Delta Smelt Summer-Fall Habitat Action

Addendum to the 2023 Action Plan

May 2023

Photo: Sunrise over the Suisun Marsh Salinity Control gates. From California Department of Water Resources

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Contents

Figures

Summary

The 2023 Summer-Fall Habitat Action (SFHA) Plan was completed in late April prior to the final Sacramento Valley Water Year (WY) designation (40-30-30 Index based on 50% exceedance forecast). The Action Plan included potential scenarios for implementation of the 'Additional 100 TAF Outflow' action in an Above Normal (AN) and Wet WY. Modeling scenarios of the Additional 100 TAF as outflow or operations of the Suisun Marsh Salinity Control Gate (SMSCG) were completed using adjustments to a Wet WY hydrology (2017); in addition, new model runs have been completed for AN WY scenarios using 2010 hydrology as a proxy for 'above normal' conditions.

DWR has prepared this addendum to the 2023 SFHA Plan to include additional modeling analysis of the 100 TAF block of water deployed in different ways in an AN and Wet WY, effects to Delta Smelt habitat suitability, and to detail CDFW's decision on the 2023 implementation strategy for the 100 TAF action.

Decision: The final 2023 Sacramento Valley WY designation is Wet; CDFW has decided, in collaboration with DWR, to implement the 100 TAF action through daily operations of the Suisun Marsh Salinity Control Gates starting August 15th or when the 3-day average salinity at Belden's Landing hits 4 psu (whichever is first). Such implementation will end when the 100 TAF is used or October 22nd when gate refurbishment is planned (whichever is first).

100 TAF Action

The ITP requires DWR to operate the State Water Project to provide a flexible 100 TAF block of water to enhance Delta outflow, as approved by CDFW, from June through September of Wet and AN WYs and the following October (ITP COA 8.19), either released from Lake Oroville or potentially through export reductions, per the Delta Outflow Plan (ITP COA 8.20), in addition to a maintaining a 30-day average X2 $\leq$ 80 km in September and October (ITP COA 8.19, 9.1.3). CDFW discussed, for an AN WY an extension of daily SMSCG operations through October and/or the use of 100 TAF to push out X2 in September and potentially October with the goal to expand suitable habitat during summer-fall to Grizzly Bay. For a Wet WY CDFW discussed the potential to operate the SMSCG daily starting when Belden's Landing hits 4 psu or 2 psu with the goal to expand freshwater habitat

spatially and temporally for as long as possible during summer-fall months using the 100 TAF outflow block. Utilizing the 100 TAF to expand freshwater habitat during summer-fall months may provide some refuge from warm water temperatures in inland areas by increasing access to suitable habitat conditions in the marsh and Grizzly Bay (e.g., cooler water, higher turbidity and possibly, elevated prey density).

100 TAF Modeling Scenarios

DWR used SCHISM to model operational scenarios for an AN and Wet year to analyze any potential benefit of the 100 TAF block of water deployed in different ways. For both the AN and Wet year models, hydrology from 2017 was used, which was Wet in the 2023 SFHA Action Plan. This addendum provides additional modeling scenarios using 2010 hydrology as a proxy for an AN WY. While the 2010 WY was officially Below Normal, if it had not been preceded by a Dry WY it might have been AN given wetter conditions. Scenarios for both 2017 and 2010 were requested by CDFW. In all scenarios, the block of water would be provided from Oroville releases, export reductions, or a combination of the two. The operational scenarios were as follows:

1. No SMSCG action – Fall X2 at 80 km for September and October (note this scenario is for a base-case such that in an AN year SMSCG would operate Jul-Aug).
2. 60 days of SMSCG operation from July 1 through Aug 31 and fall X2 at 80 km for September and October (with 650 cfs compensating flow to offset SMSCG effects).
3. 60 days of SMSCG operation from July 1 through Aug 31 and the 100 TAF used September and October as flow (no gates) and Fall X2 at 80 km for September and October (This scenario was removed in subsequent 2010 models given initial models results (i.e., 2017) demonstrated 100 TAF as gate operations provided more smelt habitat).
4. 60 days of SMSCG operation from July 1 through Aug 31 and the 100 TAF used for a September and October gates action and Fall X2 at 80 km for September and October (with 850 cfs compensating flow to offset X2 effects).

For the Wet year, the operational scenarios were as follows:

1. No SMSCG action – Fall X2 at 80 km for September and October.
2. 100 TAF used to operate the SMSCG from July 20th through September 17th, and Fall X2 at 80 km for September and October.
3. 100 TAF used to operate the SMSCGs from August 15th to October 22nd.

Results:

During an AN year (2010 hydrology), operating the SMSCG during September and October extended the period of high Delta Smelt habitat suitability index (HSI) area versus operating the gates in July and August only (Figure 5, Figure 6). This operation resulted in use of approximately 88 TAF out of the 100 TAF available. HSI and LSZ acreage both increased with extension of gate operations through October and provided additional low salinity habitat in Grizzly Bay. Adding the 100 TAF as outflow (as modeled with the initial 2017 wet hydrograph) did not provide as beneficial results to habitat compared to using the 100 TAF to offset gate operations, and therefore, that alternative was not analyzed further.

During a Wet WY, operating the SMSCG earlier for 60 days (from July 20 through September 17) did not have a large impact on high HSI area (Figure 3, Figure 4). This operational scenario resulted in use of approximately 83 TAF. Operating the gates later in the year, from August 15 through October 22 had a slightly greater impact on high HSI area that lasted longer into the year (Figure 3, Figure 4) and used 93.3 TAF.

Figure 1 Salinity at Belden's Landing (BDL) with various SMSCG operational scenarios assuming Wet (2017) hydrologic conditions. Above Normal year scenarios are Jul-Aug SMSCGs (blue), 100 TAF Sept-Oct as outflow (green), 100 TAF Sept-Oct as SMSCG operations (red), and Wet year scenarios for 100 TAF using SMSCGs for 60 days starting July (purple) or Aug (yellow). All scenarios are adjusted for the Fall X2 action.

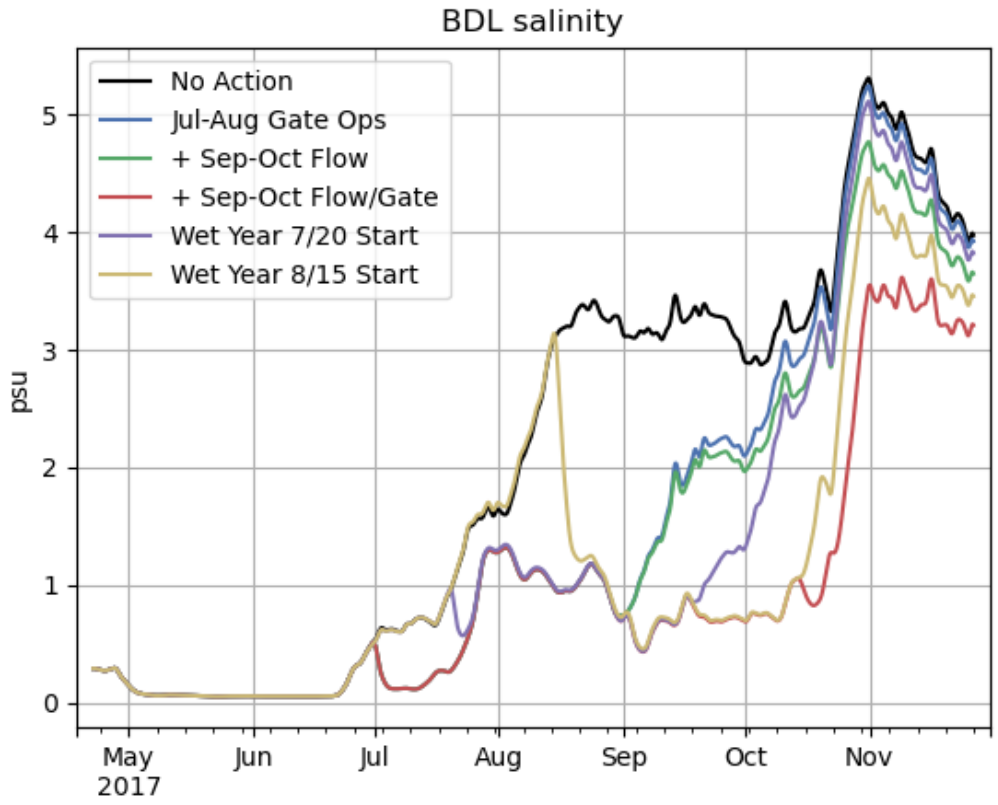


Figure 2 Salinity at Belden's Landing (BDL) with various SMSCG operational scenarios assuming Above Normal (2010) hydrologic conditions. Above Normal year scenarios are Jul-Aug SMSCGs (blue), 100 TAF Sept-Oct as SMSCG operations (red). All scenarios are adjusted for the Fall X2 action.

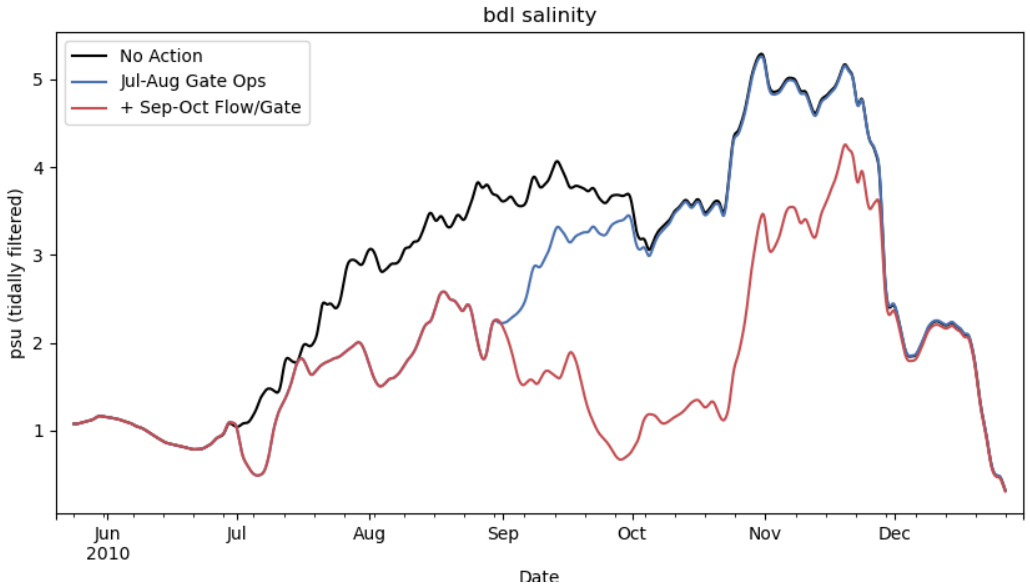


Figure 3 Area of appropriate Delta Smelt Habitat Suitability Index (HSI) in Suisun Marsh with various operational scenarios assuming wet (2017) hydrologic conditions. Scenarios are described as in Figure 1.

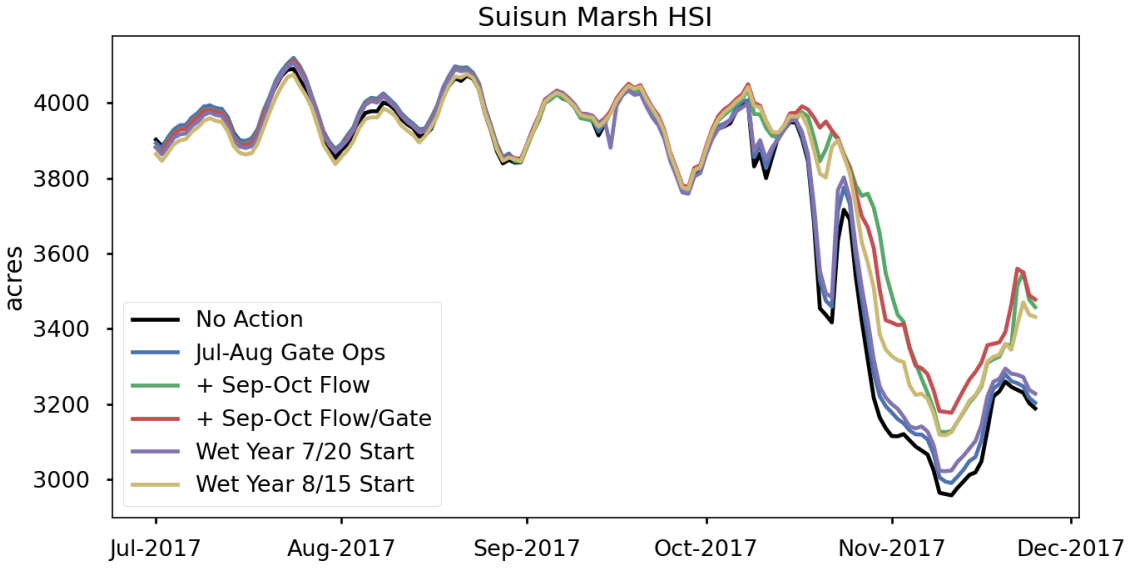


Figure 4 Area of high Delta Smelt HSI in Suisun Marsh with various operational scenarios assuming wet (2017) hydrologic conditions. Scenarios are described as in Figure 1.

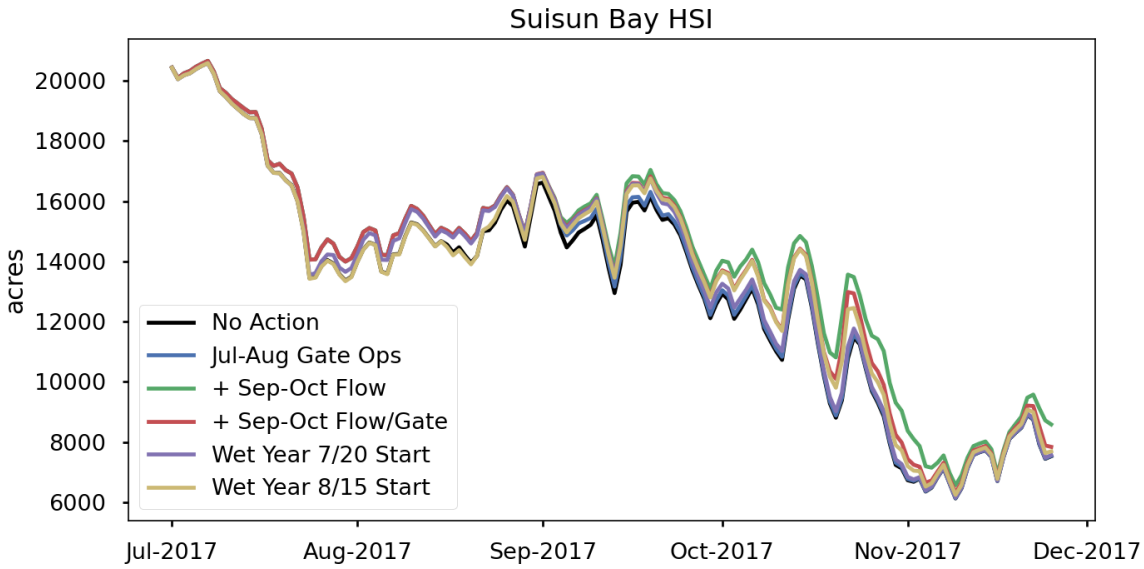


Figure 5 Area of high Delta Smelt Suisun Marsh Habitat Suitability Index (HSI) with various operational scenarios assuming an Above Normal Year (2010 Hydrology). Scenarios are described as in Figure 1.

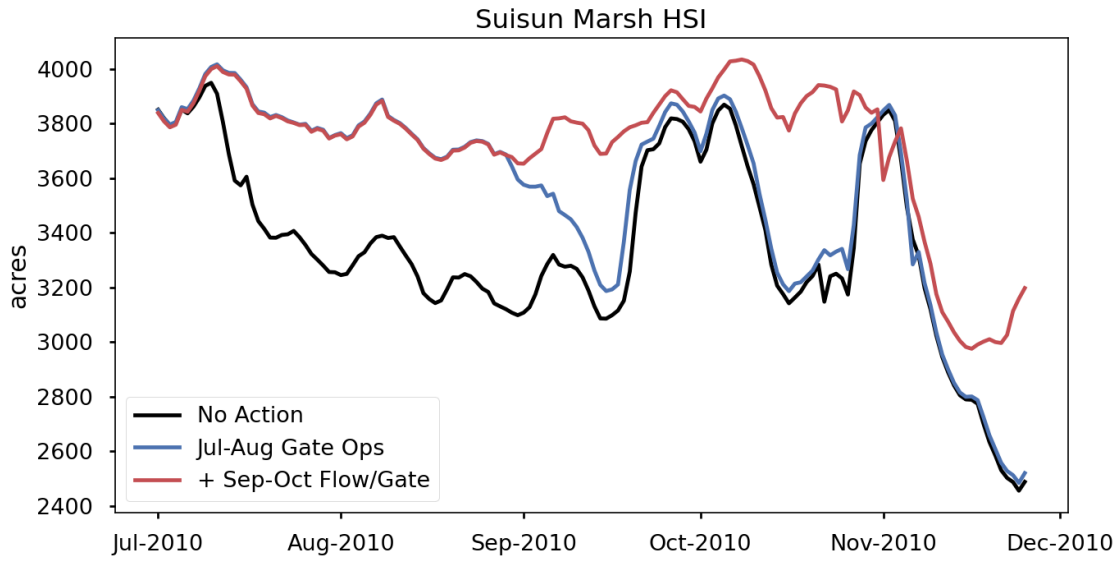
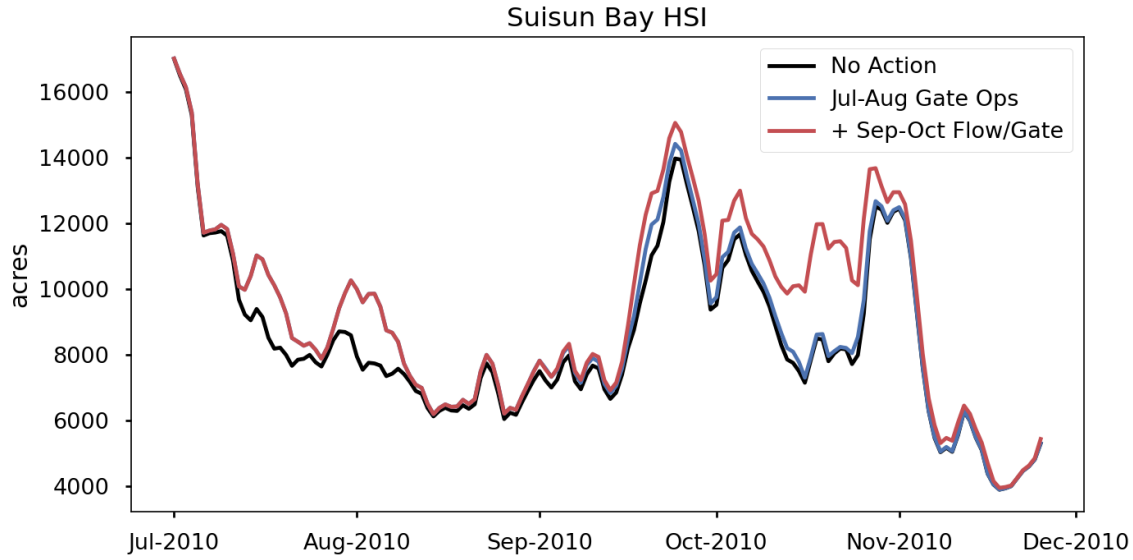


Figure 6 Area of high Delta Smelt Suisun Bay Habitat Suitability Index (HSI) with various operational scenarios assuming an Above Normal Year (2010 Hydrology). Scenarios are described as in Figure 1.



100 TAF Decision

Following the final May WY designation as Wet, CDFW decided to use the Additional 100 TAF block of water (COA 8.19) as part of the 2023 Summer-Fall Habitat Action to enhance habitat conditions for Delta Smelt. However, some portion of the 100 TAF may remain following the 2023 100 TAF action that would carry over to 2024 dependent on summer-fall conditions and water accounting.

CDFW plans to implement the 100 TAF action in 2023 through daily operations of the Suisun Marsh Salinity Control Gates starting August 15th or when the 3-day average salinity at Belden's Landing hits 4 psu (whichever is first). Such implementation will end when the 100 TAF is used or October 22nd when gate refurbishment is planned (whichever is first).

CDFW's decision to use the 100 TAF was based on urgency to improve imperiled and endangered Delta Smelt habitat conditions given the preceding drought with poor habitat. CDFW also discussed the risk of losing the 100 TAF if deferred for use in spring or summer of 2024 such that the water would be subject to spill and would not be available if spilled. CDFW

discussed the two modeled scenarios of using the 100 TAF for operations of the SMSCG demonstrated starting gate operations later (August 15) compared to earlier (July 20) provided greater habitat benefits for Delta Smelt spatially and temporally. Benefits included lower salinity at Belden's Landing in Montezuma Slough for a longer period and small increases in the acreage of suitable habitat in Suisun Marsh and Bay.