Los Angeles River Instream Flow Criteria Technical Study
Progress Report – April 8, 2020
Covering the Period Ending March 31, 2020

Project Overview

The State Water Resources Control Board (State Water Board) and Regional Water Quality Control Boards (collectively Water Boards) have invested heavily in promoting water reuse and recycling. However, reuse leads to potential reduction in stream flow, and the Water Boards are responsible for establishing adequate flows for a variety of beneficial uses. Wastewater Treatment Plant dischargers seeking to reduce discharges associated with reducing flow in a stream for reuse (or any other purpose) must file a wastewater change petition and obtain approval under Water Code Section 1211 (1211 petition) from the State Water Board prior to reducing discharges. Key considerations of appropriate levels of environmental flows include demonstrating that the reduced discharge will not unreasonably affect fish and wildlife, or other public trust resources.

The Los Angeles River Flow Study has two overarching goals. The first is to develop technical tools that quantify the relationship between various alternative flow regimes (which may include seasonal or annual needs for flow, such as presence and depth of pools, temperature, or flow timing, duration, frequency, or magnitude) and the extent to which beneficial uses are achieved. The second is to engage multiple affected parties in application of these tools to inform and solicit input regarding appropriate flow needs in the Los Angeles River. The ultimate outcome of this project is to provide technically sound recommendations and alternatives to the Water Boards for consideration and implementation of flow objectives.

Major Accomplishments in the Past Quarter

Activity 1: Stakeholder and Technical Advisory Group Coordination

We held our fourth TAG meeting on March 11, 2020 which focused on the biological modeling approach and thresholds of response, physical modeling update on the hydrology, hydraulics, and temperature models, review of the water quality data compilation and data needs, and a discussion on the approach for the flow management scenario analysis. Over 30 TAG members attended in person or by phone. We will schedule an in-depth technical webinar on the additional habitat models and overall conceptual model in mid-May and will continue dialogue with the TAG. The next TAG meeting is tentatively scheduled in late summer 2020 and will focus on preliminary results from the flow management scenarios and water quality modeling.

We also held our third stakeholder meeting remotely on March 26, 2020. Over 55 people attended remotely and we received group feedback on the outreach activities to date, provided an overview on the technical work to date and key recommendations from the TAG on the habitat modeling and scenario analysis, and received stakeholder input on draft Frequently Asked Questions (FAQs) and additional content support. The next and final SWG meeting is tentatively scheduled in the fall of 2020, with interim stakeholder webinar(s) planned for the late summer.

Activity 2: Non-aquatic Life Beneficial Use Assessments.

The final report on the recreational use survey was published in September 2019 and is available on the SCCWRP web site. Prior to its release, the draft report was reviewed by the stakeholder and technical workgroups.

The report found that the most popular uses along the Los Angeles River are walking (walking use were grouped with running, jogging, and dog walking activities), biking, and art/photography. Based on interviews with recreational experts, the activities that occur in channel require sustained, but relatively reduced flow. Experts thought that water quality was an important indicator for all recreational uses and indicated that the volume of water that now flows along the River helps to dilute contaminants. Though recreational experts could not identify a volume that would help in maintaining water quality, they thought there needed to be enough water volume so that smell, excessive algal growth, and bio-accumulating contaminants would not cause nuisance or harm to people or wildlife. Basic flow requirements for kayaking in Reach 3 were also identified. The results of the recreational use assessment was released in July 2019.

Activity 3: Aquatic Life Beneficial Use Assessments

We have made progress on compiling species and habitat information and on developing the hydrologic and hydraulic models.

For species and habitat information, we have compiled all readily available data from surveys and species/habitat databases. Based on input from the TAG, we have refined the following focal habitats, and associated keystone species:

- Cold water habitat – these habitats may not currently occur, but could potentially occur at some point in the future
- Cold water migration habitat – this habitat overlays the entire study area
- Wading shorebird habitat
- Freshwater marsh habitat
- Riparian habitat
- Warm water habitat – as a surrogate of non-native species habitats

We have mapped the habitat locations, compiled data on species that occur in each habitat and identified endmember species that represent the range of tolerances for each habitat. These have been reviewed by our TAG and the stakeholders. We have designed a conceptual modelling approach which relies on developing response curves (or in some cases thresholds) that can be used to help determine when a species is less likely to occur because a specific life history need cannot be fulfilled. Each species is separated into life stage and the model is built depending on the life stage response to its associated habitat conditions (i.e. substrate, depth, velocity & temperature, or related variables). The probability of occurrence is evaluated for individual life stage.

We have piloted this approach with the Santa Ana Sucker and black willow which represent the cold-water habitat and riparian habitat, respectively, and have demonstrated the mechanistic modeling approach to the TAC. Overall, the TAC agreed that this is a sound approach and have provided valuable feedback and consideration for refining the models. We are currently building the remaining species

models which involves compiling empirical data describing the species relationships with their habitats and will present details on the remaining habitat models in the subsequent TAC webinars.

We have created a coupled hydrologic (unsteady state EPA SWMM) and hydraulic model (steady state HEC-RAS) of the system. The model provides hourly data (both discharge and other hydraulic variables) from water year 2011 to 2017. More specifically, we have completed the following:

- **Hydrology model:** Calibration of the hydrologic model with newly spatially interpreted precipitation data is nearly complete for the mainstem. An autocalibration algorithm is being utilized to select optimal parameters at 11 gage stations.

  Hydraulic model: The hydraulic model (HEC-RAS) has been calibrated at five gage locations. In addition to stage and velocity, we are developing additional rating curves to estimate shear and stream power at key model output nodes. We are also expanding the HEC-RAS model to include additional cross sections in select soft-bottom reaches that represent key habitat features such as pools and sand bars. We are also investigating the potential of expanding the model to include the soft-bottom reach of Sepulveda Basin and will inquire on cross sectional data from the One Water City of LA study.

- **Water temperature model:** We have obtained observed river temperature data from the Resource Conservation District (RCD) of Santa Monica Mountains. Considering the RCD data as the upstream boundary condition and running the HEC-RAS steady state model as the developed model for the morphological data in the sub-reaches, we have started calibrating and validating processes for the determined sub-reaches on LA River watershed. Using the i-Tree Cool River model, we have successfully calibrated and validated river temperatures simulations for Compton Creek for a length of ~13.5 km and from June 5, 2016, to Aug. 17, 2016, in an hourly time step with 1 m of intervals.

Activity 4: Apply Environmental Flows Framework to quantify effects of flow modification on the Los Angeles River and evaluate management scenarios.

Based on discussions with the TAG, we have developed an approach for evaluating management scenarios using sensitivity curves. This approach provides flexibility in terms of management options that can be considered and allows for defining ranges of acceptable flow metrics. We have started with a series of model runs to develop sensitivity curves and are working on creating heat maps of the certain combinations of management actions that meet criteria. We have completed preliminary scenario runs for water reuse with initial hydrologic/hydraulic model outputs, based on a general percent of reuse scenarios. The preliminary results demonstrate how the final data may be displayed through interactive and online plots and will be refined over time in coordination with the TAG and stakeholder groups. During the next quarter, we will expand the sensitivity curves approach to include ranges of future conditions that may also be affected by stormwater capture.

No progress has been made yet on Activities and 6, which involve developing a monitoring program and drafting the final project report.

Activity 7: Assess Water Quality Effects of Flow Modifications on the LA River.

We have obtained water quality data dating back to 2005 from a variety of different sources, including Mass Emissions, MS4, and CEDEN, and created a water quality data database. The temporal and spatial data was analyzed to detect data gaps. Data gaps have been identified and more data is being gathered from additional sources, including SMARTS and LARWMP. A water quality module will be added to the calibrated hydrologic SWMM model. The aggregated observed data will be used for model calibration.