Establishing environmental flows for the Los Angeles River

Striking the balance between wastewater reuse, aquatic life, and recreational uses

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BACKGROUND

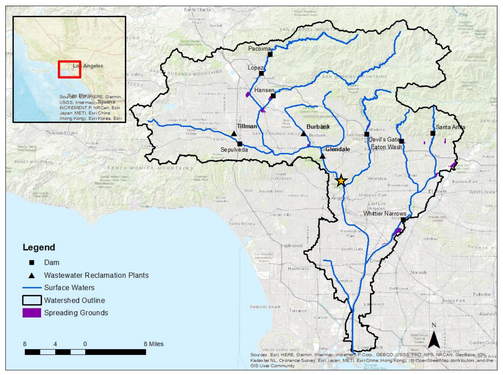
The California State Water Board promotes wastewater reuse and stormwater capture to conserve the state's water resources. However, wastewater reuse and stormwater capture can lead to a reduction of streamflow, which may impact beneficial uses, including human recreation and aquatic life. The need to better understand and establish environmental flow requirements has come to the forefront along the Los Angeles (LA) River as three wastewater dischargers are obtaining approval to reduce wastewater discharge to the river.

GOALS

- Develop a **science-based** approach for assessing flows necessary to sustain **beneficial uses**
- Establish **ecologically-protective** flow recommendations that **optimize use** support
- Evaluate the **consequences** of **alternative flow scenarios** for the LA River
- Incorporate **stakeholder** and **community input** throughout the project

STUDY AREA

- 830 mi^2, 40% impervious
- Current average daily discharge from water reclamation plants (WRPs):
  - Burbank: 8.5 cfs
  - Glendale: 18 cfs
  - Tillman: 46 cfs



Environmental flows should consider not only **minimum flows** but the **entire flow regime** along with the **ecological**, **societal**, and **management** needs of the region.

Process for Developing Flow Criteria

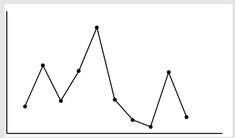
Create model

Hydrology, hydraulics, groundwater, tidal, water quality

Management scenarios

Scenario
wastewater reuse
reuse + stormwater
reuse + conservation
...

Timeseries output



Flow metrics

- Dry season baseflow
- Frequency of peak flows
- Spring recession rate of change
- Date of latest winter flood
- Stream velocity
- Minimum water depth in spring, summer, and fall
- ...

Flow metrics → Beneficial uses

- Flow-ecology mechanistic models
- Flow-recreational use relationships from targeted surveys with recreational experts

Agreed upon flow criteria

- By reach and season
- Management/mitigation recommendations

LA River at Sepulveda Basin, downstream of Tillman WRP, supports riparian habitat

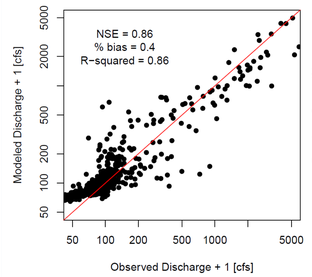
LA River mainstem, 10 miles upstream of the watershed outline

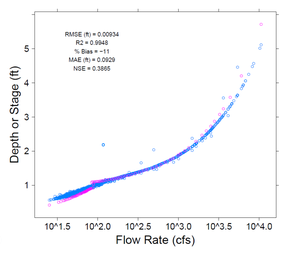
LA River at Glendale Narrows, downstream of Glendale WRP, supports freshwater marsh habitat

MODEL CALIBRATION

Hydrologic Model
SWMM
Unsteady; hourly timestep
Calibration: WY 2011–2013
Validation: WY 2014–2017

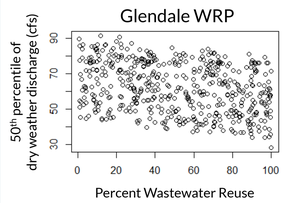
Hydraulic Model
HEC-RAS
Steady state to create rating curves

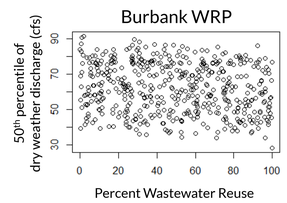


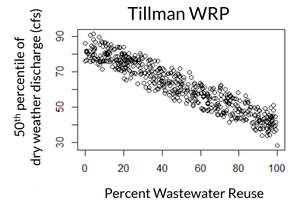


PRELIMINARY RESULTS

- Dry weather flows and mean annual discharge are sensitive to wastewater reuse, while wet season peak flows are not
- Tillman WRP has largest relative influence on hydrology







Results from Monte Carlo simulation of 500 reuse scenarios (dots) from the mainstem above Arroyo Seco (star on map). Reuse is defined as the percent of historical WRP discharge that is reused.

FUTURE WORK

- Identify impact of water reuse on flow, hydraulics, and water quality (metals and temperature) for all study reaches
- Model cumulative effects of stormwater management, conservation, and restoration scenarios
- Link outputs to the probability of supporting aquatic life and recreation uses

PROJECT PARTNERS

RESEARCH TEAM

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