

EXHIBIT S

TO SWANSON DECLARATION

Delta Smelt Working Group Meeting Notes

December 11, 2006

Participating: Gonzalo Castillo (USFWS), Mike Chotkowski (USBR), Kevin Fleming (CDFG), Lenny Grimaldo (CDWR), Tracy Hinojosa (CDWR), Ann Lubas-Williams (USBR), Matt Nobriga (CDWR), Ted Sommer (CDWR), Jim White (CDFG) and Victoria Poage (USFWS, convener and scribe)

For Discussion:

1. Revisit the preliminary recommendation for a winter action from the October 10 meeting
2. Future recommendations for spring South Delta barrier installation
3. Resources' POD Action Matrix and supporting documentation

Recommendation for WOMT: The Working Group had two recommendations for WOMT. These recommendations reflect conditions which the Working Group believes are likely to minimize salvage of pre-spawning adult delta smelt in winter and larval delta smelt in spring, but if high salvage occurs, then other actions may be warranted.

First, the Working Group finalized the preliminary recommendation from October 10 as follows:

- Implement a proactive winter action to address concerns about wintertime entrainment of adults during "first flush" conditions. It is unlikely that any action will be needed until after December 25th. Delta water temperatures have already dropped below 13^o C (compiled from data from Mossdale, Antioch and Rio Vista). Once the time of year and water temperature cues are appropriate for smelt migration to spawning areas, the Working Group may recommend the following: no more than seven days after Sacramento River flow at Freeport rises above 25,000 cfs for at least three days, increase flows in lower Old and Middle Rivers to at least -3500 cfs until February 15th.
- If no Sacramento River pulse above 25,000 cfs occurs by January 15th then Old and Middle River flows should be moderated to a range of -5000 cfs to -3500 cfs until February 15th.
- If flows on the Sacramento River are above 25,000 cfs prior to Dec 25th, and remain above 25,000 cfs through Feb 15th, the Working Group does not anticipate requesting operational changes. However, actions may be considered if Freeport flows increase but are not sustained above 25,000 cfs or if high salvage events occur.

The Working Group will consider and/or generate additional analyses of existing data and continue to monitor conditions in the Delta and survey sampling results to determine whether further refinements to the recommendation are needed.

The second recommendation is to forego installation of the spring Head-of-Old River Barrier and to postpone installation and operation of the agricultural barriers until June 1.

Meeting Notes:

1. The Delta Smelt Working Group revisited the preliminary recommendation for a winter action made at its October 10 meeting. The Working Group retained its original “first flush” conceptual model, which assumes, based on an examination of salvage data and numerous environmental variables, that adult delta smelt movement up the estuary (which increases vulnerability to entrainment) follows decreases in Delta water temperature and increases in Sacramento River flow. The Working Group retained the temperature criterion of less than 13⁰C at Mossdale, Antioch and Rio Vista and Sacramento River flow criterion of exceeding 25,000 cfs for at least three days as triggers for a winter action. It was noted that the EWA Technical Panel and others have asked the Working Group why, if we accepted analyses presented by Pete Smith, we did not recommend setting net flows in Old and Middle Rivers to zero (cfs) to better protect pre-spawning adults. The Working Group believes that while eliminating net upstream OR/MR flow likely would be better for delta smelt, operating to this target would be prohibitively expensive, and that significant protection could be achieved with flows of -3500 cfs. DWR staff have derived estimates of the water costs of the potential actions in the Resources Agency POD Action Matrix and found that the proposed winter action could consume all available environmental water, leaving no assets for spring actions for larvae or juveniles. The Working Group discussed assessing the expected benefit of alternative OR/MR flows for adult delta smelt, given that there are two key issues: (1) the rate of the flow reduction and (2) the duration of the flow reduction. In relative terms, contingency tables of flow versus duration could look something like this:

		Adults				Juveniles	
		1 week	4 weeks			1 week	4 weeks
0 cfs		Better	Best	0 cfs		Not So Bad	Best
-3500 cfs		Worse	Not So Bad	-3500 cfs		Worse	Better

The Working Group discussed restructuring the recommendation so as to gain some of the expected benefit of zero cfs, if only for a short period of time, by prescribing zero cfs for two weeks, followed by -2000 cfs for 1 or two weeks, followed by -3500 cfs for one or two weeks, using the same criteria of temperature and flow to trigger an action. However, this flow regime would not alleviate the potential shortfall in available environmental water assets, so it was not added to the recommendation.

The Working Group decided to adopt its preliminary recommendation of October 10 as a formal recommendation for a winter action. It was noted that “first flush” conditions should not take anyone by surprise; Delta water temperatures will likely drop gradually, and significant increases in Sacramento River flows would likely become apparent three to five days before Freeport flows trigger an action. However, the Working Group believed that additional analyses of the relationship of salvage to OR/MR flows and of days post-flush to first salvage would be informative. Two families of recommendations, one for adults and one for juveniles, could conceivably be generated via additional analyses of salvage in relation to OR/MR flow. Some of this work may already have

been undertaken by others; the status of this work should be clarified and remaining analyses undertaken as appropriate.

2. Recent PTM modeling (see October 30 meeting notes) indicated that the South Delta barriers increase particle entrainment risk from the central Delta. The Working Group recommends against the installation of the spring Head-of-Old River barrier and postponement of the installation and operation of the agricultural barriers until June 1.

Discussion of the first two agenda items did not leave sufficient time for discussion of the supporting documentation for Resources' POD Action Matrix.

Submitted,
VLP

EXHIBIT T
TO SWANSON DECLARATION

Delta Smelt Working Group Meeting Minutes

October 10, 2006

Participating: Gonzalo Castillo (USFWS), Mike Chotkowski (USBR), Kevin Fleming (CDFG), Lenny Grimaldo (CDWR), Bruce Herbold (USEPA), Tracy Hinojosa (CDWR), Peter Johnsen (USFWS), Ann Lubas-Williams (USBR), Matt Nobriga (CDWR), Ted Sommer (CDWR), Jim White (CDFG) and Victoria Poage (USFWS, convener and scribe)

For Discussion:

1. CDFG's action plan matrix
2. Refined analyses of data pertinent to winter salvage events (triggering variables)
3. Parameters for PTM modeling of CCF gate ops

Recommendation for WOMT:

The Working Group made a preliminary recommendation to implement a proactive winter action to address concerns about wintertime entrainment of adults during "first flush" conditions. No action will likely be needed until after December 25th and after Delta water temperatures drop below 13⁰ C (compiled from data from Mossdale, Antioch and Rio Vista). Once time and temperatures are appropriate for smelt spawning movements, Sacramento River flow at Freeport increases above 25,000 cfs should trigger operational changes to achieve flows in lower Old and Middle Rivers no more negative than -3500 cfs. If no Sacramento River pulse above 25,000 cfs occurs by January 15th then Old and Middle River flows should be moderated as much as possible until February 15th. This recommendation reflects conditions which the Working Group believes are likely to minimize salvage of pre-spawning adult delta smelt, but if high salvage occurs other actions may be warranted.

If flows on the Sacramento River are above 25,000 cfs prior to Dec 25th, and remain above 25,000 cfs through Feb 15th, no action should be necessary.

Salvage of adults or other conditions suggesting that adults are spawning in the South Delta are an indicator that springtime actions may also be beneficial. If salvage is low and flows in Old and Middle Rivers are not strongly negative in January and February, then springtime actions might not be warranted.

Minutes:

The second sampling period of the Fall Mid-Water Trawl survey is underway this week. No information was available.

CDFG has been asked to compile a supplement to the POD Action Plan that outlines any new actions that could potentially be taken to protect delta smelt. Kevin Fleming presented a draft document with separate potential actions for winter and spring (see attachment 1). The emphasis was on actions that could be implemented at the SWP. The first trigger would come with the Recovery Index, as before, but DFG proposed that if the

index is less than 74 and the net flow at Old and Middle Rivers is more negative than -5000 cfs, flows be increased so that net Old and Middle river flows are no more negative than -5000 cfs, either by reducing exports or increasing San Joaquin River flow. DFG proposed changing the level of salvage concern from reaching the 50th percentile of the ratio of salvage to the recovery index to reaching the 25th percentile of the ratio, and making both percentiles triggers for export reductions or increases in SJR flow. After reviewing the graphic of Old and Middle River flow plotted against salvage (attachment 2), the Working Group recommended that OR/MR flows be increased further, to no more negative than -3500 cfs. Although the graphic depicts a linear relationship, the Working Group discussed the possibility that it is likely more sigmoidal, with a threshold level of effect followed by a steep upward curve. The Working Group noted that some of the weaknesses of the DFG plan included the potential to exhaust all EWA and B2 assets in winter, leaving nothing in reserve for spring actions, and that the document specifies no magnitude or duration for the proposed export cuts/flow increases. The Working Group noted that if a winter action is triggered by a salvage event, indicating adult delta smelt are (or at least were) present in the southern Delta and will be spawning there, then the likelihood that a spring action would be needed is greater than if an action is triggered only by environmental factors. However, if the adult salvage concern level is not reached, a spring action may not be needed. These recommendations notwithstanding, decisions to implement the action would best be made in real-time, as circumstances dictate. Spring actions do not yet include a flow trigger; this needs further discussion, and may depend upon real-time conditions and the results of PTM modeling. Spring actions also include modifications to Clifton Court Forebay intake gate operations. Following the discussion, changes will be made to the document which will be circulated for further review and comment by the Working Group and then forwarded to DFG management for final review.

The Working Group continued its August 30 and September 26 discussions of the environmental factors that correspond to the onset or sudden increases in salvage of pre-spawning adult delta smelt. Preliminary analyses indicate that a drop in water temperature to about 13^o C followed by an increase in Delta inflow may be a good predictor of adult salvage. More work is needed to refine these potential environmental triggers; however, the Working Group made the following preliminary recommendation:

1. action triggered by environmental factors (proactive mode)
 - o when Delta water temperatures reach 13^o C and Delta inflow increases to 25,000 cfs or greater, increase the net OR/MR flow to no more negative than -3500 cfs
 - o if no Sacramento River pulse above 25,000 cfs occurs by January 15th then Old and Middle River flows should be moderated as much as possible until February 15th.
2. action triggered by salvage (reactive mode)
 - o when the adult concern level is reached, be it the 25th or the 50th percentile of the ratio, respond as per the DSRAM

As always, the Working Group believes that reacting to a salvage event as it occurred would be far less effective than anticipating a salvage event; the former likely defers or extends salvage in time, whereas the latter is intended to avoid and/or minimize salvage.

A spring action could include reoperation of the CCF intake gates and modification of the schedule by which South Delta barriers (not just the HORB) are installed. Analysis of CCF gate operations and screening efficiency indicate that there may be a diel effect of pumping, and that decreases in approach velocities lead to increases in salvage, likely because of increased efficiency of the screens. Analysis of barrier operations indicates that all barriers, not just the HORB, affect South Delta circulation and particle fate. How this information may be used to reduce impacts to delta smelt warrants further discussion.

The Working Group has for some time been interested in Particle Tracking Modeling of the effects of CCF intake gate operations. Reoperation of the CCF intake gates could even out channel velocities, export pumping and approach velocities and therefore affect salvage. The Working Group proposed that the following PTM runs be performed:

	Barriers in:		Barriers out:	
SJR	4500	7000	4500	7000
Exports	1500 comb.	3000 comb.	1500 comb.	3000 comb.
Gates	Fully Open	Fully Open	Std. Ops	Std. Ops

The PTM would be run for VAMP-like conditions from April 15 – May 15. Particles would be released at 20-mm stations 815, 902 and 910, as in the runs performed last year. Rather than the traditional bar chart output, the Working Group requested a cumulative output of particle fates. Holding Sacramento River flows constant, potentially in the range of 20-30,000 cfs, for both San Joaquin flow values would avoid introducing a confounding factor. However, it may be more realistic to match historic SR flows to historic SJR flows.

Action Items:

1. Mike Chotkowski will work on refining the winter salvage trigger analyses.
2. DWR modeling staff will perform the requested PTM runs.

Next Scheduled Meeting: Not yet scheduled.

Attachments: 2

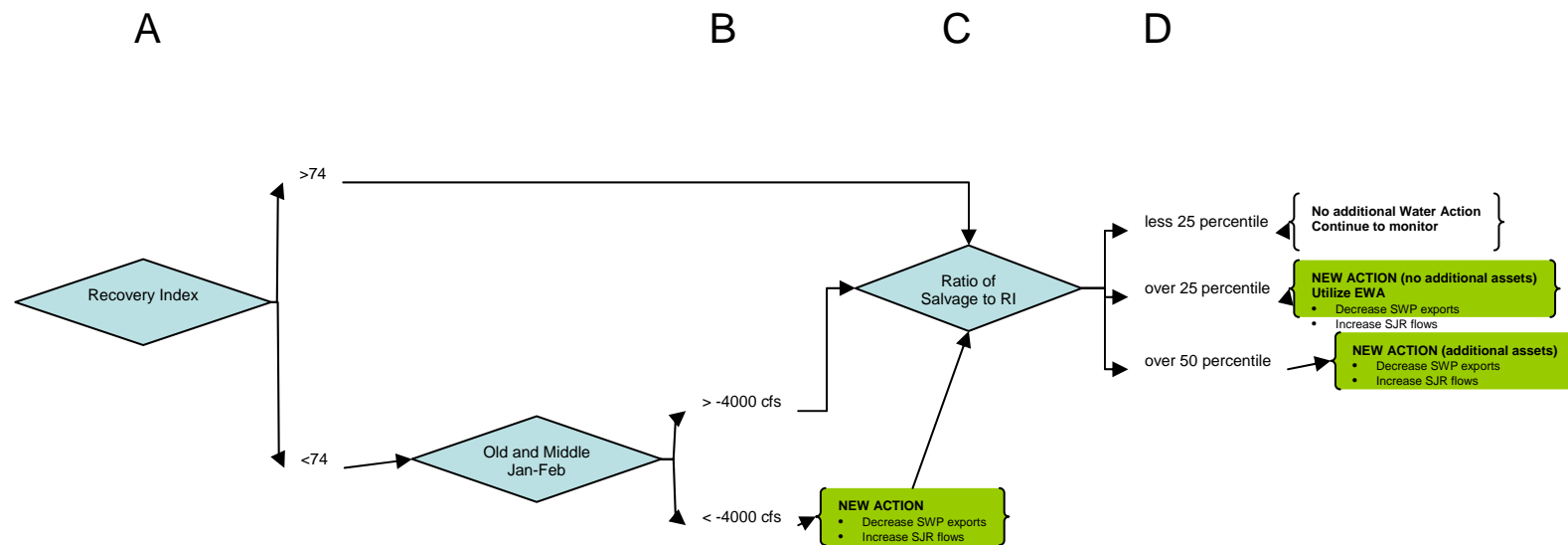
Submitted,

VLP

Winter Action – DRAFT for discussion only

Reduce entrainment of POD fish (delta smelt, longfin smelt and striped bass)

- *Modify Old and Middle River flows (pre-emptive)*
- *Reduce salvage (reactionary)*



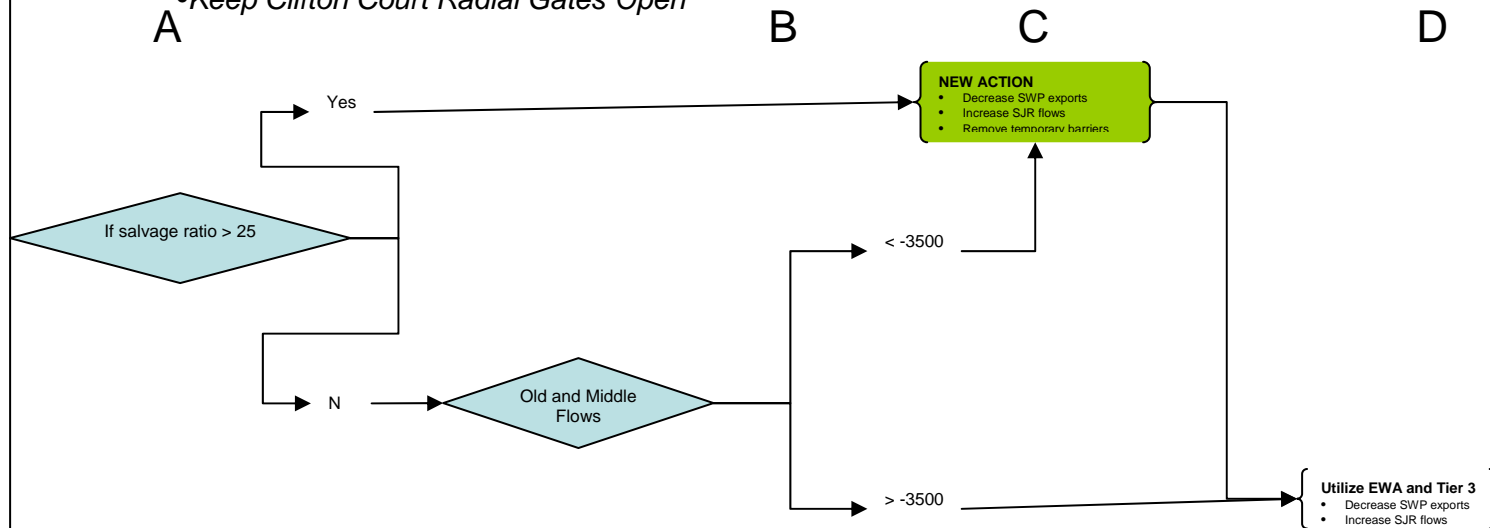
- *Recovery Index is based upon FMWT and will be available by mid October. The RI of 74 represents the median for all years. From the RI the salvage concern levels is calculated. This algorithm for the concern level is found in the 2005 USFWS OCAP BO.*
- *January and February combined Old and Middle River flows should be projected based upon model runs with both current and projected operations. The -4000 cfs criterion is only a first approximation based upon a visual inspection of the graphs prepared by Pete Smith, USGS. The actual target criterion will require further input from DSWG an other Agency staff.*
- *The amount and timing of the new action to reduce negative flows will require further input from DSWG an other Agency staff. It will likely determined by a combination of spawning migration cues (outflow and temperature) as well as historic patterns of salvage events.*
- *This is a modification of the current DSRAM with the inclusion of a more protective criterion for concern. Given a low RI the differences in salvage numbers between 25 and 50 percentile is not anticipated to be great and the length of time between hitting the 25 and 50 percentile will be short. Therefore, additional water assets need to be identified prior to the need and readied for implementation.*

Early Spring Action – DRAFT for discussion only

Reduce entrainment of POD fish (delta smelt, longfin smelt and striped bass)

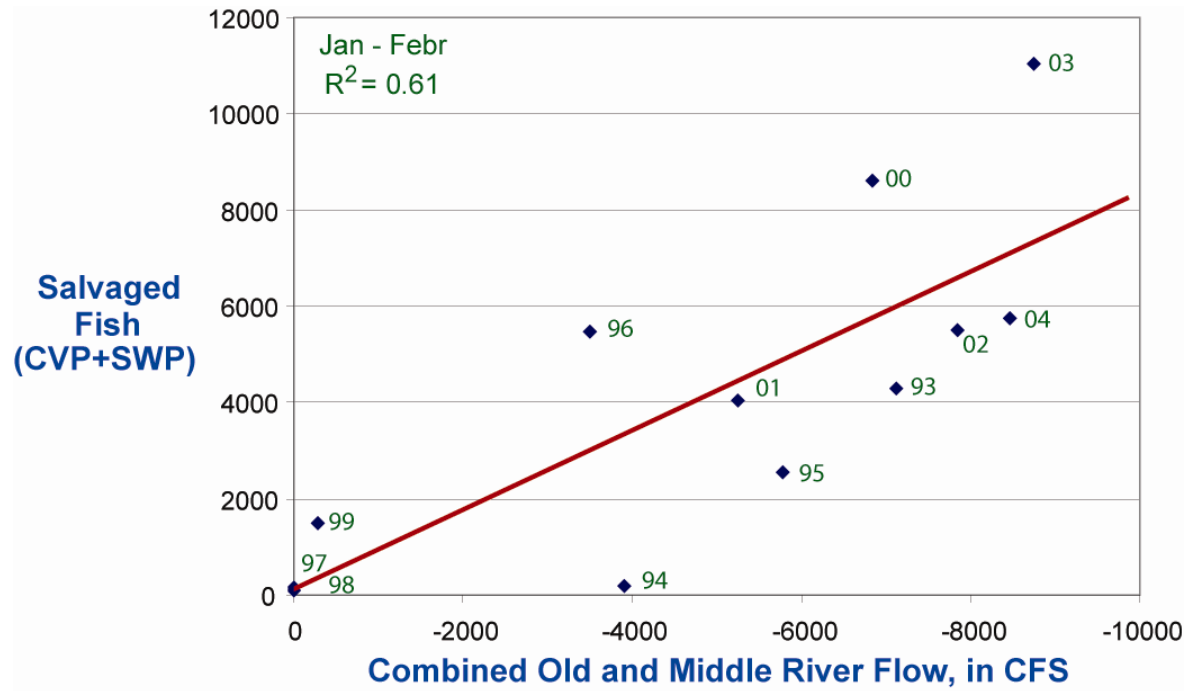
• *Modify delta hydrology during early delta smelt early larval stage*

- *Additional assets (SJR)*
- *Reduced SWP exports*
- *Remove Temporary Barriers*
- *Keep Clifton Court Radial Gates Open*



- *If there was a need for winter protection of the adults pre-spawn, there will be a need to protect the larvae.*
- *Relationship between early flows and subsequent delta smelt distribution. Based upon 20MM Survey "centroid" distribution, the higher the early flows the further downstream the resulting smelt distribution.*
- *The amount and timing of the new action to reduce entrainment will require further input from DSWG and Agency staff. It will likely be determined by a spawning cues (temperature) as well as historic patterns of salvage events.*
- *This would include a pre-VAMP use of EWA assets. It may turn out that the only time that the radial gates can be left open is during this pre-VAMP/VAMP period, in which case this is where that particular new action will be used.*

Attachment 2.



Source: Pete Smith, USGS

EXHIBIT U
TO SWANSON DECLARATION

Delta Smelt Working Group Meeting Notes

April 02, 2007

Participating: Gonzalo Castillo (USFWS), Mike Chotkowski (USBR), Andy C. Chu (CDWR, guest), Kevin Fleming (CDFG), Lenny Grimaldo (CDWR), Bruce Herbold (EPA), Victoria Poage (USFWS), Ted Sommer (CDWR), Kevin Sun (CDWR, guest), Jim White (CDFG), and Peter Johnsen (USFWS, convener and scribe)

For Discussion:

1. 7- or 14-day average as presentation of OR/MR flows
2. WOMT request to develop criteria for opening of barriers
3. Action to protect delta smelt larvae

Recommendation for WOMT:

To minimize diversion of delta smelt larvae into the Central Delta and to the water export facilities, the Working Group recommends keeping Old River and Middle River combined 5-day average flows between negative 5,000 cfs and negative 3,500 cfs.

Meeting Notes:

1. At the March 27, 2007, meeting, the Water Operations Management Team (WOMT) requested that the Delta Smelt Working Group (Working Group) evaluate changing the use of the 5-day averaging period to either a 7-day or a 14-day averaging period when tracking Old River/Middle River (OR/MR) flows. WOMT requested this change so that the averaging period average across the neap-spring tidal cycle.

The Working Group noted that an average over the whole lunar month would be required to properly address daily biases caused by the filling and draining of the delta over the spring-neap cycle; a 7-day or 14-day average would not accomplish this goal. Moreover, the protective action the DSWG recommends is keyed to the actual OR/MR flows; if flows there are negative (i.e. southward), then it is not, as far as the DSWG knows, relevant to delta smelt protection what percentage of the southward flow is attributable to the spring/neap cycle and what to pumping.

The DSWG is also concerned that use of a longer averaging period would imply DSWG agreement that a larger degree of variation in day-to-day OR/MR flow, possibly including periods of several days where southward flow substantially exceeds the DSWG's recommended limit, would not reduce the degree of protection afforded by the action. In fact, the Working Group is of the opinion that such additional variation might very well reduce protection of delta smelt. The Working Group acknowledges that OR/MR flows do vary over time because of various natural causes. The group is therefore not concerned by small variations in the 5-day average OR/MR flows and is satisfied with the Projects' efforts to moderate OR/MR flows to date. Based on the above considerations and the protection of delta smelt provided by the current operations, the

Working Group recommends that DWR continues to use a five-day average flow when tracking OR/MR flows.

2. The WOMT also requested that the Working Group develop criteria for the opening of the Head-of-Old River barrier in the event young of the year delta smelt distribution shifts to the south Delta during VAMP. The Working Group discussed if the opening of the barrier would provide any additional protection to delta smelt given the conditions and operations expected during this years Vernalis Adaptive Management Program (VAMP). Recent PTM-runs by DWR suggests that with the expected combined water export of 1,500 cfs during VAMP, the barriers will have little effect on entrainment of larvae within the Sacramento River portion of the Delta or in the Central Delta (see March 27, 2007, notes). However, the delta smelt may benefit from opening of the barrier if larvae and juveniles are found in or by Franks Tract and OR/MR flows falls below negative 5,000.

Earlier PTM-runs showed that the barriers influence entrainment of particles injected at stations in the South Delta with the percent entrained particles dropping toward zero when the barriers are not installed. Thus, the Working Group would be concerned if adult delta smelt should suddenly move into and spawn in the San Joaquin River. The Working Group thinks, however, that this scenario is unlikely because adult delta smelt are expected to have moved to spawning sites and started to, or is ready to start, spawning.

The group will continue to monitor real-time data and may recommend opening of the Head-of-Old River barrier if the expected hydrology and delta smelt distribution should change. However, because of the projected hydrology during VAMP, time of year, estimated delta smelt distribution, and the observations of delta smelt spawning; the Working Group believes it is unlikely that conditions will be such that opening of the barrier during VAMP will provide additional protection to delta smelt larvae and juveniles. Therefore, the Working Group does not see any need for developing criteria for opening of the barriers during VAMP.

3. The Working Group discussed moderation of OR/MR flows for protection of delta smelt larvae and juveniles. Based on recent PTM-runs (see March 26, 2007, notes) and what is known about delta smelt distribution, the Working Group agreed that OR/MR flows above negative 5,000 cfs would reduce number of delta smelt drawn towards the pumps. To protect larvae and juveniles, the Working Group members therefore agreed to recommend that the water export facilities operate to keep OR/MR flows toward negative 3,500 cfs and not to reduce flows below negative 5,000 cfs.

Next meeting: Monday, April 9 at 3:00 pm via conference call.

Submitted,
PJ

EXHIBIT V
TO SWANSON DECLARATION

Delta Smelt Working Group Meeting Minutes

July 10, 2006

Participating: Gonzalo Castillo (USFWS), Kevin Fleming (DFG), Bruce Herbold (USEPA), Ted Sommer (DWR), Matt Nobriga (DWR), Ann Lubas-Williams (USBR), Tracy Pettit (DWR), Tracy Hinojosa (DWR), Ryan Olah (USFWS), convener and scribe, Jim White (DFG), and Lenny Grimaldo (DWR).

For Discussion:

Continue discussions on possible fish actions for upcoming season

Recommendation for WOMT: The Working Group formally requests that DWR provide initial estimates of the cost in terms of water volumes to first achieve and then maintain a net outflow of 11,400 cfs at Chipps Island from September through November.

Minutes:

Ted Sommer presented an outline of potential actions (see attachment 1) that the Working Group used to rank potential actions to protect delta smelt. The Working Group developed a ranking system for each of the potential actions to clarify the action’s biological basis and its likelihood of successful implementation in the next 12 months:

<u>Biological Basis</u> <u>the next 12 months</u>	<u>Likelihood of successful implementation in</u>
0. None (for the specific season)	
1. Reasonable biology	A. Not worth Doing
2. Supporting pattern in data	B. Maybe
3. Correlation Present	C. Very Likely
4. Some causation known	
5. Strongly supported by evidence	

Based on these criteria, the Working Group then assigned a ranking to each hypothesis under each season. These rankings were intended to apply only to water year 2007, and could change based on hydrology, new data, or species status.

Based on this exercise, the Working Group identified the need for a description of likely conditions this fall based on hydrologic forecast modeling. Since outflows may potentially be as low as 7,000 cfs net outflow, the Working Group requested that the following initial modeling take place:

- Based on the latest hydrologic forecasts, what would be the cost in terms of water volumes to first achieve and then maintain a net outflow of 11,400 cfs at Chipps Island from September through November? [Note that between the time that the meeting occurred and the notes were produced, DWR estimated that maintaining 11,400 cfs at Chipps Island would require

approximately 600 TAF of water in the median hydrology, and approximately twice as much in the dry hydrology.]

Additional modeling:

- Assuming that the 11,400 cfs net outflow was implemented, what would be the flows in Old and Middle River, given a variety of combined inflows and export rates? The best approach to this may be to vary San Joaquin River flow, export flow and Old/Middle River flow in a single nomograph at some specific Sacramento River flow. Several nomographs could be produced for various increments of Sacramento River flow; this concept needs to be refined and, perhaps, simplified before a formal request is made of DWR.

Action Items:

1. DWR will perform the initially-requested modeling and the group will then convene to discuss the results.
2. The Working Group will refine their request for additional modeling to examine flows at Old and Middle Rivers.

Next Scheduled Meeting: TBA, based on modeling results.

Submitted,

RO/vp

Attachment 1

ALTERNATIVES TO IMPROVE DELTA SMELT ABUNDANCE DURING THE NEXT YEAR

Draft Revised July 17, 2006

Assumptions

- This review focuses on actions that could be realistically conducted during the next year.
- The list is intended as talking points to evaluate the potential efficacy and feasibility of alternatives. It is not a set of recommendations.
- There are likely other actions—this is a starting point!
- Each action includes a partial list of useful metrics of the success of that alternative.
- Additional information is needed to document the supporting evidence for each alternative.

Fall Actions (September-November)

1. Habitat Improvements

Hypothesis: Higher fall flows (total delta outflow) will increase the amount of habitat for delta smelt.

Measures:

Fish: FMWT distribution, following year's TNS abundance, condition, size, energy density, growth.

Clams: Biomass, distribution, grazing rate (may be affecting habitat quality).

Food supply: Zooplankton density, Chlorophyll a, smelt diets.

Habitat: EQ index (turbidity, ec), X2

Ranking: 3/4 C-We have a relationship between habitat and summer production and fall flows are forecasted to be low (maybe around 7,000 cfs outflow)

2. Reduce Entrainment Losses (Mortality)

Hypothesis: Increased (more positive) Old and Middle River flows will reduce losses of adults.

Measures:

Fish: FMWT distribution, TNS abundance, salvage,

Hydrology: Exports, OR & MR flows.

Modeling: ptn experiments

Ranking: 3C-based on Pete Smith of USGS's relationship

Hypothesis: Reducing Delta Cross Channel closures will reduce losses of adults.

Measures:

Fish: FMWT distribution, TNS abundance, salvage,

Hydrology: Exports, OR & MR flows.

Modeling: ptm experiments

Ranking: 2C-based on conceptual understanding of Delta hydrodynamics and recent ptm work.

3. Food Supply

Hypothesis: Increased San Joaquin River flow to Suisun Bay will deliver more phytoplankton and zooplankton to support adults and egg production.

Measures:

Fish: TNS & FMWT abundance, condition, size, energy density.

Clams: Biomass, distribution, grazing rate.

Food supply: Zooplankton density, chlorophyll a, smelt diets.

Hydrology: SJR flow, exports, OR & MR flows, particle tracking.

Ranking: 1B

Hypothesis: Increased flow from Yolo Bypass (e.g. managed wetlands) will deliver more phytoplankton and zooplankton to support adults and egg production.

Measures:

Fish: 20 mm abundance and distribution, TNS & FMWT abundance, condition, size, energy density, salvage.

Clams: Biomass, distribution, grazing rate.

Food supply: Zooplankton density, chlorophyll a, smelt diets.

Hydrology: Sac flow, Cache Slough flow, particle tracking, hydrodynamics?

Ranking: 1B

Overbite Clam Hypothesis: Additional outflow will restrict Asian clam abundance

Ranking: 2B

Winter Actions (December-February)

1. Habitat Improvements

Hypothesis: Higher flows during late winter will increase the amount of habitat (e.g. X2) for delta smelt.

Measures:

Fish: FMWT & Kodiak trawl distribution, subsequent TNS abundance, condition, energy density, growth.

Habitat: X2

Ranking: 0

2. Reduce Losses (Mortality)

Hypothesis: Export reduction during “first flush” of delta tributaries will reduce losses of adults.

Measures:

Fish: FMWT distribution, TNS abundance, salvage,

Hydrology: Exports, inflow, outflow.

Modeling: ptm experiments

Ranking: 4C-fish are entrained during these times, based on historical salvage and Pete Smith’s USGS work

Hypothesis: Increased (more positive) Old and Middle River flows will reduce losses of adults and result in a better spawning distribution.

Measures:

Fish: FMWT distribution, TNS abundance, salvage.

Hydrology: Exports, OR & MR flows.

Modeling: ptm experiments

Ranking: 4C-fish are entrained during these times, based on historical salvage and Pete Smith's USGS work

Hypothesis: Reducing Delta Cross Channel closures will reduce losses of adults and result in a better spawning distribution..

Measures:

Fish: FMWT distribution, TNS abundance, salvage,

Hydrology: Exports, OR & MR flows.

Modeling: ptm experiments

Ranking: 2C-based on conceptual understanding of Delta hydrodynamics and recent ptm work.

3. Food Supply

Hypothesis: Increased San Joaquin River flow to Suisun Bay will deliver more phytoplankton and zooplankton to support adult spawners. This action may also help to lower entrainment of fish.

Measures:

Fish: FMWT distribution, subsequent TNS abundance, condition, size, energy density, salvage.

Clams: Biomass, distribution, grazing rate.

Food supply: Zooplankton density, chlorophyll a, smelt diets.

Hydrology: SJR flow, exports, OR & MR flows.

Ranking: 0-there is evidence that material if provided, but it is too late for spawning adults

Hypothesis: Increased flow from Yolo Bypass will deliver more phytoplankton and zooplankton to promote egg production.

Measures:

Fish: subsequent 20 mm abundance and distribution, TNS & FMWT abundance, condition, size, energy density, salvage.

Clams: Biomass, distribution, grazing rate.

Food supply: Zooplankton density, chlorophyll a, smelt diets.

Hydrology: Sac flow, Cache Slough flow, particle tracking, hydrodynamics?

Ranking: 0

Spring Actions (March-May)

1. Habitat Improvements

Hypothesis: Higher flows during spring will increase the amount of habitat (e.g. X2) for delta smelt.

Measures:

Fish: 20 mm abundance, TNS abundance, condition, energy density, growth.

Habitat: X2

Food: Zooplankton, chlorophyll a, diets.

Ranking: 2B-Supportive pattern-efforts have shown that more flow will increase habitat

2. Reduce Losses (Mortality)

Hypothesis: Increased (more positive) Old and Middle River flows will reduce losses of larval and juvenile smelt.

Measures:

Fish: 20 mm abundance and distribution, TNS abundance & distribution, salvage, larval losses (e.g. Kimmerer method).

Hydrology: Exports, OR & MR flows.

Ranking: 4C-based on USGS work

3. Food Supply

Hypothesis: Increased San Joaquin River flow to Suisun Bay will deliver more phytoplankton and zooplankton to support young smelt. This action may also help to lower entrainment of fish.

Measures:

Fish: 20 mm abundance and distribution, TNS abundance and distribution, condition, size, energy density.

Clams: Biomass, distribution, grazing rate.

Food supply: Zooplankton density, chlorophyll a, smelt diets.

Hydrology: SJR flow, exports, OR & MR flows.

Ranking: 2B-critical period, first feeding, these sources do provide food

Hypothesis: Increased flow from Yolo Bypass (inflow or managed wetlands) will deliver more phytoplankton and zooplankton to support young smelt.

Measures:

Fish: 20 mm abundance and distribution, TNS abundance and distribution, condition, size, energy density.

Clams: Biomass, distribution, grazing rate.

Food supply: Zooplankton density, chlorophyll a, smelt diets.

Hydrology: Sac flow, Cache Slough flow, particle tracking, hydrodynamics?

Ranking: 2B-critical period, first feeding, these sources do provide food

Summer Actions (June-August)

1 Habitat Improvements

Hypothesis: Higher flows during summer will increase the amount of habitat (lower salinity, somewhat higher turbidity) for delta smelt.

Measures:

Fish: 20 mm abundance and water quality data, TNS & MWT abundance and water quality data, condition, energy density, growth.

Habitat: X2

Food: Zooplankton, chlorophyll a, diets.

Ranking: 3B-Matt Nobriga's analysis does show a relationship

Hypothesis: Increased turbidity via macrophyte removal will increase the amount of habitat for delta smelt.

Measures:

Fish: TNS & MWT abundance, condition, energy density, growth.

Habitat: EQ (ec & turbidity)

Food: Zooplankton, chlorophyll a, diets.

Ranking: 2A-turbidity is higher in summer and smelt distribution is related to turbidity

2 Food Supply

Hypothesis: Increased San Joaquin River flow to Suisun Bay will deliver more phytoplankton and zooplankton to support juvenile smelt. .

Measures:

Fish: TNS & FMWT abundance, condition, size, energy density.

Clams: Biomass, distribution, grazing rate.

Food supply: Zooplankton density, chlorophyll a, smelt diets.

Hydrology: SJR flow, exports, OR & MR flows, particle tracking.

Ranking: 4B-good evidence here-these sources both provide food

Hypothesis: Increased flow from Yolo Bypass (inflow or managed wetlands) will deliver more phytoplankton and zooplankton to support young smelt.

Measures:

Fish: 20 mm abundance and distribution, TNS & FMWT abundance, condition, size, energy density.

Clams: Biomass, distribution, grazing rate.

Food supply: Zooplankton density, chlorophyll a, smelt diets.

Hydrology: Sac flow, Cache Slough flow, particle tracking, hydrodynamics?

Ranking: 4B-good evidence here-these sources both provide food

EXHIBIT W
TO SWANSON DECLARATION

Delta Smelt Working Group Meeting/Conference Call Minutes

August 21, 2006

Participating: Gonzalo Castillo (USFWS), Mike Chotkowski (USBR), Kevin Fleming (CDFG), Lenny Grimaldo (CDWR), Tracy Hinojosa (CDWR), Ann Lubas-Williams (USBR), Matt Nobriga (CDWR), Ryan Olah (USFWS), Tracy Pettit (USFWS), Jim White (CDFG) and Victoria Poage (USFWS, convener and scribe)

For Discussion:

1. Potential fall actions
2. Other actions
3. Fish Food Farm proposal

Recommendation for WOMT:

The Working Group agreed that the most defensible, critical period for using environmental water to protect delta smelt is the spring, when there is a clear link between flow, population distribution and entrainment risk. No data presently exists to demonstrate that the use of environmental water can influence the distribution of spawning adults, and the amounts of water needed to demonstrably improve fall habitat quantity/quality are unavailable. At times other than spring, it is likely that food limitation is a more critical problem than entrainment. The available data for striped bass and longfin smelt suggest that food limitation cannot be managed through the application of environmental water (attachment, Figure 1). Thus, it is very unlikely that small flow additions during fall could be reasonably expected to improve food availability for delta smelt. The Working Group therefore provisionally decided to recommend forestalling the use of EWA and other environmental water assets until the March-through-June period, when such use would have the greatest likelihood of a positive effect. The Working Group will, however, monitor Delta conditions and incidental take of adults, as per the 2005 OCAP B.O. and the Delta Smelt Risk Assessment Matrix. The DSWG may still recommend winter actions if adult delta smelt entrainment rises above the established threshold. The Working Group does not endorse the proposed fish food farm at Sherman Island.

Minutes:

Entrainment. At last Tuesday's WOMT meeting, Wim Kimmerer presented the results of an analysis of delta smelt entrainment that is part of an evaluation of the EWA that he is working on with co-authors. He estimates that at times, entrainment of delta smelt larvae may be as high as 30%, making it an important source of mortality. Larval losses due to entrainment may be over-ridden by food limitation during summer, but the Working Group is confident that it can minimize entrainment losses whereas mitigating for food limitation is more problematic and will require longer-term experiments and/or restoration programs.

Fall Flows. The Working Group discussed a proposal to maintain Delta outflow at a minimum of 7,000 cfs during September-December. Due to the wet spring, this action may be possible with little or no water cost. The Working Group is not opposed to this action, but did not recommend it because 7,000 cfs is not enough flow to detectably change physical habitat quantity/quality for delta smelt and will not likely change overbite clam distribution or abundance (attachment, Figure 2). Note that the quality of delta smelt fall habitat has recently been correlated with improved Summer Tow-Net Survey indices the following year (see notes from July 10, 2006). DWR generated new estimates on the water costs associated with proposed fall actions, based upon the most recent available forecast, as indicated below:

Net Outflow	October – December			
7,000 cfs	50% Hydrology	170 TAF	90% Hydrology	443 TAF
Net Outflow	September - December			
11,400 cfs	50% Hydrology	911 TAF	90% Hydrology	1,460 TAF

A net outflow of 11,400 cfs will maintain X2 at about Chipps Island if it is already at, or seaward of Chipps Island. Currently, X2 is near Collinsville about 10 km landward of Chipps Island. Fall physical habitat parameters do not respond linearly to changes in X2 position. Over the range of fall X2 positions observed since 1970, delta smelt habitat quality does not increase detectably until X2 passes seaward of Broad Slough (Figure 2 and Figure 3). The amount of environmental water required to move X2 seaward of Broad Slough to Chipps Island and keep it there throughout the fall is 3-4 times the annual EWA budget. Absent a formal and well-thought out experiment to develop an understanding of mechanisms underlying the fall habitat-summer abundance correlation, the DSWG cannot justify the water cost to maintain X2 at Chipps Island throughout the fall.

The Working Group believes that any fall flow control action should be set up as a full-fledged experiment to test competing hypotheses (i.e., reduction in clam distribution or abundance or reduction in entrainment susceptibility of adult delta smelt during winter or reduction in larval susceptibility to entrainment the following spring, etc.).

Old River/Middle River Flows. The Working Group recognized that Old River and Middle River flow targets could be achieved either by increasing San Joaquin River flow or by reducing exports, or more likely, through some combination of those actions. The Working Group believes that OR/MR flows that are neutral or positive through the spawning period of dry years are needed to minimize entrainment of larval delta smelt. These conditions are usually achieved for part of the spawning period through implementing the VAMP. However, the Working Group thinks that the VAMP starts too late in many years to be maximally protective. The target flows would depend to some extent on hydrology; if conditions in the spring are relatively wet, less flow could be needed, but in a 90% hydrology, OR/MR flows should be neutral or positive during a variable spring period based on water temperatures suitable for delta smelt spawning. In any hydrology, the Working Group would need to track fish distribution from survey data and determine the most appropriate flow targets as conditions develop. This year, San

Luis Reservoir may fill as early as December or January, which would potentially allow the Projects greater operational flexibility during spring 2007.

First Flush. Last winter, the Working Group looked at Delta conditions that could potentially influence the timing of adult delta smelt movement into areas wherein they would be subject to entrainment, and noted that in plots of the hydrograph against incidental take, it appeared that take increased in the days following the first major storms, as Sacramento River inflows increased. Definition of a “first flush” event may be based on precipitation or inflow; the Working Group will need to return to this concept in the next meeting.

Fish Food Farm. At last Tuesday’s WOMT meeting, Wim Kimmerer presented evidence that for several species the most important source of mortality in the Delta is food limitation. The Working Group was asked to review DWR’s proposal for an experimental food production facility on Sherman Island. The Working Group does not believe that the proposal should be implemented for several reasons. First, the proposed project is too small to make a detectable difference in estuarine food availability. Second, the project proposes to create a very shallow farm “habitat” for lower trophic level production during summer. This is likely to generate anoxic water similar to what often happens during fall in Suisun Marsh duck clubs. This poor-quality water would be discharged into a core delta smelt habitat area. Lastly, the project proposes to divert water onto Sherman Island from the surrounding waterways. Although the diverted water would be screened to exclude fish, larval fish may not be screened effectively. Furthermore, it cannot be screened to prevent nuisance organisms like Microcystis and overbite clam larvae that might have undesirable influences on what grows on the ‘farm.’

Action Items:

None

Next Scheduled Meeting: Conference call, Wednesday, August 30, 2006, 3:00 pm

Submitted,
VLP

Attachment 1.

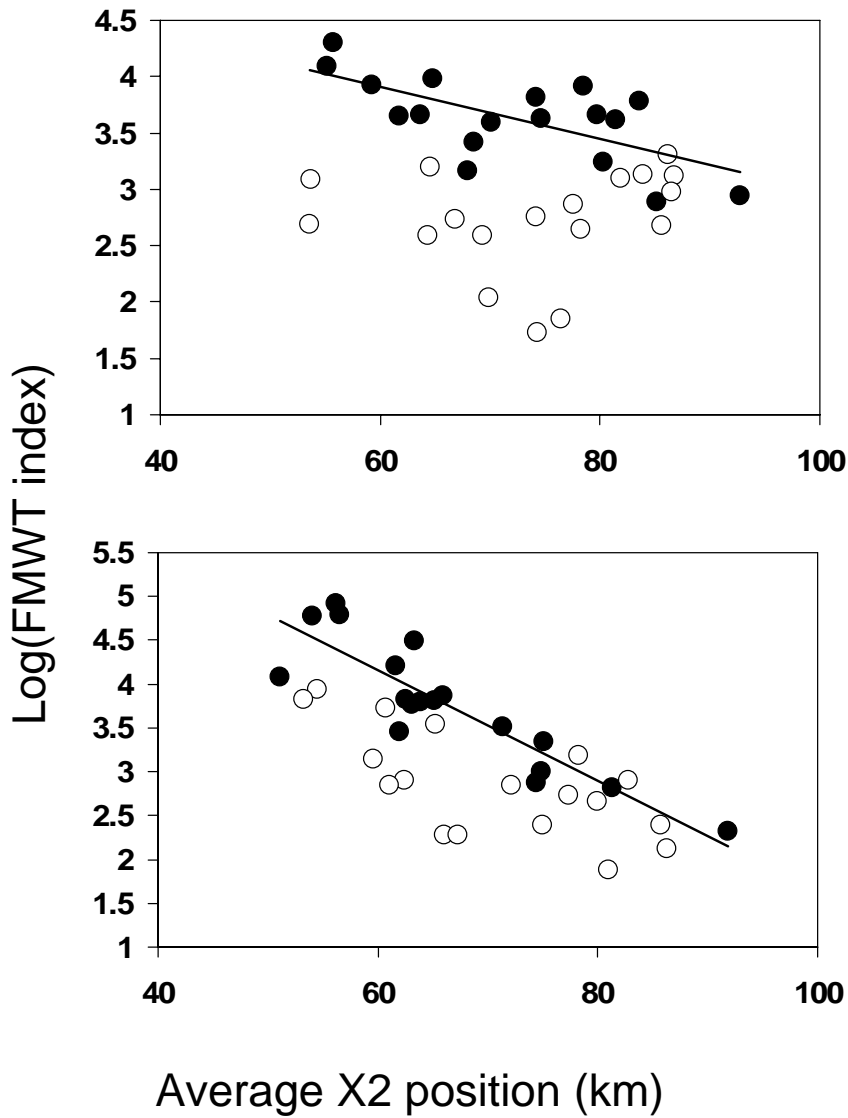


Figure 1. The 1967-2004 X2 relationships for striped bass (top panel) and longfin smelt (bottom panel) for before (solid symbols) and after (open symbols) the invasion of overbite clam, *Corbula amurensis*.

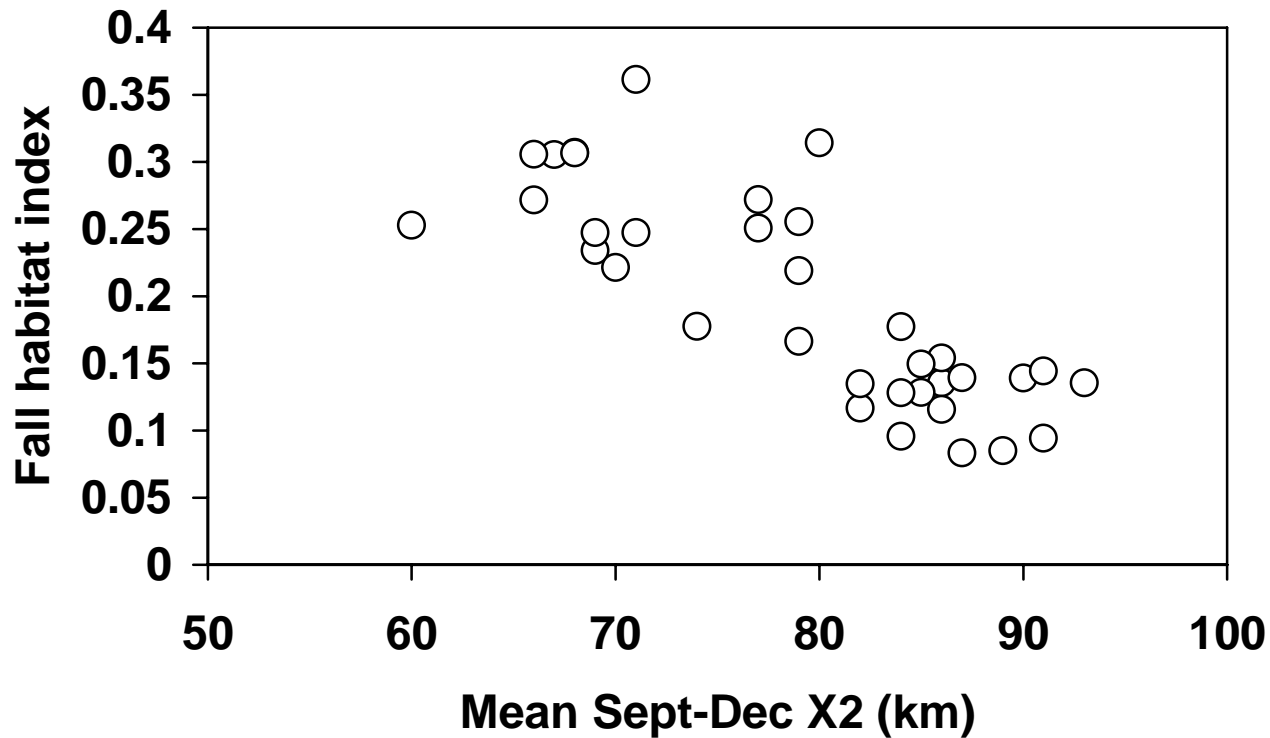


Figure 2. Relationship between fall X2 position and a delta smelt habitat index based on specific conductance, water clarity, and water temperature. Note that Chipps Island is approximately at X2 = 75 km and requires 11,400 cfs of Delta outflow to maintain its position there and higher flows to move it there from landward locations. Note that X2 was at approximately 85 km at the time of this meeting (August 2006).

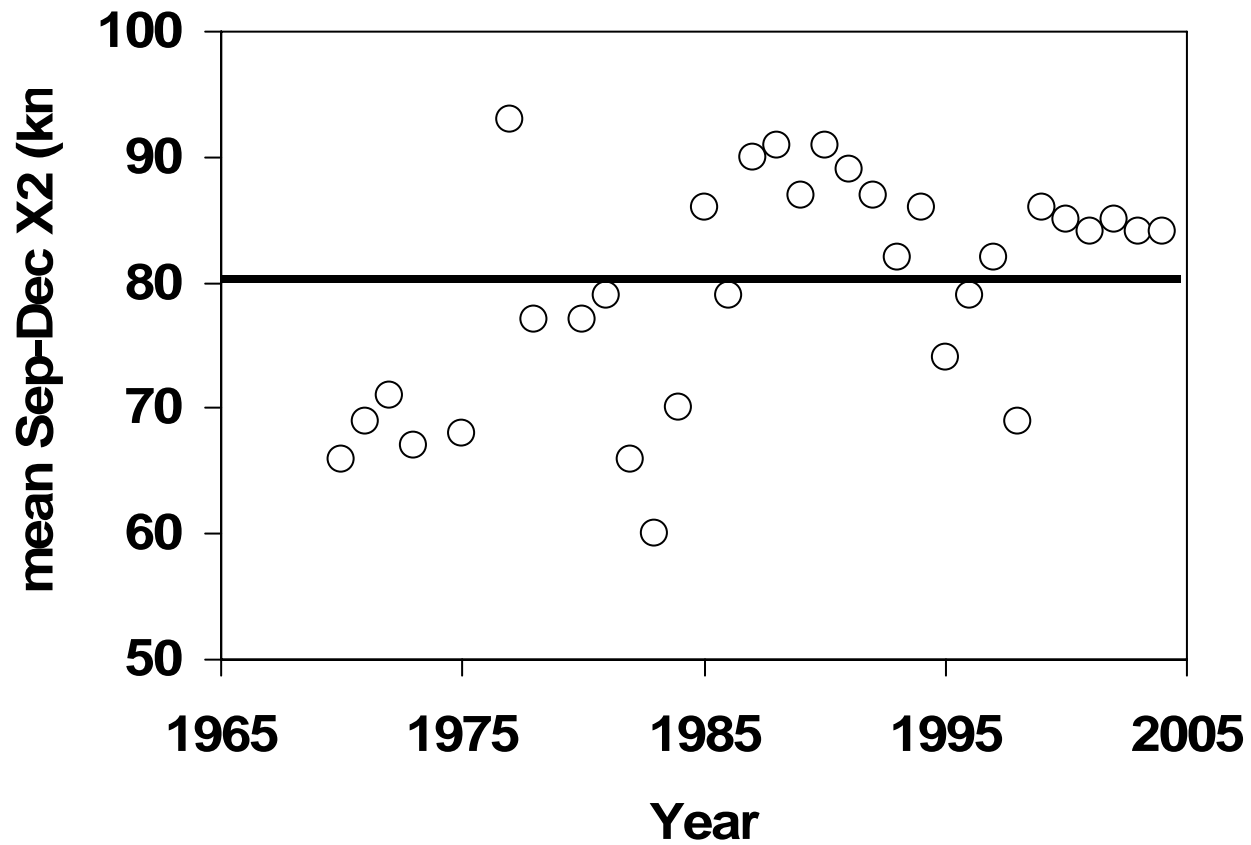


Figure 3. Time series of fall X2 positions for 1970-2004. The thick horizontal line denotes an X2 position near Broad Slough.

Summary of DAT Conference Call 7/17/2007

Participants: EChappell (DWR), JSpeegle(FWS),
RGartz(DFG), THinojosa(DWR), EGleason(DFG),
FFeyrer(DWR), KCrosby(BR), JAdib-Samii(DFG)

Conclusions and Recommendations

There were no new operational recommendations today.

20mm Survey Update – DFG has completed the final survey, Survey 9 but is still processing samples. DFG caught 38 delta smelt of which 19 were caught at Chipps Island, 7 near the confluence, and the rest in the lower Sacramento River. To date, the season total is approximately 136 larval delta smelt. The results from the 20mm surveys are posted at <http://www.delta.dfg.ca.gov/data/20mm/>.

This was the final DAT call of the season. The weekly conference calls will resume on October 2, 2007.

Delta Smelt Monitoring

Summer Tow Net Survey Update – DFG completed Survey 3 last week. DFG caught 22 delta smelt of which 1 was caught near Benicia and 2 in Grizzly Bay; otherwise the distribution was similar to the 20mm survey. So far, the season total is 44. The results from the Summer Tow Net surveys are posted at <http://www.delta.dfg.ca.gov/data/townet/>.

20mm Survey Update – DFG has completed the final survey, Survey 9 but is still processing samples. DFG caught 38 delta smelt of which 19 were caught at Chipps Island, 7 near the confluence, and the rest in the lower Sacramento River. To date, the season total is approximately 136 larval delta smelt. The results from the 20mm surveys are posted at <http://www.delta.dfg.ca.gov/data/20mm/>.

DSWG Update – The DSWG did not meet this week.

Chinook Monitoring

Upper Sacramento River Summary – In the last two weeks the catch of fall-run Chinook at RBDD has dropped to approximately 36,000 per day. FWS also caught late-fall Chinook and steelhead. Chinook were caught in low numbers in the GCID rotary screw trap last week.

Delta Monitoring Summary - Sampling is still suspended at Chipps Island to protect delta smelt. A few Chinook were caught in the Sacramento River trawl and in the Lower Sacramento River beach seine. No steelhead or delta smelt were caught in the last week.

Salvage Facilities –

Summary – Delta smelt and longfin smelt were salvaged in low numbers at SWP in the last week. No steelhead or Chinook were salvaged.

Chinook – None.

Steelhead – None.

Delta smelt – SWP salvaged 30 delta smelt for a season total of 2,327.

Splittail – SWP salvaged 132 splittail for a season total of 502. CVP salvaged 48 splittail for a season total of 684. The salvage of splittail is much lower than last year.

Longfin smelt – SWP salvaged 9 longfin smelt for a season total of 66.

Sturgeon – CVP observed one white sturgeon (473mm) with an expanded salvage of 12 for a season total of 73.

The DFG Salvage Database can be accessed at this ftp site: <ftp://ftp.delta.dfg.ca.gov/salvage/>.

Turbidity data for Clifton Court forebay is available at: <http://cdec2.water.ca.gov/cgi-progs/queryFx?CLC>.

Agricultural Barriers

HORB – The barrier has been completely removed.

Ag barriers –The Grantline and Middle River barriers are operating tidally. DWR tied open the flap gates on Old River barrier to improve circulation and water quality. DWR will continue to monitor upstream water levels.

The weekly updates on barrier operations are now available at: http://baydeltaoffice.water.ca.gov/sdb/tbp/index_tbp.cfm.

Operations

SWP -

CCFB – 7,180 cfs.
Oroville – 6,000 cfs. Releases will drop to 5,500cfs tomorrow, 7/18.
E/I - 3-day = 52.6%.
San Luis - ~323 taf. SWP share of San Luis capacity is 1,062 taf.
EWA - The current debt for SWP is approximately 320 to 330taf. The current debt in San Luis for CVP is approximately 90 to 100taf.

CVP -

Tracy PP – 4,400 cfs.
DCC – Open.
Trinity – 450 cfs.
Clear Creek – 150 cfs.
Keswick – 15,000 cfs.
Nimbus – 4,000 cfs.
Goodwin – 400 cfs. Release will drop to 375cfs tomorrow, 7/18.
San Luis – 97 taf. CVP share of San Luis capacity is 966 taf.

Flows

Sacramento River at Freeport ~ 19,500 cfs.
Fremont Weir ~ 0.
San Joaquin River at Vernalis ~ 1,100 cfs.
Delta Outflow ~ 5,197 cfs. The 7-day average is 5,199 cfs.

Delta Water Quality

Water quality is okay except in the south Delta.

July Water Quality Standards

Delta Outflow – monthly average \geq 5,000cfs and 7-day average \geq 4,000cfs.

E/I Ratio – \leq 65%.

Contra Costa Canal – CI \leq 250 mg/L. In addition, CI \leq 150 mg/L for 165 days per year. This portion of

the standard has been met for the year.

Western Delta – EC at Emmaton must be less than or equal to 1.67 and at Jersey Point it must be less than or equal to 1.35. The San Andreas station is 0.58. The objective at Mokelumne River at Terminous remains 0.45 EC or less through August 15.

South Delta – 30-day average EC \leq 0.7 until the end of August.

Erin Chappell

Environmental Scientist

DWR-DES

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EXHIBIT Y
TO SWANSON DECLARATION

Delta Smelt Working Group Meeting Notes

February 9, 2007

Participating: Kevin Fleming (CDFG), Lenny Grimaldo (CDWR), Bruce Herbold (EPA), Tracy Hinojosa (CDWR), Victoria Poage (USFWS), Ted Sommer (CDWR), Kevin Sun (CDWR, guest), Jim White (CDFG), and Peter Johnsen (USFWS, convener and scribe)

For Discussion:

1. Delta smelt distribution
2. EWA
3. Continued action after February 15
4. Spring action

Recommendation for WOMT:

The Working Group had the following recommendation for WOMT:

Continue moderating Old and Middle Rivers combined flow to a range of negative 5000 cfs to negative 3500 cfs after February 15.

The Working Group will consider and/or generate additional analyses of existing data and continue to monitor conditions in the Delta and survey sampling results to determine when refinements to the recommendation are needed.

Previous recommendation:

Forego installation of the spring Head-of-Old River Barrier. (DSWG Notes, December 11, 2006). WOMT agencies have taken this recommendation under advisement.

Meeting Notes:

1. The Delta Smelt Working Group reviewed the delta smelt distribution and maturity data from the second Spring Kodiak Trawl that was conducted from February 5 through February 9. In this year of very low apparent abundance, survey results should be interpreted with particular caution. The trawl collected 106 adult delta smelt. With the exception of 2006 (n=84), the number collected was low compared to February surveys in other years. All fish were collected from Suisun Bay/Montezuma Slough, Sacramento River near the confluence with the San Joaquin River, and the Sacramento River Deep Water Ship Channel; none were collected from the Central or South Delta. Areas west of Suisun were not sampled. The distribution was similar to the distribution during survey 1 but differed from mid-February distributions during most other years, which have collected delta smelt in the South and/or Central Delta. That no salvage has occurred suggests that delta smelt are not yet present in the South Delta in any significant numbers. All female delta smelt were at gonadal development stages 1, 2 or 3 (pre-spawning) but five males (3.5 percent of the catch) had mature gonads. The onset of reproductive

maturity appears to be late, chronologically, compared to all other years, probably due to unusually cold weather in January and resulting low water temperature. Water temperatures in most areas of the Delta are approaching 10⁰C. In previous years, surveys have seen some delta smelt with mature gonads at 10⁰C water temperature; female delta smelt are expected to mature as water temperature continues to increase. Because rain is expected and delta smelt appear positioned for potential movement into the Delta, the Working Group requested that the supplemental survey, scheduled to begin February 19, include stations in the South and Central Delta. DFG staff has posted the results of SKT sampling to the web (<http://www.delta.dfg.ca.gov/data/skt/>).

2. The Delta Smelt Working Group discussed the potential accrual of additional EWA debt to the SWP if the current action to moderate the flows at Old and Middle Rivers were to be continued after February 15. Eighteen thousand acre feet of debt were accrued by the end of January. No additional debt has been accrued since February 1 because the OR/MR flow target has been met by the Projects' operating to meet Delta water quality standards. Current and forecasted precipitation may change Delta conditions, and the group noted that continuing the action is likely to draw upon EWA purchased assets. The group was also informed that until now, the repair of the Gorman Creek Channel has suppressed exports and delayed the refill of Castaic Lake. However, completion of the repair will increase the base demand, further potentially increasing the costs of the action if the Delta remains in excess conditions. A preliminary estimate of SWP operations in late February indicates that exports could drive OR/MR flows to negative 8,000cfs. Curtailing exports by approximately 4,000cfs to meet a targeted OR/MR flow of negative 4,000cfs, i.e., continuing the action after February 15 could accrue 8TAF/day of EWA debt to SWP. At this time it is not possible to accurately estimate the actual cost of continuing to moderate OR/MR flows after February 15; however, it was noted that EWA is sufficiently funded to have purchased assets available.

3. The Working Group reviewed its earlier recommendation to continue moderating OR/MR flows after February 15. Given what is known of the delta smelt distribution from the SKT and increasing trends in water temperatures, it appears likely that the onset of spawning is approaching. The position of X2, at approximately 80 km, is an indicator that the risk of entrainment is relatively high. Due to the forecast precipitation, which could trigger additional spawning movements, the Working Group agreed that continuing the action after February 15 is likely to support the goal of avoiding adult salvage. The Working Group therefore recommends maintaining an OR/MR flow target of negative 4,000cfs at least until survey data from the supplemental SKT can be reviewed and discussed.

4. The Delta Smelt Risk Assessment Matrix (DSRAM) incorporated in the Operation Criteria and Plan (OCAP) for SWP and CVP sets criteria which, when exceeded will trigger a Working Group meeting to discuss the development of potential recommendations. Criteria included in the DSRAM that would trigger a concern, meetings by the Working Group, and discussions of spring recommendations include a recovery index below 74, an X2 location upstream of Chipps Island, Delta water temperatures of at least 12⁰C, the presence of mature and spent females, adult distribution, a negative 20mm centroid, low juvenile abundance, and/or high adult salvage. Possible March protection actions identified in DSRAM are export reductions

and changes in San Joaquin River flows. Additional possible protection actions for May and June are changes in barrier operations and changed position of the cross channel gates. This summarizes the base framework for the Working Group and the potential actions that the group may recommend. In addition to the DSRAM, the Working Group will review other information, including the POD Action Plan that was developed by State resource agencies, when developing spring recommendations.

It is not possible for the Working Group to provide a recommendation for a spring action until additional information on Delta conditions and delta smelt distribution and maturity becomes available. However, export reductions to increase OR/MR flows are believed to be the likeliest tool available to minimize entrainment of larvae and juveniles originating from spawning in the South Delta. One possible recommendation to avoid or minimize entrainment could be the POD Action Plan's OR/MR flow target of zero for at least two weeks. However, the Working Group will evaluate other data, analyses, and real-time monitoring results in deciding on appropriate protection recommendations. It is less clear how exports during spring may affect survival of larvae originating from the Sacramento River. Recently modeled fingerprint data by DWR staff indicates that the percentage of Sacramento River particles that become entrained at the SWP during March (1993-2005) is highly correlated (slope = -.003, $P < 0.001$, $r^2 = 0.36$) with Old and Middle River flows. The average percentage of Sacramento River water entrained at the SWP when Old and Middle river flows are less than -5,000 CFS is 68%, between -5,000 and 0 CFS is 28 %, and greater than 0 CFS is 14%. These data suggest that larvae in the Sacramento River are most vulnerable to entrainment when Old and Middle River flows are less than -5,000 CFS. The fingerprint data does not distinguish regional variability, thus it is uncertain whether larvae residing in the Cache Slough complex would be vulnerable at Old and Middle river flows less than -5,000 CFS.

The Working Group requested that DWR staff perform particle tracking (PTM) runs for particles released downstream of Cache Slough at station 711 under OR/MR flow conditions of negative 12,000, 8,000, and 4,000cfs and at zero flow. Particles will also be released in the South Delta at station 815 for comparison. As in the past, the Working Group set a significance criterion of 30% difference in particle fate. The results of the PTM runs will be reviewed along with Delta conditions, spawning progression, and the distribution of juveniles as indicated by the 20-mm Survey before any further recommendations are made.

Next meeting: Monday, February 26 at 3:30 pm via conference call.

Submitted,
PJ

EXHIBIT Z
TO SWANSON DECLARATION

Delta Smelt Working Group Meeting Notes

October 30, 2006

Participating: Gonzalo Castillo (USFWS), Mike Chotkowski (USBR), Steve Culberson (CBDA, guest), Kevin Fleming (CDFG), Lenny Grimaldo (CDWR), Tracy Hinojosa (CDWR), Peter Johnsen (USFWS), Matt Nobriga (CDWR), Ted Sommer (CDWR), Stephani Sparr (CDWR, guest), Kevin Sun (CDWR, guest), Jim White (CDFG) and Victoria Poage (USFWS, convener and scribe)

For Discussion:

Review of PTM requested at October 10 meeting

Recommendation for WOMT: There was no recommendation from this meeting.

Notes:

At the October 10 meeting the Working Group identified a need for Particle Tracking Modeling of the effects of CCF intake gate operations. The following runs assuming a VAMP-like hydrology were requested:

- Scenario A, SJR 7000 cfs, combined export 3000 cfs, all barriers in, and CCFB gates standard operation
- Scenario B, SJR 7000 cfs, combined export 3000 cfs, all barriers in, and CCFB gates are open
- Scenario C, SJR 7000 cfs, combined export 3000 cfs, all barriers out, and CCFB gates standard operation
- Scenario D, SJR 7000 cfs, combined export 3000 cfs, all barriers out, and CCFB gates are open
- Scenario E, SJR 4500 cfs, combined export 1500 cfs, all barriers in, and CCFB gates standard operation
- Scenario F, SJR 4500 cfs, combined export 1500 cfs, all barriers in, and CCFB gates are open
- Scenario G, SJR 4500 cfs, combined export 1500 cfs, all barriers out, and CCFB gates standard operation
- Scenario H, SJR 4500 cfs, combined export 1500 cfs, all barriers out, and CCFB gates are open

All particles were injected at stations 815, 902 and 910. Injection began April 15 and ran through May 15. The runs assumed the tidal conditions from the 2006 VAMP period.

Rather than the traditional bar chart output, the Working Group requested a cumulative output of particle fates. Review of the results revealed that “barriers out” vs. “barriers in” made a much greater difference in particle fates than did CCF gate operations. Differences were also observed when comparing Scenarios A and B to Scenarios E and F, indicating that low flows and low exports would be preferable to higher flows and higher exports. The summary table below depicts results for May 15.

Particle Fate Station	Percent of Particles @ CVP			Percent of Particles @ SWP		
	910	815	902	910	815	902
Scenario A SJR 7000 cfs/exp. 3000 cfs/barriers in/CCF gates std ops	10.9	1.2	13.5	13.8	0.8	20.4
Scenario B SJR 7000 cfs/exp. 3000 cfs/barriers in/CCF gates open	8.3	0.7	12.0	15.3	1.1	22.3
Scenario C SJR 7000 cfs/exp. 3000 cfs/barriers out/CCF gates std ops	0	0	0	0	0	0
Scenario D SJR 7000 cfs/exp. 3000 cfs/barriers out/CCF gates open	0	0	0	0	0	0
Scenario E SJR 4500 cfs/exp. 1500 cfs/barriers in/CCF gates std ops	3.4	0.2	2.8	1.8	0.1	1.2
Scenario F SJR 4500 cfs/exp. 1500 cfs/barriers in/CCF gates open	2.4	0	2.2	2.3	0	1.8
Scenario G SJR 4500 cfs/exp. 1500 cfs/barriers out/CCF gates std ops	0	0	0	0	0	0
Scenario H SJR 4500 cfs/exp. 1500 cfs/barriers out/CCF gates open	0	0	0	0	0	0

The Working Group will continue to discuss potential modifications to barrier installation at a later meeting.

Next Scheduled Meeting: Not yet scheduled.

Submitted,

VLP