Fish Sub-team notes
October 23, 2014

Attendance:

- Larry Brown (USGS)
- Ramona Swenson (ESA/SFWCA)
- Gina B
- Stacy Sherman
- Dave Contreras
- Alice Low
- Matt Seipert
- Rosemary Hartman
- Bruce Herbold

On Phone:

- Jason Hassrick (USBR)
- Lori Smith
- Gardner Jones DWR

Stacy gave update and explanation of the Tidal Wetlands PWT generalized monitoring plan process for those who have not been involved in the workteam up until now. The PWT has developed conceptual models on tidal wetland function and general issues and premises we want to study during tidal wetland monitoring. Now we are working on specific hypotheses and metrics so we will have a suite of monitoring methods that everyone can use.

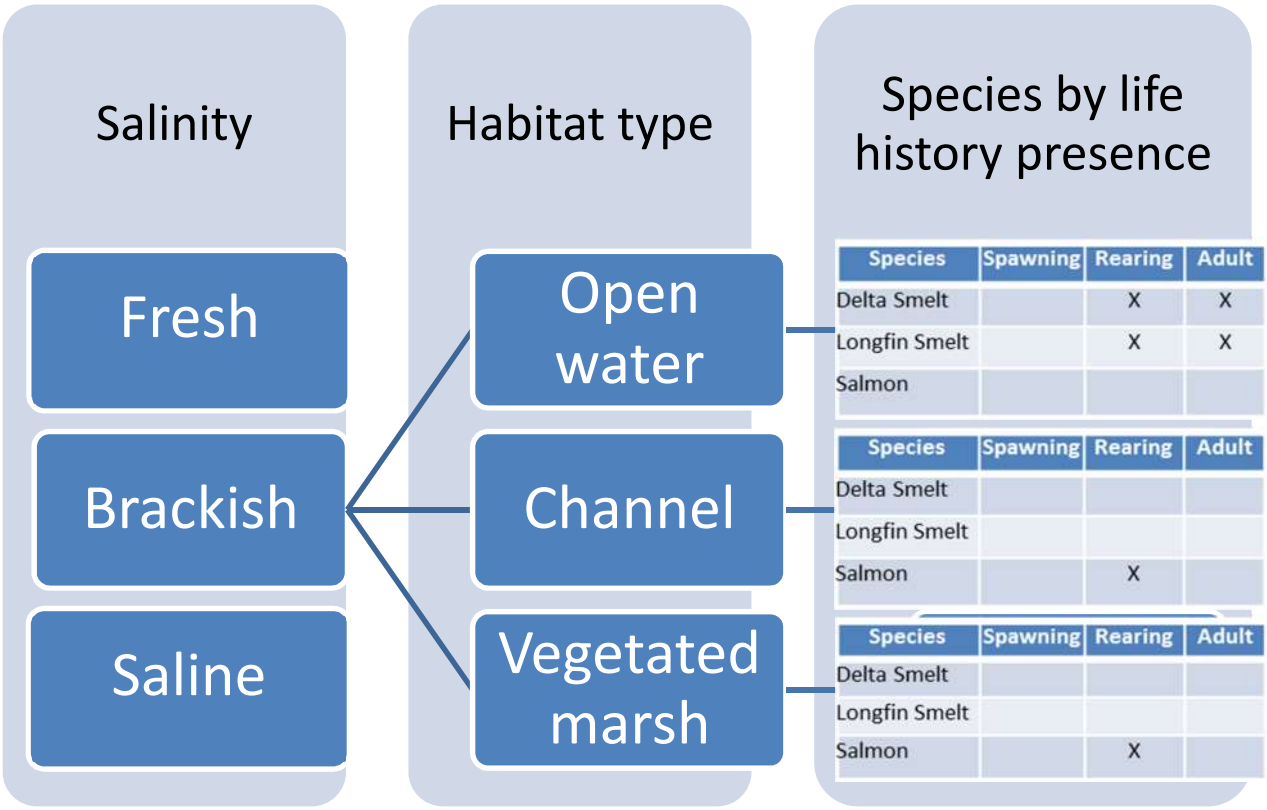
This subteam is concentrating on the fish monitoring, so we are working with the Salmon and Delta Smelt models. Dave sent out the models to everyone. We have also sent out stabs of hypotheses and monitoring metrics with some extra clarifying questions to get us started.

We then had general discussion of how we should tackle the hypotheses, starting with Hypothesis 2.1.1 (*The area of substrate and structure suitable for spawning, rearing, and/or adult residence of at-risk fish species on-site will increase compared to pre-project conditions.*)

- There was general agreement that we should break this up into sub-hypotheses relating specific metrics to specific species and life histories. For example, we know that vegetation and channel sinuosity are important for salmon smolt rearing, but we don't know much (if anything) about smelt spawning requirements. We are not expecting to have adult salmon or smelt as residents for significant periods of time, so we may not have to monitor those.
- By specifying what components are important for each species and life stage we can more easily tailor the monitoring plan to different restoration sites. For example, only sites in fresh water need to be concerned with smelt spawning habitat.
- However, we don't want to be so specific that we lose comparability between sites! It was suggested we come up with some "essential metrics" that would be measured at all sites

regardless of what fish we expect to find, and "extra credit" for sites that would allow us to learn more about the species requirements and restoration design. We really need to know whether the fish got fat. Why they got fat would be nice, but is the second step down.

- A guide (dichotomous key, decision tree, or something like that) could be included at the beginning of the general plant that helps groups chose between the multiple suggested monitoring metrics/methods. They could narrow methods down based on location, question of interest, or monetary constraints. One way to do this would be based on location type:



- Clearly, these are recommended methods and we aren't requiring anything of anyone. Different projects will probably try to minimize what they have to do. We should watch out for recommending too much detail because no one will want to do it.
- Also, we should not be so prescriptive in basing our monitoring plan off what we currently know (conceptual models) that we miss out on things that are happening just because we don't think they are happening (leading to confirmation bias). For example, no one sampled the SDWSC, because "smelt didn't occur there". Then we found out they did occur there…
- To help counter the confirmation bias problem, some our measurements really can't be written as hypotheses. Some things we want to describe without specific predictions because we don't have a specific grasp of how everything relates yet. However, getting core characterizations of the site may allow us to see new trends we were not expecting.
- In the next step, all monitoring metrics should be accompanied by a rationale. IE, we want to study length of edge habitat because we know salmon forage best in edge habitat.

- We are trying to predict whether "good" habitat will be created, so we discussed whether we should say exactly what we think "good" habitat is. Should we say 50% vegetation is good? Or 2 km of edge habitat? The consensus was we don't want to be too prescriptive, and we should be very upfront about what we are measuring because we "know" and what we are measuring because we are uncertain and want to learn more.
- We will never know why the fish are happy unless you do experiments within your project or compare across projects. We are already starting to pick out key metrics that pop up in all these things, those are the most important things to measure. Bruce thinks survival rate is key, rather than just numbers of fish.

After we discussed the process, we got down to the individual hypotheses. The FRP team will refine the hypotheses based on these discussions and send out an edited, organized list. These were the main comments on each hypothesis.

H2.1.1: This should be divided between salmon and smelt hypotheses, and divided by life history stages. Unfortunately, we don't know much about smelt spawning requirements or salmon fry requirements. To get at some of the habitat associations we are unsure of, we should generally characterize the habitat and look for relationships. The associations we are more sure of (Salmon smolts like vegetated edges) we should look at in more detail.

H2.1.2: "Volume" was confusing some people. "Hydrodynamic pattern" captures most of what we are interested in, though because that is closely tied to bathymetry, bathymetric measurements may be enough.

H2.1.3 – We should add DO, turbidity, and vegetation barriers.

(Bruce point out seasonality is really important. You only care about salmon migration for half the year. Stacy says that is in the methods. How and when we measure will come, let's agree on what first. Ramona "seasonally appropriate access")

H2.3.1 We can measure how fat fish are on the site, but can't necessarily tell that fat and happy fish we find on site are fat and happy because they've grown up there. We could recommend some special mark-recapture studies to test this in more detail, and look at changes in fish condition in areas surrounding the site. We should split this into the two species since they use the marsh differently.

H2.3.2: Measuring population stabilization is tough and will likely be impossible for any one project, but hopefully long-term trends will show up after many projects develop. IEP indices are good for smelt. We need a better metric for salmon. One possibility is condition of salmon at Chipps Island to see if your site is contributing to the health of the out-migrating population (can also mark fish on the site and see if those individuals show up later). It's a stretch, but all these population level metrics are a stretch.

H2.4.1 We should have separate hypotheses for each species, put in the timing when we do methods. Ramona: "attendance rate" of our wetland? But that has the "attractive nuisance" problem again.

Maybe this one should be just presence and survival rather than growth rate since we want to look at habitat rather than food production.

H2.4.2 Same metrics as 2.3.2.

8.1 There was a lot of discussion of which predators we should concentrate on, how to measure them, and whether to measure them. Many of the predators are such generalists that it is difficult to quantify what is good habitat for them specifically. More “natural” habitat should be good for both predators and native fish, but we don’t want to do anything that makes predation rates for native predators unnatural. Simple basic metric: composition of fish community. Extra credit: survival studies, diet studies, habitat associations.

If we may have high predation, we may get 5 fat fish out of 100, or we may have 20 skinny fish. Which is better?

8.2: see above

8.3 Add turbidity (part of microhabitat), take out overlap of habitat.

Simple metric: What fish did we catch? What habitat is there?

We proposed the next meeting sometime the week of Nov. 17. Stacy will send out a doodle poll to find an appropriate date and time.