

APPENDIX C
Stakeholder and SDM WG Meeting Summaries

APPENDIX C1: KEY FINDINGS FROM INTERVIEWS AND FLOOD CONTROL BRIEFINGS

This appendix summarizes findings from ten virtual interviews that Kearns & West conducted with stakeholders and potential Structured Decision-Making (SDM) Working Group members in spring 2022, as well as five flood control briefings that Kearns & West and cbec conducted with flood control stakeholders in early summer 2022. This appendix highlights overarching themes and key perspectives that emerged from stakeholders' input during the interviews and briefings.

The following stakeholders participated in interviews:

- California Department of Fish and Wildlife (Gretchen Murphey)
- California Department of Water Resources (Jacob McQuirk)
- Contra Costa Water District (Ching-Fu Chang)
- National Marine Fisheries Service (Barbara Byrne)
- National Oceanic and Atmospheric Administration (Cyril Michel)
- Nor-Cal Guides & Sportsmen's Association (James Stone)
- River Partners (John Cain)
- Trout Unlimited (Natalie Stauffer-Olsen and Rene Henery)
- United States Fish and Wildlife Service (Bryan Matthias)
- United States Geological Survey (Jon Burau)

The following stakeholders participated in flood control briefings:

- City of Lathrop (Mark Meissner and Rick Caguiat)
- Reclamation District 17 (Chris Neudeck and Dante John Nomellini)
- Reclamation District 544 (Pam Forbus and Steve Sinnock)
- San Joaquin Area Flood Control Agency (Chris Elias)
- US Army Corps of Engineers (Cynthia Ovdenk)

The following topics came up most frequently across the interviews:

- **Recognition of predation as a key threat to juvenile salmonids.** Participants recognized the threat posed by excessive predation of juvenile salmonids across the South Delta and along the San Joaquin River. There was less consensus on the scour hole as a predation hot spot, with some interviewees expressing concern and others focusing more on predation across the South Delta.
- **Concern about efficacy of a short-term, hyper-localized solution.** Participants expressed concern about allocating a large sum of resources to one specific location if solutions only provide predation relief in the short-term (e.g., predator removal). Multiple participants expressed doubt that filling the scour hole would be effective in the long term. Some participants expressed concern with focusing on only one scour hole when several scour holes exist throughout the system (Cyril Michel, Jacob McQuirk, Jon Burau), citing previous research at this scour hole.

- **Curiosity about nexus and alignment with other projects.** Multiple participants expressed interest in distributing funds and resources across different projects or possible coordination with other projects (e.g., the adjacent levee set-back project).
- **Varied knowledge, experience, and interests.** Participants represent different sectors, including NGOs, public utilities, and different levels of government. Participants possess a variety of experiences, including hydrology, fish science, river conservation, and water quality. Multiple participants (Cyril Michel, Gretchen Murphey, and Jacob McQuirk) have experience researching juvenile salmonid predation at the scour hole. Interests in the project include (in order of most commonly expressed to least):
 - Increasing juvenile salmonid survival and reducing predation throughout the South Delta.
 - Improving habitat along the San Joaquin River.
 - Addressing predation at the scour hole.
 - Maintaining hydrodynamics, flow, and water quality.
 - Increasing flow to the South Delta to improve habitat for all fish.
 - Mitigate impact on public use of the river downstream of the scour hole.
 - Mitigate impact on fishing; elimination of striped bass was not popular.
 - Fishing interest in preserving striped bass populations; concern that reducing striped bass population will not help salmonids but will anger fishing community.
- **Potential options to explore.** Participants suggested the following as potential options to explore to reduce predation at the scour hole:
 - Improve salmonid rearing habitat around the scour hole.
 - Coordinate efforts with the planned levee set-back project.
 - Re-route fish to the right side of the river to avoid shallow-water predation.
 - Improve floodplain habitat that can funnel juveniles around the scour hole.
 - Since this part of the river has a sandy bottom, “smooth” the corners of the fork in the river to decrease scouring effect of hydrology, thus addressing the cause of the scouring and not the effect.
 - Analyze energy dissipation options to target the cause instead of the outcome (e.g., likely an in-water structure), which would require coordination with hydrodynamics experts.
 - Use diet studies to understand the top salmonid predators (e.g., consider analyzing piscivorous birds, such as the Swanson’s Hawk).
 - Analyze existing body of knowledge and research on this scour hole.
 - Restore the many miles of degraded channel that cause scour holes.
 - Analyze the South Delta as a whole for solutions, recognizing that this scour hole is one of many.
 - Decrease water temperature, potentially by speeding up the river or increasing flow.
 - Increase flow to South Delta to address multiple issues:
 - Water temperature.

- Salmonid survival.
 - Predator (striped bass and catfish) overpopulation.
- Increase salmonid stock to mitigate predation risk, then restore habitat.
 - Increasing salmonid stock is popular among fishing interests.
- **Potential options to measure success.** Participants suggested the following as potential approaches, some of which might help measure the success of the project:
 - Use PDAT tags to track predation.
 - Use acoustic telemetry to identify which reaches are the problem areas.
 - Use multiple metrics, not just telemetry.
 - Use e-fishing to gather data in deepest parts of the scour hole.
 - Measure the amount of time that predators stay away from the scour hole following predator removals.
 - Differentiate survival rates between reaches across different water years.
- **High interest in and experience with SDM participation and confidence in process.** Six of the seven interviewees expressed high interest in SDM participation, as well as confidence in the process. All participants have experience in collaborative decision-making, and three potential SDM participants have prior SDM experience.
 - **Method of informing non-SDM members.** John Cain of River Partners and Steve Tsao of CDFW asked to be kept informed, but not part of the SDM process. This request raised the question of how Reclamation plans to periodically inform non-SDM members of the project's decisions, progress, and outcomes.
- **Importance of proactively understanding the permitting process, which can be time- and agency-intensive process.** Depending on the chosen alternative, participants noted that Reclamation will need to pursue different types of permits (e.g., tagging, e-fishing, or construction) or processes (e.g., a biological assessment or targeted NMFS consultation), all of which are time-intensive. Participants encouraged early and frequent coordination and suggested the project may be eligible for the State's "Cutting the Green Tape" initiative which could streamline permitting. The USACE representative suggested the project team look into the Regional General Permit 16, as well as to present at an interagency permitting meeting to work ahead of the permitting process.

The following topics came up most frequently across the flood control briefings:

- **Strong development interests.** Multiple participants shared that the Lathrop area is one of the fastest-growing residential areas in the state. Participants expressed the importance of new developments, including Moss Landing on the eastern bank of the confluence, new housing potentially on the northern bank, and a new high school in River Island on the southeast bank. Participants posed these developments as constraints on potential actions for the project. One participant shared: "The goal is to build as much housing as possible."
- **Importance of speaking with property owners.** All participants recommended that the project team brief and confer with property owners on the banks surrounding the confluence.

- **Strong interest in hydrodynamic and geotechnical modeling.** Multiple participants expressed concern about changes to the river causing flow and flooding issues downstream. One participant voiced strong skepticism and opposed any changes to the river on the grounds of causing unintended issues downstream. All participants expressed the importance of conducting extensive hydrodynamic and geotechnical modeling before making any decisions.
- **Concern about water levels.** Multiple stakeholders expressed concern about water levels in both the San Joaquin and Old Rivers as the true cause of low juvenile survival.
- **Curiosity around history and potential options.** All participants expressed curiosity about the history of the scour hole and what different potential options the project might include.
- **Potential ongoing briefings.** All participants expressed interest in being kept informed at least quarterly, which raised the prospect of quarterly briefings for flood control stakeholders by the project team.

APPENDIX C2: SJAFCA BRIEFING NOTES

JANUARY 24, 2023: SCOUR HOLE TEAM BRIEFING OF SJAFCA

ATTENDEES

SJAFCA

- Chris Elias, Glenn Prasad, *SJAFCA*
- Dustin Sanoski, *CVFPB*
- Kathryn Oehlschlager, *Downey Brand*
- Josh Brown, Jesus Esparza, Larry Ito, Mauricio Meza, David Moldoff, Ryan Young, *DWR*
- Tiffany Edwards, Bill Eisenstein, John Pritchard, *ESA*
- Erik Almaas, *KSN*
- Mark Cowan, Kevin Lee, Eric Nagy, *Larsen Wurzel*
- Chris Neudeck, *RD17*
- Brittney O'Connell, Mike Rossiter, *R&F Engineering*

SCOUR HOLE TEAM

- Dylan Hickey, *USBR*
- Scott Wright & Chris Bowles, *cbec*
- Jennie Hoffman, *Adaptation/Insight*
- Mary Beth Day & Henry DeRuff, *K&W*

ACTIONS

- **cbec:** Add American Rivers to outreach slide
- **cbec:** Check with USBR about sharing slides
- **K&W:** Add SJAFCA members to contact database
- **K&W:** Schedule follow-up meeting with SJAFCA for them to present and coordinate on alternatives, stakeholders, etc.

BRIEFING NOTES

- I. Overview
 - Introductions
 - Scott presented on the project background, team, concepts, performance metrics, and consequence table
- II. Q&A/Comments
 - Kevin Lee (LWA): Great timing with overlap on our project
 - Eric Nagy (LWA): When I look at those six alternatives, I'm thinking about cost. When or how does cost enter into the framework?
 - Cost is a decision objective, so USBR will need to figure out how to weigh those. Haven't had that conversation yet.
 - David Moldoff: You mentioned NEPA and USBR as the lead agency. Has there been discussion about CEQA and what the lead agency would be? I have to imagine it would be DWR.

- We'll bring that up this Friday
- Larry Ito (DWR): The RDs are concerned about downstream flows that could impact residents and levees. Have you done any H&H analysis on some of those options?
 - That issue has come up a lot in our SDM meetings. One of the metrics we're looking at is the flow split with the goal of maintaining the 50-50 flow split over the full range of flows, which RMA is analyzing.
- Kevin Lee (LWA): What work have you done with USACE? Are you aware of the USACE's ongoing study on the right bank of the San Joaquin regarding flood risk etc?
 - Could you connect us to them?
 - KL/HD: We'll set up another meeting to present on our project, lessons learned, and share what we know about stakeholders in the area.
- Bill Eisenstein (ESA): How are you modeling the impacts to fish?
 - Brad Cavallo at Cramer Fish Science is leading an empirical modeling that factors in habitat modeling as well.
- Eric Nagy (LWA): Can you release these slides or are they too much of a work in progress.
 - SW: We'll check with USBR on that.

FEBRUARY 3, 2023: SJAFCA BRIEFING OF SCOUR HOLE TEAM

ATTENDEES

SJAFCA

- Glenn Prasad, Deputy Executive Director, *SJAFCA*
- Kevin Lee, Project Manager, *LWA*
- John Pritchard, Water PM, *ESA*

SCOUR HOLE TEAM

- Dylan Hickey, *USBR*
- Scott Wright & Chris Bowles, *cbec*
- Jennie Hoffman, Adaptation/Insight
- Mary Beth Day & Henry DeRuff, *K&W*

ACTIONS

- **Both Teams:** Share available slides
- **Both Teams:** Regroup to brainstorm next steps for coordination, esp. on NEPA
- **SJAFCA:** Attend SDM WG mtg next Friday
 - **K&W:** Share SDM WG 1-Pager

SDM PRESENTATION

Jennie presented on the SDM WG PROACT process.

- Kevin: Are there any specific objectives in the BiOp with regard to fish counts, etc.?
 - Jennie: Not specific ones.
- Kevin: Is USBR the decision-maker?
 - Jennie: Yes. USBR gave the SDM WG a lot of creative license to work on ways to reduce predation at this location, so long as the work happened at the scour hole.
 - Scott: Our directive was to generate six options to give to USBR, who would then narrow to three, plus a no-action alternative.
 - Dylan: The objective in the BiOp is to reduce predation at the scour hole.

Jennie presented on the objectives and performance measures from the SDM WG.

- Glenn: Is the SDM process designed to make a decision?
 - Jennie: It's designed to generate options for USBR to consider, so this potential overlap with SJAFCA is perfect for this round of the project.
 - Glenn: We're excited to share how this overlaps with the stakeholder engagement and our project.
- Kevin: I'm glad that you're considering flood capacity and ruling out negative impacts. With CVFPB and USACE, if you negatively impact flood capacity, the project will be shut down. If you improve flood capacity, that's not necessarily a "yes," either. With the Corps and the CVFPB, you have to select a preferred alternative before you can get feedback from them; so, you either

have to push for a pre-application meeting, or move ahead with an application and get feedback later on the preferred alternative.

SJAFCA MOSSDALE TRACT URBAN FLOOD RISK REDUCTION PROJECT

Kevin Lee, LWA (see attached slides)

- Joint project between DWR and SJAFCA
- Objective: Identify a plan to both local and state sponsors to achieve an urban level of protection (ULOP)
- Supporting goals:
 - Improve operation and maintenance of flood control system
 - Increase resiliency to future climate change
 - Promote multi-benefit projects, i.e., ecosystem restoration and recreation.
- Both DWR and USACE have been working on flood control in this area for a while (DWR San Joaquin River Basin-wide feasibility study, 2017, and USACE Lower San Joaquin Feasibility Study, 2018)
- Borne out of UFRR Alternative 4a:
 - Includes full fix-in-place levee improvements that address 2040 climate change scenarios
 - Development prohibitions and binding easements on ~1430 acres for floodplain use
 - Ecosystem restorative elements
- Currently in Phase 2 (CEQA): ADEIR #2 expected end of February, when they'll engage agencies for review before release to public
 - Also engaging AB 52 (tribal coordination)
 - Scott: Is your project focused on the west bank of the San Joaquin at all? All of the levee work will be on the east side?
 - Kevin: It's not subject to the same ULOP rules and is outside SJAFCA's jurisdiction
- Phase 3 is Engineering
- Public and Regulatory Engagement (see slide 5, attached)
 - Dates should be 2022 instead of 2023 except the last one
 - Public meetings, site visits with agencies
- Just downstream of the scour hole, on the northern part of the Mossdale peninsula (south bank of SJR, UFRR Site 9), one option is to restore a curved section of floodplain by setting back the levee; more in John's presentation.
- Next steps
 - Advance levee designs to 65% by 12/23
 - Release Draft EIR by 12/23
 - Advance restoration concepts to 35% by December 2023
- Dylan: Can you speak to where we have our project area – what your plans will be?
 - Kevin: John will present on that, but it'll be a restoration project.

RIVER MILE 52 OPTIONS PRESENTATION

John Pritchard, ESA

- UFR study identified 18 alternative sites, including River Mile 52 (east bank of confluence)
- Goal 1: improve quantity and quality of floodplain and riparian habitat
- Goal 2: support broader ecosystem recovery in Lower San Joaquin River region
- River Mile 52 is what they're calling the area around the scour hole
- Site overview:
 - Benefits
 - Largest Mossdale Tract Area UFRR restoration below I-5 (158 acres)
 - Reduce number of miles of levee O&M
 - American Rivers' proposed *San Joaquin River Riparian Corridors Project* is located on opposite bank
 - Challenges
 - Landowner opposition
 - Conflicts with general plan use (recreation)
 - Potential trigger for recreation mitigation
 - Potential transfer of flood risk; flow split
 - Right now 50-50
 - If changed anything, could direct more flood flows toward Stockton, which wouldn't work
 - Nonnegotiable point with Dante from RD17
 - Long-term O&M
- Option 8A: No levee setback, some ecosystem restoration on the peninsula
 - Opportunities to fill in riparian enhancements along east bank levee
 - Some wetlands habitat restoration option, but mostly terrestrial habitat
 - Current owners of property are very interested in building homes there – could be a very expensive piece of real estate to buy or difficult to negotiate
 - Low vs. high flows want to go different directions
 - Complicated hydrodynamics at all times of year (pumps, barriers, flows, etc.)
 - RD17 just constructed a new project in this reach (berms and cutoff walls) and are unhappy about the idea of SJAFCA changing them
- Scott: Have you talked to the landowner?
 - John: No, but we have a good idea from RD17 and KSN.
- Chris: Do you know where they've built cutoff walls on the levee?
 - Kevin: I can provide a map of their improvements.
- Option 8B: Setback with connection downstream of HOR
 - Almost exactly like SH option 4 but with a floodplain side channel downstream of the confluence
 - Setback levee cutting off the peninsula as floodplain habitat; levee remains on south and west sides of peninsula; northern levee is removed
- Option 8C: Setback with connection upstream of HOR

- Same as 8B except with levee removal on south and west sides of peninsula and side channel upstream of confluence
- Dylan: Are you avoiding SJR-SJR connection to avoid flow split issues?
 - John: yes. We've heard in the field that when the river's up, everything wants to go down OR, but our numerical models say it's about 50-50.
 - Glenn: Our objectives are flood risk reduction and ecosystem restoration, and it doesn't immediately achieve solution of scour hole, but it does improve habitat and breeding grounds for salmon, so it may meet some of your goals as well. I'm not sure if we did the modeling, but flows we looked at are favorable to overall hydrology of scour hole, which might
- Kevin: I will say that an alternative that cuts new river channel would probably require five-plus years of permitting application with the Corps, which is time we don't have. (aka: redirecting San Joaquin is not going to happen)
 - Chris: the channels we'd create would be flood-activated, not new routing of the San Joaquin; analogue is Southport Levee setback process (which Kevin permitted). Second point I have is that our 2D and 3D modeling is focused on flow split, then scour hole, then habitat enhancement. I would love to combine forces to make this happen so that it can succeed.
- Dylan: what's your timeline for restoration and work?
 - Kevin: We've narrowed from 18 sites to 8, and our goal is to create 35% models for each of those by the end of this year in Draft EIR (including Options 8B and 8C). We've included all of these in CEQA but haven't started NEPA yet. We're also evaluating the different limitations (landowners, etc.)
 - Glenn: The goal is to get whole map from early slides done by 2028. The only way we're going to get there is through partnership with the Corps. The Smart Study is blessing our CEQA alternatives and adopting them as their plan. Otherwise it's not going to happen.

APPENDIX C3: SDM WORKING GROUP MEETING SUMMARIES

MEETING #1 MEETING SUMMARY

Friday, April 29

PARTICIPANTS

WORKING GROUP

- Steve Tsao, CA Department of Fish and Wildlife (CDFW) (Alternate for Gretchen Murphey)
- Thomas Agosta, CA Department of Water Resources (DWR)
- Yuan Liu, Contra Costa Water District (CCWD) (Alternate for Ching-Fu Chang)
- Barb Byrne, National Marine Fisheries Service (NMFS)
- Cyril Michel, UC Santa Cruz/Southwest Fisheries Science Center
- John (JD) Wikert, US Fish and Wildlife Service (USFWS)
- Jon Burau, US Geological Service (USGS)

PROJECT TEAM

- Brooke White, US Bureau of Reclamation (USBR)
- Ian Smith, USBR
- Jo Anna Beck, USBR
- Chris Bowles, cbec eco engineering
- Scott Wright, cbec eco engineering
- Greg Shellenbarger, cbec eco engineering
- Brad Cavallo, Cramer Fish Sciences
- Jeff Tupen, ECORP
- Ed Gross, RMA
- Jennie Hoffman, Adaptation/Insight
- Mary Beth Day, Kearns & West
- Lindsay Tryba, Kearns & West

ACTION ITEMS

- Kearns & West (KW) will distribute Brooke White's (USBR) contact information to all Structured Decision Making (SDM) Working Group (WG) members. (complete)
- KW will distribute all PowerPoint presentations and working group guidelines to all SDM WG members. (complete)
- KW will distribute a meeting summary.
- KW will set up a group SharePoint site for document sharing. (complete)
- All SDM WG members are encouraged to share relevant resources with the SDM WG. (ongoing)

SUMMARY NOTES

PROJECT OVERVIEW

Scott Wright, cbec ecoengineering, provided an overview of the scour hole project. Scott's presentation can be found in the PowerPoint meeting slides; however, a summary of his presentation is captured below.

The scour hole was mentioned in the 2019 Reinitiation of Consultation (ROC) on the Long Term Operations (LTO) Biological Opinion (BO) (see *Biological Opinion Proposed Action 8.6.12.6.7: Address scour hole at Head of Old River*). The Project aims to reduce the predation intensity on juvenile California Central Valley (CCV) steelhead and spring-run chinook salmon entering the Delta from the San Joaquin River. Scott noted that the project scope includes three Reclamation selected feasibility designs and cost estimates that would increase survival of juvenile CCV steelhead and CCV spring-run Chinook past Chipps Island.

The project is located in the San Joaquin River, near the city of Lathrop (see Photo 1).

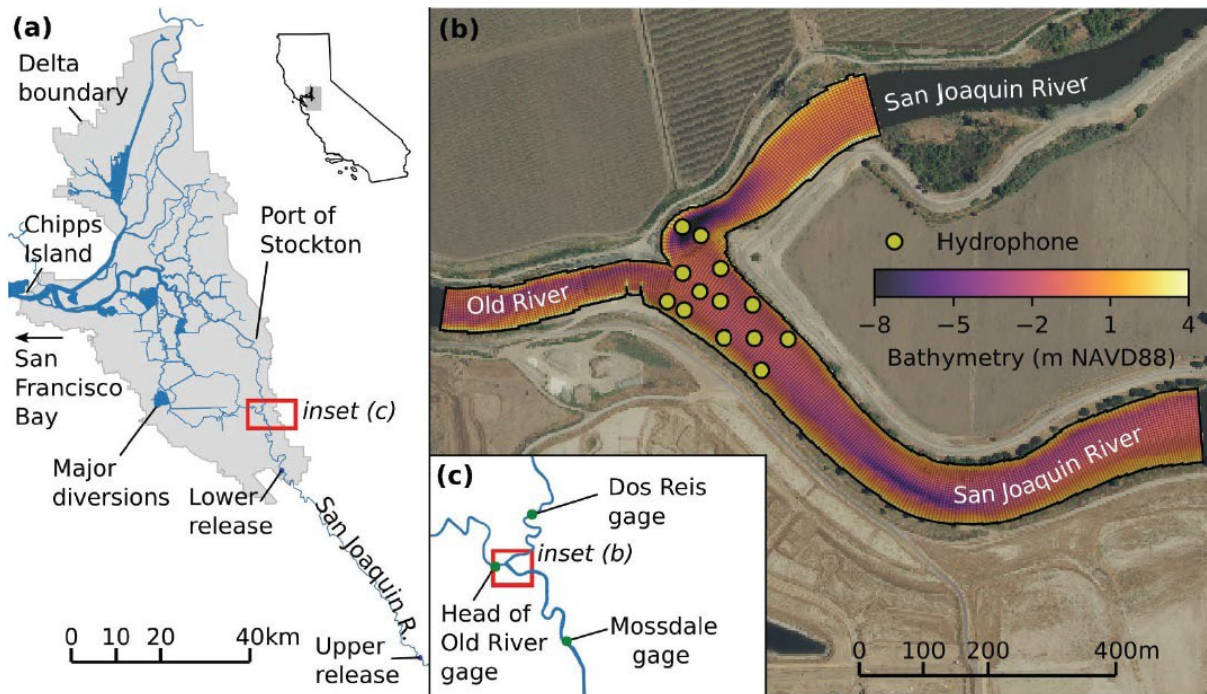


Figure 1: Location of the scour hole.

Figure 1 is a three-panel map showing the study area at multiple scales, from the full Delta context down to bathymetry and hydrophone locations at the junction of Old River and the San Joaquin River.

Scott provided an overview of the project schedule and milestones:

- October 2021: Project initiated
- April – October 2022: SDM workgroup meetings
 - Includes stakeholder outreach, model development, and options development
- January 2023: Six initial options presented to the Team
 - Includes National Environmental Policy Act (NEPA) and options screening
- October 2023: Three feasible alternatives presented to the Team
 - Followed by NEPA review
- February 2024: Draft environmental impact statement (EIS)
 - Followed by NEPA review
- June 2024: Final EIS
- August 2024: Permit Applications

Questions and comments from the participants are summarized below:

- Comment (C) (SDM WG Member): I would like to clarify that the scour hole project was included as a recommendation, but not a new requirement from NMFS in the 2019 ROC LTO BO.
- Question (Q) (SDM WG Member): What is the proposed scope of the potential project? NMFS is interested in maximizing habitat. Additionally, I would like to express an interest in proposing an alternative of “rounding off” the sharp corner of the land that exacerbates the hydrological issues that cause scouring in the river.
 - (C) (Team Member): Thank you for providing this alternative. We will make a note of it, but at this time, it is too early in the SDM process to propose and discuss alternatives. We will focus on discussing the SDM process at this time before discussing alternatives.
 - (C) (Team Member): Yes, we will discuss options of alternatives in depth in future meetings. That said, we can discuss high-level proposals to understand the scope of the project and determine what is possible in the universe of alternatives.
- (C) (Team Member): Yes, USBR is open to discussing all options in an open and transparent dialogue. We do not want to limit any alternatives at this stage of the process.
- (C) (SDM WG Member): I have worked in scour hole previously (between 2014-2015) and would like to share that there is a shallow shoal (i.e., an accumulation of sediment in a river channel) downstream that was created by the scour hole’s unique hydrology. This shoal should also be considered as part of the potential predation issue.
- (C) (SDM WG Member): Another suggestion was made to consider habitat recovery. This project provides an opportunity to create and improve habitat for juvenile salmonids and for green sturgeons. An alternative to consider is to route fish around the scour hole and possibly even route fish around the Old River rather than into the deeper ship channel to reduce predation risk.
- (C) (SDM WG Member): In my previous work on the scour hole, progress has been hampered by outdated technology; I can provide a presentation to this group on previous data collected and

lessons learned. For example, some technology may be unable to accurately track predation at depth. This technology may be improved now, but the group should consider and discuss potential technological challenges as well as previous obstacles.

- (C) (Team Member): Thank you very much for offering to share previous work. The Team is brainstorming ways to provide all SDM WG members with an opportunity to share previous, relevant work in an efficient way (e.g., via a file-sharing system or presentation session).

WORKING GROUP GUIDELINES

Jennie Hoffman, Adaptation/Insight (SDM specialist), provided an overview of the SDM WG guidelines. The SDM WG guidelines address four distinct topics: Project Overview, Project Roles and Responsibilities, Approach, and Work Plan. The SDM WG Guidelines were distributed to the SDM WG Members and Team in advance of this meeting, and the full guidelines document can be found on the [WG's Microsoft Teams site](#).

There were no questions or comments from participants.

STRUCTURED DECISION MAKING OVERVIEW

Jennie provided an overview of Structured Decision Making (SDM) with the goal of developing a shared understanding of the SDM process within the scour hole SDM WG. Jennie's presentation can be found in the PowerPoint meeting slides; however, a summary of her presentation is captured below.

Structured decision making is based on a large literature and represents the 'best management practices' for decision making. It seeks to guard against cognitive biases and works to improve (or maximize) the chance for a good outcome. Key elements of the SDM process include values-focused thinking, inquiry rather than advocacy, and problem decomposition (i.e., breaking the problem into components). Decomposing the problem includes the following steps: frame the problem, elicit objectives, develop alternatives, evaluate consequences, identify preferred alternative, and implementation. Jennie also provided an SDM example (using the example of booking an airplane flight) to discuss how people consider objectives, alternatives, and tradeoffs daily.

Benefits of the SDM process include:

- Helps focus decision energy where it matters most.
- Improves, or even maximizes, the chance for a good outcome.
- Transparent process.
- Guards against errors and psychological traps.

Seven participants have participated in an SDM process before, and Jennie invited participants to share wisdom and lessons learned associated with previous SDM experiences:

- (C) (SDM WG Member): It is very important to understand the problem that the group is trying to solve from the beginning. The SDM WG should spend extra time in the beginning to ensure everyone understands the problem and is on board from the start; otherwise, the process may become derailed if participants do not agree on the primary problem.

- (C) (SDM WG Member): We should consider inviting additional SDM WG members who can “shake up our thinking” because many of these participants have worked together before, so we should solicit added information and creativity from outside groups.
- (C) (SDM WG Member): Yes, and consider inviting local representatives from the City of Lathrop.
- Response (R) (Team Member): The Team has reached out to the City of Lathrop and will continue to provide representatives with relevant updates and engagement opportunities.

DECISION FRAMING & OBJECTIVES

Participants were sent into break out rooms to fill out a Miro Board discussing the following questions:

- Decision Makers – Who is the decision maker? Who is ultimately responsible?
 - The group agreed that USBR will ultimately choose a final decision, but other interest groups will have multiple opportunities to give input.
- Action – What kinds of actions need to be taken?
- Goals / Objectives – What are the things you would like to achieve?
- Temporal Extent – What is the time scale of the issue?
- Spatial Extent – What is the spatial scope of the issue?
- Constraints – What constraints on the decision are there?

As a group, SDM WG members discussed and refined each Miro board response. Responses are captured below:

DECISION MAKER: WHO IS THE DECISION MAKER? WHO IS ULTIMATELY RESPONSIBLE?

- USACE
- USBR
- NMFS
- USFWS
- DSC
- Flood Board
- Permitting Agencies
- ACOE
- CDFW

ACTIONS: WHAT KINDS OF ACTIONS NEED TO BE TAKEN?

- Improve surrounding habitat
- Predator removal
- Bypass scour hole and areas with poor survival/high predation
- Channel realignment
- Develop alternatives
- Consider options
- Measures to reduce predation intensity at the scour hole through mods to channel geometry and associated habitats

- Sediment transport modeling (for example) to assess alternative
- Assessment of biological response to new bathymetry under alternatives (PERs, modeling)
- Coordination with resource agencies (alternative development, permitting, and more)
- Bypass channel
- Filling in hole/creating uniform bathymetry
- Release hatchery fish further downstream
- Salmonid transport
- Setback levee

GOALS/OBJECTIVES: WHAT ARE THE THINGS YOU WOULD LIKE TO ACHIEVE?

- Reduce the number of landscape features in the spatial domain that generate hydrodynamic features that increase predation
- Decrease predation
- Reduce salmonid predation
- Reduce predation on juvenile salmonids
- Increase salmonid survival
- Increase survival
- Improve survival to Chipps Island
- Minimize impacts to surrounding landowners
- Do no harm (flooding impacts)
- Improve conditions for salmonids
- Minimize cost
- Meet Proposed Action requirement
- Minimize impact to CCWD Old River diversion location (e.g., WQ, flow, stagnant points, aquatic weeds)
- Maximize habitat value
- Creating additional suitable habitat - value added
- Maintain or improve flood safety
- Minimize detrimental impacts to Delta uses
- Avoid just shifting the problem?
- Suitable habitat for juvenile salmonids
- Flexibility for adaptive management
- Defensible science
- Transparency

TEMPORAL EXTENT: WHAT IS THE TIME SCALE OF THE ISSUE?

- Permanent
- Adaptive management and monitoring are essential
- Design horizon? 50 years? 100 years?
- How sustainable (how long) is the solution
- Hydrologic (River flows) to turbulence timescales
- Permanently

- Want a fix that is durable, or is not too expensive to maintain

SPATIAL EXTENT: WHAT IS THE SPATIAL SCOPE OF THE ISSUE?

- The Delta (HOR to Chipps Island)
- In the SJR btw Old River and Chipps Island
- Junction to Chipps Island
- Likely near HOR, but could consider redesigning that overall junction

CONSTRAINTS: WHAT CONSTRAINTS ON THE DECISION ARE THERE?

- How much dirt can we realistically move to change the offending geomorphology in the number of places we need to do it to restore San Joaquin salmon populations
- Money to make the connection between geomorphology, hydrodynamics, and predation
- Considering effectiveness, durability, and cost (capital and O&M)
- Planned developments
- Flood control
- Water operations
- Cost/Budget
- Future related management actions in the South Delta
- Status Quo Bias

The group also began to draft a decision statement based on the responses above:

- USBR is considering physical channel alterations, hydrological actions, predator control, and direct actions on juvenile fish to increase survival of and decrease predation on species of concern in the HOR scour hole area in perpetuity in the HOR junction area. USBR will do this while considering permitting agencies, power customers, landowners, other stakeholders, improving habitat, avoiding shifting the problem elsewhere, avoiding negative impacts on landowners and flooding, and capturing learning for future action.

Questions and comments from the participants are summarized below:

- (Q) (Team Member): When will we discuss who influences this process?
 - (R) (Team Member): We can begin to discuss this now and will continue these conversations throughout the process.
 - (C) (SDM WG Member): I suggest that the Team finds ways to ensure that people who are not SDM WG members have an opportunity to share their input.
 - (R) (Team Member): Yes, there will be other opportunities for people who are not SDM WG members to provide their input; for example, during the NEPA comment period. The SDM WG is intentionally designed to allow a smaller group of people with a scientific, technical focus to discuss alternatives. The goal is for this small SDM group to help jump start alternatives before opening the conversation to the broader community. Additionally, a smaller group can often reach consensus more efficiently than a large group.

- (C) (SDM WG Member): I recommend the Team reach out to community members as soon as possible to include them from the beginning. This can help with transparency, communication, and buy-in from the beginning, rather than trying to build support after alternatives are selected.
- (Q) (SDM WG Member): Because there are various levels of alternatives possible, can USBR provide recommendations or boundaries on spatial scale?
 - (R) (Team Member): While USBR has not set an exact spatial scale, the solicitation was written using Chipps Island as a metric (e.g., “survival at Chipps Island”). At this stage, USBR will consider a wide variety of alternatives spanning a broad spatial scale.
 - (C) (SDM WG Member): I recommend limiting the spatial scope to the San Joaquin River.
- (Q) (Team Member): Should the group consider objectives beyond reducing predation? For example, if we address increasing spawning habitat, we will need to show a clear nexus with reducing predation.
 - (C) (SDM WG Member): USBR should consider conducting before and after studies to understand the results of our work.

CONFIRM NEXT STEPS

The SDM WG will convene virtually one to two times per month in May, June, and July. Participants agreed that they did not need to meet for a site visit at this time, as most participants have previously visited the scour hole site. The next SDM WG meeting will occur on Friday, May 20th from 3-5 pm PDT.

MEETING #2 MEETING SUMMARY

Friday, May 20

PARTICIPANTS

WORKING GROUP

- Gretchen Murphey, CA Department of Fish and Wildlife (CDFW)
- Curtis Yip, CA Department of Water Resources (DWR)
- Ching-Fu Chang, Contra Costa Water District (CCWD)
- Barb Byrne, National Marine Fisheries Service (NMFS)

PROJECT TEAM

- Brooke White, US Bureau of Reclamation (USBR)
- Rod Wittler, USBR
- Scott Wright, cbec eco engineering
- Brad Cavallo, Cramer Fish Sciences
- Dave Thomas, ECORP
- Jennie Hoffman, Adaptation/Insight
- Mary Beth Day, Kearns & West (KW)
- Henry DeRuff, KW

ACTION ITEMS

- USBR will discuss the preliminary problem statement internally to clarify the scope of the WG process.
- USBR will provide an update to the WG regarding whether the Head of Old River (HOR) barrier could be reinstalled in the future.
- Working Group (WG) members will reach out to KW if they are unable to access the Microsoft Teams site.
- KW will follow up with Curtis Yip regarding access to the Microsoft Teams site.
- KW will distribute a meeting summary.
- KW will schedule June and July meetings, including a Scour Hole Science Symposium.
- Adaptation/Insight will circulate the brainstormed objectives developed during the breakout sessions.

KEY AGREEMENTS OR OUTCOMES

The Working Group agreed upon the following preliminary decision-framing statement:

USBR is deciding what actions it might take to increase survival of juvenile San Joaquin Basin origin California Central Valley steelhead and Central Valley spring-run Chinook Salmon to Chipps Island with a focus on decreasing predation at the HOR scour hole, keeping in mind other socio-economic, recreational, regulatory, and operational considerations and uncertainty around effectiveness.

The structured decision making (SDM) WG is explicitly exploring options that include a range of action locations (limited to HOR vs. elsewhere), a range of action types (e.g., changing the channel, within existing levees, setback levees, including operations, etc.) and actions specifically focused on reducing predation vs. increasing survival more broadly.

SUMMARY NOTES

DECISION FRAMING

Jennie Hoffman, Adaptation/Insight (SDM specialist), reviewed the PROACT Cycle of SDM and the results of last meeting. The WG discussed and edited the draft decision-framing statement.

- Question (Q)/Comment (C) (WG Member): Has USBR decided to constrain the scope at all? The scopes we have discussed so far are fairly broad. I do not want to waste time coming up with a big idea if we are going to go with least expensive option.
 - Response (R) (Team Member): There are not any sideboards to start, to help get all ideas on the table. I can share the initial ideas with my leadership, and we will work to better define the scope.
 - (R) (Team Member): Once we have the decision statement, we will discuss what we want to share with USBR for feedback.
- (C) (Team Member): I would change the statement say “increase survival... to Chipps Island” instead of “beyond Chipps Island”.
 - The WG agreed.
- (C) (WG Member): “With a focus on” suggests there is a possibility to consider actions outside the Scour Hole. I suggest we discuss if that is true.
- (C) (WG Member): It seems important to consider fishing and boating in the area. I suggest we explicitly include “recreational” considerations.
- (C) (WG Member): I like that “survival” is included. We do not want to fill holes just for the sake of it. I think the biological assessment (BA) specifies that the survival benefit is for San Joaquin Basin origin salmonids. This might help us narrow the scope.
 - The WG agreed to specify “San Joaquin Basin origin” salmonids.
- (Q) Team Member: If we were to leave the problem statement broad, does that expand the scope significantly?
 - (C) (WG Member): the way it is written now is pretty broad. We could remove “with a focus on” to narrow the scope.
 - (C) (WG Member): In the decision statement, precision is important. I do not like the phrase, “in the vicinity of HOR.” The focus is reducing predation risk at the scour hole, but an action that could reduce that risk does not necessarily have to take place at the HOR. I think other actions should be considered. “With a focus on” gives us that wiggle room. We need to be clear about where the actions are.
 - (R) (Team Member): One example of an action that could be taken elsewhere would be flows on the San Joaquin River impacted by reservoir releases upstream. Additionally, I would note that I believe actions at pumps and reservoirs (i.e., operations) are not mentioned in the BA.

- (Q) (Team Member): Does the draft problem statement limit the scope to actions changing channel or including operations? Could it include actions involving the levees?
 - (R) (WG Member): The decision statement needs to be broad enough to accommodate all of those things.
 - (R) (Team Member): We could add in a statement to the effect of, “We recognize we are leaving open questions of action location and action type. Here are the levels of specificity we’re going to explore.”
 - (R): What I heard earlier is that people are not interested in coming up with a broad range of solutions if USBR is not going to consider them.
- (C) (WG Member): I would be interested in hearing from USBR about how specific you want us to be in these actions.
 - (R) (Team Member): The first round does not need to have that much specificity.

DECISION OBJECTIVES

Jennie reviewed how to generate decision objectives. The WG was sent into breakout groups to discuss the following brainstorming questions:

- What are we trying to achieve (or avoid)?
- What concerns are we trying to address?
- What things do we need to consider when evaluating alternatives?
- What criteria can we use to compare alternatives?
- What would be a great (or terrible) outcome? Why would it be so great (or terrible)?
- What would others ask or be concerned about?

Groups were asked to brainstorm concerns using the questions below, then convert concerns to decision objectives that include and object and a preferred direction. Responses are captured below:

- Minimize Corps concerns by maintaining or improving flood capacity
- Avoid futile “token” effort. I am skeptical, e.g., of one-off predator removal as a successful approach
- Maximize clarity and relevance of survival metrics
- Reduce predation loss of the targeted species
- Minimize adverse impacts on beneficial uses of water (quantity or quality)
- Minimize financial impacts
- Minimize adverse impacts on other species (a very tricky one)
- Minimize impacts on public access and utilization of the site
- Increased demands on operations and/or water supply
- Maximize long-term effectiveness
- Minimize landowner concerns
- Minimize environmental impacts to target salmonids (e.g. might design cause detrimental effects in some times/flows)

- Maintain flow split at HOR so as not to increase flooding downstream or affect pumping capabilities
- The scour hole reforming due to river processes would be a bad outcome
- Estimated survival to Chipps Island to compare alternatives
- A terrible outcome would be spending a lot of time and money and not appreciably improving survival of salmon and steelhead
- Mark-recapture effort to determine efficacy
- Increase San Joaquin salmon and steelhead populations
- Reduce predation on salmon at steelhead at the scour hole
- Determining baseline predatory fish population size
- Avoid unintended consequences (i.e. increased predation, lack of access, problems for marine mammals in the area)
- Avoid recreational boating impacts
- Should consider future plans in that area (i.e. if the HOR Barrier is reinstalled, as well as a new levy planned by the city of Lathrop)

After the breakout group activity, the project team asked the following question:

- (Q) (Team Member): Based on the breakout group activity, what other questions do you want the group to reflect on or USBR to address?
 - (R) (WG Member): I would like USBR to share if there is a chance that the HOR barrier might be reinstalled.

The WG adjourned at 5:00 p.m.

MEETING #3 MEETING SUMMARY

Monday, June 27

PARTICIPANTS

WORKING GROUP

- Ching-Fu Chang, Contra Costa Water District (CCWD)
- Gretchen Murphey, CA Department of Fish and Wildlife (CDFW)
- Thomas Agosta, CA Department of Water Resources (DWR)
- Curtis Yip, CA Department of Water Resources (DWR)
- JD Wikert, US Fish and Wildlife Service (USFWS)
- Barb Byrne, National Marine Fisheries Service (NMFS)

PROJECT TEAM

- Brooke White, US Bureau of Reclamation (USBR)
- Ian Smith, USBR
- Jo Anna Beck, USBR
- Scott Wright, cbec eco engineering
- Brad Cavallo, Cramer Fish Sciences
- Jennie Hoffman, Adaptation/Insight
- Mary Beth Day, Kearns & West (KW)
- Henry DeRuff, KW

ACTION ITEMS

- **cbec** to ensure appropriate technical team members attend Working Group (WG) meetings when alternatives will be discussed.
- **cbec** to present a summary about landowner interests and different abutting properties at the next WG meeting.
- **USBR** to discuss how to coordinate with different groups discussing related topics (e.g., Reconsultation, the Head of Old River Barrier (HORB) group).

KEY AGREEMENTS OR OUTCOMES

- The WG agreed on more focused decision objectives (See “Decision Objectives”) based on the previous week’s conversation and USBR’s guidance about scope.

SUMMARY NOTES

DECISION FRAMING

Jennie Hoffman, Adaptation/Insight (SDM specialist), reviewed feedback from USBR. At the previous meeting, WG members sought clarification around the scope of the scour hole project. Questions for USBR and their responses are as follows:

Scope/range of **ACTION LOCATIONS**

- Limited to the immediate area of the HOR scour hole?

- USBR response: The action area should be within a limited area of the Head of Old River (HOR) scour hole. See next question.
- Consider areas in the vicinity of HOR scour hole?
 - USBR response: An action area of 1-2km upstream and downstream of the HOR scour hole seems reasonable.
- Consider all areas between HOR scour hole and Chipps Island?
 - USBR response: No. We are interested in finding ways to improve survival of fish to Chipps Island, but the action location does not include the entire Delta.

Scope/range of **ACTION TYPES**

- Focused solely on reducing predation versus improving survival more broadly?
 - USBR response: Survival can be improved through multiple mechanisms created by the scour hole including predation, entrainment, habitat quality. Action should improve survival but does not need to solely focus on reducing predation.
- Limited to channel modifications within existing levees versus modifications to levees?
 - USBR response: Actions should be reviewed that can include channel modification and modification to levees.
- Consider changes to operations that affect flows at HOR scour hole?
 - USBR response: Actions should not consider changes to operations that affect flow at HOR.
- Should actions consider the possibility of installation of HOR barrier?
 - USBR response: Actions should not evaluate installation of the HOR barrier. The consequences of a HOR barrier have been observed, reported, and can be modeled. This information can be used at some point as a comparison to actions being considered in this study and we don't need to evaluate that as part of this project.

WG members had various follow-up questions:

- Comment (C) (Team Member): It sounds like the WG should not consider actions that depend on the HORB either being present or not.
 - Response (R) (WG Member): The WG should also consider hydrology since the scour hole was likely created by physical forces.
 - (R) (WG Member): The WG should be coordinating with the Reconsultation and HORB groups, as we are all discussing similar topics.
 - **Action**: USBR to discuss internally how to coordinate with other related groups.
- Question (Q) (WG Member): Does the WG have the necessary expertise to address the hydrodynamics of a possible solution?
 - (R) (Team Member): The technical team has significant expertise, including hydrodynamic modelers, and the WG includes a USGS staff member who is an expert in hydrodynamics at the scour hole. Our goal is to understand the hydrodynamics that have led to the scour hole and use the most sophisticated modeling to make sure we're addressing those issues.

- (R) (Team Member): The role of the WG is not so much to develop the detailed technical plans, but rather to support the technical team to make sure they are considering all of the objectives of the project and explore the full decision space.
- (R) (WG Member): I think the WG needs to have a deep conceptual understanding of the physics of the situation so that we can propose plausible solutions. Will a member of the technical team be present at these meetings?
- **Action:** cbec will ensure the project team hydrodynamic modelers attend WG meetings when alternatives will be discussed.
- (Q) (WG Member): Will the science symposium include a presentation on the hydrodynamics of the scour hole?
 - (R) (Team Member): Yes.

Based on the questions and answers from USBR, Jennie edited and clarified the Decision Statement to reflect:

The action area will be within a few km of the HOR scour hole. Actions to be reviewed can include channel modification and modifications to levees but will not include changes to operations. Survival can be improved through multiple mechanisms created by the scour hole including predation, entrainment, habitat quality. Action should improve survival but does not need to solely focus on reducing predation.

DECISION OBJECTIVES

Jennie led a discussion of the Decision Objectives. Based on discussions from the previous meeting, Jennie organized objectives based on the following categories: effectiveness, cost/financial impacts, effects on other species, flooding, water options/availability, recreation, and outstanding questions. The WG reviewed each category, beginning with the “Effectiveness” objectives.

Please note: italicized text in the “Objectives” sections represents this workshop’s additions; non-italicized text represents synthesis from the 5/20 workshop.

Effectiveness

Objectives – from Miro:

- Effectiveness at reducing mortality of target species in the vicinity of the HOR scour hole
 - Evaluate survival locally (monitoring after implementation) and to Chipps Island (via modeling for purposes of selecting an alternative)
 - Consider thresholds
- Durability
 - likelihood that whatever we do will still be in place in 50 years, or
 - number of years we think our solution will remain in place
 - Consider thresholds

Discussion:

- The group discussed what “long-term effectiveness” means.

- (R) (WG Member): Based on the actions possible in the limited scope (e.g., within a few kilometers of the scour hole), is it reasonable to expect increased survival to Chipps Island? I'm not against making modest recoveries, but I want the WG to consider the scale of our solution.
- (R) (WG Member): The solution should be at the same scale as the challenge. It would be difficult to measure improved survival to Chipps Island based on just this improvement.
- (Q) (Team Member): To what extent do we want to focus on reducing predation versus increasing survival?
- (R) (WG Member): I don't think we're going to be able to do much outside of reducing predation. The goal is to turn the environment into one that's favorable for the predators into one that's favorable for the prey, such as through environmental restoration.
- (R) (WG Member): I don't think we're going to see changes in survival to Chipps Island based on this solution, so I think we should reduce our scope of measurement.
- (R) (Team Member): Survival to Chipps Island is an important part of the technical team's charge.
- (R) (WG Member): I agree that survival to Chipps Island is important since that's how this effort could be plugged into the CVPIA Science Integration Team (SIT) model. I don't think this action will generate a measurable impact, though it may produce a modellable impact. Performance metrics need to be modellable but don't have to be measurable.
- (R) (WG Member): We could measure survival to Chipps Island and also measure at a smaller interval, for example, to Turner Cut.
- (R) (WG Member): Most fish die because they're small, there are predators, or it's hot. Can we change the phrasing from "reducing predation" to "reducing mortality"?
 - WG members agreed.
- The group agreed effectiveness should consider local survival (monitoring after implementation) as well as survival to Chipps Island.
- The group discussed what "long-term" means.
 - (R) (WG Member): At least ten years.
 - (R) (WG Member): I defer to our fluvial geomorphologists, but I would lean toward a longer range, such as 50 years.
 - (Q) (WG Member): Can we propose different alternatives, e.g., a \$5 million solution for something that will work for 10 years versus a \$15 million solution for 50 years? Alternatively, we could use minimum thresholds for both survival and durability.
 - (R) (Team Member): It won't be worthwhile if we select a durable solution that's not good for our other objectives, so we may want to weight different objectives.

Cost/financial impacts

Objectives – from Miro:

- Cost (start-up and operations & maintenance over 50 years)

- Cost to Reclamation
- Cost to others

Discussion:

- (Q) (Team Member): Whose time and money are we talking about? Are we talking about what USBR spends or someone else?
 - (R) (WG Member): What about “good use of public resources”? As a taxpayer, I don’t want to be pouring money into a bad idea.
 - (R) (Team Member): We could use a “cost effectiveness” metric instead.
 - (R) (WG Member): We want a “bang-for-buck” solution rather than just choosing the least expensive option. Also, a cost-sharing agreement could impact the budgets of entities other than USBR.
 - (R) (Team Member): I think we’d want to think about this as total cost of the project and to USBR.
 - (R) (WG Member): If there are possible flood control or habitat restoration flow benefits, perhaps other groups might pitch in.
 - (R) (Team Member): It seems like the decision should consider total cost as well as direct costs to different participants to the solution.
 - (R) (WG Member): We should also think about upfront costs versus ongoing costs for operations and maintenance (e.g., over 50 years). For example, we might need to put new rock in the scour hole every five years.

Effects on other species

Objectives – from Miro:

- Minimize adverse impacts on species of concern (construction and long-term)
- Maximize long-term benefits to other species of concern
 - Sea lion, Longfin Smelt, Swainsons Hawk, riparian brush rabbit, maybe giant garter snake, other salmonids, sturgeon (white and green are found in the tribs)
 - Change to cost (mitigation)

Discussion:

- The group discussed the naturing and timing of impacts to other species:
 - (R) (WG Member): The project team will have to consider mitigation for impacts on all listed species.
 - (R) (WG Member): Many impacts will occur during the construction phase; therefore some impacts could be avoided by considering timing (e.g., avoiding San Joaquin steelhead migration in March and April).
 - (R) (WG Member): Long-term impacts should be considered as well as short-term impacts.

- (R) (WG Member): Some impacts can be positive, e.g., habitat restoration. Small modifications can be made to project designs to create benefits for other species, such as the giant garter snake or riparian brush rabbit.

Flooding

Objectives – from Miro:

- Maintain or improve flood capacity as required by Army Corps and Flood Protection Board

Discussion:

- The group discussed potential flooding impacts:
 - (R) (WG Member): I think we need to minimize any US Army Corps of Engineers concerns and avoid any negative impact on flooding downstream.
 - (R) (WG Member): I agree and would add that the Central Valley Flood Protection Board will need to approve of any changes that affect flooding by more than 1/10 foot.
 - (R) (WG Member): Flooding can actually be good from a habitat perspective. We need to frame this as “negative impact to human environment.”

Water operations/availability

Objectives – from Miro:

- Minimize adverse impacts on beneficial uses of water
 - Beneficial uses may be adversely affected by changes in water surface elevation, water quantity, and water quality

Discussion:

- The group discussed objectives related to water operations:
 - (R) (WG Member): “Affect pumping capability” is not the same as demands on operations. We need to capture elevation, quality, and quantity. We need to address “minimize adverse impacts on beneficial uses of water.”
 - (R) (WG Member): Elevation will impact which pumps are affected.
 - (R) (WG Member): The initial list can include elevation, quantity, and quality, and we can get more specific later.
 - (R) (WG Member): The phrasing I would use is “Beneficial uses may be adversely affected by changes in water surface elevation, water quantity, and water quality.”

Recreational Impacts

Objectives – from Miro:

- Minimize adverse impacts to recreational use associated with site

Discussion:

- The group discussed which potential recreational impacts to consider:

- (R) (WG Member): If we include fishing as an impact, we'd be very constrained, since people fish at the scour hole due to the presence of striped bass. We also need to consider the ability to run boats through the area since water levels can get low at low flows or low tides.
- The group agreed to keep the recreational impacts objective general for now, considering the project may negatively impact striped bass fishing while improving boating access. The WG may change this objective at a later date.

The Working Group then discussed objectives outside of

Adequately captured by other objectives?

Objectives – from Miro:

- Avoid unintended consequences (i.e. increased predation, lack of access, problems for marine mammals in the area)
 - Make sure in our consequences evaluation we consider the possibility negative effects on target species as well as positive ones
- Minimize landowner concerns
 - In process of identifying landowners
 - Have talked with RDs, Lathrop. RD to north is amenable to something happening. East and west are probably no-go areas because of development and planned development
- Minimize adverse impacts on beneficial uses of water (quantity or quality)

Discussion:

- (Q) (Team Member): Are there other unintended consequences the WG should consider?
 - (R) (WG Member): Make sure we consider the possibility of negative effects on target species.
- (Q) (WG Member): What do we know about the landowner interests?
 - (R) (Team Member): The project team spoke with the Reclamation Districts (RDs) managing the adjacent levees, who have shared some information, e.g., the City of Lathrop's planned development to the east of the scour hole (Mossdale Landing West).
 - (Q) (WG Member): Could the WG speak with the City of Lathrop about possibly including floodplain habitat in their development?
 - (R) (Team Member): RD17 staff indicated any changes to the channel that would impact flooding would not be viable.
 - **Action:** cbec to share a summary of landowners and their interests at the next WG meeting.

Clarify what these mean/"WITI"

Objectives – from Miro:

- Maximize learning for application to related projects and processes
 - Recapture effort to determine efficacy
 - Determining baseline predatory fish population size

- Have robust team in place to plan pre-project M&E
- Maximize clarity and relevance of survival metrics
- Should consider future plans in that area (i.e. if the HOR Barrier is reinstalled, as well as a new levy planned by the city of Lathrop)

Discussion

- (C) (WG Member): We want to make sure we're including learning as a future benefit, e.g., how we apply what we learn here to other projects in the Delta.
- (Q) (Team Member): What does "clarity and relevance of survival metrics" mean?
 - (R) (WG Member): I think that this is aiming for very specific metrics, e.g., "We are measuring salmon and steelhead survival before and after the solution in this reach of the river."

CONFIRM NEXT STEPS

The next WG meeting will be on Friday, July 15 from 3-5 p.m. The science symposium originally scheduled for July 1 will be rescheduled.

The WG adjourned at 11:00 a.m.

MEETING #4 MEETING SUMMARY

Friday, July 15, 2022

PARTICIPANTS

WORKING GROUP

- Thomas Agosta, CA Department of Water Resources (DWR)
- Barb Byrne, National Marine Fisheries Service (NMFS)
- Ching-Fu Chang, Contra Costa Water District (CCWD)
- Cyril Michel, University of California - Santa Cruz & NOAA Fisheries
- Gretchen Murphey, CA Department of Fish and Wildlife (CDFW)
- Steve Sinnock, Kjeldsen, Sinnock & Neudeck, Inc. (KSN)/Reclamation District (RD) 544
- JD Wikert, US Fish and Wildlife Service (USFWS)

PROJECT TEAM

- Brooke White, US Bureau of Reclamation (USBR)
- Brad Cavallo, Cramer Fish Sciences
- Scott Wright, cbec eco engineering
- Chris Bowles, cbec eco engineering
- Jeff Tupen, ECORP Consulting, Inc.
- Jennie Hoffman, Adaptation/Insight
- Mary Beth Day, Kearns & West (KW)
- Lindsay Tryba, KW

ACTION ITEMS

- Jennie to compile and distribute the candidate performance measures.
 - Working Group (WG) members to share comments and add additional suggestions in [the compiled document](#) prior to the next WG meeting.
- KW to distribute the summary from the 6/27 SDM WG meeting. [COMPLETE]
- KW to distribute the 7/25 Science Symposium agenda. [COMPLETE]
- KW to change future meetings to Zoom. [COMPLETE]

MEETING OBJECTIVES

- Share overview of local landowners.
- Continue the discussion of objectives.
- Discuss evaluation criteria.
- Confirm action items and next steps.

KEY AGREEMENTS OR OUTCOMES

- The WG agreed to continue discussing potential performance measures (see “Decision Objectives”) to build upon the work completed in the breakout rooms.

SUMMARY NOTES

OVERVIEW OF ADJACENT LANDOWNERS

Scott Wright, cbec eco engineering, provided an overview of the landowners adjacent to the scour hole (please note: all property ownership information that was shared is publicly available). The purpose of the presentation was to familiarize the WG with landowners who could potentially become affected by the Project. At this time, no landowners have been contacted. Please reference Scott's PowerPoint presentation for specific details.

WG members had various follow-up questions and comments:

- Comment (C) (WG Member): Reclamation District (RD) 544 will be interested in tracking any adjustments made to the levee, as well as any project(s) that occur on the west side that may impact flood protection within a thirty-acre range. In general, RDs are unlikely to support modifications that impact flood protection.
 - Question (Q) (WG Member): Is there any pitch that can be made to RDs that would make modifications more amenable?
 - Response (R) (WG Member): It is possible, but I cannot think of specific recommendations at this time. I recommend the Project Team reach out to the Central Valley Flood Protection Board (CVFPB) and United States Army Corps of Engineers (USACE), as they represent landowners.

REVIEW DECISION STATEMENT

Jennie Hoffman, Adaptation/Insight (SDM specialist), reviewed the WG's progress to date and shared the most recent decision statement (updated as of June 27, 2022):

USBR is deciding what actions it might take to increase survival of juvenile San Joaquin Basin origin California Central Valley steelhead and Central Valley spring-run Chinook Salmon to Chipps Island with a focus on decreasing predation at the HOR scour hole, keeping in mind other socio-economic, recreational, regulatory, and operational considerations and uncertainty around effectiveness.

The action area will be within a few km of the HOR scour hole. Actions to be reviewed can include channel modification, modification to levees, and habitat restoration, but will not include changes to operations. Survival can be improved through multiple mechanisms created by the scour hole including predation, entrainment, habitat quality. Action should improve survival but does not need to solely focus on reducing predation.

SDM Participants were given an opportunity to review and modify the decision statement.

PERFORMANCE MEASURES

Jennie provided an overview of performance measures. Performance measures clarify what exactly is meant by the objective for this decision. In addition, performance measures can be used to:

1. Predict (in advance of the decision) how a given decision will lead to measurable objective outcomes (always).

2. Expose values-based trade-offs across alternatives (always).
3. Compare realized objective outcomes to predicted outcomes after decision implementation (sometimes).

Please reference Jennie's PowerPoint slides for greater detail.

WG members had various follow-up questions:

- (Q) (WG Member): What happens when we spend too much time focusing on the technical model? How can performance metrics help?
 - (R) (Team Member): You can "bin" outputs to lessen the risk of uncertainty. While it is important to ensure that the technical model is correct, it is also important to make sure that the WG prioritizes the things that matter to this decision. For example, if a certain dataset is interesting but will not change the outcome, the group should not focus as much attention on it.

Participants were invited to join breakout groups to identify candidate performance measures. After the meeting, Jennie will compile and distribute the candidate performance measures to allow all participants to provide comments and additional suggestions.

WG members presented their suggestions to the full group (results compiled below).

A. GROUP 1

Objective #1 – from Miro: Maximize effectiveness at reducing mortality of target species in the vicinity of the HOR scour hole

Notes:

- Evaluate survival locally (monitoring after implementation for learning purposes) and to Chipps Island (via modeling for purposes of selecting an alternative).
- Consider the possibility of negative as well as positive effects on target species.

Candidate Performance Metrics (PMs) and Units:

- Survival from Mossdale to Chipps Island.
- Survival through Scour Hole Reach.

Notes about where information would come from for predicting consequences:

- Before implementation: Hydraulic and fisheries behavior modeling through the area based on acoustic tagging calibration data.
- After implementation: Acoustic tagging studies.

Objective #2 – from Miro: Minimize adverse impacts on species of concern.

Notes:

- Includes immediate effects e.g., of construction as well as longer-term impacts resulting from any changes in flow, habitat, etc.
 - Possible species of concern include sea lion, longfin smelt, Swainson’s Hawk, riparian brush rabbit, maybe giant garter snake, other salmonids, sturgeon (white and green are found in the tributaries).

Candidate Performance Metrics (PMs) and Units:

- Reduce risk to listed species - (categorical based on: # of species, and magnitude of impact, mitigation costs) - assess each species separately, then add into a combined score.

Notes about where information would come from for predicting consequences:

- Hydraulic and fisheries behavior modeling, GIS analysis, previous BiOps.

Objective #3 – from Miro: Minimize adverse impacts to recreational use associated with the site.

Notes:

- Beneficial uses may be adversely affected by changes in water surface elevation, water quantity, and water quality.

Candidate Performance Metrics (PMs) and Units:

- Categorical.

Notes about where information would come from for predicting consequences:

- User elicitation - fishing clubs, recreational users in the area.

Objective #4 – from Miro: Maximize learning.

Notes:

- How can we apply what we learn here to other projects in the Delta?

Candidate Performance Metrics (PMs) and Units:

- Categorical - Hydraulic and fishery and information about the site, fish numbers, information about success of project to inform future “scour hole” type projects.

Notes about where information would come from for predicting consequences:

- Hydraulic and fisheries behavior modeling through the area based on acoustic tagging calibration data.

B. GROUP 2

Objective #1 – from Miro: Maximize effectiveness at reducing mortality of target species in the vicinity of the HOR scour hole.

Notes:

- Evaluate survival locally (monitoring after implementation for learning purposes) and to Chipps Island (via modeling for purposes of selecting an alternative). Consider the possibility of negative as well as positive effects on target species.

Candidate Performance Metrics (PMs) and Units:

- # of juvenile spring run and steelhead at scour hole and at Chipps, both pre-actions and post-actions.
- # of predators at scour hole pre and post actions.

Notes about where information would come from for predicting consequences:

- N/A

Objective #2 – from Miro: Durability.

Notes:

- Could consider as likelihood that whatever we do will be in place in 50 years, or as the # of years we think our solution will remain in place and effective.
- Consider thresholds.

Candidate Performance Metrics (PMs) and Units:

- Constructed scale.
- Low O&M cost \$\$.
- Life expectancy of the structure.

Notes about where information would come from for predicting consequences:

- N/A

Objective #3 – from Miro: Minimize adverse impacts on beneficial uses of water.

Notes:

- Beneficial uses may be adversely affected by changes in water surface elevation, water quantity, and water quality.

Candidate Performance Metrics (PMs) and Units:

- Compliance at nearby stations.
- Change in frequency and duration of controlling regulation.

Notes about where information would come from for predicting consequences:

- N/A

Objective #4 – from Miro: Minimize landowner concerns.

Notes:

- N/A

Candidate Performance Metrics (PMs) and Units:

- N/A

Notes about where information would come from for predicting consequences:

- N/A

C. GROUP 3

Objective #1 – from Miro: Maximize effectiveness at reducing mortality of target species in the vicinity of the HOR scour hole.

Notes:

- Evaluate survival locally (monitoring after implementation for learning purposes) and to Chipps Island (via modeling for purposes of selecting an alternative). Consider the possibility of negative as well as positive effects on target species.

Candidate Performance Metrics (PMs) and Units:

- Survival to Chipps Island (percent)
- Local survival from durham ferry to turner cut (percent)
- Local survival in the scour hole (percent)

- Local predation risk (scale TBD)
- Area of suitable juvenile steelhead and chinook habitat (acres)
- Predator density (fish/volume)
- Area of predator deep water habitat (acres)

Notes about where information would come from for predicting consequences:

- Delta passage model
- Eco ptm
- Eptm
- predation risk studies (direct measurement)
- Acoustic telemetry studies
- Fisheries acoustics
- Modeling depth and velocity
- Habitat suitability curves

Objective #2 – from Miro: Cost.

Notes:

- Include start-up cost and O&M over 50 years, regardless of who's paying. The total will include mitigation costs related to impacts on species of concern.

Candidate Performance Metrics (PMs) and Units:

- O&M (\$/year)
- Design and build (\$)
- Right of way acquisition (\$)

Notes about where information would come from for predicting consequences:

- Cost projections

Objective #3 – from Miro: Maximize long-term benefits to other species of concern.

Notes:

- Includes immediate effects e.g., of construction as well as longer-term impacts resulting from any changes in flow, habitat, etc.
 - Possible species of concern include sea lion, longfin smelt, Swainson's Hawk, riparian brush rabbit, maybe giant garter snake, other salmonids, sturgeon (white and green are found in the tributaries)

Candidate Performance Metrics (PMs) and Units:

- Constructed scales depending on the specific species and information available on the species.
- Possible scale: adverse, benefit, neutral.

Notes about where information would come from for predicting consequences:

- Expert elicitation

Objective #4 – from Miro: Maintain or improve flood capacity as required by Army Corps and Flood Protection Board.

Notes:

- Also include CV FPB—no more than 1/10' change in elevation. Recognize that there are positive effects of increased floodplain inundation; the concern is flooding that's harmful to people and sometimes brush rabbits.

Candidate Performance Metrics (PMs) and Units:

- 100 and 200-year water surface elevations (ft)
- Affected levees meet DWR standard 192-82 (binary)
- Flow split during major floods at the SJR-Old River junction (%)

Notes about where information would come from for predicting consequences:

- Hydrodynamic model (RMA)
- USACE flood model

CONFIRM NEXT STEPS

The next WG meeting will be on Thursday, July 21 from 3-5 p.m.

The WG meeting adjourned at 5:00 p.m.

MEETING #5 MEETING SUMMARY

Friday, July 29, 2022

PARTICIPANTS

WORKING GROUP

- Ching-Fu Chang, Contra Costa Water District (CCWD)
- Gretchen Murphey, California Department of Fish and Wildlife (CDFW)
- JD Wikert, US Fish and Wildlife Service (USFWS)

PROJECT TEAM

- Brooke White, US Bureau of Reclamation (USBR)
- Ian Smith, USBR
- Brad Cavallo, Cramer Fish Sciences
- Scott Wright, cbec eco engineering
- Chris Bowles, cbec eco engineering
- Ed Gross, RMA
- Jennie Hoffman, Adaptation/Insight
- Mary Beth Day, Kearns & West (K&W)
- Henry DeRuff, K&W

ACTION ITEMS

- cbec to follow-up on the specifics of the tenth-of-an-inch flood control rule with USACE.
- All Working Group (WG) and Team Members to fill out the [Doodle Poll](#) to schedule the next meeting. [COMPLETE]

KEY AGREEMENTS OR OUTCOMES

- The WG identified preliminary candidate performance metrics for each objective.

SUMMARY NOTES

PERFORMANCE METRICS

The WG discussed, specified, and organized candidate performance metrics for each objective. Jennie Hoffman, Adaptation/Insight (SDM specialist), tracked the WG's progress in [this document](#), which outlines the objectives and candidate performance metrics. In the document performance metrics highlighted in yellow are the ones the WG decided to use for the first round of consequences; Jennie used this as the basis for [this new document](#) that includes the "final" set of preliminary PMs for this round. The WG can revisit and modify these selections if needed.

Discussion regarding each objective is summarized below. Because this is the first, more exploratory round of the ProACT cycle, some PMs remained somewhat loose. This is common at this stage.

Maximize effectiveness at reducing mortality of target species in the vicinity of the HOR scour hole.

WG Members discussed and agreed on the following as the performance metric: *Survival to Chipps Island*. Discussion around this metric included:

- Question (Q) (Team Member): Which level of survival are we interested in – survival to Chipps or local survival?
 - Response (R) (Team Member): Survival to Chipps is more measurable.
 - (R) (WG Member): Modeling will be useful to predict this and would require a pre- and post-project survey.
 - (R) (WG Member): It doesn't seem very likely that the project team will be able to measure enough fish to accurately model its impact.

Maximize durability.

WG Members discussed and agreed on the following as the performance metric: (1) constructed scale; (2) life expectancy of the structure; and (3) expected performance over next 50 years; (4) uncertainty term: how sure are we that this solution is going to continue to operate over next 50 years? Discussion around this metric included:

- (Q) (Team Member): What do we mean when we say “durability”?
 - (R) (WG Member): Durability means that the solution should remain effective across a range of flow conditions. For example, a floodplain-based solution might not be durable over the long range, because there may not be flood-level flows very often.
 - (R) (Team Member): It's not so much the life expectancy we care about but rather the expected performance over 50 years.
 - (R) (WG Member): There could be an “uncertainty” term. What's the certainty that it will be there in 5, 10, or 20 years? There's uncertainty with continued maintenance (e.g., yearly gravel dumps) as was mentioned earlier.
 - (R) (WG Member): To determine value over time, we'll need to use an expected-value estimate. What we're looking for is the best estimate of long-term survival of the solution.
 - (R) (WG Member): I would prefer a solution that has greater benefits in drier years when survival is already worse.
 - (R) (WG Member): I agree, but it needs to also be durable in high-flow conditions. If a high-flow year blew out the solution, that would not be worthwhile. The solution should therefore be effective at low flows and durable at high flows.

Maximize long-term benefits and minimize adverse impacts to other species of concern.

WG Members discussed and agreed on the following as the performance metric: (1) constructed scales depending on the specific species and information available on the species; and (2) a possible tiered system: initially just -1, 0, 1, then 1-10 scale within adverse/beneficial. Discussion around this metric included:

- (Q) (Team Member): What scale do we want to use to measure effects to other species of concern?
 - (R) (Team Member): You could use a tiered system: -1, 0, 1 for adverse, neutral, benefit, then a 1-10 score on the magnitude of the adversity or benefit.
 - The WG agreed on this suggestion.

Minimize cost.

WG Members discussed and agreed on the following as the performance metric: (1) O&M (\$/year); (2) design and build (\$); (3) right of way acquisition (\$); and (4) mitigation costs (\$). Discussion around this metric included:

- (Q) (Team Member): How are we including the costs – separately or as a sum? Are there other costs to consider?
 - (R) (Team Member): If alternatives affect water operations, there might be water costs as well. These effects might be very small to the point of being negligible, but worth mentioning.
 - (R) (WG Member): We could add in “Possibility of inducing water costs” as a new objective.
 - (R) (WG Member): I’m having a hard time imagining an alternative that would affect the flow split more than the HOR barrier.

Maintain or improve flood capacity as required by Army Corps and Flood Protection Board.

WG Members discussed and agreed on the following as the performance metric: flood control neutral vs. flood control positive; any FC negative is disqualified. Discussion around this metric included:

- (Q) (Team Member): What are the WG’s thoughts on this framing?
 - (R) (WG Member): USACE won’t allow a flood control-negative solution.
 - (R) (Team Member): So, we’ll look at flood control-neutral and -positive solutions and disqualify solutions that would be flood control-negative.
 - (R) (Team Member): The tenth-of-an-inch rule is not hard-and-fast, but unlikely to bend too much. cbec will follow up on how exactly this works.

Minimize adverse impacts on beneficial uses of water.

WG Members discussed and agreed on the following as the performance metric: (1) negative effects on HABs, water quality, river stage; and (2) possibility that water costs are induced. Discussion around this metric included:

- (R) (WG Member): HABs could be easily modeled in stagnant areas or dead-end channels.
- (R) (WG Member): It’s hard to imagine a solution that has a positive impact on HABs.
- (R) (Team Member): We could leave water treatment costs at a relatively general level.

Minimize adverse impacts to recreational use associated with the site.

WG Members discussed and agreed on the following as the performance metric: (1) categorical; and (2) -2, -1, 0, 1 score for ability to boat in the area, sport fishing, access. Discussion around this metric included:

- (Q) (Team Member): What would be the different recreational uses?
 - (R) (WG Member): It should mostly be ability to boat in the area on a -2, -1, 0, 1 score.
 - (R) (WG Member): There is some ability to mitigate for impacts, e.g., putting in a boat lift.
 - (R) (WG Member): People also swim and sport fish at the scour hole.

Minimize landowner concerns.

WG Members discussed and agreed to treat this as a constraint rather than an objective for this round. Any alternative that would require cooperation by a landowner we know will not go along with it will be excluded. Discussion around this metric included:

- (Q) (Team Member): What are the reasons to consider landowner concerns?
 - (R) (WG Member): Landowner concerns could block implementation of the project.
 - (R) (Team Member): We may need to evaluate those interests ahead of time, specifically to the north, since they are the only direct neighbor that may be impacted.
 - (R) (Team Member): This seems like more of a constraint than a cost right now.

Maximize learning.

WG Members discussed and agreed on the following as the performance metric for learning: a categorical metric with the following categories: learning about this site, learning about doing this type of project, and monitoring information that's more broadly applicable. Discussion around this metric included:

- (Q) (Team Member): What does the WG mean by "maximize learning"?
 - (R) (WG Member): Learning something new across many categories about the scour hole.
 - (R) (WG Member): Between identical choices, we would choose the one that offers more learning. But it's not primary to the project team's decision-making.
 - (R) (Brad): There might be different categories of learning that could be valuable: about the site, about this type of project, and monitoring information that's more broadly applicable.
 - (R) (WG Member): Ideally, we leverage this project to improve future projects.

Jennie closed out discussion by acknowledging that the following meeting would focus on alternatives.

CONFIRM NEXT STEPS

The next WG meeting will be determined based on the results of the [Doodle Poll](#).

The WG meeting adjourned at 5:00 p.m.

MEETING #6 MEETING SUMMARY

Tuesday, August 16, 2022

PARTICIPANTS

WORKING GROUP (WG)

- Ching-Fu Chang, Contra Costa Water District (CCWD)
- Gretchen Murphey, California Department of Fish and Wildlife (CDFW)
- Tommy Agosta, California Department of Water Resources (DWR)
- Curtis Yip, DWR
- Barbara Byrne, NOAA National Marine Fisheries Science (NMFS)
- Cyril Michel, NMFS
- JD Wikert, US Fish and Wildlife Service (USFWS)

PROJECT TEAM (TEAM)

- Brooke White, US Bureau of Reclamation (USBR)
- Jo Anna Beck, USBR
- Ian Smith, USBR
- Scott Wright, cbec eco engineering
- Jeff Tupen, ECORPS
- Brad Cavallo, Cramer Fish Sciences
- Martin McIlroy, MGE
- Jennie Hoffman, Adaptation/Insight
- Mary Beth Day, Kearns & West (K&W)
- Henry DeRuff, K&W

ACTION ITEMS

- Scott Wright & Jennie Hoffman will create categories of actions, refine ideas, and then consider expert opinions available.
- cbec will follow up with JD & Erin Foresman at SWCRB regarding upcoming changes to unimpaired flow requirements.
- USBR will discuss what types of alternatives they would like to consider in the Initial Options Technical Memo.
- K&W will schedule the next WG meeting (8/30 2-4pm).

KEY AGREEMENTS OR OUTCOMES

- The WG developed and discussed initial ideas for alternatives.

SUMMARY NOTES

INTRODUCTION

The WG began discussion of alternatives. Jennie Hoffman, Adaptation/Insight (SDM specialist), previewed the process for creating alternatives, including explaining how to use the [Miro Board](#) to create and discuss alternatives. Jennie also shared a [Google Document](#) reflecting the “final” PMs from the 7/29 WG meeting as a reference. The WG then proceeded into breakout rooms to create and discuss alternatives.

BREAKOUT ROOMS: ALTERNATIVES BRAINSTORMING

In three breakout rooms, WG members took two to three minutes to brainstorm alternatives individually. Then, participants shared ideas with each other in their breakout rooms, focused on expanding the set of options. Finally, the groups organized their ideas in a way that made sense to the group. Breakout group Miro Boards included the following:

Breakout Group 1

Velocity control – control size of scour or migration route

- Adjustment in channel geometry to slow down the velocity before the split into Old River (OR) and the San Joaquin River (SJR; thus reducing the velocity at the bend and reducing down/upwelling)
- In-water structure to cue targeted species away from the bend and scour hole
- Modify channel geometry so that more juvenile salmonids are migrating on river right, enhance rearing/refuge habitat on river right bank upstream and downstream of Head of Old River (HOR) junction

Natural river channel features

- Restore a more natural geomorphology with setback levees and wide channel at OR-SJR confluence
- Restoration to a more natural junction

Avoid SWP/CVP diversions

- Close off OR with a structure and use fish screen and pumps for water diversion

Predator control

- Intensive predation control
- Biological cue to deter predators in the scour hole
- Introduce native predators of the predators (neutral on the target species)
- Crazy idea: introduce sea lions

Filling the scour hole

- Leveling of riverbed (fill in the scour hole) periodically to combat the down/upwelling, reducing the space for predators
- Fill it in with substrate that discourages predation

Bypass problem areas

- Capture some proportion of juvenile salmonids immediately upstream of HOR, provide boat transport to western Delta (bypass scour hole and poor Central Delta habitat)
- Split the RD 544 Island in half and connect the east-west sides of RD 544 with a bridge to allow direct south-north flow of San Joaquin River

Step back and assess severity of the scour hole

- Determine if scour hole is worth investigating or if another area is more pertinent to the problem
- Determine the actual levels of predation caused by piscivorous fish within the scour hole
- More natural flow regime might alleviate or make up for scour hole area predation losses

Breakout Group 2

Rerouting to the east or west

- Reroute main stem of the San Joaquin River (to the east)
- Reroute main stem of the San Joaquin River (to the west)

Restructuring the channel and restoring natural river features

- Does all the MegaFlood coverage lately mean that Lathrop might think again about developing the point across from HOR and we might have additional channel re-shaping options
- Restore the junction to a “more natural” configuration including floodplain restoration and setback levees
- Create instream conditions to increase rate of moving through problem areas and avoid stressors
- Increase flows through the SJR to reduce “predator-friendly” conditions
- Change river morphology to alter hydraulics and create a more natural balance between predators and conserved fish
- Redesign the entire junction, including the OR and main-stem SJR (with and without a physical HOR barrier-type structure)
- Remove riprap to the north to allow all lateral movement of the channel and reduce scouring (assumes the riprap is the driver of the scour)

Reduce predator load

- Reduce predator load on continuous or periodic basis
- Reduce predation by e-fishing every day (impractical, but theoretically possible)

Trapping and escorting juvenile salmonids

- Trap and escort fish past HOR... and maybe all the way to the Bay

Fill the scour hole

- Fill in scour hole with “something” that will resist scouring
- Fill scour hole as often as needed – does anyone know how often this will be?

Chill scour hole

- Reduce water temperatures during peak outmigration – link to habitat restoration? Could we chill the scour hole?

Breakout Group 3

Local engineering

- Reduce hydraulic complexity
- Add seasonally inundated habitat of high complexity
- Create habitat for juvenile salmonids while reducing habitat for predatory fish
- Fill in scour hole with gravel and cobble
- Realign SJR channel to remove 90-degree bend

Predator reduction

- Dewater the channel during summer in a drought period
- Rotenone the river to remove predators when salmonids are not present
- Spearfishing tournaments
- Exploding chinook fries to take out predators
- Robotic decoy juvenile salmon
- Lure predatory fish away to somewhere else
- Predator removal

External actions

- Augment sediment supply
- Invasive vegetation removal to decrease ambush points and increase turbidity
- Add food for salmonids upstream to grow them larger
- Manage water temperatures using either flow actions or habitat restoration (riparian cover)
- Mobilize chinook fry to downstream areas with a late February pulse flow when predators are less active
- Pulse flow actions to assist fish migrations through hostile environments

Routing

- Peripheral salmon canal for juvenile outmigration
- Yolo bypass analog in the San Joaquin Basin
- Trap and haul around scour hole
- Route fish down OR instead of SJR

DISCUSSION

When WG members returned from the breakout rooms, each group summarized their discussion.

Group 1 reported that they focused discussion on seven idea areas: restructuring the channel; restoring natural river features; avoiding diversions; predator control; filling the scour hole; bypass problem areas; and stepping back to reassess the severity of the scour hole.

Group 2 reported that they focused discussion on five areas: rerouting to the east or west; restructuring the channel and restoring natural features; reduction of predator load; filling the scour hole; chilling the scour hole; and trapping and escorting fish past HOR.

- Question (Q) (WG Member): Would a levee setback north of the scour hole be enough to fix the scour hole? Is there a realistic channel reconfiguration to consider?
 - Response (R) (Team Member): There's room to work there to make the bend of the river more gradual.
- (Q) (Team Member): What was your approach as you were discussing potential alternatives?
 - (R) (WG Member): I focused on alternatives with a potential for increasing survival for anadromous fish. The decision statement specifically calls out decreasing predation; other objectives are secondary.

Group 3 reported that they focused on four areas: local engineering; predator reduction; external actions; and routing.

- (Q) (Team Member): What are the mitigation or tradeoff considerations? Which ideas are attractive from a salmonid perspective?
 - (R) (WG Member): It might be too early to get into mitigation efforts, since we don't know which alternatives are moving forward. I would like to rank the ideas across the objectives with weights as previously discussed.
 - (R) (WG Member): Our decision objectives are to decrease predation and increase survival. We should compare each idea across those two goals, then think about mitigation challenges.
 - (R) (Team Member): I think we need to refine what we've come up with first and then discuss mitigation tactics. Can we start refining and combining ideas?
 - (Q) (Team Member): Jennie, Scott, and whomever else is interested will work on refining those ideas and send them out ahead of the next meeting. We'll then use them to create sets of actions, as well as brainstorming which experts to contact.
- (Q) (Team Member): Would it make sense to consider the flow impacts not as alternatives but as constraints or for mitigation?
 - (R) (WG Member): Other rivers (Merced, Stanislaus, Tuolumne) will have an increased requirement for 40% unimpaired flows, which may impact the flows on the San Joaquin River.
 - (R) (WG Member): It would be worthwhile to reach out to Erin Foresman at SWRCB for more information.

Scott Wright, cbec, shared a concept for a potential channel realignment that could theoretically soften the flow of the river.

- (C) (WG Member): More functional floodplain would be a good thing in the Delta.
- (Q) (Team Member): How would you create a "Yolo Bypass" style reroute?

- (R) (WG Member): This would have to happen upstream but could potentially reroute fish around the scour hole. Another potential option is making use of the Old River by putting a weir in at HOR. We would need to restore that route as an isolated migratory corridor.

CONFIRM NEXT STEPS

The WG shared their availability for a follow-up meeting.

The WG meeting adjourned at 4:00 p.m.

MEETING #7 MEETING SUMMARY

Tuesday, August 30, 2022

PARTICIPANTS

WORKING GROUP (WG)

- Ching-Fu Chang, Contra Costa Water District (CCWD)
- Gretchen Murphey, California Department of Fish and Wildlife (CDFW)
- Barbara Byrne, NOAA National Marine Fisheries Science (NMFS)
- JD Wikert, US Fish and Wildlife Service (USFWS)

PROJECT TEAM (TEAM)

- Brooke White, US Bureau of Reclamation (USBR)
- Jo Anna Beck, USBR
- Ian Smith, USBR
- Scott Wright, cbec eco engineering (cbec)
- Chris Bowles, cbec
- Dave Thomas, ECORPS
- Brad Cavallo, Cramer Fish Sciences
- Martin McIlroy, MGE
- Brad Reichel, MGE
- Rusty Holleman, RMA
- Jennie Hoffman, Adaptation/Insight
- Mary Beth Day, Kearns & West (K&W)
- Henry DeRuff, K&W

ACTION ITEMS

- K&W will schedule the final two WG meetings in consultation with the project team (likely in early- and mid-October).
- All will add availability to [this Doodle Poll](#).
- Project Team will conduct expert elicitation and analyze alternatives.

KEY AGREEMENTS OR OUTCOMES

- The WG identified a preliminary suite of six different alternatives:
- Fill in the scour hole with material
- Set the levee wherever possible to improve rearing habitat
- In-water guidance to cue target species away from the bend and scour hole
- Channel realignment
- Channel realignment "plus"
- Capture juveniles upstream and boat them to the western Delta

SUMMARY NOTES

INTRODUCTION

The WG continued to discuss alternatives¹. Jennie Hoffman, Adaptation/Insight (SDM specialist), previewed the process for narrowing alternatives and displayed a “[menu of actions](#),” which Jennie had created out of the ideas brainstormed at the last meeting. Jennie also reminded the WG of the objective of this alternatives discussion, which is for the technical team to identify six project options (decision alternatives) based on these action ideas from the SDM WG.

- Question (Q) (WG Member): The WG Member asked the technical team which of the brainstormed actions were feasible.
 - Response (R) (Team Member): Filling the scour hole would require very large boulders, since smaller ones would be scoured away. One constraint to keep in mind is that solutions cannot affect 100-year flood elevations. For setback levees or channel realignment to increase the radius of the curvature in the river, the technical team would need to look at channel flow, direction, and hydraulics.
 - (Q) (WG Member): If the purpose is to get rid of the scour hole, how would the technical team redesign the channel? What’s the most reasonable design?
 - (R) (Team Member): A good solution might be to reroute the river to create a gentler bend so the river can meander instead of taking such a sharp turn.
 - (Q) (WG Member): Could setback levees and channel realignment be included in the same solution?
 - (R) (Team Member): They don’t have to be combined, but they could.

DISCUSSION OF ALTERNATIVES

In breakout rooms, WG Members discussed bookend alternatives (most and least intensive alternatives) and additional alternatives, using this [slide deck](#). When WG members returned from the breakout rooms, each group summarized their three alternatives.

Group 1’s least intensive alternative (slide 1) was to fill the scour hole with material, which the group thought was unlikely to succeed. Group 1’s most intensive alternative (slide 2) was to set back the levee to improve rearing habitat and pointed to the southwest bank at the junction as a possible location.

- (Q) (WG Member): Did this team consider the River Islands development on the southwest bank and the levees on the other side?
 - (R) (WG Member): No. The group focused on rearing habitat as a more feasible and popular option.
 - (R) (Team Member): This group also noted the presence of undeveloped land between the current river alignment and the development, leaving more room to work with.
 - (R) (WG Member): A challenge with this solution is that it would route fish into the Old River, unless the team wants to make Old River the migratory corridor for those fish. Doing so would also require habitat restoration throughout the Old River corridor, which is outside the scope of the project.

Group 1's additional alternative (slide 3) was to include in-water guidance to cue target species away from the scour hole, which could potentially avoid realignment or levee setback challenges.

Group 2's least intensive alternative (slide 4), aside from doing nothing, was a channel realignment from the junction to avoid two bends and reconnect downstream. Group 2's most intensive alternative (slide 5) was to set back the levee on the eastern bank and create floodplain habitat and a realignment. This alternative could also include blocking off the Old River and using pumps to move water. Group 2's additional alternative (slide 6) was to guide fish to the correct channel with a floodplain bench.

- (Q) (WG Member): Creating a floodplain bench would likely increase water levels, so the Army Corps is unlikely to approve this option. Is there a way to build a floodplain bench without moving a levee?
 - (R) (WG Member): A sand bed floodplain bench would get taken away by the river, whereas a wider channel would allow for more natural habitat.
 - (R) (Team Member): It would be challenging to create a bench without hardening the channel, which is not an attractive option.
 - (R) (WG Member): Another alternative would be to deposit sediment upstream and let the river do the work to fill in where it needs to.

Group 3's least intensive alternatives (slide 7) were to fill in the scour hole with coarse material or to remove the riprap along the north bank and allow the channel to erode back to a natural shape, with a levee further back. Group 3's most intensive alternative (slide 8) was to realign the channel to increase the radius of the curvature, which could also include optional additions such as levee setbacks, predator removal, increasing turbidity, and temperature reduction. These additions could be included or excluded as needed. Group 3's additional alternative (slide 9) was to capture some portion of juvenile salmon upstream and provide boat transport to the western Delta. This alternative could also be added on to any other alternative.

CONFIRM NEXT STEPS

Jennie concluded the discussion by asking what role the WG would like to have in alternative selection moving forward. Members of the WG expressed interest in reviewing the list of alternatives selected by the technical team and then participating in consequence evaluation.

The WG meeting adjourned at 4:05 p.m.

CONCEPTS FEEDBACK MEETING SUMMARY

Tuesday, December 13, 2022

PARTICIPANTS

WORKING GROUP (WG)

- Ching-Fu Chang, Contra Costa Water District (CCWD)
- Gretchen Murphey, California Department of Fish and Wildlife (CDFW)
- Thomas Agosta, California Department of Water Resources (DWR)
- Barbara Byrne, NOAA National Marine Fisheries Science (NMFS)
- JD Wikert, US Fish and Wildlife Service (USFWS)

PROJECT TEAM (TEAM)

- Scott Wright, cbec eco engineering (cbec)
- Greg Shellenbarger, cbec
- Dave Thomas, ECORP
- Jeff Tupen, ECORP
- Brad Cavallo, Cramer Fish Sciences (Cramer)
- Brad Reichel, MGE
- Ed Gross, RMA
- Jennie Hoffman, Adaptation/Insight (A/I)
- Mary Beth Day, Kearns & West (K&W)
- Henry DeRuff, K&W

ACTION ITEMS

- cbec will compile notes and send follow-up questions by email.
- cbec will revise project concepts to include more detail per the feedback from the Working Group (WG).
- K&W will schedule final two Structured Decision Making (SDM) SDM WG meetings. [complete]

KEY AGREEMENTS OR OUTCOMES

- The WG identified a preliminary suite of six different alternatives:
 - Fill in the scour hole with material
 - Set the levee wherever possible to improve rearing habitat
 - In-water guidance to cue target species away from the bend and scour hole
 - Channel realignment
 - Channel realignment "plus"
 - Capture juveniles upstream and boat them to the western Delta

SUMMARY NOTES

INTRODUCTION

Mary Beth Day, Kearns & West, opened the meeting by welcoming everyone and stating the purpose of the meeting: to discuss feedback provided by CCWD and the fisheries agencies (CDFW, NMFS, and USFWS). Scott Wright, cbec, then opened the floor to discussion of feedback provided, beginning with CCWD.

CCWD COMMENTS DISCUSSION

- Comment (C) (CCWD): Impact on water use is not reflected in the consequence table and CCWD would like it to be. This addition would fold in neatly to the modeling that is already required on salinity, water movement, and stagnation. CCWD would like to understand the impacts on null zones (where the same bulk of water moves back and forth with low or zero net flow). CCWD would also like to understand if there will be any impacts to the flow split.
 - Response (R) (RMA): One design goal is to not change the flow split. Does CCWD have a preference about more or less water flowing into Old River?
 - (R) (CCWD): CCWD's charter is governed by water quality, so we are most concerned about null zones (as an indicator for harmful algae blooms) and flow splits (as an indicator for water quantity).
 - (R) (RMA): These analyses will be included later on in a more detailed stage of analysis.
 - (R) (A/I): Water use is currently represented as a threshold in the consequence analysis. The group would not recommend an action that would have negative effects on water use. However, beneficial uses of water was dropped as a performance metric by mistake and will be added back in.
 - (R) (Cramer): There may be existing modeling from the Head of Old River Barrier (HORB) studies that can be used, so there may not be much modeling the Project Team needs to do.
 - (R) (NMFS): It makes sense to evaluate water quality and flows in the south Delta. With potential flooding flows, agricultural barriers may need to go in earlier, which could have challenging implications for flow and scouring.
 - (R) (RMA): There is precedent for less flow down Old River because of the HORB but not for more, so the Project Team will likely need to look into that more. The HORB is unlikely to go in again.
 - (R) (CDFW): The solution should be durable whether or not the HORB is in.
 - (R) (CCWD): CCWD would like to see how water use is impacted in different alternatives.
 - (R) (Cramer): It would be helpful to know more specifics about what the Project Team should be looking for (e.g., water quality and salinity at location X at time Y).
 - (R) (NMFS): It would be nice to develop a single number that evaluates water quality.

FISHERIES COMMENTS

- (C) (USFWS): I wanted to contribute some recent additional thoughts:

- Dry periods cause problems with hyacinths; ideally, the chosen solution will not allow for increased populations of water hyacinths.
 - (R) (CDFW): CDFW agrees that it is essential to keep hyacinth from proliferating and taking over; it's nearly impossible to deal with once it's there.
- Assuming based on recent news that many flood control projects will be happening upstream, and there will be a need for larger channel capacity. The fluvial geomorphologists should take this into consideration. Because of all the work being done, there will be a need to coordinate with other agencies and organizations to achieve multiple goals (flood control, water quality, salmonid populations, etc.).
- (R) (cbec): Scott acknowledged these points and added them to his notes.
- Scott introduced the topic of inundation duration and invited conversation on the point.
 - (C) (USFWS): The ability of the habitats to function across a range of flows is important. Slopes are helpful, including velocity breaks and habitat restoration. Habitat needs to be underwater for at least two weeks in February to May during driest hydrological years and dry during the rest of the year. USFWS does not care as much about how the habitat functions in a good water year, aside from preventing destruction; the project should be designed with drier years in mind. The Project Team should look at Vernalis flows from 2011 to 2016 for dry representation and base habitat goals on those data; the Project Team can look at 2017 to 2018 for wet representation and base flood control goals on that information. A two-month window for inundation would be more helpful than a two-week window; more flexibility is good. Ideally, this project will be built as something in perpetuity that does not require upkeep. Finally, we do not want to create more centrarchid spawning habitat.
 - (R) (CDFW): Slopes do create more margin for error in inundation modeling.
- Scott then introduced discussion on Option 6: Trap and Haul.
 - (C) (USFWS): USFWS is philosophically opposed to things that require ongoing intervention by humans to encourage natural processes. USFWS would rather see the migratory corridor function properly than do too much engineering and hands-on intervention.
 - (R) (CDFW): CDFW agrees; trap and haul should not be an option unless there are persuasive details on how this would work.
 - (R) (NMFS): Functionally, trap and haul probably will not even increase survivorship. NMFS would prefer this option be removed unless someone wants it.
 - (R) (ECORP): Trap and haul was left as an option that focuses on the primary objective, which is to increase survivorship past Chipps Island.
 - (R) (Cramer): It needs to be on the table at this point, but will likely be evaluated by USBR as a less effective option.
 - (R) (A/I): Trap and haul is useful as a comparative option against the other ones, even if it's highly unlikely to be selected.
 - (R) NMFS: I understand, and it makes sense to keep it in, but that option needs to be fleshed out more before we can truly address it.

- (R) (CDFW): It seems like the technical team has had more discussions about trap and haul than the SDM WG did. We need more information about it.
- Scott summarized the discussion by acknowledging that the SDM WG members, especially the fisheries, want more details about the different options, and that he would send follow-up questions by email. He then asked for any final questions.
 - Question (Q) (USFWS): Will the scour hole get filled in?
 - (R) (cbec): In most scenarios, yes.
 - (Q) (USFWS): What will the channel look like once it's reconfigured? USFWS would like more detail.
 - (C) (USFWS): There may also be opportunities to provide sturgeon habitat (with gravel). USFWS would love to have the opportunity to provide more input on the process once more details are set.

CONFIRM NEXT STEPS

Scott concluded by announcing that he would follow up with additional questions, and that the Project Team would refine the options accordingly.

Mary Beth adjourned the meeting at 3:00 p.m.

MEETING #8 MEETING SUMMARY

Friday, January 27, 2023

PARTICIPANTS

WORKING GROUP (WG)

- Cyril Michel, NOAA Southwest Fisheries Science Center
- Gretchen Murphey, California Department of Fish and Wildlife (CDFW)
- Barbara Byrne, NOAA National Marine Fisheries Science (NMFS)
- JD Wikert, US Fish and Wildlife Service (USFWS)

PROJECT TEAM (TEAM)

- Dylan Hickey, US Bureau of Reclamation (USBR)
- Scott Wright, cbec eco engineering (cbec)
- Chris Bowles, cbec
- Dave Thomas, ECORP
- Brad Cavallo, Cramer Fish Sciences
- Martin McIlroy, MGE
- Brad Reichel, MGE
- Ed Gross, RMA
- Jennie Hoffman, Adaptation/Insight
- Mary Beth Day, Kearns & West (K&W)
- Henry DeRuff, K&W

ACTION ITEMS

- RMA: review streakline impacts from different options.
- K&W: share attachments.
 - All: provide additional feedback on preliminary consequence analyses.
- NMFS: share contact from the San Joaquin County Department of Public Works.

KEY AGREEMENTS OR OUTCOMES

- The Working Group (WG) reviewed and discussed the six initial options, including a detailed review of Option 6: Trap and barge.
- The WG reviewed and discussed the consequence table.

SUMMARY NOTES

RECAP OF SDM PROCESS & REVIEW INITIAL OPTIONS

Before beginning discussion, one WG member asked to review Option 6, "Trap and Barge," in more detail since it was not covered in the December options feedback meeting.

Jennie Hoffman, SDM Decision Analyst, gave a summary of the Structured Decision Making (SDM) process so far. Then, Scott Wright, cbec, reviewed the six initial options, pausing for discussion after each one.

Option 1: Fill the scour hole

- Question (Q) (WG Member): Would the design for Option 1 be robust enough to withstand high flows like those that have occurred in the last few weeks (20,000 cfs)?
 - Response (R) (Team Member): The design would have to be robust enough to withstand peak flows.
 - (R) (WG Member): I would recommend studying the 2017 flows. Those were the highest and most sustained in recent years. Don Pedro Reservoir has only had to spill over twice in its history and one of those times was in 2017.
 - (R) (Team Member): There will be a good opportunity to study the scour hole in its current configuration this spring in the high flows.

Option 2: Channel realignment to the north

- (Q) (WG Member): This configuration includes land to the north of the scour hole and some land on the southeast bank of the river. How do those inclusions fit with the landowners' preferences and the City of Lathrop's plans for that levee?
 - (R) (Team Member): The landowner to the north is not excited to give up land. To the southeast, there is a Mossdale Tract Flood Risk Reduction Plan that might be a win-win with the San Joaquin Area Flood Control Agency (SJAFCA) and the California Department of Water Resources (DWR).
 - (R) (Team Member): The technical team is planning to coordinate with SJAFCA about overlapping concepts and options. SJAFCA is going to brief the team on a feasibility study for an alternative that looks a lot like Options 4 & 5. SJAFCA will also attend the next SDM WG meeting.

Option 3: More significant channel realignment to the north

No comments were made on Option 3.

Option 4: Channel realignment to the south

No comments were made on Option 4.

Option 5: Channel realignment to the south, closing off the existing channel

No comments were made on Option 5.

Option 6: Trap and barge

Brad Cavallo, Cramer Fish Sciences, detailed Option 6. The San Joaquin River's greater width and slower flow makes it more difficult to catch fish. The designs keep these characteristics in mind. The debris boom is designed to deflect debris around the trap and the deflector wing is designed to guide flows around the trap as well. This particular type of trap works by attracting fish to swim in and not allowing them out. Then, fish are loaded into a boat with continuous exchange of water and released at ideal points in the western Delta. This option would give good information about juvenile salmonid outmigration on the San Joaquin. It would capture approximately 25% of the fish out-migrating. There are a number of opportunities to study migration patterns and survival through tagging, capture, and more.

- (Q) (WG Member): The San Joaquin River can have really heavy debris loads, which could cause problems for catching fish. What's the plan for addressing this?
 - (R) (Team Member): Fish capture can pause and then restart after debris passes.
- (Q) (Team Member): Is the capture location intentionally at the outside of a bend in the river?
 - (R) (Team Member): Yes, but that configuration is not critical to the ability to capture fish.
- (Q) (Team Member): Which parts of the device are permanently in the river and which are removeable?
 - (R) (Team Member): The ideal solution would use pilings, but in-river anchors could also be used. The boom and deflector wing can be laid on the bank of the river when not being used, or moved if vandalism is a concern. The trap and holding pen would be removed from the river when not in use as well.
- (Q) (Team Member): What flow range could this accommodate?
 - (R) (Team Member): These mechanisms are typically designed for up to 3,000 cfs but could potentially operate above that. It is not intended for flows up to 10,000 or 20,000 cfs, but predation is typically lower at those flows anyway, since out-migrating fish are carried more swiftly through the river.
- Comment (C) (WG Member): The River Islands community might be hard to work with because they have their own levees they are concerned about. It would be advisable to have a plan for working with them. For example, FishBio wanted to install a screw trap at the north end of their levee and River Islands prohibited it.
- (C) (WG Member): The opportunity to have a monitoring station at the junction of the Old River and San Joaquin River is exciting, but not for salmonid survival. It would not be that helpful there, since it's rare that these types of traps have more than 5-10% efficiency.
 - (R) (Team Member): Most rotary screw traps have very low efficiency (1-5%), but none have this kind of aggregating system, which should improve efficiency. However, the fish that are captured will survive to the western Delta. It's a tool in the toolbox, and if it's working, it seems like a good proposition to give 10% of the outmigrants 100% chance of survival.
 - (R) (WG Member): There have been a lot of high-flow years recently in the spring. If flows are too high for the trapping to work during the most important phase of outmigration, it's not that useful. It would be useful to see the historical analysis of flows and outmigration and to know when this will be able to catch fish.
- (Q) (WG Member): In dry years, is there enough water in the Delta to run a barge to take the fish? In previous years, trawl boats have hit sandbars; it seems like a barge would have at least that much draft.
 - (R) (Team Member): Yes. The barge is designed with minimal draft.
- (Q) (WG Member): Would the debris boom and flow deflector wing deflect fish away from the trap?
 - (R) (Team Member): Cramer Fish Sciences is working on a design to potentially combine these two that should mitigate that issue.

- (Q) (WG Member): Does Reclamation have a 50-year commitment? With trap and barge, if you don't run it there's zero benefit. Reclamation can't pre-obligate funding, so this puts the fish agencies in a tough spot.
 - (R)(WG Member) One screening criterion is difficulty over the life of the project. Not sure about the frequency of permitting, who permits, etc.
 - (R)(Team Member): Anchoring would be one-time permitting. Operations would be programmatic.

REVIEW AND DISCUSS CONSEQUENCE TABLE

Objective: Flood risk

Scott reminded the group that all designs are intended to not impact flood risk one way or another, and that some of the options have been adjusted slightly to fix for this. Ed Gross, RMA, added that there has been three-dimensional modeling on Option 1 to determine if different materials would affect flood capacity in different ways. The other options were modeled in two dimensions across the Delta. All options were adjusted to make sure that there are no flood capacity changes. At 100 year flows (43,000 cfs), the most dramatic flow split change was 100 cfs, which is a very small impact. Scott added that the goal is to reduce flow split impacts to zero.

- (Q) (WG Member): Why is it that the flow split changes are so minimal?
 - (R) (Team Member): These changes are so local that the effects are pretty small over the course of the whole river. Smaller changes mostly have small effects on flow splits.
 - (R) (WG Member): There's the mass balance of what goes down each route, but it would be important to know what happens to the critical streaklines of fish.
 - (R) (Team Member): That is reviewable in RMA's 3D model.

Objective: Minimizing adverse effects on other species

Dave Thomas shared ECORP's preliminary analyses of [construction](#) and [operations impacts](#) on biological resources (fish, land animals, and birds). Each species was ranked with a positive, negative, or no effect across all six options.

- (C) (WG Member): Longfin and Delta Smelt are very rare in that area, so the impacts to those species are unlikely to be big.
- (Q) (WG Member): For the bird habitat, is there more nuance available to the impacts on the raptors based on inundation and other similar factors? For example, is there foraging on agricultural lands year-round? How would converting agricultural land to riparian affect foraging?
 - (R) (Team Member): Scoring is hard to figure out; positive and negative scores across each species may be needed.
- (Q) (Team Member): Is there a way to assign a single score across each concept?
 - (R) (Team Member): Yes, and the effect on steelhead will be the most weighted since that is one of the objectives of the project.
 - (R) (Team Member): Survival modeling will be based on acoustic modeling. There is already a good understanding of survival across the Delta and in the shorter reaches.

Survival benefits of habitat restoration are harder to model but that's why these rankings are broken out.

- (R) (Team Member): On previous projects, specific factors were weighted, so that might be a way to ensure emphasis on the salmonid species of concern.
- (R) (USBR): It is important to be able to discern between options that rank highly.
- (Q) (WG Member): What about impacts to the giant garter snake?
 - (R) (Team Member): I can't speak to those since I am not a wildlife biologist.
- (Q) (WG Member): What about impacts to green sturgeon?
 - (R) (Team Member): There will definitely be monitoring and modeling for this.
 - (R) (WG Member): There might be a negative impact on green sturgeon since they might like the scour hole. However, their population is pretty small so the effect might be really small, perhaps a score of zero to slightly negative.
 - (R) (Team Member): Agreed, steelhead would probably spawn upstream in the watershed.
- (C) (WG Member): Chinook are present in May or June except in extreme cases. This should be included in the construction effects.

Jennie noted that the effectiveness analysis is not quite done, and that that would be a topic of discussion at the next WG meeting.

Objective 3: Durability

Jennie described the durability of the different options (see [Durability Flowcharts](#)).

- (C) (WG Member): Option 6 doesn't really affect habitat, so that should be reflected in this analysis.
- (C) (WG Member): This should be rated on a 1-5 scale with and without operations and maintenance (O&M). For example, without O&M, Option 6 does nothing, since it would need an ongoing funding commitment. It would be important to understand what USBR and DWR would be committing to in terms of funding longevity.
- (Q) (USBR): Is there an aspect of the framework that considers the difficulty to implement over the lifespan of the project?
 - (R) (Team Member): Yes; there might need to be an objective that summarizes funding and permitting mechanisms and how often they would have to happen in order for the solution to be successful.
 - (R) (Team Member): For Option 6, the permitting would happen primarily at the beginning of the project. Of course, the solution does require ongoing staffing and funding for O&M.

Jennie asked if there were additional comments or questions.

- (C) (Team Member): It was pretty difficult to make these judgments, and a lot of thought went into them.
- (C) (Team Member): It is hard to know what would happen in many situations. For example, floodplain habitat might get overrun with invasive species, which would be counterproductive.

- (Q) (Team Member): Do people have examples of what happens when habitat is restored for native species versus invasive species?
- (R) (Team Member): One can look at analogues, for example the Southport Levee Setback. The levee was set back, and floodplain was lowered to a level where it inundates every year. Since then, there have been issues with invasive species, but for the most part, native species are growing back quickly. Every effort should be made to minimize nonnative species, but those efforts are never 100% effective. Unfortunately, no one is monitoring Southport for fish usage due to lack of funds. Intuitively, since it is regularly inundated floodplain, one would think it is good for rearing.
- (C) (WG Member): I appreciate that maintenance or lack thereof was considered. There are some projects that require frequent O&M.

Objective 4: Recreation

Jennie reviewed ECORP's preliminary analysis of [impacts to recreation](#) for different the options (link).

- (C) (WG Member): For anyone who fishes in the scour hole, any changes to the scour hole seem like they would have negative impacts. Since it is a popular fishing spot, the project seems unlikely to have positive impacts.
 - (R) (WG Member): People typically fish for predators, not for juvenile salmonids. Any action that causes predators to redistribute is probably negative for fishing.
 - (R) (Team Member): This makes sense; any changes will be perceived negatively for fishing at the scour hole.
 - (R) (Team Member): The recreational fishing interests spoken with by the team did not want bass to all be redistributed but were not too concerned.
 - (R) (WG Member): It depends on where the fishing is happening. For someone who walks to and fishes primarily at the scour hole, it would be hugely impactful. For boat-based fishers, it likely has a smaller impact.
- (Q) (WG Member): What are the positive impacts for boating? A new boat ramp?
 - (R) (Team Member): The people who estimated that impact are not in this meeting, but it might be positive for kayaking.
 - (R) (WG Member): The majority of local use is by motorized boats, not kayaks.

CONFIRM NEXT STEPS

Jennie concluded the discussion by acknowledging that the next step is to look at effectiveness, cost, adverse impacts on beneficial uses, and learning, and to provide an update on coordination with SJAFCA.

- (C) (WG Member): Contra Costa Water District should be in attendance for the discussion of adverse impacts on beneficial uses
- (C) (WG Member): For cost, it would be important to highlight the impact of cost on durability. For example, Option 6 can be implemented effectively if there is enough money. The right balance might be to show initial, ongoing, short-term, and long-term costs.

Jennie solicited additional feedback on all documents shared.

The WG meeting adjourned at 12:03 p.m.

DURABILITY FLOWCHARTS

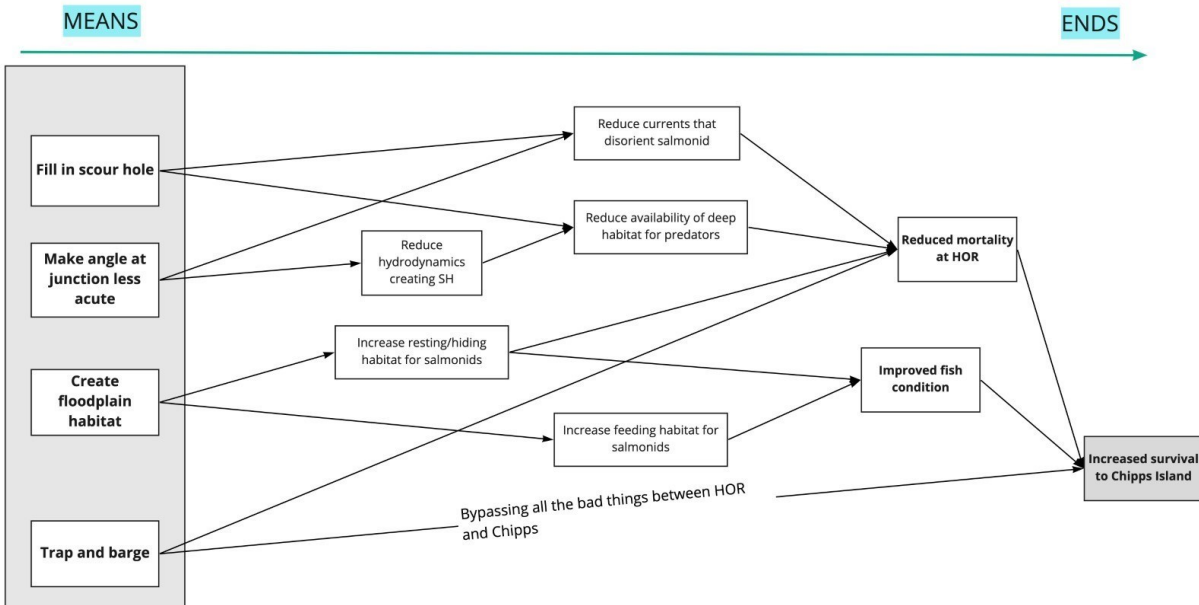
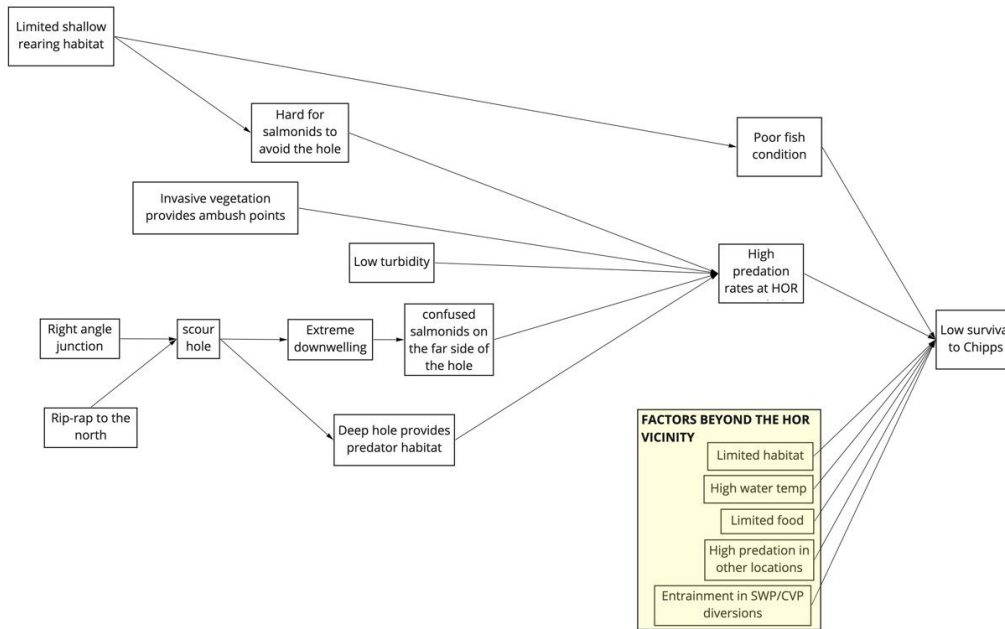


Figure 42: Head of Old River Problem and Intervention Logic Diagrams

Figure 42 is a two-panel flow diagram. The top panel traces physical and environmental factors at the Head of Old River — including the scour hole, right-angle junction, and invasive vegetation — through high predation rates to low salmonid survival at Chipps Island. The bottom panel maps proposed interventions such as filling the scour hole, modifying the junction, and creating floodplain habitat to reduced mortality and increased survival at Chipps Island.

MEETING #9 MEETING SUMMARY

Friday, February 10, 2023

PARTICIPANTS

Working Group (WG)

- Ching-Fu Chang, Contra Costa Water District (CCWD)
- Gretchen Murphey, California Department of Fish and Wildlife (CDFW)
- Barbara Byrne, NOAA National Marine Fisheries Science (NMFS)
- JD Wikert, US Fish and Wildlife Service (USFWS)

San Joaquin Area Flood Control Agency (SJAFCA)

- Glenn Prasad, SJAFCA
- Kevin Lee, Larsen Wurzel

Project Team (Team)

- Scott Wright, cbec eco engineering (cbec)
- Chris Bowles, cbec
- Dave Thomas, ECORP
- Brad Cavallo, Cramer Fish Sciences
- Martin McIlroy, MGE
- Brad Reichel, MGE
- Rusty Holleman, RMA
- Jennie Hoffman, Adaptation/Insight
- Mary Beth Day, Kearns & West (K&W)
- Henry DeRuff, K&W

ACTION ITEMS

- **Project Team:** contact CDFW wardens to understand potential impacts to fishing.
- **K&W:** share access code to Microsoft Teams with Gretchen.
- **All:** share additional feedback on SMART analysis.

KEY AGREEMENTS OR OUTCOMES

- Working Group (WG) members ranked the six initial options. Option 5 received the most support from WG members due to its potential to create the most new habitat.

SUMMARY NOTES

INTRODUCTION

Mary Beth, Facilitation Team, began the meeting and introduced Glenn Prasad and Kevin Lee from SJAFCA. Kevin gave a brief overview of SJAFCA's role and the context of the area.

- Question (Q) (WG Member): Is there time in the agenda to hear about SJAFCA's alternatives and how they overlap? How do the timelines match up?

- Response (R) (Team Member): There are overlaps in that they are looking at similar parts of the river and also physical overlaps between the alternatives in terms of flood impacts.
- (R) (Team Member): Our team's options 4 and 5 include levee setback on the property to the southeast of the scour hole; some SJAFCA concepts include a similar plan, although it's not exactly the same and has different objectives.
- (R) (SJAFCA): SJAFCA's work is funded by a DWR grant and includes the Mossdale Tract, which is also known as RD17. One of SJAFCA's projects includes a similar levee setback. SJAFCA is working on the Draft EIR to release this year.

Jennie Hoffman, SDM Decision Analyst, reviewed the decision context, the decision statement, and the decision objectives.

- (Q) (WG Member): Did the technical team review last meeting's discussion on the impacts to fishing?
 - (R) (Team Member): This is something the team is interested in learning more about but has not yet reviewed more deeply.
 - (R) (WG Member): CDFW's wardens might be good contacts for learning about fishing impacts.

OBJECTIVE AND CONSEQUENCE TABLE REVIEW

Brad Cavallo, Cramer Fish Sciences, reviewed the model on steelhead smolt survival throughout the Delta to Chipps Island, including that survival is lowest in the kilometer around the scour hole (0.87). He noted that the goal is to increase survival through that reach to the same level as throughout the Delta (0.97). Without options 1-5, the survival to Chipps Island is 0.238. With Options 1-5, the survival is 0.265, which is an improvement.

- Comment (C) (WG Member): In thinking about survival, what is important is that fish have opportunities for "rest stops" on their way through the Delta. If there is a sufficient network of patches of habitat, fish have a much better chance of survival along the whole route.
 - (R) (Team Member): The analysis is focused on survival through the scour hole reach, but the team may be able to model out greater survival when the more in-depth analysis is done.
- (C) (WG Member): It is surprising that a single kilometer out of the 80 kilometer journey would have that big of an impact.

Brad then reviewed chinook salmon survival, which is lower than steelhead survival. Brad then reviewed the modeling of Option 6 (Trap and barge) as a comparison against the other options. Brad also clarified that that percent increases in survival are against a no-action alternative.

- (Q) (WG Member): Was the issue included that smolt and steelhead fish are caught differently due to different sizes?
 - (R) (Team Member): No, but the model could include that.

Brad reviewed the assumptions of the model and then looked at habitat-based benefits.

- (C) (WG Member): When fish use habitat, they don't just move through and come out the other side the same as they were when they entered the habitat. It is important that the habitat estimates don't underestimate the value of that habitat. If the habitat is high-quality, fish will grow and then have better rates of survival coming out the other side.
 - (R) (WG Member): If the value of creating habitat is to bring about better outcomes for fish, then in the Initial Options Technical Memo, it would be important to describe the assumption and show the acres of habitat. It is hard to turn acres into fish, but it is a consistent measure.
 - (R) (WG Member): The Central Valley Project Improvement Act (CVPIA) Science Integration Team (SIT) is using acres as a measure in their model, so it should be worthwhile for Reclamation to use it.
 - (R) (Team Member): This is a reminder that these are appraisal-level design and every bit of input given right now can be considered later in the process.
 - (R) (Team Member): The goal is to measure in numbers of fish so Reclamation can easily make use of the information.

Brad then demonstrated that options 3, 4, and 5 increase habitat and survival the most and asked for questions and comments.

- (C) (WG Member): Options that increase habitat on both sides are ideal for fish since fish migrate down both sides of the river.
 - (R) (Team Member): Agreed.
- (Q) (WG Member): Why not include number estimates for the original comparison instead of percentage?
 - (R) (Team Member): It doesn't make sense to model numbers for the whole stretch from HOR to Chipps since there's so much year-to-year variation, depending on the water year.
 - (R) (WG Member): It would still be ideal that any option be designed for a low-water year, not a median or high-water year.
- (Q) (Team Member): For the fish scientists in the WG, which is more important: percent survival or number of fish?
 - (R) (WG Member): Ultimately, the goal is to double the number of fish getting to Chipps Island, but the way to get there is by changing the percentages.
 - (R) (WG Member): Percentage is better in terms of understanding the degree of "fix." One could use some range of population sizes to convert to numbers of fish since Reclamation might want to see it in terms of fish numbers. With small populations, especially in bad years, small absolute numbers of fish may have additional importance since they are rare survivors.
- (Q) (WG Member): The model evaluated survival on the main stem San Joaquin River. Would there be any reason to examine the routing of the fish, especially since this project takes place at a junction?

- (R) (Team Member): Cramer Fish Sciences can explore that in the full analysis, but in the meantime we can look qualitatively at RMA's model and make some estimates about where the fish would go.
- (R) (WG Member): Another option might be to route fish down Old River, which would be a better fish corridor than the San Joaquin River. The San Joaquin River is a deepwater shipping channel, which has a substantial negative impact on survival. If USFWS were designing this project, it would be better to ignore the Chipps Island requirement if there's a good chance that fish will survive better along Old River. The comparison is between a 100-foot-wide channel that's ten feet deep against a 300-foot-wide and 30-foot-deep channel. A lot less water is needed to move the fish at a higher velocity in a narrower channel. It would be much easier to get fish on a direct line out of the Delta than to improve the whole Delta from a habitat perspective.

COST

Scott Wright, cbec, then reviewed cost estimates for each option, which do not include costs of land acquisition or permitting. Scott then asked for questions and comments.

- (C) (WG Member): It would be valuable to see the context of improvements in this comparison in terms of carbon sequestration, habitat increase, etc. With SJAFCA, DWR, and USACE all interested, there's great potential for others to help pay for this and to undertake a multi-benefit project here.
 - (R) (Team Member): At the moment the team is evaluating options one at a time on their own merits, but we agree there is a lot of potential for coordination.
 - (R) (Team Member): This is exactly why the team is coordinating with SJAFCA.

Ed Gross, RMA, presented on flood impacts and flow split impacts and reminded the group that these scenarios and other projects may impact flow split and flood impacts.

- (Q) (WG Member): How much of a flow change would Paradise Cut taking on more water create?
 - (R) (Team Member): No water flows into Paradise Cut at low flows; at high flows, significant flows enter Paradise Cut, which starts at 16,500 cfs. There may be some coordination required with the Paradise Cut team.
 - (R) (Team Member): The goal is to design options that don't impact flood capacity.
 - (R) (SJAFCA): SJAFCA is working on moving from a one-dimensional model to a two-dimensional model, with the same goal: that no additional water will move down the San Joaquin River.
- (Q) (WG Member): What is the magnitude of a 100-year flood condition and of the low-flow condition? Is RMA using a range or individual levels?
 - (R) (WG Member): RMA is using 7,800 cfs at Vernalis for high flows and haven't identified low-flow conditions yet.
- (Q) (WG Member): What is the dynamic that could bring more water into the San Joaquin?

- (R) (Team Member): Imagine opening up a bathtub. This is akin to the larger-restoration options. The water can spread out more, which lowers the water levels upstream, for example at Paradise Cut. This would cause more water to go up the San Joaquin River.
- (Q) (SJAFCA): Has RMA looked into how flow split changes when compared to an original condition (without a scour hole)
 - (R) (Team Member): The closest to this would be the examination of filling the scour hole. Some information on historical flow splits, including the flow into Paradise Cut, [is in this paper](#).

Jennie presented on learning potential and the expert elicitation, showing that options 3, 4, and 5 have the most opportunity for learning.

- (C) (WG Member): This was an awkward elicitation process. A better approach would have yielded better information about the type of information we could learn.
- (C) (WG Member): The way the questions were written was focused on floodplain and scour hole learning, which is why Option 6 was ranked low.

Jennie then presented the [SMART analysis](#), converting all objectives into 0-1 score, then weighting categories differently. Jennie then asked for comments or questions.

- (C) (WG Member): Reclamation will choose three options and two of them are likely to be options 1 and 6, since options 2-5 are more similar. The question becomes: which of options 2-5 is most likely? The team should choose whichever of those four is the most likely to actually happen.

Mary Beth introduced the ranking of options on a [Miro Board](#). She noted that the WG members should do the ranking, not the staff or visitors.

- (Q) (SJAFCA): Is the amount of time required to implement a given option a consideration? For example, would it be possible to implement Option 1 and then pursue Options 2-5 later?
 - (R) (WG Member): That has been and will continue to be discussed and considered.

Mary Beth displayed the results of the ranking. Option 5 was most highly ranked, followed by 4, 3, 2, 1, and 6. Mary Beth asked if anyone wanted to elaborate on their ranking.

- (C) (WG Member): These were ranked from most floodplain to least, followed by filling the scour hole and then trap and barge.
- (C) (WG Member): One concern is that the SMART analysis makes filling the scour hole or trap and barge look good, which do not address the larger problem. Please pass this feedback on to Reclamation.

CONFIRM NEXT STEPS

Mary Beth thanked the WG for all the time and energy put in to the SDM WG process and summarized action items, which include sharing summaries and meeting materials. Jennie noted that she would be sending out a summary document of the rankings as well as some questions. Mary Beth shared that

although the WG has completed, the project team will keep WG members on the project email list and may reach out to make specific requests moving forward. One WG member volunteered to participate in meetings with Reclamation to testify to the importance of habitat restoration.

The WG meeting adjourned at 12:00 p.m.

APPENDIX C4: ELICITATION OF EXPERT OPINION ON POTENTIAL FOR LEARNING FOR DIFFERENT DESIGN OPTIONS

The following results were compiled in January 2023 via electronic form. Five experts responded to the elicitation: Barbara Byrne, Cyril Michel, Gretchen Murphey, JD Wikert, John Cain. Total Scores were calculated by averaging the results of each question, using None=0, Low=1, and High=2.

The Option with the highest-rated learning potential is Option 5, followed by Option 3, then 4. Then, there is a significant gap before Option 2, then 1, and finally 6.

On average, learning is low for causes of salmonid loss in other scour holes in the SF Bay Delta, approaches to reducing salmonid loss in other scour holes in the SF Bay Delta, and for broadly applicable monitoring data.

Major themes include:

- Interest in floodplain restoration and associated learnings – the more floodplain, the better.
- Concern about cost vs. benefits of channel realignment options.
- Concern about observable learning from channel realignment options.

Responses are summarized on the following pages, including the additional question on the final page. Individual responses are available [here](#) or in the attached spreadsheet.

Option 1: Fill in the scour hole with non-erodible material

Area of learning	Potential for learning	Mean	Compiled rationale/comments
Head of Old River: causes of salmonid loss	Low (5/5)	1	May reduce predation specifically but broadly ineffective. We already know what is happening at the scour hole.
Head of Old River: approaches to reducing salmonid loss	Low (3/5) High (1/5) None (1/5)	1	May learn about whether filling the scour hole reduces predation at that one hot spot.
Other scour holes in the SF Bay Delta: causes of salmonid loss	Low (3/5) None (2/5)	0.6	Not much new to learn; we know nonnative predators like deep holes. Minimal transferable knowledge.
Other scour holes in the SF Bay Delta: approaches to reducing salmonid loss	Low (3/5) High (1/5) None (1/5)	1	High: if filling at this scour hole is effective, it might be effective elsewhere.
Floodplain habitat restoration approaches and effectiveness in the SF Bay Delta	None (5/5)	0	No floodplain habitat included in Option 1.
Broadly applicable monitoring information	Low (3/5) None (2/5)	0.6	Would only prove that filling a hole reduces or does not reduce salmon mortality.
N/A	Total Score	4.2	N/A

Option 2: Channel realignment to the north with modest floodplain restoration

Area of learning	Potential for learning	Mean	Rationale/comments
Head of Old River: causes of salmonid loss	Low (3/5) High (1/5) None (1/5)	1	Might show if shallow-water habitat provides refuge, but only if common enough (which seems unlikely).
Head of Old River: approaches to reducing salmonid loss	Low (4/5) None (1/5)	0.8	It would be difficult to see much reduction with such a modest change to the alignment.
Other scour holes in the SF Bay Delta: causes of salmonid loss	Low (3/5) None (2/5)	0.6	Hard to tell. And because the channel adjustment is so slow, it would be hard to get an accurate read.
Other scour holes in the SF Bay Delta: approaches to reducing salmonid loss	Low (4/5) None (1/5)	0.8	If it works, might be applicable, but hard to tell.
Floodplain habitat restoration approaches and effectiveness in the SF Bay Delta	Low (5/5)	1	Minimal floodplain built, not enough to make a significant impact or be measurable.
Broadly applicable monitoring information	Low (3/5) None (2/5)	0.6	Unlikely to make a significant difference.
N/A	Total Score	4.8	N/A

Option 3: Channel realignment to the north with substantial floodplain restoration

Area of learning	Potential for learning	Mean	Rationale/comments
Head of Old River: causes of salmonid loss	High (2/5) Low (2/5) None (1/5)	1.2	Could provide information on routing, rearing patterns, although likely not as much as Option 5.
Head of Old River: approaches to reducing salmonid loss	High (4/5) Low (1/5)	1.8	Often talked about but rarely employed restoration strategy. Could learn a lot about restored floodplain habitat as an approach.
Other scour holes in the SF Bay Delta: causes of salmonid loss	Low (3/5) None (2/5)	0.6	Unique site.
Other scour holes in the SF Bay Delta: approaches to reducing salmonid loss	Low (5/5)	1	May be useful if effective here.
Floodplain habitat restoration approaches and effectiveness in the SF Bay Delta	High (3/5) Low (2/5)	1.6	Really expensive intervention, but potentially great learning opportunity.
Broadly applicable monitoring information	Low (2/5) None (2/5) High (1/5)	0.8	Could learn how to monitor floodplains for salmon presence and survival.
N/A	Total Score	7.0	N/A

Option 4: Channel realignment to the south, bypassing the scour hole

Area of learning	Potential for learning	Mean	Rationale/comments
Head of Old River: causes of salmonid loss	High (2/5) Low (2/5) None (1/5)	1.2	Relatively more learning potential because of two paths – one with scour hole and one without. Still expensive and lots of confounding variables.
Head of Old River: approaches to reducing salmonid loss	High (4/5) None (1/5)	1.6	Dramatic change in habitat may result in change in survival.
Other scour holes in the SF Bay Delta: causes of salmonid loss	Low (3/5) None (2/5)	0.6	No cost-effective learning potential regarding causation. Unique location limits applicability.
Other scour holes in the SF Bay Delta: approaches to reducing salmonid loss	Low (5/5)	1	Expensive and not likely to be transferable.
Floodplain habitat restoration approaches and effectiveness in the SF Bay Delta	High (3/5) Low (1/5) None (1/5)	1.4	Good potential for comparative study between valley floor floodplain restoration and Yolo/Cosumnes. None: we already know a lot about floodplains and this is really expensive.
Broadly applicable monitoring information	Low (2/5) None (2/5) High (1/5)	0.8	Learning about floodplain monitoring.
N/A	Total Score	6.6	N/A

Option 5: Channel realignment to the south, bypassing the scour hole, and closing off the existing SJR-Old River confluence

Area of learning	Potential for learning	Mean	Rationale/comments
Head of Old River: causes of salmonid loss	High (2/5) Low (2/5) None (1/5)	1.2	Addresses scour hole and major change in routing that could both impact survival. None: won't learn anything that couldn't be learned for less cost.
Head of Old River: approaches to reducing salmonid loss	High (4/5) Low (1/5)	1.8	Measuring wetlands for benefits to salmon growth and survival.
Other scour holes in the SF Bay Delta: causes of salmonid loss	Low (4/5) None (1/5)	0.8	Unique scour hole; not transferable.
Other scour holes in the SF Bay Delta: approaches to reducing salmonid loss	Low (2/5) None (2/5) High (1/5)	0.8	Since this changes the routing and removes the scour hole, it's unlikely to have transferable information.
Floodplain habitat restoration approaches and effectiveness in the SF Bay Delta	High (4/5) Low (1/5)	1.8	Creates the most floodplain so best for study, including off-channel habitat.
Broadly applicable monitoring information	High (2/5) None (2/5) Low (1/5)	1	Learning about fish monitoring in floodplains and floodplain restoration.
N/A	Total Score	7.4	N/A

Option 6: Trap and haul

Area of learning	Potential for learning	Mean	Rationale/comments
Head of Old River: causes of salmonid loss	Low (3/5) High (1/5) None (1/5)	1	Lots of flexibility in study design. Doesn't clarify causation of salmonid loss.
Head of Old River: approaches to reducing salmonid loss	Low (3/5) None (2/5)	0.6	Does not help us learn about normal migration at all.
Other scour holes in the SF Bay Delta: causes of salmonid loss	Low (3/5) None (2/5)	0.6	Not a practical solution Delta-wide.
Other scour holes in the SF Bay Delta: approaches to reducing salmonid loss	Low (3/5) High (1/5) None (1/5)	1	Not practical Delta-wide.
Floodplain habitat restoration approaches and effectiveness in the SF Bay Delta	None (5/5)	0	No restoration.
Broadly applicable monitoring information	Low (2/5) None (2/5) High (1/5)	0.8	New RST site could be very useful for collecting monitoring data. Might support learning related to passage timing and abundance.
N/A	Total Score	4.0	N/A

Additional Question: Are there existing surveys, monitoring projects, or related efforts in the area that Reclamation should take into consideration in the evaluation and winnowing of these options?

- The Mossdale trawl samples in this reach so the installation of a trap would likely be a problem for trawl operations, and cause the data collected to be less useful if a portion of fish are removed. Although the HORB is not currently proposed it would be good to consider options that would still allow for installation if it becomes a proposal in the future.
- In addition to hydrology changes in the future (note recent storms!), Reclamation should ensure that project designs (especially for Options 2-5) should consider the potential for the flow regimes that might come from efforts such as the Voluntary Agreements and/or the SWRCB's WQCP update.