FYI. Please also post on ftp site, along with the other reviews, but also post this email along with them (maybe paste into first page). Stephanie told me that Richard had sent her these notes quite some time ago so she could include them in her review, but she didn’tt get around to doing that, so I asked for them separately. I don’t want to treat/list them as public comments that we have to respond to, but have them as potentially helpful colleague input. Anke

Anke Mueller-Solger

IEP Lead Scientist

(916) 275-8727

<www.water.ca.gov/iep>

[www.deltacouncil.ca.gov/delta\_science\_program/](http://www.deltacouncil.ca.gov/delta_science_program/)

Views expressed in this e-mail are my own and do not necessarily represent the views of the Interagency Ecological Program or the Delta Stewardship Council.

**From:** Richard Connon [mailto:reconnon@ucdavis.edu]
**Sent:** Friday, September 06, 2013 4:36 PM
**To:** Mueller-Solger, Anke@DeltaCouncil
**Subject:** MAST comments

Hi Anke,

Stephanie just told me she spoke with you about the MAST comments, etc… and mentioned that you’d like my comments as a colleague.  I’ve attached my initial notes, but I think that Stephanie would have caught most of it (I haven’t seen the SFCWA letter).

These are mainly notes, as I went through the document. I had scribbled them down for Val and Stephanie.

I’m happy to help in any way I can. E.g. helping write the contaminants section.

R

Richard E. Connon, BSc, PhD

Assistant Adjunct Professor

School of Veterinary Medicine: APC

Room 3205 Vet Med 3B

1089 Veterinary Medicine Drive,

University of California,

Davis, CA 95616, USA

TEL: +1 (530) 752-3141

Cell: + (916) 505 4925

FAX: +1 (530) 752-7690

E-MAIL: reconnnon@ucdavis.edu

WEB-SITE: <http://www.vetmed.ucdavis.edu/faculty/results.cfm?fid=19083>

MAST

Two primary concerns arise from reviewing the MAST document:

* The conceptual Model very briefly mentions “Eggs and Larvae”, under the breakdown – seasonal-specific models, but not on the primary CM.
* Contaminants are grossly ignored, as only being associated with the fall first storm evens, and adults, or WWTP (ammonium) in spring. Contaminants are only referred to in the context of acute toxicity, where sublethal effects (e.g. from EDCs or pseudopersistent chemicals arising from WTP) are not considered important. Interactions between contaminants and predator (easy prey), hydrology, food, and weather, are not sufficiently addressed. This is a major and dangerous oversight and a very poor section in the document. There’s no developmental effect impact, epigenetics, etc., only a bias to adults. There are so many aspects that are wrong with this section. I can elaborate further if needed – e.g. if below the limit of detection, then it’s not toxic, etc... would make any toxicologist cringe! Lack of contaminant interactions, and only addresses acute mortality.

More specific notes:

**Figure 7.** Species-specific conceptual model for delta smelt (Baxter et al. 2010)

(Line: 486). The figure legend would not make sense to someone unaware of the other three models. This is one of four species-specific CMs, the one for delta smelt. It’s a conceptual model for the delta smelt.

**Figure 8.** (line 547) The CM needs amending. There is inconsistency between the use of contaminants and toxicity. It is inferring that there is no toxicity in spring? Only in fall, and that it only affects adults. However, in spring there are contaminants from the WWTP (presumably they are referring only to ammonia!) but no contaminants or toxicity in the summer.

WWTP effluent is all year round, contaminants arising from WWTP are pseudopersistent.

**Figure 10.** (Line 562) Commences with Eggs & Larvae, with a transition probability relating to feeding success, growth and survival. Emergence success, though not assessed in the field, needs to be included as a probability (not sure that feeding success of eggs is a viable assessment!)

Lines 711-713. “*We consider all habitat attributes discussed here as equally important because, as noted in Chapter 2, habitat is the sum of* ***all*** *physical and biological attributes affecting a species*.” Paragraph on line 849 begs to differ, stating that temperature is one of the most important habitat parameters…

Lines 738-739. “*These simple statistical models should be used with caution because they only predict temperature at the site of the 739 recording instrument*.” Specific depth should be considered in any temperature prediction model! water is 3D!

Line 748. Water temperature is measured, not collected.

Lines 770-771. “*The maximum temperature delta smelt will tolerate is currently being revisited as part of a larger UC Davis study about the “fundamental niche” of delta smelt, but results have not yet been published*.” Cite Connon et al. plus grant details.

Lines-782-783. “*At the stressful temperatures beyond the optimum but below the lethal level, the ability to grow and mature might be impaired or over some period of time could be lethal*.” If it's below the lethal level, then it cannot be lethal! This needs rephrasing. Explain CTmax short time-period to explain lethal level.

Line 821. “*In the culture experiments reported by Bennett (2005), temperature strongly influenced hatching success of eggs, which appeared optimal at about 15°C*…” This is very un-scientific, and sounds like an unfounded pers. comm. Determined temperature, and range should be presented.

Line 825. “*Starting life after hatching at a relatively small size…”* “…after hatching…” should be deleted. Most fish start life after hatching.

Line 837. “*…make a behavioral choice to feed, grow, and become less vulnerable to predators, even though the short-term predation risk might increase.” I believe the author intended to write “…become more vulnerable…”.* Also, it reads as if growth and vulnerability to predation are a behavioral choice.

Line 843 “*… smelt appear to have a physiological optimum temperature near 20°C…”* Again, this is very un-scientific, and sounds like an unfounded pers. comm. Determined temperature, and range should be presented.

Line 862. “…isohaline measured near the bottom of the water column.” Measurement location deeds to be specific “Near the bottom”, is not scientifically replicable!

The Turbidity section needs a lot of work.

Data is presented as Secchi depth, as opposed to NTU. Why?

Lines 930-931. Grammatical errors: “if turbidity was incorporated” instead of “if turbidity were incorporated”. Perhaps this is an Americanism that I’m not aware of(?). I’m losing my English the longer I spend in CA.

Lines 942-945. It is stated that “*In many estuaries, these areas are located in or near the low salinity zone and are recognized as particularly productive fish nurseries*…*In the SFE, turbidity is largely determined by the amount of suspended inorganic sediment in the water*”  and that “…*organic components may also play a role*”. Organic components of turbidity are what drive the productive nursery. Inorganic sediment is not responsible for "particularly productive fish nurseries"

Lines 1005-1006. “*The greatest differences in average water transparency between the pre-POD and POD periods occurred in September and October (28 and 30 cm difference between monthly averages, respectively) and the smallest differences in January-May (10 cm).”* Only 2 cm difference? 28-30? ... and why is the smallest difference 10cm? I believe this may be miswritten.

Line 1011. “*Delta smelt are visual feeders, and feed primarily between dawn and dusk*” is this now considered a fact?

Line 1020. “maximum feeding response occurred at the highest alga concentrations and light levels tested.” Please state range tested. Delta smelt do not feed at very high turbidity levels. See Hasenbein et al 2013 (just published), or cite as Pers Com. 2013. This was presented at IEP.

The author indicates that delta smelt need turbidity to see their prey, and the goes on to say, on lines 1032-1033, that: “it has generally been assumed that juvenile and adult delta smelt are closely associated with turbidity in order to minimize their risk of predation in their generally open-water habitat.”

Lines 1048-1049. “*Entrainment is a specific case of involuntary transport. It refers to situations when altered flows misdirect and transport fish and other organisms in directions in which they would not normally travel or where they will encounter unfavorable conditions and increased risk of mortality*.” I would caution as to the latter part of the paragraph not being (legally) accurate.

Line 1217. “*This does not mean that predation isn’t a primary source of mortality, but that delta smelt are not a major prey item of large striped bass, so predation is relatively difficult to detect*.” Factors affecting this are: Speed of digestion, size? etc.. Eggs would be digested almost instantaneously. Could be detected with DNA tools, but these studies generally use visual scope approaches. Bernie May has been conducting these studies - Belinda has published this. Cited a page further down (line 1248), and should have been cited on line 1205.

Line 1274. “*Herbicides can affect primary producers, and insecticides can affect invertebrate prey species*.” Herbicides can affect invertebrates and vertebrates directly too; and vice-versa.

Line 1334. “A major reason for the long-term phytoplankton reduction in the upper SFE after 1985 is benthic grazing by the invasive overbite clam (*Potamocorbula amurensis* also known as *Corbula amurensis*)”. This is stated as a fact. Is it?