OUTCOMES MEMORANDUM

TO: CAMT Salmon Subcommittee Members

FROM: Rafael Silberblatt

DATE: February 28, 2020

RE: February 13, 2020 CAMT Salmon Subcommittee Meeting

Attendees: Brad Cavallo, Bryan Matthias, Brycen Swart, Cathy Marcinkevage, Deanna Sereno, Frances Brewster, John Ferguson, Kate Spear, Mike Beaks, Rene Henery, Todd Manley

Action Items:

- K&W - Schedule call with Bruce, Carl, Rene, Brad, Brycen (+ others?) to go through the rest of the Salmon Action Matrix (and potentially add actions)
- Dylan - Share project summaries with Subcommittee and let project managers know that the Subcommittee is available as a resource
- Subcommittee + Dylan/Pascale - Coordinate opportunities for Subcommittee to provide feedback on projects (if so desired) including: hypotheses at launch + 1 year stakeholder workshop
- NMFS & CDFW - Discuss steelhead monitoring and be prepared to report out at March Subcommittee meeting
- John, Brad, Cathy - Share project statement proposals for 2020 Workplan item related to salmon entrainment (to be discussed at 2/18 CAMT meeting)
- K&W/Bruce - Follow up with Erik and Carl on Salmon resiliency strategy action implementation
- K&W/Bruce/Others? - Provide update at Feb CAMT meeting on Subcommittee discussions re: Prop 1 Projects and Salmon Entrainment
- John & Brad - Work with Rebecca to develop slides for Chinook & Steelhead presentation, target March CAMT meeting for presentation, review PPT at March Subcommittee meeting
- K&W/Bruce - Confirm that there's sufficient time for Rebecca's Chinook & Steelhead presentation at March CAMT meeting
- K&W/Bruce - Propose CSSP survey recipients for confirmation by Subcommittee. Options include: Subcommittee members, CAMT members, Interviewees (just scientists and not managers?) or combinations thereof
- K&W/ESSA - Coordinate in-person CSSP workshop with Subcommittee (date, topics, venue, etc)
- K&W/ESSA - Move CSSP Activity List spreadsheet to google for group editing (combine tabs, add column for comments, lock cells not to be edited, add columns for the following additional metadata: non-duplicative, genetic diversity + resiliency, benefits to ecosystem)
- All - Refine CSSP Activity List
- ESSA
    - Recirculate updated criteria
    - Complete and daylight Q statements

  - Consider using SFEI's draft Delta Salmon Rearing Habitat Report map (p. 37) for Criteria #2
  - Refine Criteria #3 to only consider salmonid benefits (impacts to other species will be assessed at a later stage)
  - Adjust timeline to accommodate Q Method Survey Pilot
- Brad, Rene, Cathy - Participate in Q Method Survey Pilot
- K&W/ESSA - Distribute "Info Flow" presentation/survey

Discussion Highlights:

1. Agenda Review and Updates

- Updates on Salmon Actions Matrix
  - Bruce, Rene, Carl and others have reviewed/updated the majority of actions in the matrix. Next steps include:
    - Working with project proponents/managers to determine how CAMT can help move projects forward
    - Coordinating project presentations to CAMT
    - Feeding projects into the CVPIA decision support model
    - Scheduling one more review session to complete filling in the matrix

2. CAMT 2020 Workplan

- Research from the 2018/2019 Delta Science Proposal Solicitation: Salmon and Steelhead
  - Partnership between Delta Stewardship Council (DSC), CDFW, and USBR to address funding gaps for large, multi-agency solicitations.
  - The partnership generated ~$17m, of which ~$3m was distributed to projects focused on salmonids in the Delta.
  - These projects were selected in part to address one of the following near-term science needs in the Delta, as identified in the Science Action Agenda
    1. Human dimension
    2. Science synthesis
    3. Habitat restoration
    4. Stressors, species, communities
    5. Monitoring, data management, modeling
  - Study 1: Synchrony of native fish movements: synthesis science towards adaptive water management in the Central Valley (Andrew Rypel, University of California, Davis)
    - Addresses Science Action #2
    - Contract amount (via USBR funding): ~$742k
    - Allows UC Davis to coordinate with agencies to collect and organize acoustic telemetry data and life history diversity for salmon and sturgeon across multiple years. These data sets will be made available to the public.
  - Study 2: Quantifying the contribution of tidal flow variation to survival of juvenile Chinook salmon (Russ Perry, US Geological Survey)

        - Addresses Science Action #2
        - Contract amount (via DSC funding): ~$761k
        - Tests hypothesis that juvenile survival increases as a result of higher flows and less tidal influence on rivers, thereby reducing juveniles' travel times and exposure to predators.
        - Project will generate models that can predict how management actions that modify tidal patterns impact juvenile salmon survival.
    - Study 3: Impact of temperature and contaminants on Chinook salmon survival: a multi-stressor approach (Joseph Dietrich, NOAA Northwest Fisheries Science Center)
        - Addresses Science Action #4
        - Contract amount (via DSC funding): ~$478k
        - Examines the cumulative effect of contaminant exposures on salmon health, swimming behavior, and other physiological functions coupled with temperature fluctuations.
        - Results will be used to parameterize lifecycle models and assess susceptibility to predation and disease.
        - Project is responsive to SAIL conceptual models and IEP monitoring framework for the upper San Francisco estuary.
    - Study 4: An improved genomics tool for characterizing life history diversity and promoting resilience in Central Valley Chinook Salmon (Mariah Meek, Michigan State University)
        - Addresses Science Action #4
        - Contract amount (via DSC funding): ~$633k
        - Addresses current inability to rapidly and inexpensively identify large numbers of individuals from different populations during ocean migration.
        - Will leverage preexisting genomic data to develop a new technique allowing scientists to identify individual life history type and location.
    - Study 5: Evaluating Juvenile Salmonid Behavioral Responses to Hydrodynamic Conditions in the Sacramento-San Joaquin Delta (Michael MacWilliams, AnchorQEA)
        - Addresses Science Action #5
        - Contract amount (via USBR funding): ~$446k
        - Combines model predictions with salmonid tracking data to inform how river flows effect steelhead movement throughout the Delta.
        - Will evaluate:
            - Behavior relative to flow under existing regulatory requirements.
            - Five new management metrics identified by the Salmonid Scoping Team.
    - CDFW Prop 1 Proposals
        - Monitoring and Modeling Pathogen Exposure in Salmon Migrating to the Delta ($847,041 to University of California, Santa Cruz)
        - Developing an eDNA metabarcoding protocol to improve fish and mussel monitoring in the San Francisco Estuary ($419,742 to University of California, Davis)
        - Reconnecting Delta food webs: evaluating the influence of tidal marsh restoration on energy flow and prey availability for native fishes ($1,107,041 to State Water Contractors)
    - Comments/questions and responses:
        - What is the target completion date of these projects?

        - The majority started this past winter and are anticipated to be completed in the next two to three years.
    - Are these proposals available online?
        - No, but DSC can email them out to this group.
    - At the March Subcommittee meeting, we should discuss which of these projects are close to being done and would be good candidates for CAMT presentations.
        - The CDFW projects would be the likely candidates for CAMT presentations as the others are not close enough to being completed.
        - Opportunity to hear updates on these projects during stakeholder meetings. DSC can share the dates of those meetings with Subcommittee.
    - For AnchorQEA study, MacWilliams' hydrodynamic model will be used to highlight metrics identified by the Subcommittee.
        - Key West is difficult to measure due to the 100,000 cfs moving back and forth at Jersey Point. I would question using a model to look at relationships.
        - It seems like the advantage of the 3D model would be to get hydrodynamic conditions at a specific reach where we know tagged fish are present. Is Michael planning to use a metric that considered when fish are present?
        - Yes, plan is to take acoustic telemetry data for steelhead to identify as short a time increment as possible. The intent would be to determine what fish are reacting to based on hydrodynamic data. This study seeks to answer whether we can use existing telemetry data to answer questions developed by CAMT. This study is different than those being conducted by Russ Perry and Rebecca Buchanan.
        - I appreciate the focus on steelhead. It is hard to relate steelhead to chinook based on swimming patterns. Mike is putting together a San Joaquin steelhead monitoring program – it would be good to talk to him to see if there is any overlap. Want to ensure those efforts are talking to each other.
        - A stakeholder workshop will be held in fall 2021; that would be a good time to engage with Mike, but we will look to do so before then.
        - Ideally define hypotheses beforehand in order to have clear correlation with data. This has been a challenge with the NMFS lifecycle model.
        - AnchorQEA should be ready to discuss hypotheses and engage with the Subcommittee by the summer.
    - It sounds like there are a couple of roles for the Subcommittee to pursue as part of 2020 Workplan:
        - Coordinating the presentation of completed Prop 1 projects to CAMT/Policy Group
        - Participating in launch and mid-project workshops to provide feedback where so desired.
- Salmon entrainment discussion
    - Policy group members have indicated a desire to study salmon entrainment. The smelt entrainment work showed CAMT's ability to bring the right people together to update state of science, develop additional study questions, and institute and iterative review process. As part of the 2020 Workplan,

we might consider pursuing a similar process possibly by revisiting 2017 Salmon Scoping Team study, identifying gaps and synthesizing additional studies.

- We need to be clear about what we are talking about with respect to entrainment. There are still many unknowns regarding salmon entrainment patterns at facilities.
- A lot of that information was studied as part of the 2017 study. Routing and level of flow/export appear to be higher priorities. I am curious as to why there are requests for additional entrainment studies at the pumps given the work that's been done to date.
    - It still comes up as big issue on water project operations. We may not see it as a priority, but it is consequential from a management perspective.
- Lack of understanding of what's in 2017 report is a result of a lack of forums for discussions, among other factors. Maybe there is an opportunity to begin there to get people familiar with existing information.
- Concerned that local entrainment was not adequately covered in SST's 2017 report.
- Perhaps a next step is for this group to synthesize what is there and then discuss what else is needed and what has changed. After that discussion, we could develop a work plan for additional analysis and data gathering needs.
    - I would start with questions we have on entrainment and then determining what information is available; that informs where the gaps are. I do not think we should have SST's report dictate how work is carried out.
    - It would be useful to start with the SST report as both a frame of reference and as a foundation for future work. If different questions are now are a priority, we need to have managers let us know.
- I think we need a broader understanding of what salmon entrainment is and what this group's subsequent charge would be. CAMT should weigh in on what the task is, but it would be good to have something to react to. If group has that understanding, it needs to be shared more broadly.

- Steelhead monitoring
    - No additional information was ready to share, CDFW and NMFS will aim to present at the March Subcommittee meeting.
- Salmon resiliency strategy action implementation
    - K&W to follow up with Karl and Erik for updates as neither attended February Subcommittee meeting.

3. Coordinated Salmonid Science Plan (CSSP) Update

- 37 key documents have been reviewed for monitoring, scientific, and management-specific activities.
- Inventory includes a mix of activities that have been conducted, but most are ongoing or proposed.
- Literature review and interview feedback has resulted in 109 activities being identified. Specifically, this includes:
    - 29 Monitoring Activities
    - 25 Science Activities
    - 56 Management Activities
- Key questions regarding activities prior to Q method survey:

  - Are their activities that are largely completed or underway that should therefore be removed from our prioritization list?
  - Which activities are misclassified?
  - Are any science activities listed considered fundamental/basic research that do not readily help discern choices surrounding management actions? If so, they should be removed from prioritization list.
  - For any activity statement, are CAMT members able to narrow down priority locations (e.g., beyond "Full Delta")?
- The survey will:
  - Start with a common purpose statement on this project to align thinking.
  - Sort statements based on criteria (as opposed to specific activities) which helps to reduce bias.
  - Handle respondents who may have widely differing opinions or mandates related to priorities by:
    - Forcing tradeoffs – it's not possible to emphasize everything in a given agency's mandate
    - Surfaces areas of consensus / divergence in opinion which will be an interesting result in and of itself
    - Relies on representative participation to capture full diversity of opinions – we will track affiliations behind the scenes.
- Prioritization criteria for activities:
  - Criteria 1: The science activity/action accelerates learning on key cause-effect mechanisms influencing salmonid survival, migration and behavior through the Delta & in so doing directly contributes to clarifying management options or evaluating their effectiveness.
  - Criteria 2: Identifies a science activity/action at locations that are the most important to reduce uncertainties influencing our understanding of salmon survival, migration and behavior
  - Criteria 3: Activity is expected to generate multi-salmonid benefits (and conversely, will pose a low chance of unintended consequences/negative trade-offs to other priority salmonids)
  - Criteria 4: Implementability/Action feasibility – what is the level of agreement across CAMT participants about how easy or hard implementation would be
- Next steps
  - Prune activity list & respond to questions
  - Determine whether an agreement on a standard map and set of key locations can be done quickly
  - ESSA to generate final Q statements
  - Identify who will be invited to complete the surveys
  - Conduct the four Q surveys, each of which will take approximately 30 minutes
  - ESSA to present options for combining/weighting criteria
- Comments/questions and responses:
  - Will there be an opportunity to iterate on refinement? Most of what determines adaptive management value of an activity is the way it is structured and its scale.
    - We could conduct a pilot with a small sub-group, incorporate that group's feedback before sending survey to full list.
  - Criteria 1 needs more refinement as it does not match level of resolution in ESSA's scope of work

        - Having a few of you do pilot where we capture further modifications to statements will be helpful in that respect. We are not trying to ask implementation-level questions.
    - SFEI's draft Delta Salmon Rearing Habitat Report map could be used for Criteria #2.
    - Simplify Criteria 3 to only address salmon, consider smelt effects as results of survey are being reviewed.
    - How widely should the survey be distributed?
        - We have three options: just this group; all of CAMT; or all of CAMT + interviewees
        - We should aim to have decision on who it gets distributed to two weeks before next Subcommittee meeting.
        - It would help CAMT understand what's being proposed in CSSP if they are taking survey, but there would likely be a need to catch people up if its open to all CAMT as not all work on salmon.
        - **Bruce/Rafi to discuss path forward on this, have subcommittee vet a proposed list
- Information flow mapping: ESSA to develop survey to be distributed to members and discussed next meeting. Survey will vet:
    - Which management actions to use for case studies
    - Key questions to ask for each link of information flow chain
    - Key individuals to survey / speak with

4. Prep for Upcoming CAMT/CSAMP Presentations

- Rebecca Buchanan presentation
    - Brad and John to work with her on what specifically would be helpful for CAMT to discuss.
    - Once PPT is done, coordinate review with Subcommittee
- Standardization of scientific presentations at CAMT/CSAMP
    - Attendees felt formal guidelines are not needed for coordinating future presentations.
    - Attendees expressed support for compiling a list of potential future presentations.