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# Proposed Alternative to Modular Alternative 6a For New or Expanded Diversion Projects

## Background

In 2023, the State Water Resources Control Board (State Water Board) released the Draft Staff Report/Substitute Environmental Document in Support of Potential Updates to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary for the Sacramento River and its Tributaries, Delta Eastside Tributaries, and Delta (Draft Staff Report). The Draft Staff Report assessed potential updates to the Water Quality Control Plan which included the potential implementation of Voluntary Agreements (now known as "Agreements to Support Healthy Rivers and Landscapes" [HRL]). The Draft Staff Report included "Modular Alternative 6a" as a potential add-on measure to the HRL to protect the HRL flows during consideration of new or expanded water diversions.

DWR and CDFW understand that the State Water Board should protect the flows that are part of the HRL, and that the Water Quality Control Plan update is where such measures should be identified and applied to new or expanded water rights. Modular Alternative 6a from the Draft Staff Report is a preliminary concept and not the subject of extensive analysis. DWR and CDFW are proposing that this alternative be further developed through the adaptive management function contained in the HRL Science Program which is designed to account for new scientific developments. Many of the new proposed water infrastructure projects included in Table 7.24-1 of the Draft Staff Report, such as Delta Conveyance and Sites Reservoir, that have the potential to change Delta outflow, will not be constructed and operational during the proposed 8-year term of the HRL program. There is time for the HRL Science Program to explore alternative, science-based options for protecting the HRL flow base. Rather than establish flow-specific thresholds for protection of HRL flows now for projects that involve new or expanded water diversions in the future, DWR and CDFW propose that the Bay-Delta Plan incorporate new information and analysis that will be carried out during the 8-year term of the HRL program to develop and establish flow-threshold protection criteria by the conclusion of the 8-year term period. The new flow-threshold criteria would apply to new water supply projects that will become operational after the proposed 8-year term of the HRL, to protect Delta outflow for native species in light of new or expanded diversions.

The purpose of HRL is to improve conditions for native fish in the Sacramento and San Joaquin rivers while also balancing other beneficial uses of water, and it is hypothesized that increased spring Delta outflow will provide benefits to native fishes and ecosystem functions. The draft HRL Science Plan articulates these hypotheses through nine distinct hypotheses and proposes specific metrics and baselines for their evaluation. The State Water Board's Draft Staff Report analyzed the effects of increased spring Delta outflow on numerous native fish species including California bay shrimp, Sacramento splittail, starry flounder, and white sturgeon. DWR and CDFW are focusing on longfin smelt because compared to these other native fish species, the scientific community has the most data and science to date on longfin smelt, however a lot of uncertainty remains. Given the uncertainty in existing longfin smelt conceptual models and the flow/abundance relationship, including biological mechanisms driving population responses, limitations in historical longfin smelt data sets, and changes in statistical relationships over time, knowledge on native fish species and their environment gathered through the HRL Science Program should be used to identify appropriate outflow targets protective of longfin smelt and other native fish species. Additionally, adaptive management will help reduce uncertainties of the value of habitat restoration and other actions that are hypothesized to benefit longfin smelt and other native species. The HRL Science Program will incorporate any new relevant information (e.g. flow/abundance relationship, biological mechanisms driving population responses, etc.) for other native fish species, where applicable.

For example, a science plan is currently being developed for white sturgeon as part of the long-term operations of the Central Valley Project and State Water Project and can inform this effort.

**Proposed Module 6A Adaptive Management**

The period of March through May has been identified by the State Water Board as a key period when HRL-related flows would yield significant environmental benefits. For this period, DWR and CDFW propose as an initial concept that new flow criteria establish diversion thresholds that do not impact HRL flow benefits. However, it should be recognized that HRL flow benefits will continue to be informed and assessed through the duration of the HRL Program. Additional information is expected through studies supported by DWR's longfin smelt Science Program required per its 2024 State Water Project Incidental Take Permit (ITP) and the HRL Science Program. The goal of both HRL and ITP study plans is to better understand mechanisms that underlie the longfin smelt flow abundance relationship. Ultimately, new project flow thresholds should be established in consideration of life-stage specific processes, and other ecosystem improvements (e.g., habitat restoration), that are predicted to contribute to the recovery of the populations of longfin smelt and other native species.

*HRL Science Program of the Water Quality Control Plan*

The HRL parties have proposed a Science Program, which includes participation by State Water Board staff, that will develop and oversee studies that evaluate performance of flow and non-flow measures. We encourage the Board to adopt the HRL and its Science Program for the Water Quality Control Plan (WQCP). The Science Program will be coordinated through a collective of tributary-and Delta-focused monitoring and research programs relevant to understanding the outcomes of Program implementation that have several high-level functions:

- To inform decision-making by the Systemwide Governance Committee, Tributary and Delta Governance Entities, and HRL Parties;
- To track and report progress relative to the metrics described in Section 2 of the WQCP Science Plan;
- To reduce management-relevant uncertainty; and
- To provide recommendations on adjusting management actions to the Systemwide Governance Committee, Tributary/Delta Governance Entities, and HRL Parties.

For longfin smelt, the HRL Science Program includes key hypotheses on the mechanisms underlying spring outflow-fall abundance relationships. Specifically, HRL Science Program proposes to better understand how increased outflow affects spawning and rearing habitat availability and transport mechanisms. In addition, the HRL Science Program aims to leverage DWR's new ITP life cycle model results with HRL studies to better understand mechanisms underlying the longfin smelt flow-abundance relationship.

*Longfin Smelt Life Cycle Model*

DWR's ITP requires the development of a longfin smelt mathematical life cycle model (LCM) that could inform how a variety of environmental conditions and management actions may impact longfin smelt across different life-stages. The longfin smelt LCM is expected to be complete by before WQCP Year 6 and is intended to be a decision support tool for agency management to predict the effect of proposed management actions on the population dynamics of longfin smelt and to assess, after the fact, the effects of actions that were implemented as well as the effects of historical environmental conditions. Specifically, the model will address questions relating to spatial and temporal differences in vital rates. Further discussions will be necessary to determine how the LCM can address these needs and whether the

expected spatial and temporal scales of the expected responses are supported by existing data. There is a need for scientists to be able to apply the LCM to novel scenarios in support of management decisions. Two overarching modeling goals emerged from discussions and the modeling goals exercise: managers want a tool to address both retrospective analyses of previous actions and predict the effects of future management on abundance of longfin smelt. In the context of changing environmental conditions (e.g., from climate change or upstream management actions), care must be taken for predicting future conditions from a model that was developed on past data. If future conditions are outside the combinations of conditions that existed in the past, extrapolations may not be trustworthy.

Another goal of this model is to describe relationships between variables in such a way that management actions can be translated into changes in environmental variables and their effects can be estimated. Turning the hypotheses into a set of conceptual models will not only help organize the topics, but also provide a means of turning them into relationships for modeling, and ultimately, management actions. This model is intended to connect with other models that are being developed for the purpose of understanding changes in the Sacramento-San Joaquin estuary. The model will be a state space regression model, but we anticipate that a next step would be to formulate an individual-based model for estimating movement of longfin smelt in relation to flow, food supply, and water temperature. Estimates of vital rates from this model can be formulated in a way to inform future efforts. This LCM will be designed to take output from other models as inputs. For example, a model of ocean conditions and habitat that is currently being developed by USGS may provide useful data to inform survival and/or growth of longfin smelt during their ocean residency, a stage where little data exist.

**Proposed Modular Alternative 6A Adaptive Management Timeline**

DWR and CDFW propose the following timeline for the Modular Alternative 6A adaptive management. The timeline would support the development of a longfin smelt LCM and additional complementary science to address the key management questions identified by Modular Alternative 6A. Progress on the process will be tracked through the HRL science program adopted into the WQCP. The State Water Board will receive the following updates and reports:

**WQCP Year 3:** Updates regarding the development of the longfin smelt LCM in the triennial synthesis report, to the extent the model has been evaluated and tested. Identify additional information from the HRL science program necessary to support the LCM. The LCM is projected to be completed in HRL Year 4. Report findings on available science regarding the relationship between Delta outflow and abundance of other native species.

**WQCP Year 6:** Report findings of the: 1) longfin smelt LCM that address key management questions regarding the relationship between longfin smelt abundance and Delta outflow in the second triennial synthesis report; and 2) available science regarding the relationship between Delta outflow and abundance of other native species.

**WQCP Prior to Year 7:** The HRL Ecological Outcomes Analysis report, will include but not be limited to the following: 1) longfin smelt LCM results, along with additional longfin smelt science developed as a part of the HRL Science Program; 2) available science regarding the relationship between Delta outflow and abundance of other native species. The report will also include proposed flow threshold criteria that are beneficial for native fisheries and protect WQCP flow assets. As part of the HRL Ecological Outcomes Analysis report, the flow criteria proposal will undergo peer review prior to presentation to the State Water Board.