

DRAFT: South Delta Hydrodynamic Assumptions

Manage South Delta exports/hydrodynamics to reduce entrainment of fish and food Resources. There are at least four ways to manage South Delta hydrodynamics to reduce entrainment:

1. Decrease south Delta exports
2. Increase San Joaquin flows
3. Isolate middle and old river corridors to remove, at least seasonally, one of these corridors from the zone of entrainment
4. Gates to limit entrainment or control Q-west

The core plan will focus on decreasing south Delta exports, but will describe the other options and identify a process for evaluating them in the future.

Option #1: Reduce S. Delta exports

Hydrodynamic Outcome #1: Reduces reverse flows in middle and old river, all other things being equal. This is different than hydrodynamic outcome #2, maintain positive Q-west, described below, but the level of reverse flows is a major factor influencing Q-west. Q-west is treated separately, below.

- Preliminary range: negative 2,000 to 5,000 Dec.- June

Biological Response Hypotheses

- Reduces entrainment of adult Delta Smelt who move east of Jersey Island (Dec.-Jan). These eastward movements may be triggered by early run-off/turbidity events that encourage smelt to expand range in plume of turbidity. Big Mama hypothesis suggests that these entrainment events could have a population level affect by depleting the most fecund fraction of the population.
- Reduces entrainment of larvae Delta smelt (January –May). The population level magnitude of this benefit depends on how many Delta smelt spawn or potentially could spawn in the central or southern Delta (assuming cross channel closed and positive Q-west). The benefits of this action may be to substantially expand the range of suitable spawning and rearing habitat for Delta smelt, if entrainment is the only limiting factor, which is unlikely.
- Longfin smelt? It is unclear whether longfin smelt would be affected solely by reverse flows in Middle and Old rivers, since they are primarily found west of Sherman Island and would only move eastward of Sherman Island during periods of increased salinity coincident with periods of negative Q-west (see below), which could be triggered by OMR reverse flows.
- Reduces entrainment of juvenile San Joaquin, Mokelumne, Calaveras, and Consumnes salmon (March – June).
- Reduces entrainment of food produced in the central or southern Delta, December through June, or longer if S. Delta diversions are limited beyond Dec- June time frame. How many food resources are actually generated in this portion of the Delta.

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There are very limited existing wetlands. The primary food benefit may be to expand the potential to restore habitats that will generate food.

- Entrainment of larvae and food resources originating in Middle and Old Rivers, particularly I
- Sacramento runs of Chinook salmon. Could reduce entrainment of juvenile Sacramento River Chinook salmon, particularly those that move into the Central Delta via Georgiana Slough. Closed Delta cross channel gates between December and June prevent most movement of juvenile Chinook salmon into the OMR entrainment zone. Other juveniles could be entrained via 3-Mile slough, but only in periods of negative Q-west.

Water Supply Response

- Decreases water supply or requires increased diversions from N. Delta facility.

Water Quality Response

- Reduction in South Delta exports, marginally increases salinity (above agricultural and municipal standards) in the south and central Delta due to less dilution of saltier San Joaquin River inflows and Delta island discharges, particularly in late summer and early fall. These increases would probably have minimal ecological affects or even positive effects (limiting invasive species), but would have negative impacts for agricultural and municipal water users who divert from the South Delta. Could be mitigated by increased pumping and open cross channel during these months.
- Reduction in South Delta exports, could increase concentration of pollutants in the south and central Delta due to less dilution of polluted discharges from the San Joaquin River and Delta Islands. This could result in a series of negative biological responses. Could be mitigated by increased pumping and open cross channel during these months.

Hydrodynamic Outcome #2: Increases Q-west all other things being equal (including cross channel and San Joaquin inflow). In reality, however, there are other ways to influence Q-west including operation of a gate at 3-mile slough. For this reason, it is treated as a separate hydrodynamic outcome of reducing S. Delta exports.

Biological Response

- Increases in Q-west at Jersey Island will reduce entrainment risks for adult stages of western Delta species such as long-fin smelt and Delta smelt.
- Increases in Q-west at Jersey Island will reduce entrainment of Sacramento River juvenile salmonids.

Water Supply Response

- Same as above for reductions in OMR reverse flows.

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Water Quality Response

- Same as above for reductions in OMR reverse flows.
- Reduces salinity intrusion into central Delta, but reductions in the south Delta offset by less dilution from the Sacramento River associated with reduced pumping.

Option #2: Increase San Joaquin Inflows to increase the ration of San Joaquin inflows to South Delta Diversions. Not part of Core plan, but option will be identified in Core plan and future evaluated in subsequent analyses.

Option #3: Isolate middle and old river corridors to remove, at least seasonally, one of these corridors from the zone of entrainment. Not part of Core plan, but option will be identified in Core plan and future evaluated in subsequent analyses.

Option #4: Gates to limit entrainment or control Q-west. Not part of Core plan, but option will be identified in Core plan and future evaluated in subsequent analyses.