**IEP Longfin Smelt Synthesis Project Work Team Meeting**

**Friday October 21, 2016 from 13:00-16:00**

**DWR, West Sacramento, Room 106 (DWR-DES, 3500 Industrial Blvd, West Sacramento, 95691)**

Attendees: Randy Baxter, Vanessa Tobias, Wim Kimmerer, Jan Thompson, Louise Conrad, Richard Connon, Lauren Damon, Matt Nobriga, Zair Burris, Felipe La Luz, Jim Hobbs, Christina Parker, Larry Brown, Peggy Lehman, Trishelle Morris

It’s important to meet in person the first couple meetings, but just in case:

Call-in number: 866-764-1290  Passcode: 5000198

**Agenda:**

1. Introductions (All 15 min)
2. Discussion of LFS Synthesis Team Scope, Timeline and Format (All, 30 min)

* Timeline as of October 2016
  + Attempt to meet roughly monthly through mid 2017. To determine document structure, develop conceptual model and hypotheses. Once done, can partition out sections for writing and finalize discussions on topics with less frequent meetings.
  + Timeline has finishing Winter 2018 for most contributions for document to be produced. Then rest of 2018 to fine-tune document.
  + Can help inform upcoming Federal listing in 2020.
* Document format
  + Products – Original idea was for peer reviewed document. Now thinking a Tech Rept is better format. Can cite research to be published in a technical report. PIs might want to publish individually that could be included in tech report, submitted in similar time frame. Can discuss.
  + Larry – Interest in discussing review process
* Membership
  + Randy – Membership currently limited to agency and academics. Question to group of including outside scientists.
  + Louise – Should have statement for membership if asked. There could be interest in participation if opened up. Value in having experts not participate so to review later.
  + Randy – Thought is to invite consultant researcher working directly with LFS. Will consider and have a phone conversation to determine interest and availability (if cost can be absorbed by current contracts).

1. Coordination with other LFS work – discuss current and near future work (All, 30 min)

Review of other ongoing work

* Randy – Want to acknowledge ongoing work that could inform synthesis work
* Jim Hobbs – Collaboration with DWR and CDFW, conducted as part of longfin smelt settlement. Whether longfin smelt spawn in Bay tributaries versus confluence, in also South Bay.
  + Includes use of SLS gear and protocols
  + In wetter years LFS larvae use San Pablo Bay
  + Completed second year of field sampling.
  + Also have otolith chemistry, natal origin salinity and possibly chemistry
  + Can compare otolith chemistry of juv. and adults caught in Bay to larval detections in tributaries and tributary chemistry, and interpret origin and survivorship of adults from spawning areas and from those collected in monitoring surveys
  + CB samples (zooplankton) collected unprocessed as of now.
  + There is also water chemical signature work based on trace elements/isotopes
  + UC Davis isotope machine has died, Dept. working on replacement. Looking at other isotopes. Boron isotopes present from waste water treatment identifies south bay, as waste water is main fresh water input
* Wim Kimmerer– Has a contract Prop 1 coming.
  + - Hydrodynamic 3d Modeling – Trying to model distributions of larval longfin smelt.
    - Catches in salt water, increased retention with high outflow
    - Can use amphipods to show vertical migration vs. being advected of a neutral particle.
    - LFS probably orienting with food and habitat features – can add behaviors to particles
    - Does retention increase with fresh water flow? Gravitational flow induced.
    - Steve Brandt? – Bioacoustics to learn what fish are up to (how they move in the water column) based on tidal current conditions.
    - Bioacoustics need fish to target; low abundance will influence answers that are possible. Could use other species as proof of concept
    - Diet – Julian Burns has larva from the marsh habitats sampled by Lenny Grimaldo. Could be good contrast to fish from open water
    - Wim – Student developing genetic testing for gut contents of larval fish
    - Steve – Tomo (UCD) might have genetic information (tag unknown) that might be useful.
    - Randy – LFS have protracted larval period; maybe genetic tools useful for looking at Delta Smelt predators (shrimp)
    - Richard – Might be easy to develop marker for Longfin Smelt and eDNA.

1. Break
2. Life History Summary (Randy, Jim, others? 45 min)

* Review published and unpublished information to set the stage for conceptual model construction and hypothesis development
* Presentation – Early Life History focus based on old conceptual model (see Baxter Longfin Life Hist 2016.ppt)
  + Spawning in fresh and likely brackish water. Net currents likely move FW spawned larvae downstream. Fish Culture and Conservation Lab conducted small studies on egg and larva survival vs salinity; initially used NaCl and had difficulties
  + Larval in estuary found throughout half salinity range (90th percentile about 18 ppt)
  + Really long incubation periods based on temperatures, 3-4 weeks on bottom for temps found in SF estuary
  + Lake Washington data – spawn in sand and gravel (Sibley and Brocksmith 1995)
  + Our E&L data distinguishes larvae w/ yolk sac or oil globule – FCCL observations of days to first feeding… early as 3 dph. (days post hatch)
  + Air bladder development at 10-12 mm (ca. 20 dph) effects vertical migration with efficiency to prevent advection (Wang 2007)
  + Slow growth, and fish are rearing in low temps. Almost 80 days to get to 20 mm FL. (Fish Conservation and Culture lab data)
  + Larvae <10-12 mm are surface oriented (Bennett et al. 2002)
  + Does FCCL see surface orientation? How much swimming against current?
  + River KM Larva distribution vs X2
    - Bay Study E&L data: In wet years, have recruitment centered in San Pablo Bay; in dry years mostly Suisun and upstream
  + Hobbs et al. 2010: 20-mm samples detected LFS larvae to 8 ppt and occasionally higher; otolith chemistry from surviving juveniles and adults showed rearing mostly 1-4 ppt
  + Hatch-out peak historically in February, range Dec-May based on YSLCPUE; now sporadic.
  + LFS larvae sensitive to temps at 20C (Jefferies et al 2016)
  + Longfin age-0 early in season caught throughout estuary
  + Numbers in Delta drop with increase temps and entrainment
  + Temps in Suisun Bay might also be too high for days, precluding temps
  + Longfin can move out to ocean if conditions in estuary are poor
  + Orientation of age-0 and older fish favors deeper water – Bay Study channel stations (Rosenfield and Baxter 2007)
  + Stomach fullness by time – LFS have large olfactory sense might not need to be visual feeder. (also see Hobbs et al. 2006)
  + Copper runoff to estuary could be influence sensing food or predators
  + Randy shared Bay Study data for various regions
    - Patterns of 1980s among regions – upper estuary used for age-0 rearing during 1980s (wet years and dry years)
    - Shift in detections 2001-2007 – less use of upper water column (fewer caught in Bay Study MWT), and possible downstream shift in catch.
    - Coastal Rearing evidence from City of SF otter trawling
    - Fecundity vs length (three age classes can spawn).
    - Summary of 2006 LFS diet info: Eurytemora impt to larvae, late larvae and juve feed a lot on mysids, and amphipods eaten somewhat later in year
    - Look at copepod anomaly NOAA data to consider rearing on coast, maybe red tides influence it also
    - Outflow abundance relation shows step declines for Potamocorbula establishment (both surveys all gear) and POD (both surveys MWT gear only); Bay Study OT does not show 2nd step decline.
    - Adult stock size (spawning stock) is also an important factor in year-to-year abundance.
* Jim – Shared slides on growth and otolith increments (see Hobbs Longfin Smelt MAST Synthesis Meeting.pptx)
  + Chris – Shared UCD longfin smelt catch patterns 2015 and 2016, compared with CDFW data
  + Longfin caught in Petaluma and Napa rivers
  + Length by salinity

1. Initial thoughts and discussion about structure of conceptual life history model (All, 30 min)

* Randy – Conceptual Model discussion (see LFS\_Syn\_Conceptual Models. Ppt)
  + Historic POD Basic CM helped frame this effort
  + There are other models that have filled information
  + SAIL group – Location an important factor in their CM.
  + Likely looking at life stage or life stage transition models
  + Consider audience – Think of resource manager and a simple model for use
    - Spatial could include GIS conceptual model
  + Conceptual model to include historical and current conditions
  + Potential broad factors affecting longfin smelt
    - Food, contaminants, entrainment, predation, habitat
    - Start with production and recruitment with outflow and abundance

1. Wrap up discussion
   * Steve S. – Consider setting deadline date for new material and data
   * Louise- Conceptual model development for Delta Smelt benefitted from subgroups to develop and bring back to the group for review.
   * Need to identify data and fraction in ocean
   * Next Steps – Conceptual model and how to bring life stages with an overall model
     + Interest in SAIL model
     + MAST DS model also informed by data available
   * Think about winter period and larvae and presence and survival
     + Productivity, clam grazing, etc
   * Query group on meeting during week of Dec 5.
   * **Homework: think about what the LFS life history conceptual model should show and how to organize**