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**Subject:** habitat objectives for the smelts  
**Date:** 06/27/2012 10:46 AM  
**Attachments:** [Longfin Smelt Habitat Objective 6-27-2012 carl wilcox + mc edits.docx](#)  
[2012 06 19 1040 Delta smelt habitat objective.docx](#)

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Attached. I agreed to a few cosmetic edits to the d.s. objective that are not reflected in the attached file; I'll send along the update when I get it.

I think we're very close to agreement on the delta smelt objective, but the longfin objective edits I sent them will not please them, so the issue is sure to be in front of you tomorrow.

I've got a call with DWR scheduled for 11 to talk about how outstanding issues are teed up for the workshop tomorrow. I'm going to prepare some slides for us to talk about this afternoon. Mike



Longfin\_Smelt\_Habitat\_Objective\_6-27-2012 carl wilcox + mc edits.docx



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BDCP  
Draft Biological Objective for Longfin Smelt Habitat  
Version date: 06-26-12

Increase the extent of suitable habitat, as defined by flow, salinity, temperature, turbidity, food availability and presence of longfin smelt, to support contribution to longfin smelt recovery by the achieving the following sub-objectives:

a. Achieve an average March through May Delta outflow of at least 44,500 cfs in 50% of years.

~~a. Suitable habitat shall meet the following criteria: during the seasonal period from December through April when adult, larval, and early juvenile longfin smelt are most likely to inhabit the sub-tidal and inter-tidal wetlands habitats: water depths of less than 10 feet over the majority of the tidal wetland habitat area, salinity <3 psu, extensive vertical circulation including gravitational circulation, lateral mixing, contiguous with other open water habitat, and other hydrodynamic processes keeping Secchi disk depths less than 0.5 meters, high calanoid copepod densities (over 7,000 per cubic meter), hydrologically connected to substantial tidal marsh areas, and maximum water temperatures less than 25 degrees Celsius. [\*Since July – November crosses a Water Year boundary, the Water Year type criteria apply to the first three months of that period.]~~

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Comment [CGW1]: Be more specific about what they inhabit. We have a nomenclature problem.

Comment [CGW2]: This is applicable to longfin

b. Increase the extent of sub-tidal and inter-tidal wetlands of all types in the Plan Area by 10,000 acres by year 10, 17,000 acres by year 15, and 48,000 acres by year 40. In Susuin Marsh, West Delta, and Cache Slough/Sacramento Deep Water Ship Channel complex, individual restoration projects must show a net positive flux of calanoid copepods and mysids off of the restored wetlands into open water occupied by longfin smelt. Specific details, including food production targets and export distances, are to be determined through field investigations and modeling, and refined by adaptive management.

c. Increase by 100% the surface area of open-water very low salinity (< 1 psu) habitat in the Cache Slough/Sacramento Deep Water Ship Channel complex. This habitat shall meet all of the following criteria: extensive lateral mixing, contiguous with other open water habitat, hydrodynamic processes keeping Secchi depth less than 0.5 meters, high calanoid copepod densities (above 7,000 per cubic meter), and temperature criteria described in item a, above.

Material for Rationale:

- Longfin smelt are typically present in the Plan Area during the months of November through June. Spawning typically occurs in the months of January through March, with exact timing depending on, among other things, water temperature. Larvae typically

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hatch in February and March, with larvae and juveniles moving toward the low salinity zone, where they remain until temperatures rise above about 20 degrees. Suitable habitat for longfin smelt spawning is sandy substrates beneath subtidal channels that are adjacent to sandy shores, with sufficient tidal energy to maintain the sandy substrate throughout. Longfin smelt seem to spawn in areas where salinities are less than 3 psu. Larval and early juvenile longfin smelt habitat is open water in the low salinity zone until temperatures rise to a level that causes them to move into colder, saltier water in the lower estuary.

- The Plan is premised on a hypothesis that the longfin smelt population will greatly benefit from creation of new shallow water habitat in the Delta and Suisun Marsh. The sub and inter-tidal marsh targets in parts (b) and (c) of the objective allow for investigation of this hypothesis and implementation of large additional investments in shallow water-sub-tidal and inter-tidal habitat if the benefits are demonstrated. Until this hypothesis is resolved, the primary component (part (a) above) of the objective is intended to provide recovery-oriented habitat benefits in the low salinity zone (1-3 psu).
- If shallow water-sub-tidal and inter-tidal habitat benefits are demonstrated and substantial progress is made towards achieving recovery goals, this objective may be revised to adjust the mix of habitat targets in parts (a) through (c) through the Adaptive Management Process described in Section 3.6. Such an adjustment would have to be based on new information about species status, trends, and needs, including documented performance of new shallow sub-tidal habitat water- and inter-tidal marsh areas in producing and exporting food and/or providing other benefits to longfin smelt that are of sufficient magnitude that such an adjustment can prudently be made.
- The objective ~~recognizes-positis~~ that shallow sub-tidal and inter-tidal wetlands in Suisun Marsh, West Delta, and Cache Slough have the greatest potential to contribute to longfin smelt abundance because of their proximity to the channels and embayments hosting most of the population.
- The objective recognizes that the same area can ~~meet more than one of the sub-objectives described. For example, the same area could~~ satisfy items (a) and (b) or (b) and (c), ~~but not (a) and (c).~~
- The objective recognizes a continuum of freshwater and brackish water habitat from 3 psu to less than 1 psu that is important to adult longfin smelt spawning, egg incubation, and larval and early juvenile rearing during the late winter and spring.
- Outflow effects on longfin smelt habitat quality and abundance is an active area of research, and we expect our understanding will improve in the coming years. Until then, ~~it is important to note that while this objective is phrased in terms of habitat area at a range of water depths, salinities, turbidities, water temperatures and other features,~~ these benefits are ~~being~~ achieved ~~now~~ by providing, in 50% of years, average flows in March through May-flows that are necessary to exceed an apparent threshold below which positive population growth has not occurred during a 45 year reference period. ~~position the low salinity habitat in or near Suisun Bay during the late winter and spring months.~~ It is not apparent at

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| present that these benefits can be provided by means other than augmenting flow. However, advances in science, especially including investigation of the value of new shallow [water-sub-tidal and inter-tidal](#) habitat areas adjacent to channels, may expand the available options to accomplish this objective.

BDCP  
Draft Biological Objective for Delta Smelt Habitat  
Version date: 06-08-12

Increase the extent of suitable habitat, as defined by flow, salinity, temperature, turbidity, food availability and presence of delta smelt, to support contribution to delta smelt recovery by the achieving the following sub-objectives:

- a. Provide a monthly average of at least 37,000 acres of highly connected open-water habitat in hydrologically Wet years\*, and at least 20,000 acres of connected open-water habitat in hydrologically Above Normal\* years, of 1-6 psu habitat surface area during July – November. This habitat shall meet all of the following criteria: extensive vertical circulation including gravitational circulation, lateral mixing, and other hydrodynamic processes keeping Secchi disk depths less than 0.5 meters, high calanoid copepod densities over 7,000 per cubic meter, adjacency to substantial off-channel marsh areas, and maximum water temperatures less than 25 degrees Celsius. [\*Since July – November crosses a Water Year boundary, the Water Year type criteria apply to the first three months of that period.]
- b. Increase the extent of tidal wetlands of all types in the Plan Area by 10,000 acres by year 10, 17,000 acres by year 15, and 48,000 acres by year 40.
- c. Increase by 100% the surface area of highly connected open-water very low salinity (< 1 psu) habitat in the Cache Slough/Sacramento Deep Water Ship Channel complex during July – November by 2060. This habitat shall meet all of the following criteria: extensive lateral mixing, hydrodynamic processes keeping Secchi depth less than 0.5 meters, calanoid copepod density above 7,000 per cubic meter, and temperature criteria criteria described in item b.

Material for Rationale:

- The Plan is premised on a hypothesis that the delta smelt population will greatly benefit from creation of new shallow water habitat in the Delta and Suisun Marsh. The tidal marsh targets in parts (b) and (c) of the objective allow for investigation of this hypothesis and implementation of large additional investments in shallow water habitat if the benefits are demonstrated. Until this hypothesis is resolved, the primary component (part (a) above) of the objective is intended to provide recovery-oriented habitat benefits in the low salinity zone (1-6 psu).
- If shallow water habitat benefits are demonstrated and substantial progress is made towards achieving recovery goals, this objective may be revised to adjust the mix of habitat targets in parts (a) through (c) through the Adaptive Management Process described in Section 3.6. Such an adjustment would have

to be based on new information about species status, trends, and needs, including documented performance of new shallow water marsh areas in producing and exporting food and/or providing other benefits to delta smelt that are of sufficient magnitude that such an adjustment can prudently be made.

- The objective recognizes that tidal wetlands in Suisun Marsh, West Delta, and Cache Slough have the greatest potential to contribute to delta smelt abundance because of their proximity to the channels and embayments hosting most of the population.
- The objective recognizes a continuum of habitat from 6 psu to less than 1 psu that is important to juveniles and subadult delta smelt during the summer and fall months.
- Outflow effects on delta smelt habitat quality and abundance is an active area of research, and we expect our understanding will improve in the coming years. Until then, it is important to note that while this objective is phrased in terms of habitat area at a range of salinities, turbidities, and other features, these benefits are being achieved now by providing flows necessary to position the low salinity habitat in or near Suisun Bay. It is not apparent at present that these benefits can be provided by means other than augmenting flow. However, advances in science, especially including investigation of the value of new shallow water habitat areas adjacent to channels, may expand the available options to accomplish this objective.