Fish Team Meeting Notes
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Discussion of outline:

Stacy reviewed the outline for us. Most of the comments were directed to what to include in the "sampling design" chapter.

We want to keep design fairly general, but have enough information to help people plan the right level of sampling rigor. The level of specificity will change, with greater specificity on core metrics, less so on special studies, to be discussed along with the methods later on.

FRP team clarification: We are talking about designing the monitoring program in this chapter, not designing the restoration site.

We will also be general about statistical design (allowing weight of evidence approach like MAST rather than insisting on significant p-values for everything). A description of stats could be a whole giant volume in itself. However, it will be important to describe type of analysis and emphasize the importance of baseline sampling and planning the analysis before you start sampling. Maybe call it "analysis" rather than "statistical analysis".

We also need more details on sampling design and analysis along with the individual metrics, but raise the issue on variability as important to designing sampling.

Tables would be better than list of text.

Triggered things might be either triggered by situational context, or triggered by data being collected. IE, dependent on state variables or response variables, so maybe make them two tables. Might be able to address some of these in the state variables section.

The group agreed that the meta-analysis section could get complicated. It might not be the responsibility of the project proponent, but should be here because it puts things in context. We need to keep sight of the end goal of all this restoration. We are changing the state of the system – combination "state" and response variable. (This should be discuss with the larger group)

Revisit the hypotheses, do they still fit?

Hypothesis 3.2.1.1 - Habitat used by Delta Smelt and Longfin Smelt for spawning and rearing will have distinct physical properties

Comments:

- We decided to include turbidity and temperature as metrics with structural habitat, but still have water quality as a separate hypothesis because it will be measured on different time scales.
- Figuring out how to quantify habitat proved to be a little tricky. Variability in velocity, channel cross-section, and depth and channel width would be what you measure, not hydrodynamic pattern. Detailed relationships between geomorphology and habitat might be a special study rather than a core metric.
- Our working hypothesis is that smelt spawn in sandy shoals, so the core metric should be area of sandy shoals (substrate + water depth). This is a triggered metric if you have open-water area on your site.

Hypothesis 3.2.1.3 – The area of physical habitat for juvenile Chinook Salmon rearing will increase

Comments:

- Salmon are easier than smelt because we know more about them. The broader characterization of geomorphology can be related to things we know are important for salmon habitat.
- We may need to relate temperature to other physical factors to see how temperature is likely to change in an easier way.

Hypothesis 3.2.2 – Water quality as habitat for at-risk species on-site will be ~~increase~~ suitable

Comments:

- We discussed wordsmithing this hypothesis somewhat and settled on “water quality will be suitable”
- Important note: Every site does not have to have all of these expected outcomes, but we want to have some of them (some sites may not have spawning substrate, but will have productive marsh plain instead). We should include the goals of the project in the state variables section.

Hypothesis 3.2.3 – Conditions allowing at-risk fish species to access quality habitat will be increase

- no comments

Hypothesis 3.2.4 – At-risk fish species will use restored habitat for some portion of their life history

Comments:

- All sub-hypotheses will be represented by hypothesis 3.2.4, and fish species will be discriminated within the text of the methods.
- Add abundance or frequency of occurrence to metrics. However, be careful with abundance. Density/abundance is determined by habitat area. If you only get one delta smelt when there is lots of area, you have lots of smelt, if you get one delta smelt when there is only a tiny aspect of habitat you are in trouble. Put frequency of occurrence as a core metric, abundance as higher-level if you think you have enough data to do it properly.

Hypothesis 8.1.1 - The area of suitable habitat for non-native aquatic organisms on-site will increase

Comments:

- Should add water quality to this. For example, low DO will give you catfish, and many non-natives do better with warm temps than natives.

Hypothesis 8.2.1 – Non-native aquatic organisms competition with and predation on at-risk fish species will increase on-site

Comments:

- Do we really want to do diet? No, relative abundance is more important. Diet is a special study.
- Competition is also hard to determine.
- All of this is really special studies, to be triggered if native fish are not doing well.
- We should compare relative abundance between sites, and look for correlations between different habitat sites to see if your relative abundance is similar.

Hypothesis 8.3.1 - The ability of at-risk fish species to avoid predation by non-native predators will be improved on-site

Comments:

- We really can't measure survival either here or in the above hypothesis. Definitely a special study.

Hypothesis 10.2.1 - Restoration will increase the availability of wetland-derived fish food in channels surrounding the site

Comments:

- This is all a VERY special study. We could look at surrounding channels before and after project and see if densities go up.
- Don't worry about stable isotopes. We should assume that fish are eating what is there in proportion to its abundance.
- Diet composition can be a fingerprint.
- Condition of fish in the channel as a measure of health.

MOVING ON TO METHODS

Larval fish sampling:

We don't have to worry about oblique trawls in very shallow water (don't have to worry about a winch), because you already will sample the whole water column.

Trawls are also more quantitative and more comparable to IEP surveys. In the Liberty Island studies, they found that they can't compare in and out very well because they can only do surface trawls inside the island.

Light traps might be more consistent for presence, but can be difficult to anchor. May not be able to eliminate either of these until we try them both. What type of question are we most concerned with? But do we care about quantity? There was disagreement as to how important how much data resolution we need (ie. CPUE vs are fish present)

Liberty Island studies also found that fyke and gill nets were very difficult to work with

The FRP team will take this table back and work on it some more, adding columns for specific habitat, species, or questions for which each of these methods works best, along with the specific metric they will give you. They will consult with Lori Smith about lessons learned from Liberty sampling.