Meeting Summary

INTERDISCIPLINARY WORK GROUP

Tuesday June 25, 2024

TRRP Office/MS Teams

Tuesday, June 25, 2024: 9:00 AM

Participants

Core members: (HVTFP), Eric Wiseman (USFS), Todd Buxton (USBR/TRRP), (YTFP), Patrick Flynn (Trinity Co.), Chris Laskodi (USBR/YTFP/TRRP), Trevor Morgan (CDWR), Seth Naman (NOAA), Ty Wallin (USFWS) Eric Peterson (USBR/TRRP),

Other participants: Kiana Abel (USBR/TRRP), John Buffington (SAB/USFS), Kurt Fausch (SAB/CSU Fort Collins), John Hayes (SAB/Cawthron Institute), Ken Lindke (CDFW, coordinator), Jeanne McSloy (afternoon, USBR/TRRP), Bradley Nissen (USFWS), Andrew Paul (SAB/University of Calgary), Smokey Pittman (Applied River Sciences), Oliver Rogers (USBR/TRRP), Karl Seitz (HVTFP), Daniele Tonina (SAB/University of Idaho)

Action Items Derived During the Meeting

For reviews of items through Teams, simple edits may be made directly but larger changes should be coordinated by sending to Eric.

1. Eric: schedule short meeting with Riparian Response investigators for IDT to resolve remaining questions. ☑
2. ALL: Review Workgroup Recommendation Action Tracker.xlsx toward use in all workgroups.
3. ALL: Review Annual Cycle Map.pptx.
    a. Eric to add WG Coordinator elections to diagram☑
    b. Also Workplan Development☑
4. Eric: Add uncertainties column to O&T (as a guide for targeted studies) ☑
5. Eric: Send out starter list of FY26 topics for Workgroups to consider
6. ALL: Review evaluation rubric: Monitoring and Modeling Review Form.docx

Action Items Outstanding from Previous Meetings

Summary of Meeting by Agenda Item

Program Updates

Oliver reported that Upper Connor Creek is scheduled to break ground week of 8 July. This project wasn't planned for 2024, but was moved up in the queue due to ongoing delays with the land swap for Sky Ranch. Next up will be Sky Ranch and Sawmill, but not necessarily in that order. Upper Connor Creek is an HVT/McBain design. Oregon Gulch was planned to go into 2024, so Upper Connor Creek had to be moved up a year.

Eric P. reported that the TRRP secretary hiring fell through and has been reposted. The data steward position is in process and the posting date is unknown but hopefully ASAP. It will be a GS7-GS12 ladder position.

Oliver reported that the HVT/TRRP riparian ecologist position is vacant, has already flown, and will be open until filled. A few applications have already been received.

FY25 Proposal Revisions – *consensus item*

Eric reported that TMC recommended funding all proposals pending IDT concurrence following revisions. One project required major revisions, and the other two required only minor revisions. TMC motion (June quarterly meeting) was shared with group. Revisions didn't lead to any changes in budget.

PIs were not asked to step out for discussion of their proposals. Instead, Eric wanted people available to field questions, but not weigh in unless responding to questions. PIs for the BMI and foodscape modeling proposals were in attendance, but PIs for the riparian study were not. Eric reviewed primary summary points from reviews for each project to start discussion.

BMI study: there were no comments on revisions to sampling protocols, or lack thereof. Hayes asked what sampling depths and velocities could be sampled and how far out into channel. Chris responded that in previous work the Hess sampler had a maximum depth of 18" and a practical minimum of a couple inches. Some flow is needed for the Hess sampler so a couple inches are needed. The upper limit for velocity was the fastest that the sampler could be held down in, he thought it could have been up to 4 ft/s. PIs plan to explore other samplers and methods to broaden sampling area/conditions. Hayes noted that sampling methods will depend on objectives. If there is interest in recovery following scour or bedload disturbance, a lot of area that meets that criteria may be too deep and fast. PIs responded that they're aware this is an issue and there will be times when we can't get to where we want to sample. We hope a combination of exploring other methods and having higher sample size than previous studies will address this issue to some degree. Hayes is interested in the total bed area that could/would be addressed with the study. I.e., what proportion of the bed can be sampled and what are the implications of sampling limitations on inference?

Modeling Foodscape: Ken stated his only concern was model structure in terms of recording history for each mesh element rather than pre-supposed categories like time since 6k flow. Eric's response indicated an option for outputting daily values, so that would be addressed. Eric also noted that the modeling platform will be R, skipping Excel all together in response to comments.

Andy P. said it helped to see coordination between the BMI sampling and the foodscape modeling explicitly stated in both proposals. It would be helpful to see details how and on what project elements coordination would be focused on. Regarding the use of previously available models, Eric stated that it may be a lot of work, and Ian Jowett had done similar work. Might be opportunity to work with him and same time/effort.

Hayes was pleased to see correspondence between Eric and Jowett following proposal review and coordination at the science symposium. Jowett is bored in retirement! There is another model they worked

on at the hydraulic cell resolution scale that is coded in R and Visual Basic. Hayes can supply the R model. Eric replied by reminding the group that the project is unfunded, only using existing staff time. Consequently he's trying to keep it efficient with staff time. That's why it's called "*toward* foodscape modeling." If there are ways to coordinate, he's certainly open to it and wants to engage within limits of staff time without additional funding. The hydraulic model and facies map are fairly easy to integrate into a daily time step model.

Ken offered that this could provide an opportunity for collaboration between proposals. BMI PIs could look at model and see if there are things that could be integrated to Eric's work because they don't have a lot of time.

There were no major objections so the project should get approved.

Riparian: One of the primary comments was that the project needs clear and testable hypotheses. Eric stated that hypotheses have been added, but direction of change isn't mentioned until late in the proposal.

Buffington asked Eric to point out where the hypotheses are specific? Also a concern of his, thought he just saw hypothesis of difference. Eric read an excerpt from Section 2a. It's specific to the metric, but it doesn't say what the expected difference between design types would be. There is no direction of the hypothesis, e.g., greater diversity or abundance at the stage-zero design.

Todd thought that it seemed obvious that changes in wetted width would lead to changes in plant community due to changes in surface elevations, depth to water, etc. Don't we already know this and why would we need to spend this amount of money to confirm what is obvious? Seth expressed the same concern. Also, there is no accounting for seed dispersal. Seed recruitment from outside the project boundaries is just one of many that could introduce a lot of unexplained variability. There is a lot of vulnerability to spurious effects that aren't due to rehabilitation type itself, particularly given there are no replicates for the three rehabilitation types.

Eric attempted to respond because there were no PIs present at the meeting. He had learned in discussions outside proposal that there is a concern that Oregon Gulch could become a carpet of narrow leaf willow. This, in part, motivated the proposal. It would be a bit exploratory on how valley-wide lowering will shift riparian plant community. Part of the point of the project is to explore that evolution, which may contribute to the vagueness.

Todd again questioned the cost vs. effort or information gained. Could aerial photos give us similar information for much less cost? Eric responded that photos would be good, say in 10 years, but would be less useful for a short timeframe. Information gained from the project could be used in the shorter term for site design, e.g., Hocker Flat revisit, if revisits are allowed within a 10 year horizon. It would provide better knowledge of riparian response. Todd stated that it still seems expensive, e.g., they could use transects instead of full mapping. Wiseman liked that it could give a short term answer.

Eric noted that the proposal sates there will be a follow up proposal in a few years for Oregon Gulch after things have settled in a little more.

Andy P. noted that it looks like a preliminary study. There are countless spurious things that could occur when there is only one replicate per treatment. A lot could still be learned, but it's more of an observational study. The strength of conclusions would be very limited by the lack of replicates because you couldn't rule out spurious effects.

Eric noted that data would/could be used for calibrating the TARGETS model. He didn't know how much calibration has happened already, but data could be used to further calibrate.

Buffington stated that the project proposes to looks at riparian development and time since restoration, but it's only getting a single time step at each site. It seems really preliminary in nature, rather than a test of hypotheses. Eric noted that it is focused on the colonization period per TARGETS because that model is a colonization model, not succession through time.

Laskodi questioned future funding. What happens if they don't get that future funding? Would this project be worth it if that funding and the future project fell through? Eric responded that it would still provide TARGETS calibration, but there are still a lot of questions.

Buffington noted that they're proposing data collection at Chapman and Sky Ranch, but no sampling at Oregon Gulch. That would come later. Is that right? On p. 4, 3rd paragraph before timeline, it does seem like that is the intention. Oliver pointed out that Sky Ranch could be done in 2025, so if it's a control, that might not be an option.

Eric was hearing a lot of hesitation and questioning of the value of results and the vulnerability of depending on unknown future funding for same work at Oregon Gulch. Without consensus support, project funds could be available for construction.

Buffington brought up a procedural concern. He was apprehensive about making decision because no PIs were available to answer questions where other projects had PIs available. Eric proposed an additional meeting in next couple weeks with project proponents to discuss.

Ken pointed out that given this is the first full year of Science Plan implementation for annual science planning, we'll need to address this in process. We'll need to adapt process so it's consistent for all proposals. Either PIs are asked to attend IDT meeting(s) during which these discussions are had and decisions are made, or all are excluded from discussion. He preferred the former.

Action Item: Eric will schedule a brief IDT meeting in the near future and will include at least one project PI to answer questions, so that the IDT may complete their evaluation of this proposal.

LFA bid review

Erica Engstrom, Dalton Schmitz, and Femke Freiberg from NFWF joined and shared compiled reviews. There was only one response to the RFQ, from Cramer Fish Sciences. The average score was 91.7. They proposed moving forward with Cramer unless there are hesitations. There were no major reservations among the IDT or SAB, so the rest of the agenda item was largely focused on timelines and revisions for executing the agreement.

There is $295k available in the NFWF grant, leaving a gap of +27k based on the proposal. It may be possible to close that gap if other active projects close under budget. We probably shouldn't plan on that though. Todd was shocked by hourly rates charged and asked whether they could be negotiated? Femke responded that there have been negotiations in the past and NFWF can sometimes get non-profit rates.

Ken expressed the opposite concern. Not in terms of hourly rates, but that the time allocated for the data gathering task was too low. Ty agreed and added concern that there may be an overreliance on Program staff for providing data. The proposal wasn't clear, but it seemed like they intended to rely on the Program. This needs to be explicit so both sides have clear understanding/expectations. We'll need to know if they are expecting more than Program partners have available, or vise verse.

Ken wondered if they could allocate some work to lower-level staff to save money? All of the folks on the proposal are high-level journeyman biologists and analysts. Also, can the Program add money to NFWF fund?

Erica replied that reallocation of tasks could be part of budget discussions with Cramer. Femke said it is possible to add money to the NFWF grant.

Seth cautioned that we'll need to thread the needle regarding asking for smaller budget but also that the data task needs more time. It may be confusing and we'll need to think about how to discuss.

Erica stated that deliverables need to be Aug 2026 because of NFWF grant agreement with the Program. Wiseman replied that the schedule looks aggressive, but doable because their involvement in Phase I. If it was someone new, he would be hesitant.

Erica will follow up with Cramer regarding concerns and share responses to questions to IDT. If all is OK, NFWF will proceed with the contract. Contracting could be wrapped up by late July and they could start as soon as the contract is signed by Cramer and NFWF.

Buffington asked how the group feels about receiving only one proposal? Does IDT feel comfortable moving forward with them? Naman responded that we haven't really had that discussion. He reached out to the NOAA Southwest Fisheries Science Center when the RFQ went out. They do similar work and are well qualified, so they were aware of RFQ and could have submitted if they wanted but didn't. They are likely time and staff limited. He also pointed out that the NFWF mailing list is very big. The fact that we didn't get more than one response isn't because the right people didn't get it or wasn't distributed widely enough. Eric added that over 300 recipients were in the initial mailing, and he sent it to many others other TRRP folks did too. He wasn't surprised to only receive one proposal. Given that Cramer did the study plan, other contractors probably thought the competition would have been hard.

WG Organizing and Tracking Recommendations

Eric shared a new MS Teams team for the IDT that will facilitate collaborative document editing. He plans to set up teams for all work groups and a general one. Mostly we'll be using the "Files" tab. Limited storage capacity means this needs to be used selectively for editing important documents, not as a catch-all for IDT. FYI, after something is deleted it will stay in storage for some time taking up that limited storage space, so it should be used mainly for active editing.

The Objectives & Targets draft report is in the General channel along with Kyle's action tracker. Eric added a general action tracker for all workgroups. It currently only has Fish WG in it. If making edits, let Eric know. Once we're happy with how the Fish WG one is laid out and working, Eric will duplicate it for other workgroups. Patrick really likes the action tracker and wants to use it for the Flow WG. Does Eric want us to refine Fish WG version before using it in other workgroups? Yes, and Eric asked that workgroup coordinators work on it over the next few weeks to finalize the template.

Eric also shared the annual work cycle diagram and concept he's been working on. It's laid out quarterly and revolves around TMC meetings. Inputs to TMC are back tracked in time through IDT to workgroups and includes things like annual hydrograph planning and science RFP/proposals. Roles of the SAB and each workgroup are mapped. Eric asked for feedback from IDT, WG coordinators, and SAB on this product. IDT members offered lots of praise. Ken suggested adding annual SAB and workgroup plans, and annual workgroup coordinator elections. As for timing of coordinator elections, the Flow WG is probably the most important to avoid changing in the middle of the flow planning season. May/June-ish seem best.

Andy P. also expressed praise for the diagram/concept. The SAB hasn't had an explicit role in annual flow planning, but it would be good to do that formally. It could lead to a joint recommendation to TMC from the Flow WG and SAB. Eric thought the SAB had been a reviewer of annual hydrographs in the past. Andy responded that in past they had been kept aware, but not often or ever been asked for a formal review. They did review one of the proposals for winter flows and provided formal input on the winter variable flow white paper. Buffington agreed. SAB involvement has mostly been FYI, and only a few times have they been asked for input on changes. Once early on (many years ago) then again with the winter variable flow white paper. He was encouraged by large presence of SAB in overall diagram and would like to know better from IDT/Program where they are needed/desired.

LUNCH 11:40 – 12:30

Objectives and Targets – status and progress

Eric would like to finalize the Objectives and Targets document soon. He shared an Excel O&T document including key uncertainties, management actions, monitoring activities, and modelling/DSS activities. We're tasked with review of long-term monitoring and DSS. He sees this as two sides of same coin. Modeling looking at what's happened so far, DSS is what is likely to happen in future based on our actions, leveraging models. The goal is to align long-term monitoring and the DSS with objectives and targets. Andy P. suggested adding a column for uncertainty with modeling and DSS activities, one for each, e.g., using high, medium, and low rankings. It could be used to track things that need to be done to reduce uncertainty, e.g., it could guide targeted studies. Eric asked that workgroup coordinators identify what needs more work.

Eric went through individual objectives and targets, and questioned the value of having objectives that don't have targets, e.g., sturgeon and lamprey. Ken offered some background on the OT refinement process. The guidance at the time indicated that objectives could be kept without quantifiable targets, which would be used as general guidance for management but not measured toward program success. E.g., all else being equal, we would make decisions to promote unquantified targets. Eric remained skeptical of the value of objectives without targets. Todd was also skeptical and had never heard of examples of management consideration for sturgeon and lamprey. E.g., frogs and turtles may actually affect management decisions and are talked about and modeled, but we don't have any explicit objectives or targets for them. Andy P. shared language from the Science Plan on unquantified targets. Ken shared the example of Hamilton Ponds when consideration of effects to lamprey ammocetes stopped dredging and precipitated the Program recommendation to stop dredging in the future.

Eric expressed uncertainty as to whether the flow-to-Capacity site scale target was intended to be replace by newly proposed reach-wide targets. Ken replied that no, that was not the intent. The flow-to-Capacity site-scale target is intended to address the long-term trajectory or persistence of habitat of individual rehabilitation projects. The new targets address physical habitat availability at the 40-mile restoration reach scale and the interaction of flows with channel form. All are meant to work together. Eric asked if there are any plans to do modeling and report the current state for the new habitat targets? Ken was unaware of any. Eric suggested we should consider this work in annual workgroup planning.

FY2026 Science Planning: after action review

Eric shared his thoughts on the FY25 process on what went well and where is there room for improvement? The list below began with Eric's thoughts but had other's ideas inserted without attribution (although some attribution may by represented in the discussion below).

- Overall process was effective
- Science Plan steps
    1. Key uncertainties
        - Worked well with IDT
        - Might deserve more Workgroup and SAB interaction
    2. Specific Research Questions (with '**SAB** input', focus on early)
        - Did not entirely fulfill purpose of pre-proposals, but worthwhile anyway
            - Applicants are internal and have institutional knowledge of objectives and process
            - SAB found this useful as to understanding how the program is approaching questions listed in Science Plan
        - Needs SAB review (more than just early 'input')?
    3. Develop RFP
        - Delayed due to Vacancies in FY24
        - Accidental limit to 2 pages
    4. Posting RFP
        - For lack of a Science Coordinator over winter, we got behind. RFP posting deadline should be New Years or maybe even before Christmas, TMC Meeting in December?
        - Proposal development is not a step clearly identified in the Science Plan.
        - Needs more time. At least a month for a longer full proposal
        - Needs more clarity on proposals from outside.
        - Format should include specifying
            - hypotheses,
            - Tasking
            - More than 2 pages for methods
    5. Proposal evaluation (workgroups and **SAB**)
        - Needs more time.
        - Lack of anonymity (within program) can inhibit robust, honest reviews, can also be beneficial as a reviewer
        - We added a revision step – should continue to do so but time it better for completion before the next step.
            - Response to comments required?
            - Providing only a revised proposal?
            - Opportunity for conversation/interview/presentation? When?
    6. Develop proposal
        -
    7. Present to TMC
        - Presentation went well
        - Eric had initiated a memo last fall; did not get carried all the way through.
            - Suggest finalizing anyway, after the fact.
            - Include this after-action review
            - Future should be a memo to the TMC/ED to request funding of the proposal
    8. Funding Decision
        -

9. Contracting
    - [Pending]

Ty asked folks that submitted proposals: did you find the RFP substitute for pre-proposals useful, in place of having to develop a pre-proposal.

Ken responded that it is hard to say on the fly without looking back at the RFP. Many of us have institutional knowledge that could have substituted for sufficient background in the RFP. Would someone outside the program feel they were given enough information?

Seth stated that it was a little difficult to give frank honest critiques of proposals because we all know each other personally and we work together all the time, etc. Eric and Ken agreed with Seth and pointed out that the SAB provides that independent review to some degree, which was reiterated by Kurt Fausch. Buffington saw value in developing the research questions before developing the proposals/RFP. Putting thought and work into refining questions paid off by getting proposals that are focused on key questions for the Program.

Todd supported process we did and felt that we had good frank discussion on proposals. We benefit from reviewing each other's work, we support each other, and we're here to improve everyone's work. He didn't see a problem with current process in terms of peer review.

Buffington would like more time for looking at revisions/responses to comments. Otherwise, he felt there was sufficient time for other steps in the process.

FY26 Science Planning: review of key uncertainties

Some of the discussion during this agenda item were captured in the research parking lot Excel file (Attachment A). Discussion was largely focused around new questions that could be added to those developed for FY25 that either were included in the RFP or put in the "parking lot."

Chris shared some thoughts from Kyle (who was absent from the meeting). There is a unique opportunity to do studies associated with acoustic tagged fish that are being released by the survival study. No specific studies were offered. The Program should be aware of this opportunity and think about how we could capitalize on it. Wiseman offered a couple examples: how long are fish rearing in the upper 40? How long does it take for them to transit various parts of the river?

Fausch brought up life history diversity. It is difficult to measure, but important. Ken agreed that this is an important topic.

Chris brought up the severe thunderstorms and turbidity events that occurred last summer. We could develop recommendations for dosages that might be harmful to salmonids. The dose-response presentation given to TMC at a September quarterly meeting a couple years ago could either be used or replicated. Smokey noted that after the Monument fire the Physical WG submitted a proposal for turbidity monitoring. If we want to link suspended sediment to effects on fish, we'd need a sediment sampling program which is expensive. He noted the difference between turbidity and suspended sediment concentration. Seth expressed continued concern about the effects of sediment from Deadwood Creek on salmonid eggs and again emphasized the importance of synchronized flow releases. Ken suggested that documenting the impacts of fine sediment inputs in the absence of synchronized flows could be done longitudinally in the mainstem showing how the bed isn't blanketed further downstream where

synchronized flows are natural. Todd questioned whether this is necessary. We know it is happening and it is obvious. Ken agreed it is obvious, but still saw value in documentation.

Hayes suggested consideration of developing habitat suitability curves for macroinvertebrates, which could fit into hydrological modeling. What flows support BMI growth/development? Ian Jowett has some programs that can generate HSCs, including some that use GAMs.

Effects of carcass additions to BMI and/or fish production was proposed. Fausch noted that Scott Collins, one of Colden Baxter's students, did studies on carcass additions. Also that there is other work in the literature on this topic.

Hayes brought up the potential conflict between flow management and recreation. Angler satisfaction surveys and expert opinions of optimal flow levels could be explored. Hayes has found in similar work in New Zealand that there can be a conflation between fishing conditions and fish abundance. Even if conditions don't change, anglers will be more happy when there are more fish, sometimes regardless of conditions. Fish abundance can change a lot and CPUE may not change much, but angler satisfaction can go up.

Ken advocated for continued prioritization of nutrient flux. There were two questions in the FY25 RFP, one for BMI and one for foodscape modeling. Both questions were only partially addressed by the proposals that were received. He suggested pursuing completion of BMI model in FY26, building off the work that will be done in FY25.

Topics for FY26 for now: foodscape modeling to support S3 (nutrient flux), effects of suspended sediment and deposition on bed in the mainstem due to fires and channel rehab in the absence of synchronized flows (fish production [impacts to]), salmonid life history diversity (fish production), effects of temperature on periphyton and BMI (potential models from John Hayes; temperature), temperature for turtles (temperature).

Monitoring and DSS review

Eric developed a rubric to evaluate long-term monitoring projects and shared it with the group. Ken expressed concern about including budgets or agencies doing the work. These are not usually considered at the technical level of the Program (i.e., IDT and workgroups). The review should be focused on the science, how data aligns with objectives and targets, and Program data needs. Also, what is the onboarding process for stuff we're not currently doing? Ty suggested we focus on what we're doing now first. Ken said that would be fine for now, but wanted to make sure TMC isn't presented with only an evaluation of current projects. We should present a wholesale evaluation of long-term monitoring, including recommendations on current monitoring that should continue, current monitoring that should be discontinued, and monitoring that should be added.

Eric offered examples of monitoring that could be added, including turbidity and BMI monitoring. The end goal is to provide TMC with package for future long-term monitoring, which may include some combinations of what we're currently doing, stuff to keep, stuff to get rid of, and new stuff. He suggested engaging workgroups and have each monitoring project reviewed by two workgroups. He would like some feedback on the rubric before we start using it. He would like to target this coming fall/winter for the review to be done. For the Flow WG, Oct/Nov makes the most sense because that would be a lull between winter flow planning ending roughly in August and spring flow planning starting in January.

Buffington stated that he would prefer for the SAB to review the Program's review. He would also like to see a plain language explanation describing the link between data collected and how it's used. How is the data useful to the Program?

AJOURNED 16:05

Attachment A: Research Parkinglot (Excel file)

Source (workgroup, individual, SAB, TMC, etc)	Date Entered	Key Uncertainty	Topic	Hypothesis or Question	Comments
FY25 Science Planning	2024-06	Wetted Width	Flow Interactions	Q: Under what conditions are Lewiston Dam releases and/or tributary accretions of flow sufficient to cause channel widening and increase wetted areas in alluvial valleys?	Writeup of question is included in the FY25 RFP Solicitation. This question did not receive any proposals. Keep as a priority. Difficult to answer because approach is condition dependent. Open funding option?
FY25 Science Planning	11/28/2023	Temperature Regime	Summer flows	What are the effects on 1D daily average temperature of summer discharges needed for management of riparian plants?	Potential need to look outside of the program. Ammenable to a laboratory study (M.S./PhD)
FY25 Science Planning	11/28/2023	Temperature Regime	Summer flows	What effects do water temperatures at the 450 cfs summer baseflow release from Lewiston Dam have on periphyton and BMI and maturation of Spring Chinook Salmon for spawning? How can Lewiston Reservoir management be used to provide optimal temperatures for these organisms at this baseflow?	Some work and data collection have been ongoing towards these questions for a number of years. Optimal temperatures for periphyton, BMI, and SCS need to be known to answer first question and approach second. Intrinsic rate of increase is temperature dependent and needed to inform foodscape model

FY25 Science Planning	11/28/2023	Temperature Regime	Summer flows	Develop missing tools to assess hydrographs, including changes to summer baseflows (e.g. models for periphyton, invertebrates, turtles)? [Flow WG for DSS, particularly toward summer baseflows]	FYFAM is site specific, could use a larger reach specific model (S3 scale). Western Pond Turtle needs and potential temperature impacts currently no tool to monitor. FY25 BMI study could be data source.
FY25 Science Planning	11/28/2023	Nutrient Flux		Can salmon carcass additions measurably bolster BMI production and salmon populations in the Trinity River?	Hatchery Technical Team already putting carcasses in tributaries, but BMI production isn't being monitored. Dependent on carcass availability from TRH (possibly thousands for mainstem). Existing literature from Idaho.
FY25 Science Planning	11/28/2023	new		Relationship between flow management and recreation?	Often part of discussion for management actions (summer/winter flow). Possibly part of NEPA and ongoing. Recreation beyond anglers. Need for expertise that may not exist within program partners.
2024 Science Symposium	6/25/2024	Fish Production	Life History Diversity		
				Thermal Regimes and Terminal Limits	comparison of literature to observations
FY26 Science Planning			Seasonal Flows	Suspended Sediment dosage	Turbidity vs suspended sediment

FY26 Science Planning				Mobilization of fine sediment from post fire drainages	Comparison to lower drainage tributaries (i.e. Canadian Cr) where there is synchronized flows and system is functioning
FY26 Science Planning	6/25/2024	Flux		Habitat Suitability Models for Macroinvertebrates.	Could build on work/partnership between Eric and Ian from FY25 project
				What are the impacts of scour and inundation on benthic macroinvertebrate species composition and density, and how sub-geomorphic peak flow (<4,500 cfs) frequency, magnitude, and timing affect drift forage species composition, flux, and concentration on a systemic scale? Develop a spatio-temporal foodscape model linked to shear stress, grain size, topography, and hydrology both for contrasting potential flow release schedules, and for potential input to the S3 fish production model.	