: Verona, Elkhorn, Sand Cove, Discovery Park, American River, Miller Park, Sherwood Harbor, and Garcia Bend.
 - The trawl version of the catch index is standardized to 10 tows; therefore, the index is calculated as: $(\text{total number of older juveniles captured} / \# \text{ tows}) * 10$.
- *Lower Mokelumne River (LMR) Attraction Flow:* Reclamation will coordinate through the Mokelumne River Partnership Coordination Committee regarding the Lower Mokelumne River Attraction Flow efforts. The Mokelumne River Attraction Flow Plan will be integrated into the weekly assessment when relevant to reduce risk of straying impacts to adult fall-run Chinook salmon.

December 1 to January 31:

If drought conditions are observed, review Reclamation's and DWR's preliminary assessment that considers cumulative salvage entrainment from prior years, the Knights Landing RST, Delta juvenile fish monitoring program (Sacramento trawl, beach seines), Rio Vista flow standards, relevant acoustic telemetered fish monitoring information, recent hatchery releases of Chinook salmon or steelhead, as well as DSM 2 modeling informed with recent hydrology, salinity, and tidal data. The SaMT's review/edits shall focus on how fish responses may be altered by DCC operations, specifically any changes in survival, route entrainment into the Delta interior, or behaviors associated with opening the gates for the specified periods of time and frequency to improve Delta interior water quality.

May 21 to June 15:

Review Reclamation's and DWR's 14-day closure preliminary assessment that considers the Knights Landing RST, Delta juvenile fish monitoring program (Sacramento trawl, beach seines), Rio Vista flow standards, acoustic telemetered fish monitoring information as well as DSM2 modeling informed with recent hydrology, salinity, and tidal data.

B. Change Orders

Notifications of DCC gate operations will be made through the issuance of change orders. Reclamation operators coordinate the daily operation of the DCC, and will provide the SaMT with at least 48 hours prior notice to any opening or closing of the gates for fishery related actions pertaining to the Knights Landing and Sacramento Catch Indices. However, under conditions of urgent need with appropriate coordination with SaMT, Reclamation may make real time changes. Reclamation intends to continue to provide change order information via email to the SaMT.

C. Water Operations Management Team

After the SaMT provides input on any preliminary assessment, Reclamation and DWR will prepare the Final Assessment and provide to WOMT, including any notes available from the corresponding SaMT meetings (October to June).

D. Updates to Guidance Document

It is expected that as this Guidance Document is being implemented there will be necessary revisions to provide further clarification and refinement. Reclamation and DWR, with technical assistance from the SWRCB, USFWS, NMFS, and CDFW, commit to reviewing this Guidance Document following each DCC Gate operational season, at a minimum, to identify and incorporate any necessary revisions.