Los Angeles River Instream Flow Criteria: Technical Study

Technical Advisory Committee Meeting #3 – September 16, 2019

Meeting Objectives:

- Review focal habitats for LA River and key hydrologic needs
- Update on model development
- Discuss potential flow management scenarios and management scenarios

Participants

In-person:

- Andy Collison (ESA Consultants)
- Anthony Nercessian (LA DWP)
- Doug McPherson (USBR)
- Geremew Amenu (LACDPW)
- Hassan Rad (LA City)
- John Randall (The Nature Conservancy)
- Katherine Pease (Heal the Bay)
- Kelly Schmoker (CDFW)
- Manuel Aguilar (LA DWP)
- Mas Dojiri (LA City)
- Rafael Villegas (LA DWP)
- Steve Skripnik (LimnoTech)
- TJ Moon (LACDPW)
- Wendy Katagi (Stillwater)

Project Team:
• Eric Stein (SCCWRP)
• Katie Irving (SCCWRP)
• Kris Taniguchi-Quan (SCCWRP)
• Jenny Taylor (SCCWRP)
• Liesl Tiefenthaler (SCCWRP)
• Terri Hogue (CSM)
• Jordy Wolfand (CSM)
• Reza Abdi (CSM)
• Lori Webber (SWRCB – Division of Water Quality)
• Tatyana Isupov (SWRCB – Division of Water Quality)

Phone:

- Anthony Hicke (ULARA Watermaster)
- Chris Medak (USFWS)
- Cris Morris (LA Regional Water Board)
- Dan Schultz (SWRCB - Division of Water Rights)
- Dean Wang (Long Beach Water)
- Dian Tanuwidjaja (Long Beach Water)
- Ethan Bell (Stillwater)
- Ginachi Amah (LARWQB)
- Katherine Rubin (LA DWP)
- Nathan Holste (USBR)
- Patrizia Hall (Long Beach Water)
- Richard Ruyle (City of Glendale)
- Richard Slade (ULARA Watermaster)
- Samuel Boland-Brien (SWRCB - Division of Water Rights)
- William Saunders (LACDPW)

- Derek Booth (Stillwater)
- Melanie Tory (Los Angeles City Attorney's Office)

Agenda

1. Introductions
    a. New technical team members
2. Recap from last TAC meeting
    a. Update on action items
3. Review focal habitats, key spp. and present hydrologic profiles
    a. Coldwater fish habitat – represented by O Mykiss or Santa Ana Sucker
    b. Riparian habitat – need to define specific alliances (e.g. cottonwood alliance), represented by least Bell's vireo
    c. Freshwater marsh habitat – defined by red-winged blackbird or Western pond turtle
    d. Wading shorebird habitat – defined by black necked stilt or long-billed dowitcher
    e. Warmwater, perennial flow habitat – as a surrogate for invasive spp habitat, represented by largemouth bass
4. Update on hydrologic modeling
5. Begin development of flow management scenarios
6. Wrap-up, action items and next steps

Key Action Items:

- Share technical report of non-aquatic life use study
- Send out compiled list of 5 habitat types, alliance and species data, prelim end members and rationale
- Set up a follow up zoom meeting with more detailed discussion on the habitat characterization
- Flow management scenarios:
    - Develop sensitivity curves and review with TAC
- Follow up action items on data needs:
    - Burbank plant discharge data
    - In stream temperature and salinity data
    - Additional water quality data
- Share PowerPoint presentations from this meeting

Key Recommendations:

- Habitat characterization:
    - Keep coldwater fish habitat, as we are already modeling temperature
    - Flow and temperature needs should be contextualized, as we won't be able to model all hydraulic needs such as substrate. Although certain flow/hydraulic/temperature needs may be met, habitats also need the specific substrate (or other habitat needs) that we cannot model.
    - Keep all 5 habitat groups but incorporate edgewater/pools (not as separate habitat but within some of the reaches where this habitat can occur)
    - It's okay that there is overlap between some key habitats

    - We will approach species tolerances as ranges that reflect our level of confidence in those tolerances

- Flow management scenarios:
    - Use sensitivity approach and sensitivity curves because it provides flexibility in terms of management options that can be considered and allows for defining ranges of acceptable flow metrics
  - Scenario details:
    - WRP scenarios: Clarify that we are focusing on changes in the *discharge* into the river.
    - Stormwater scenarios: start with a simple plan: full implementation of the EWIMPS, add complexity as needed

DETAILED NOTES:

Habitat Characterization:

- Review of 5 focal habitats with definitions:
    - Coldwater fish habitat: cool, gravel/cobble, deep pools, (shallow edgewaters for fry?), well oxygenated, overhanging vegetation/banks
    - Riparian habitat: floodplain with temporary flow or channel bottom with intermittent flow, shallow water table throughout year
    - Freshwater marsh habitat: standing water, near surface water table, or low velocity, fine substrate
    - Wading shorebird habitat: shallow water or mudflat / concrete that supports algae or invertebrates
    - Warmwater, perennial flow habitat – as a surrogate for invasive spp. Habitat: warm, perennial flow, slow velocity, shallow to deep, [submerged aquatic vegetation]

- How representative are the habitats?
    - Habitats are represented longitudinally
    - Habitat groups miss a key habitat laterally: edgewater/and shallow pool habitats are missing
    - Categories are not mutually exclusive

DISCUSSION QUESTIONS:

- *Do we feel habitats are mutually exclusive?*
    - Mas: Not always a positive relationship if we want to keep the shorebirds alive. Wading shorebirds and salt water marsh habitats are blurred. They have found that there has been avian botulism due to a lot of vegetation that slows flow of river and creates stagnant pools, water temperature rises, which impacts bacteria, resulting in bird death.
    - Need to try and develop some quantitative divisions that uniquely define each of the 5 classes.

- *Coldwater habitat is absent, should we include it in this study?*
    - Wendy, Stillwater: we are looking at LAR fish introduction and steelhead passage, I think it should be in the mix
    - Additional projects (i.e. Park and LAR corridor projects) that will provide riparian cover and secreted wetland habitat. As an example, South Gate Urban Orchard could provide

benefits to potential coldwater fish habitat. This study area is the corridor itself, but we need to note that there are adjacent habitats and projects that are benefitting the River corridor habitats

- Andy Collison: How far off is the River from meeting criteria for coldwater? If the temperature threshold for changes in flow are close to meeting that criteria, we should keep coldwater habitat.
- Jon Bishop: would the temperature range be able to support the coldwater habitat realistically?
- Kelly: is there upwell/groundwater inputs that could meet that coldwater criteria?
    - Doug McPherson: I don't think that that is occurring right now.
    - Andy: There was historic upwelling in Glendale narrows.
    - Chris Medak: Historically there was upwelling, that's why they didn't line it. It was a historic condition.
    - Rafael: Historically, going back over a hundred years ago, there were instances when you didn't get flows down the LA River at all – even before sustained groundwater pumping started happening. Historical records indicate the settlers of El Pueblo, chose the location because it was downstream of the Arroyo Seco confluence. There were usually flows down one of these waterways (LA River or Arroyo Seco). Also, would caution against advocating for seeking more upwelling. Beyond the City's Pueblo Water Right, the source water is essentially contaminated groundwater and may negatively impact habitat in the LA River.
    - Manuel: if the coldwater habitat is not going to be obtainable, there might be a potential management scenario where this habitat is possible; under what scenario could we meet that?
    - Hassan: 80% of flow is wastewater treatment plant, which we can't control discharge temperature. If it's not possible then why keep it? Then there might be regulatory implications on what needs to get done to support the temperature?
    - Lori: We don't want any gaps in knowledge, we want to be able to answer that question. It is topic of interest to many and something that a SWB member could ask. We want to keep it in even if it doesn't result in regulatory impacts. SWB does not want to have a gap in the overall understanding
    - Mas: If we don't include coldwater fish habitat then it may look like we neglected it. What is SCCWRP and CSM's feeling about it?
        - Eric: We are already looking at the temperature issues, we already have a model to do it, but if we ignore it then people might ask why did you ignore it. There isn't solid knowledge on if this habitat can or cannot be obtained. It's useful information.
        - Terri: we can get at the temperature question. However, it may be hard to get at the substrate conditions. Hydraulic model will likely not be able to simulate changes in substrate
    - John, TNC: Would this analysis incorporate connection to the tributaries that might support that habitat? If there's a stretch of Arroyo Seco that qualified as coldwater habitat, will there be winter flows to connect between the mostly separate populations of the mainstem and Arroyo Seco tributary? That could help with metapopulations.
        - Nate Holste: seems like migration and traveling seasonally is of importance

        - Chris: mainstem was crucial for pathway for breeding to the tributaries.
- Chris Medak: helpful to know if specific criteria (temperature, etc.) are being required for each of those habitat tolerances/ranges.
    - Eric: We will elaborate on that later in the meeting.

RECOMMENDATION: Coldwater habitat should be included in our analysis. Even though coldwater fish habitat is currently absent in the LAR, we should analyze whether future management scenarios would make it more or less difficult to establish in the future. We need to clarify that our goal is not to manage flow in order to establish coldwater habitat, but rather to evaluate the implications of different proposed management scenarios on future conditions. We should also recognize that our analysis will look only at hydrologic and temperature properties and not physical/substrate properties of coldwater habitat. Including this analysis allows us to be comprehensive within the capabilities of the models that we are already building.

Should we incorporate edgewater/shallow pools with coldwater fish or as its own separate habitat?

- Chris: what are the consequences of incorporating them together? Once they are together it will get harder to say that a reach is satisfying the habitat criteria. You don't need edgewater and shallow pools in all areas, just in some places.
    - Eric: 1. splitting it out is more difficult in terms of hydrologic modeling, in terms of model and confidence in model
        - 2. from ecological perspective: thinking of amphibian species --> we can set them up as co-occurrence of habitat. For specific species we need habitat to co-occur, argument to imbed them together
        - From a technical perspective it's easier to lump them together unless there's a strong feeling that we should split them
        - Chris: depends on reach length and species may not need that habitat everywhere. It doesn't include the species. Need to think of them at finer scale at different life history needs. See if it meets any life history needs, doesn't need to meet all habitat criteria in all reaches
        - Eric: for a given reach we can break it up into finer pieces – we don't want to consider an entire reach in or out just because it doesn't meet one thing.

RECOMMENDATION: We will continue to track these habitats in reaches that they have potential to occur, but we won't break them as their own distinct habitat classes. We will evaluate them in the context of the other 5 habitat classes and consider their role within each of the 5 classes where they co-occur.

Habitat characterization additional discussion:

- Beneficial use designation for riparian veg and vegetative marsh?
    - Eric: If there's a beneficial use as "wild" designated then those veg habitats would be included
    - Yes, there is "wild" designation for all reaches
- John, TNC: How to evaluate impacts on habitat?
    - Eric: more of a probabilistic approach of are we more likely or less likely to get those habitats under the different scenarios
- Kelly: pond turtle spends significant portion of its life outside of the river. Any attempts that you are considering those considerations outside of the river. Generally, outside of the floodplain
    - Eric: we are not looking outside of the River channel. Within this project won't be able to answer the question if there are adjacent habitats outside of the river

Process for habitat characterization:

- Presented habitat characterization process:
    - **Goal:** Characterize habitats based on hydrologic/hydraulic needs
    - Identify vegetation alliances and key species associated with each habitat type
    - Characterize habitat needs (hydraulic/hydrologic thresholds)
    - Determine end members at the range of tolerances
    - Translate hydraulic/flow needs to functional flow metrics

DISCUSSION:

- *Characterize habitat needs (hydraulic/hydrologic thresholds):*
    - Chris Medak: Concerned that we don't have the data specific to southern CA species and we will be relying on studies from similar species in other areas that may or may not be accurate:
        - What exactly is needed to support riparian habitat in the river? Seems to be disagreement in those numbers in the literature, we will come up with a number derived from northern CA, which has a completely different set of flow needs than what we actually experience in southern CA. We may have a threshold for duration that was derived from the literature that may or may not resemble the artificial flow regime that we have here. We don't have a clear idea that the reduction would have an impact in our systems
        - Eric: we know where certain habitats are, but we will have current hydrology modeled to understand what the riparian habitat is currently surviving with. If we have a number and we don't have confidence in that number, we could also look at it from a sensitivity perspective where we will have some level of confidence in the analysis. With the models we will be able to do that type of manipulation: if the tolerance range is 20% higher, what does that mean in the results of the model?
        - Katie: this is why we are leaning towards a more mechanistic route because statistical approaches assume that the species react the same way in all areas, with mechanistic we have more flexibility to account for some of these issues/uncertainties. We will talk more about that later
- *Determine end members at the range of tolerances:*
    - Jon Bishop: will we use all species that can be supported in that habitat type or create the range of tolerances only from the species present?
    - Jenny: we would work within our system and work with the range of species that we have and the current conditions. We already know that specific upland riparian species do not exist in the mainstem due to the elevation gradient or to a lack of floodplain, for example, so we will not include those species in our range.
    - Lori: likes using the endmember species to bracket things: do the variables have to be something we can model? ANSWER: Yes, need to be able to model
- *Translate hydraulic/flow needs to functional flow metrics:*
    - Jon Bishop: but will all the functional flow metrics be relevant for the management scenarios that we are focusing on for this study? Seems like the peak flows are less relevant for changes in wastewater reuse
    - Eric: we will be calculating all of the functional flow metrics in bulk, but some may be more relevant than others for southern CA systems and for our specific study

SUMMARY OF RECOMMENDATIONS for Habitat Characterization:

- Keep coldwater fish habitat, as we are already modeling temperature
- Flow and temperature needs should be contextualized: we won't be able to model all hydraulic needs such as substrate. Although certain flow/hydraulic/temp needs may be met, habitats also need the specific substrate (or other habitat needs) that we cannot model
- Keep all 5 habitat groups but incorporate edgewater/pools (not as separate habitat but within some of the reaches where this habitat can occur)
- It's okay that there is overlap between some key habitats
- We will approach species tolerances as ranges that reflect our level of confidence in those tolerances

Stakeholder meeting: we will not get into the level of detail within each habitat types/species needs, but we will report back on the general process for characterizing habitats and the 5 general habitat types with our first cut on end-member selection (based on recommendations from the TAC)

CSM: Modeling Update:

- Water quantity modeling update
- WQ modeling approach: WQ data needs and temp model overview
- Discussion of scope of estuary model

Water Quantity and Hydraulic Modeling:

SWMM Hydrology model:

- WY 05-18, hourly, unsteady flow
- 114 sub-catchments

HEC-RAS:

- Unsteady flow to simulate velocity and stage

QUESTIONS TO TAC:

1. Van Norman Complex, LA Reservoir: is it part of the hydrologic system? It was an extra data file in the data collected. It is not affecting analysis.
   - Raphael: It goes through Bull Creek, but this is water imported from Owen's Valley Water and Bay Delta, not local runoff or discharge.
     - Kelly: Wetland in front of LA Reservoir does connect to Sepulveda Basin. When it rains, water does not go through the LA Reservoir, but the flow that goes around it will end up in the Sepulveda Basin and into the LA River.
     - Raphael: But there is a high flow diversion debris basin that could change the timing of high flows in Bull Creek. This is to relieve pressure in Bull Creek during high flows

2. Have not received the Burbank WRP discharge data, they are looking for daily or hourly. They report on monthly average, how can we get this data?
   - Cris Morris from RB4 will get hands on the daily discharge data from Burbank

- HEC-RAS (hydraulics)
  - 5 gages, manual adjustment of manning's n

- SWMM: 11 gages, more intensive calibration using NSGAI -II optimization methods

Model Calibration:

HEC-RAS Calibration not as great in some of the concrete lined channel --> low flow channel and large jump in wetted perimeter --> rating curve may have been calibrated for the high flow channel because it's a flood control channel

- Amir: Roughness may be higher in the low flow channel, and may be smoother outside of the low flow channel, that's why you are getting much higher depths outside of the channel
- Kelly: prioritization of maintaining the volume that propagates downstream into other habitat areas.

SWMM Calibration: have calibrated 3/11 gages, still in progress

- Pacoima Diversion has poor performance in the model. Missing data for Lopez Dam and it's having big impact on calibrating the model. In contact with Army Corps to get the missing data.

Water Quality:

Scope: Temperature, Metals (copper, lead, zinc), Total Suspended Solids, Specific Conductance

Data needs:

- From WRP discharges
- Mass emissions data at Wardlow pre-2006
- MS4 pre-2015
- What else?

QUESTION: Are we missing any key data sources?

- Lori: have you looked at Department of Water Resources data? They may have data on temperature monitoring.
- Amir: Are you looking at mass emissions pre-2015? Prior to 2006. The City has several stations along LAR that have been monitoring since 2008 as part of metals TMDL.
- Hassan will put us in contact with someone to get that missing monitoring data
- Katherine Pease: did you get temperature data from Rosie Dagit with RCD, Heal the Bay has collected temperature data and would be happy to share.

Temperature modeling:

- Statistical vs mechanistic model difference for water temperature models.
- Different modeling options: HEC-RAS temp module (simple and easy to incorporate with the already existing HEC-RAS model, but can't account for complex processes/interactions) vs. iTree cool river model (was designed for ecological restoration and incorporation of multiple interactions, requires a lot of data and computationally demanding to run).
- Have validated the iTree cool river for a case study reach of the LAR well (model already developed for an 11 mi stretch).

Proposed Approach Options for Temp modeling:

- Use HEC-RAS to simulate temperature for all of the domain via HEC-RAS.
- i-Tree Cool River to simulate for specific reaches to get more detailed information at key habitat areas as it's very computationally heavy.
- Pick reaches with important potential habitats to do the more detailed i-Tree Cool river, run HEC-RAS temperature as a first pass for entire River.

Water Temp Discussion:

Amir: Are their different temperature metrics that are important? How different are temperature needs?

- Eric: Lots of different temperature metrics for different species. Set of different metrics that are shown to show species occurrences. During times of high temperatures at night might help them persist during hot times during the day. If you change discharge patterns, then it can relieve the temperature during specific times during the day it might tip the scale for certain habitats to be supported.

- Amir: Will model account for diurnal flows? ANSWER: Yes, our hourly resolution from the watershed model will be able to model temp at that same resolution.
    - May be important for i-Tree Cool River to prioritize certain reaches for the more detailed temperature modeling. I.e. reaches for potential restoration
- Terri: Reza did his PHD developing this model and he already has a model set up to 11mi of the river, we can leverage off of the work already completed and build additional reaches that we want higher resolution of temp data. But we need to have the input data to create the model

Question: how do you handle the seasonality issue? If we have the data to drive it, we can run simulations for longer period of time?

- Data: need a lot of meteorological inputs in the model, we can list all data that we need
- Andy: boundary conditions should exist, LA County sanitation districts measure that around their treatment plants and have a series of reaches to monitor downstream.

<u>Estuary Model:</u>

- Will focus on tidally influence piece of the mainstem
- What does the scope of the model need to be for the objectives of this study?
- Can we use the HEC-RAS model which will incorporate some tidal influences, salinity, and hydraulics?
- John, TNC: do you have the line of salinity profile movement in this area? That will impact what you will be able to model.
- Mas: City of LA (and Long Beach) are considering diverting river water at the end of the River. Point of diversion or where they would do the diversion from? End of the LA River, upstream of the tidal influence. May be upstream of Willow. This was just a 1-minute discussion - do not have all of the answers. What do you think if we do this? Thought behind that: worst case scenario is that we can't do anything because of Glendale Narrows. If you try not to impact Glendale Narrows, you move downstream and pick up the water, you limit impact upstream. But how much we can do is still a question, size of terminal island, have to be looked at what volume we will be talking about.

John, TNC: has there been a lot of work done on the biology of the wading shorebirds down there?

- Yes, FOLAR and CH2M-Hill have done some wetlands work.
- In estuaries in Louisiana, intermediate salinity zone was unique that didn't survive in the fresh or the salt water. In this watershed, the amount of freshwater inflow during the low flow season may get diluted almost instantly, but uncertain. But in case not, might be worth seeing if this is a big impact or not.
- Eric: we are proposing to not develop a full 2d-3d estuarine model, proposed to use HEC-RAS model and apply it to that area. Also apply the temperature model to that area – TAC generally agrees with this approach.

Management Scenarios:

- Defining management scenarios options
- Elements to consider:
  - Varying amounts of reduced discharge from 3 water reclamation plants
  - Stormwater capture along rio hondo and compton creeks
    - Stormwater capture in upper watershed (Arroyo Seco, Tujunga)
  - Restoration along Compton creek, Rio Hondo, and Arroyo Seco
- Bounding range of scenarios:
  - Bound scenarios based on extremes
  - Define scenarios based on sensitivity of system to response
  - Develop sensitivity curves to help define ranges of scenarios
  - Consideration of seasonal effects
  - Consideration of cumulative effects of different management actions

First Approach: Bounding the extremes discussion:

- Jon Bishop: In terms of the extremes: we should start at the current recycling and then go to the max. The lower end of the extreme shouldn't be zero, it should be the current conditions. From SWB, they want to look at differences from what they're recycling today to the future scenarios and what are the impacts.
- Kelly: If you start at current conditions, you are ignoring any potential effects that may have already occurred from what we are doing today.
- Chris Medak: Takes a while to get the permits into effect. So, we don't know the effects of current water projects that are in line. Will be important because these have come online within last 10 years, so we may not see the results of the effects of that. Recommend looking at whole range, not just starting at current conditions.
- Lori: How hard is it to run a 0% recycle scenario?
  - Terri: very easy to do.

Hassan:

- We have to define what recycling is. Different plants define recycling different. Is this percentage that isn't going to go back to the river.
  - Eric: We still have questions about how to define wastewater and stormwater.

Andy:

- If you're thinking of this as sensitivity analysis, these may have different orders of magnitude. Difference between Tillman vs Burbank vs Glendale these ranges and scenarios should be proportional to their input into the system.

Second Approach:

- We might have some criteria that we set up jointly and subset those examples in the matrix that meets those criteria

If there are minimum flow regimes, assumption that if there are then the responsibility for the LAR should be shared from ALL of the WRPs.

Third Approach:

- Sensitivity curves approach: develop curves based on the sensitivity of response of specific reaches for different flow metrics or hydraulics, based on different seasonal flow conditions.

- Have whole series of these curves based on different flow metrics and WRP management scenarios on the y axis.
- This is not mutually exclusive of the other approaches.

Scenario Details: Discussion:

- Extremes vs sensitivities
    - Jon Bishop: sensitivities approach resonates better with him. Allows for consideration of the probabilities of meeting flows for bio and rec conditions. This seems better than looking at the different impacts of predefined scenarios and gives us more flexibility.
    - Terri: there are multiple ways to get to the criteria that we need. Using heat maps can be one way to tell you the range of scenarios
    - Eric: On sensitivity curves, we can use in the front end, we know that volume needs to hit this area but then you can look at which scenarios or combinations of scenarios can achieve those volumes.
    - Raphael: I know we are considering different seasons, but are you considering different times of the day? For example, since there is no kayaking at night, could we take away flow at night when it is not needed to sustain kayaking?
        - Eric: we can account for that with the hydrologic modeling we have hourly output but in the biological model we may not be able to account for that.
    - Jon: to create these curves, we are going to look at a variety of flow regimes. But from SWB, the management question is what probability do you want to meet, and policy decision is how are you going to allocate that? That's really the SWB's decision.
        - Eric: There might be a range in discussion. To meet a certain biological goal, baseflow magnitude need to be within a given range. In this example if there's an amphibian or fish species that baseflow magnitude is in this range. That's management decision to decide how protective of biology we need to be. How much is risk tolerance, and that needs to get translated to the discharge
    - Kelly: at a certain temperature range, you can't sustain algae species, will you have those distinct lines in those thresholds?
        - Eric: going back to Chris' comment, for flow we may not have a distinct line for those thresholds, not as exact as temperature threshold for vegetation may be.
    - Will there be vegetation scenarios for vegetation removal (i.e. Arundo)?
        - We won't directly model vegetation management, but we may be able to get at the implications of those actions on flow, velocity and temperature with the hydraulic and water quality models.
    - Jon: will we have enough sensitivities to temperature during the day? Because water temp and flow could be less sensitive during the night.
    - Kelly: will biology models be able to look at the diurnal conditions? She would caution that the sensitivities of the biological models won't be able to address that. We don't even understand the layered levels of uncertainties within the models and the uncertainties in the science/literature.
    - Will you be looking at future changes in climate? No, we are looking at contemporary conditions. Assessing effects of climate change would need to be a future project.

- **RECOMMENDATION:** TAC prefers the use of the sensitivity curves because it provides flexibility in terms of management options that can be considered and allows for defining ranges of acceptable flow metrics.

- Start with a series of model runs to develop sensitivity curves and work on creating heat maps of the certain combos of management actions that meet criteria.
- *Later discussion will be:* where do we want to be on the x-axis that is informed by the model output. We will aim for a range, not a hard boundary.

Action Items:

- Develop sensitivity curves for proposed flow, temperature, and hydraulic metrics.

Scenarios details: WRP Reuse

- How do we simulate percentages of recycling?
  - Hassan: clarify it by calling it reduction instead of recycling, suggest by starting baseline in current conditions
  - Jon: reduction in discharge for recycling, not to remove discharge altogether.
  - Hassan: different people call different things for recycling. A lot of different uses have multi-faceted benefits, which could include infiltration and other uses. We are talking about reduced flow that will go to recycling
  - Eric: amount of current discharge that is no longer being discharged in the river and there are timing issues that could be diurnal and seasonal. What we are talking about is recycling of what is currently discharged
  - Chris: reduction in water pool of what is coming into the plant isn't regulated (i.e. water conservation), this is based on proportional water that is available. Not necessarily including water conservation increases
  - Sam SWB: it is useful to show the change in reduction, what SWB is looking at is the reduction in discharge. 1211 doesn't tie directly to recycling. Location of discharge and proportion in discharge is where 1211 comes into play. There will be changes that are not due to existing water recycling and other factors (i.e., water conservation) that aren't part of the permitting process
  - Eric: how much of that reduction is due to current conservation practices? We might be able to tease out how much of the pie we can affect (with the things you can control) vs things you cannot control (like increases in water conservation)

RECOMMENDATION: we want to focus on changes in the *discharge* into the River. We will clarify that moving forward.

Scenario details: stormwater capture

- What stormwater reuse scenarios should we model?
  - Start simple, and then add complexity
  - Andy: The plan is to physically model the stormwater capture in the basin, relying on the plan. A lot of the plans have unrealistic numbers, but it's great that you are going to physically model that

RECOMMENDATION: start with a simple plan: full implementation of the EWIMPS, add complexity as needed

Discussion: how will we approach a 50% reduction? Will this just be half of historical discharge or would it be a timing type of question?

- Eric: might say can't be above or below this range during this time of the day
- Jon: keep in mind that this is a management decision (i.e. with kayaking and time of day for management actions) but it does not consider ecological flows

Dean Wang: discussion on what will happen to water at end of River?

- Long Beach (LB) Water looked into treating water at the end of the River. Looking down the road, LB is interested in more water

Ecological Effects:

- Statistical vs mechanistic ecological model differences
- Habitat suitability model: mechanistic and hybrid approaches
  - We haven't decided which approach until we know exactly which end member species, suspects that it will be different for each habitat, if use mechanistic, will need to know a lot about species, etc. will be focus of next meeting in January.

Discussion

- Jon: Will likely be an iterative process: might be switching end members based on what is available in the literature. We might pick them because sensitive and rare, therefore a lot of data collected on them
- Kelly: Most of the knowledge that we have on species needs is based on northern CA data and experiments, lots of data gaps on southern CA relationships.

Action items and next steps:

- Share technical report for non-aquatic life use study
- Send out compiled list of 5 habitat types, alliance and species data, preliminary end members and rationale.
- Set up a follow up zoom meeting with more detailed discussion on this.
- Flow management scenarios:
  - Input on the curves and will continue to work on that
- Follow up action items on data needs:
  - Burbank plant discharge, temperature measurements, and salinity data
- Summary set of recommendations from the scenario discussion:
  - Scenario analysis and using sensitivity curves and circling back to heat maps and interpreting sensitivities of the model outputs
- Share PowerPoint presentations from this meeting

Final Questions:

- For the last meeting:
  - Jon Bishop: January meeting may need to be more web-based if it's information exchange. If we are looking for decisions and advice, it should be in-person.
    - Eric: We will probably make that decision depending on our progress. Will likely set a web-based meeting to discuss further details on habitat characterization
  - Jon Bishop: How are we in terms of the project timeline?
    - Eric: We started this with an 18-month timeframe – we are on track if we start the 18 months from when we finalized the scope of the project.