

November 22, 2019 Release of Provisional Modeling and Analyses of the Voluntary Agreement

Overview of Provisional Modeling and Analyses

This document provides a brief overview of hydrologic modeling and quantitative habitat analyses related to assessing the potential for submitting the Voluntary Agreement (VA) to the State Water Resources Control Board (State Water Board) as a recommended alternative in the Bay-Delta Water Quality Control Plan (Bay-Delta Plan) update/implementation process.

It is important to emphasize that this package of results is not intended to serve as an assessment of whether or not the VA is adequate to restore the viability of native fishes. The evaluation of adequacy will rely on multiple sources of scientific information, including model outputs from the multiple hydrologic and habitat models. These provisional results, which are sure to evolve as we continue our work and receive input and feedback from stakeholders, along with other information, will help inform a recommendation to the State Water Board.

The hydrologic modeling and habitat quantification analyses include existing conditions/baseline and the VA. The assumptions for the hydrologic and habitat analyses of the VA assets were provided by the VA proponents. Hydrologic modeling results for scenarios identified by the State Water Board for updates and potential updates to the Bay-Delta are also included.

Hydrologic Modeling

The hydrologic modeling includes: the Sacramento Water Allocations Model (SacWAM) for the Sacramento River and Delta and tributaries; the Water Supply Effects (WSE) model for the Lower San Joaquin River and tributaries (LSJR); and the CalSim II model, which addresses State Water Project (SWP) and Central Valley Project (CVP) operations with inputs from tributary models. The above models are provided in this release, as is documentation describing updates and major assumptions for each of the models. This release also includes summary results for tributary flows and Delta outflows during the winter and spring periods for each scenario that was modeled. SacWAM and CalSim II include different hydrologic inputs (SacWAM relies on unimpaired hydrology developed for CalSim III) and have other model differences.¹ As such, it is appropriate to compare the relative differences between existing conditions

¹ Major differences are that American River and North Bay Aqueduct demands are based on historical demand levels in SacWAM and full contract amounts in CalSim II and demands for crops are calculated dynamically in SacWAM and are based on fixed demands in CalSim II.

and the VA from each model rather than directly comparing the SacWAM and CalSim II model results to one another.

SacWAM

SacWAM is the model that the State Water Board is using to evaluate potential Sacramento River and Delta and tributary flow and operational changes to the Bay-Delta Plan (flows for the LSJR to the Delta are generated from WSE). The SacWAM modeling includes modeling for existing conditions, the VA, and scenarios identified in the State Water Board's July 2018 framework for potential updates to Sacramento River and Delta inflows and outflows (45 and 55% of unimpaired flow), cold water habitat measures, and interior Delta flows in the Bay-Delta Plan (Framework scenarios).

WSE

WSE is the model that the State Water Board relied upon for the 2018 LSJR flow update to the Bay-Delta Plan. For the purposes of evaluating the VA, WSE was modified from the version used for the 2018 update to the Bay-Delta Plan as described further in the hydrologic modeling summary document. The WSE modeling includes existing conditions, the VA, and LSJR flows identified in the 2018 Bay-Delta Plan (30 and 40% of unimpaired flow).

CalSim II

CalSim II is the primary model that the Department of Water Resources and U.S. Bureau of Reclamation rely upon to evaluate potential changes to SWP and CVP operations. For the CalSim II VA modeling, flows for the Tuolumne River were generated from WSE and flows for the Mokelumne and Yuba rivers were generated from local watershed models. The CalSim II results include existing conditions and the VA. In addition to the hydrologic modeling summary document described above, a more detailed description of the CalSim II VA modeling is also provided.

Post Processing Spreadsheet

A spreadsheet that can be used to view the results from SacWAM and CalSim II has been made available.

Habitat Analyses

The habitat analyses include quantification of habitat generated in VA tributaries and the Delta, under different scenarios. An overview of the approaches used for the analyses and the results are provided.

Tributary Habitat

Hydrologic modeling from SacWAM, WSE, and CalSim II and flow to suitable (Fall-Run Chinook salmon) habitat area relationships, were used to generate the amount of spawning and rearing habitat under existing conditions, the VA, and State Water Board unimpaired flow scenarios. For the VA scenarios, these flow to suitable habitat area relationships were also used to represent the quantity of constructed floodplain habitat

that was included in the VA. A document describing the approach used for this analysis is provided along with the results.

Delta Habitat

Hydrologic modeling from CalSim II was used as input to the RMA Bay-Delta model to quantify the amount of habitat generated under baseline and the VA (for salmonids, Delta smelt, and longfin smelt). Existing habitat, as well as expected EcoRestore projects, were modeled under baseline flows. The additional Delta habitat proposed as part of the VA was added to the existing and EcoRestore habitat and modeled with VA flows. Results for the SacWAM existing conditions, VA, and Framework scenarios are currently being developed and will be forthcoming. A document describing the approach used for the Delta habitat assessment is provided along with the results.

Accessing the Analyses

The above information can be accessed on the State Water Board's FTP site at <https://ftp.waterboards.ca.gov/WebInterface/login.html>, and entering username "baydelta-public" and password "4WE3IG".

Additional Information

If you have questions about the hydrologic or habitat analyses, please contact the following staff:

- SacWAM - Matthew Holland at matthew.holland@waterboards.ca.gov or Scott Ligare at scott.ligare@waterboards.ca.gov.
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- Tributary habitat modeling - Elise Holland at elise.holland@resources.gov
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