November 7, 2014
Contaminants subeam meeting 1
Sacramento CDFW Fisheries office, 1:30-3:30

Attendees: Carol Atkins, Stephanie Fong, Shawn Acuña, Alice Low, Petra Lee, Swee Teh, Rosemary Hartman, Stacy Sherman (notetaker)

Introduction to process: Carol explains what IEP Tidal Wetlands Monitoring PWT has done thus far (conceptual models, "issues" as problem statements, with premises describing what we think restoration will do); our task is to craft hypotheses and metrics corresponding to the higher level issues and premises, then describe appropriate methods and sampling schemes. We want to make sure to connect with other programs and not duplicate efforts. For contaminants, location is really important, so will have variability between site-specific monitoring plan.

This subteam is looking at premises 10.x (listed on handout, 9.x in most recent version) and 4

Questions before discussion of specific hypotheses corresponding to premises:
Is our work to consider future actions (e.g. BDCP), or recommend management options to reduce contaminant loading in the estuary?

- We are not considering design plans, but thinking about how to assess what restoration has done. We do need to know region and site background (part of model). Data we collect should inform future management and design options.

Do we drill down contaminant specific, or generalize by reaction group?

- Reaction group as much as possible

Premises:
Premise 4: Tidal wetland restoration will change water quality in the restored site and surrounding areas through capture, mobilization and /or chemical transformation, in ways that will alter habitat for at-risk fishes.

- Potential metrics: water temp, turbidity, pH, dissolved oxygen, salinity, nutrient concentrations, contaminant concentrations
- Look at this more later, focus on 9.x/10.x first

PREMISE 10.1 (aka 9.1): Tidal wetland restoration will mobilize contaminants on restored sites and in adjacent areas, facilitating incorporation of contaminants into the foodweb and multiple exposure pathways to at-risk fish.

- Does "mobilize" mean physical movement or becoming more bioavailable? Consensus was both.
- Our hypotheses should be testable. Will be difficult to tell if any particular restoration design has *minimized* contaminant export because have so few sites for comparison.
- Should we look at biomarkers to knock out multiple contaminants? As much as possible, we should go mechanistic rather than by individual contaminants, e.g. lump Hg and Se monitoring because are bioaccumulative/both exhibit exposure through food web.

- Also consider use type of contaminant, e.g. ag vs. urban pesticide use, and legacy vs. continuing. This will help people without a strong contaminants background identify potential problems to watch.
- Will have to work on frequency of sampling based on effect of contaminant, and consider location (sediment, fish tissue, water column) when determining minimum frequency. MeHg should be sampled monthly, whether fish there or not. Recent USGS study showed every month has opportunity for pesticide exceedances of one sort or another. Can monitor legacy contaminants less frequently
- Hypotheses deal with the following (see metrics and hypotheses table for wording and order):
    - Surrounding land use affects the types and concentration of contaminants
    - The history of site use will affect types and concentration of contaminants
    - Restoration actions will increase pesticide concentrations in water column, sediment, and food web
        - Metrics: chemical concentration in water, sediment, biota
        - Methods: US EPA standard where exist; chemically relevant environmental concentrations
    - Restoration actions will increase the effects of pesticides (both legacy and current use) in the water column, sediment, and/or food web
        - Metrics: species composition changes; health of organisms; overall abundance of species
        - Methods: US EPA toxicity testing methods; inventory of species diversity and numbers; emerging methods for organism health
    - Restoration actions will increase production and export of meHg and Se (targeting bioaccumulating substances)
    - Restoration of wetlands will increase effects of other metals (e.g., copper – anything not mercury).
        - Should call out other metals? All neuro toxins; cadmium has same mode of action as copper

PREMISE 9.2 (aka 10.2): Tidal wetland restoration will detoxify, destroy, and/or sequester contaminants and thereby reduce their effects on at-risk fishes on-site and in adjacent areas.

- Will consider for next meeting

New premise (9.3/10.3)– Tidal wetland restoration may decrease the resilience of the organisms to contaminants (interactions with temp and eating more (SA says this really new issue because any stressor will have effect WHO 3 spheres organism, stressor, environment)

Another potential new premise: Tidal wetland restoration increases HABS (Microcystis and other cyanotoxins) and causes additional neurotoxic stress.

Should another new premise focus on non-food web ammonium?