DATE: March 28, 2012

SUBJECT: Notes from Estuarine Habitat Workshop

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TO: Files

Attached are my notes from one of the group discussions at the March 27 Estuarine Habitat Workshop.

Schwinn notes of Val Connor's group

Val = Val Connor
Jon = Jon Burau
MC = Mike Chotkowski
RG = Robin Grossinger
Mark = Mark Stacy
Ted = Ted Sommer

Q#3 – Ted Sommer = reporter (10:50-12:15)

Focus on salinity or define habitat more broadly

Mark – use salinity as bounds

MC – real question is what the lower salinity limit is

Val – think of habitat for a given species. LSZ does not equal "habitat"

Jon – species have certain salinity tolerances

MC – action is from fresh to 6

[group decided to use 1-6 for purposes of discussion]

<u>What are the drivers of quality</u>?

MC – straight physics

Mark – flow, tides, bathymetry and wind. At a more detailed level, other processes are important. Hard to decouple wind from barometric pressure.

Val – X2 is strongly averaged. Is it a good tool?

MC – yes, it is an index

Mark – need to talk about processes that are driven by flow, tides, wind and bathymetry. More uncertainty about processes than drivers.

MC and Jon agreed

Jon – temporal and spatial variability, depending where X2 is. Not just volume. It's what occurs in those places.

MC – "volume is a suspect way to look at the LSZ"; interaction between water and edge

MC – physical and biological aspects of quality – depth, turbidity, salinity variation between 1-6

(stratification; distribution)

MC – benthic organisms have larger range of salinities

Mark – hydrodynamic variability may be a process

Mark/Jon – vertical sheers; vertical stratification; lateral sheer

Ted – temperature

RG – geometry, heterogeneity, connectivity of habitat

Mark – scale is important (ex: depending on which part of Grizzly Bay may matter)

Jon – particle tracking may be useful

MC – would need many assumptions about behavior of organisms

Biotic drivers

MC – food availability and quality (biomass composition)

? – freedom from predation and competition - sheer (disorientation); upwelling; topography; turbidity

? - SAV

? – how much grazing by benthics

Val – native or aquatic?

Chemical factors

Val – nutrient concentrations and ratios; contaminants

Biological indicators

Mark – observations about question – “what indicators respond?” not “how they respond?”

Benthics:

Ted – timeframes matter

MC – perimeter is what matters for corbula and corbicular

Ted – X2 effects benthos seasonally

Pelagics

MC – abundance of long fin (not controversial); delta smelt (debatable); split tail

Ted – is fish distribution a good indicator?

Val & MC – yes

Ted – is distribution broader with higher flows

MC – doesn't matter; location matters

Mark – distribution will get at future survival and health

Ted – striped bass distribution and abundance

Val – shrimp – shellfish is broader than clams

Val – Dugdale diatom plumes

MC – starry flounder widely distributed and diffuse so not a good LSZ indicator

<u>Food</u>

Ted – unsure if food density changes

MC – redefine category as "food availability"

Ted/MC – may want to quantify food access

Mark – seems like mechanisms support theory

Ted – Wim did some relevant work

MC – grazing rate per unit volume

Mark – net productivity

These are two ways to frame a metric but data is not available

Ted – phytoplankton and zooplankton

RG – time that the LSZ is in different types of habitat

MC – estimate plankton production in Suisun Marsh

Group decided to punt to Ted's next group on question of seasonality

Mark – secondary indicators – turbidity and depth with LSZ, which are tie to mechanisms of primary indicators

MC – Smelt historic record – controversial now because we don't have record that includes LSZ upstream for long periods of time

Jon – quarterly sampling isn't enough to support

Question #4 – Steve Culbertson = reporter (12:30 – 1:30)

SC summary of previous group:

- better communication and follow-through is needed.

- unease in linking models; maybe worth understanding weak links of models (existing state-of-the-art models won't get answers)

- primary productivity models are crude so can't show temporal, spatial variability. Bio models less sophisticated than hydrodynamic models.

- Group did not conclude that a new model was needed. Rather knowledge exchange.

MC – rely on physical models. Rather than historic record of biology, focus on processes. Do special studies. Time scale is important.

Jon – Liberty Island/Cache Slough example – overproduction in tribs but zero in Cache Slough because of volume/dilution/mixing

Mark – any of physical models will lead to same general results, and then layer

Mark – certain inputs hard to pin down (sea level rise and where shoreline will be affected). Scenarios are of for physical perspective but biology more difficult

Jon – Big question on how many islands will be allowed to flood

Mark – Can models capture secondary indicators and then connect to primary indicators? Ex: smelt to turbidity

Jon – models improved for many reasons, partly because interaction between data collection and modeling

Mark – don't try to model fish today. Start with turbidity, temperature, chlorophyll. Need to begin to pursue integrative biological models.

Val – Like Dugdale's simple model?

Jon – use a Dugdale-like approach, a special study on a small scale

Jon – really expensive to do biology. Start with conceptual models, collect data, instrument it

Jon– look at what USGS learned from CASCADE model

Mark – restoration modeling is different

Robin – need new expertise and models in Delta as restoration is planned because not many wetlands there now. Really difficult to predict biology for habitat that hasn't been there for 100 years

Robin/mark – sociological factor; more interdisciplinary teams, focused workshops

Val – plus different stakeholder perspectives

Mark – focus on question, uncertainty, scenario

Val – miss most important factors if just LSZ

Mark – for ex: effects of change in temperature in next century, physical models, forecasts, various time scales. Discuss response of ecosystem

Jon – if not narrowly focused, would be free-for-all

Jon – still need down-scaling of modeling results to level of sophistication of biological models

? – question Bruce's metric of volume of LSZ

Question # 1 – Les Grober = reporter (1:40-2:30)

Les summarized previous 2 groups, including disagreement over whether there was a master variable or whether the master variables were flow and/or nutrients

Mark – more agreement about broadscale correlations; less agreement about underlying mechanisms. Points out weakness of predictive tools

Jon – dilemma of almost no capability to predict biology. Don't understand mechanisms. Need to be strategic in where to begin since monitoring will be expensive

Val - start with which one is most critical now, which would have the biggest impact

Mark – need not to make it worse

Jon – "master variables" = flow and landscape, interacting with tides. And those are the big things that BDCP might change

Les – agree. All the other things are a function of flow, but not the other way around

Mark – hard to find indicators that aren't connected, directly or indirectly, to flow and landscape

Val – But that doesn't mean it's what needs to be changed. Need to get at mechanisms to figure out what to manage

Val – Don't agree on correlations. OK with status and trends but not cause-and-effect

Jon – can figure out how to maintain X2 thru change in landscape without changing flow (tho might not be a good idea if you live in Benicia)

RG – would be interesting to play around with different scenarios

Jon – ex: 2 small breaches being contemplated near Liberty Island would radically change outflow (in a bad way)

Val – habitat is not LSZ; focus on abiotic habitat

Les – LSZ is one measure of Estuarine Habitat. LSZ is ecologically important but it is not the only thing.

Mark – easier to define drivers of quantity with models; hard to define high quality EH

Jon – more diverse landscapes, the greater the chance species will find what they need

RG – plenty of literature about habitat diversity and connectivity being linked to resilient populations

Les – infers that variability is advantageous to account for uncertainty

RG – HE looked at hw diverse habitats used to be. Restoration projects need to be connected.

Jon – habitat has to be at the right scale – big! and connected

RG – HE informative on that point – will need to be bigger than people want. If Delta looked like it did 100 years ago (700,000 acres of wetlands), some water quality problems would not exist. Look at past patterns and processes as one of the tools for restoration

RG- design landscape to maximize complexity and resilience