

2020 OPERATIONS AND MONITORING PLAN FOR THE SPRING AND FALL TEMPORARY BARRIERS AT THE HEAD OF OLD RIVER

The 2020 Spring Head of Old River (HOR) barrier will include eight 48 inch-diameter culverts through the barrier with slide gates which will be fully open. It will be operated from April 1 through May 31 provided that the San Joaquin River flows allow for its installation and operation. The 2020 spring barrier installation will start during the first week of March and the removal will start on June 1. All needed environmental permits to commence construction are on file. The agricultural barriers at Middle River and Old River will be fully closed and the Grant Line Canal barrier will be partially closed prior to closing the HOR barrier. The purpose of the spring HOR barrier is to keep out-migrating anadromous fish (Chinook salmon and Central Valley steelhead) in the San Joaquin River. The HOR barrier has been shown to effectively prevent anadromous fish from straying into Old River.

The 2020 Fall HOR barrier will include six 48 inch-diameter culverts through the barrier with slide gates on each culvert. The Fall HOR barrier also has a 30-foot notch that allows flow into Old River as well as allowing adult salmon passage from Old River to the San Joaquin River. The culverts in the Fall HOR barrier are assumed to be closed and would only be opened if more flow is needed down Old River to address water quality or water elevation concerns and approval is received from the California Department of Fish and Wildlife (CDFW).

The purpose of the Fall HOR barrier is to provide increased attraction flows and improved dissolved oxygen (DO) levels for returning adult anadromous fish in the mainstem of the San Joaquin River. The barrier increases the northward flow in the San Joaquin River by reducing flows into Old River toward the State Water Project (SWP) and the Central Valley Project (CVP) export facilities. Because the purposes for the Spring HOR and Fall HOR are different, and the possible responses to water elevations, or water quality conditions, or fisheries concerns are different for these two-time periods within the year, the HOR Operations and Monitoring Plan is separated into two sections corresponding to the two different installation periods.

The South Delta Water Agency (SDWA) concerns include the minimum water elevations in the south Delta channels that are required for agricultural water diversions. The protection of all diversions is the intent of establishing levels of concern for minimum water elevations. The water levels of concern (elevations) that have been established for this HOR Operations and Monitoring Plan are 0.0 feet Mean Sea Level (MSL) or 2.3 feet North American Vertical Datum (NAVD 88) at Old River near Tracy Road Bridge and at the Grant Line Canal at Doughty Cut monitoring gaging stations, and 0.3 feet MSL or 2.6 feet (NAVD 88) at the Middle River near Howard Road monitoring gaging station. The elevation criteria may only be modified by agreement of DWR and SDWA in consultation with the CDFW, USFWS, and NMFS if it proves to be more or less than needed to protect fisheries and maintain south Delta diversions. Prior experience with flow monitoring within the boundaries of SDWA indicates that the lowest levels normally occur near the Undine Road Bridge in Middle River, and the ability to divert at this location has occurred when the 0.3 MSL or 2.6 feet (NAVD 88) was met.

A sufficient water depth must exist during low tides to allow the pumps or siphons to operate. Sediment deposits near the intakes may prevent water from reaching the pumps or siphons. Channel geometry and corresponding water depths during low tides may change over time, and the high flows of 2017, 2018, and 2019 to a lesser degree may have caused additional deposition. DWR survey crews have been actively collecting and analyzing bathymetry data in the South Delta to determine the current channel geometry. With the channel geometry water depths at low tide elevations can be determined. Therefore, if agricultural diverters document when and where inadequate channel depths are preventing full diversions, the minimum water levels from the tidal elevation monitoring network will be reviewed within one full business day of the complaint. If through this review of the effected diverter(s) and actual water levels it is determined that the water level concern elevation is not protective, then the parties will perform hereunder as if the water level was below the level of concern and attempt to modify the HOR slide gates or agricultural barrier operations, as described below.

This HOR Operations and Monitoring Plan has been developed by DWR in consultation with CDFW, USFWS, the City of Stockton, Reclamation District (RD) 544, and SDWA. In addition to terms and conditions of required regulatory permits, it is expressly acknowledged by DWR that its authorization and ability to install and operate the HOR barrier are conditioned on compliance with the terms of this Plan. DWR also acknowledges that permits to install the HOR barrier given by landowners and Reclamation Districts adjacent to the HOR barrier site contain conditions requiring the compliance with a HOR barrier Operations and Monitoring Plan acceptable by SDWA. Failure to abide by the terms and conditions of this Plan shall require DWR to immediately remove the HOR barrier. SDWA, RD 544, and RD 2062, as well as landowners and diverters in the south Delta and third-party beneficiaries of this Plan, shall be able to enforce the conditions herein through all appropriate legal measures.

The status of the HOR barrier operations, SDWA complaints, and/or communications pertinent to the barrier operation, field reports, and results of Delta modeling runs will be provided on a weekly basis via e-mail by DWR to SDWA, CDFW, USACE, NMFS, and USFWS. The City of Stockton shall be notified during the fall operations only.

As far as is practical, DWR shall consult and discuss with the agencies described in this Plan on all aspects of this Plan and actions hereunder, and shall use the data and experiences developed in establishing more effective HOR barrier operations in future years. This Plan shall be effective for one (1) year only.

Spring HOR barrier Operations and Monitoring Plan

The current spring barrier design includes eight 48-inch diameter culverts through the barrier with operable slide gates on each culvert. In order to protect downstream agricultural water users, the culvert slide gates are assumed to remain open. Keeping the culverts open helps ensure adequate water levels and flows are maintained in the channels within the SDWA downstream of the HOR barrier to protect agricultural diversions. Another reason for keeping the culvert slide gates open is to assist in meeting the current Water Quality Control Plan Salinity (EC) Objectives for Agricultural Beneficial

Uses at the compliance locations that are downstream of the HOR barrier on Old River (CDEC Stations UNI and OLD). During the installation and operation of the Spring HOR barrier, the culverts shall be operated in the following manner:

1. The Spring HOR barrier slide gates will not be closed unless prior approval from the SDWA is obtained. If any unforeseeable situations, except brief closures needed for maintenance, require closing of the culvert slide gates, DWR will consult with the SDWA before any slide gates operational changes are made.
2. If at any time during the Spring HOR barrier operations low water levels occur in the SDWA's service area upstream of the agricultural barrier sites, which impede the capability of diverters in the SDWA to irrigate their farmlands according to their needs, the SDWA shall be responsible for notifying DWR's Operation and Maintenance, South Delta Branch staff of the situation by providing the name and contact information of the landowner, the location where insufficient water levels are occurring, and the nature and timing/duration of the problem. DWR will attempt to identify the diversion site number using the CDFW's Delta Diversion database and/or other sources of information including aerial photos. Email notifications of complaints and or problems should be sent with the above required information to SDWAComplaint@water.ca.gov. Upon notification, DWR shall contact the CDFW, NMFS and USFWS to relay the above information provided by SDWA and provide a narrative as to why the landowner is experiencing problems.
3. DWR shall make forecasts of tide elevations at Old River near Tracy Road Bridge, Middle River near Howard Road, and Grant Line Canal at Doughty Cut. The forecasts shall incorporate the latest measured and forecasted river flows, tides at Benicia and Antioch, and SWP and CVP Delta export rates. When forecasted water elevations at these locations approach the established water level criteria, DWR will notify SDWA as well as CDFW, USFWS, and NMFS. If there are TBP actions like releasing culvert flap gates to tidal operations or closing the center section of the Grant Line Canal barrier that may improve conditions for SDWA and documented water level issues have been received, DWR will seek approval from CDFW, USFWS, and NMFS to undertake those actions.
4. DWR shall concurrently install the Grant Line Canal (GLC) barrier while the Spring HOR barrier is closed. However, USACE and CDFW permit conditions for the GLC barrier specify the closure of the center section, which may not begin until on or after April 1 (the expected date the HOR barrier will be fully installed and operated) and permission from NMFS, USFWS, and CDFW is received. Those permit conditions may also restrict closure of the GLC barrier until the need to fully install the barrier is demonstrated through forecasted water levels and water diverter complaints. This Plan recognizes that such need is demonstrated when modeling shows levels at or below 0.0 feet MSL or 2.3 feet (NAVD 88) in Old River and in Grant Line Canal or 0.3 feet MSL or 2.6 feet (NAVD 88) in Middle River at Howard Road the three measuring points referenced above, or the existence of actual diversion problems resulting from low water levels.

5. HOR barrier operations and water level requirements herein are assumed to include installation and operation of the Old River near Tracy and Middle River tidal barriers. If these two tidal barriers cannot be installed and operated, then the HOR barrier shall not be installed and operated unless approved by SDWA.
6. If any of the culverts in the Spring HOR barrier were closed, for anything other than a very brief closure for maintenance, and the EC objective at Old River Union Island (CDEC Station UNI) or Old River at Tracy Boulevard (CDEC Station OLD) is above the 0.7 EC objective, DWR will open (if for any reason they were closed) all the Spring HOR barrier culverts.

Fall HOR barrier Operations and Monitoring Plan

The current fall barrier design includes six 48-inch diameter culverts through the barrier with operable slide gates on each culvert. In order to increase attraction flows and DO concentrations in the Stockton Deep Water Ship Channel (DWSC), the culvert slide gates are assumed to remain closed. During the installation and operation of the Fall HOR barrier, the culvert slide gates shall be operated in the following manner:

1. If at any time during the Fall HOR barrier operations low water levels occur in the SDWA's service area upstream of the agricultural barrier sites, which impede the capability of diverters in the SDWA to irrigate their farmlands according to their needs, the SDWA shall be responsible for notifying DWR's Operation and Maintenance, South Delta Branch staff of the situation by providing the name and contact information of the landowner, the location where insufficient water levels are occurring, and the nature and timing/duration of the problem. DWR will attempt to identify the diversion site number using the CDFW's Delta Diversion database and/or other information including aerial photos. Email notifications of complaints and or problems should be sent with the above required information to SDWAComplaint@water.ca.gov. Upon notification, DWR shall contact the CDFW, NMFS and USFWS to relay the above information provided by SDWA and provide a narrative as to why the landowner is experiencing problems.
2. DWR, upon notification of insufficient water levels from SDWA, shall open two culverts (measured relative to the number of culverts which are opened at the time of the incident) to relieve the problem. After the culverts are opened, DWR shall evaluate the effects on water elevations and on the diversions at the identified site(s). If the evaluation indicates that the opening of two culverts does not remedy the problem, DWR shall open at least one additional culvert. After the culvert is opened, DWR shall evaluate the site(s) by conducting a similar evaluation and also evaluate DO concentrations in the San Joaquin River and the Stockton DWSC. Based on this investigation, if DWR determines the reduced capability to divert is not solved, one additional culvert may be opened. This culvert opening procedure will occur once every 24 hours until the problem is remedied or until all the culverts at the barrier are fully opened. DWR shall notify CDFW, USFWS, NMFS and the City of Stockton in advance of culvert operations under this condition and report the results of each site visit and DO recordings.

3. During the time period when any of the culverts are opened to meet SDWA water supply needs, DWR shall obtain actual stage level measurements at the tidal gages at: (1) Old River near Tracy Road Bridge, (2) Middle River near Howard Road, and (3) Grant Line Canal at Doughty Cut in conjunction with DO measurements in the San Joaquin River and the Stockton DWSC. If, through the information reported in DWR's site evaluation, culvert closing is possible while still maintaining the above minimum levels (see paragraph 4 above in the spring portion of this plan) necessary to protect diversions, DWR may close such culverts, provided that SDWA water levels are not lowered beyond those necessary to meet irrigation needs. DWR shall notify SDWA and the City of Stockton in advance of the culverts closing.

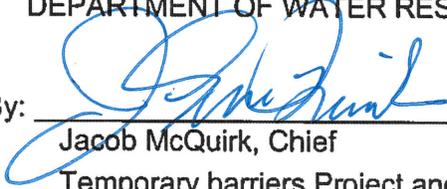
4. DWR shall similarly monitor and report the water quality at the two-interior south Delta compliance locations specified in the 2006 Water Quality Control Plan that are downstream of the HOR barrier on Old River (CDEC Stations UNI and OLD). If at any time the electrical conductivity (EC) at any of these locations exceeds the 1.0 EC objectives, the HOR barrier and the culverts, if they were closed, therein shall be operated to improve water quality to meet or attempt to meet the objective.

5. If water quality in the SDWA service area is degraded as a result of harmful algae blooms, dissolve oxygen, or other factors, culverts within the Fall HOR barrier remain closed, and the opening of culverts may improve water quality or the Central Valley Regional Water Quality Control Board requests culverts be opened to improve water quality, DWR will request permission from CDFW to open culverts and open culverts as specified in section 2 of this agreement.

6. If culverts have been opened and through the information reported in DWR's site evaluation DO levels are below 6 mg/L in the San Joaquin River Stockton Deep Water Ship Channel, additional flows on the San Joaquin River may be recommended. If SDWA, DWR, CDFW and the City of Stockton agree, some culverts may be closed as long as diversions by SDWA farmers are not adversely affected.

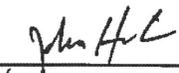
Dated: 2/27/20

DEPARTMENT OF WATER RESOURCES

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SOUTH DELTA WATER AGENCY

Dated: 27 Feb 2020

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