From Stoneflies to Spiders:
Integrating Aquatic and Terrestrial Invertebrate Monitoring to Understand the Effects of Effluent on Stream Ecosystems in Southern California

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Introduction

- Treated wastewater (effluent) has dominated the flows of the Los Angeles and Santa Clara Rivers (Figures 1, 2, and 3) since the mid-to-late 20th Century, but there are plans to decrease these effluent discharges.
- There is a need to understand how changes in river flows will influence ecosystem health, people's relationships with rivers, and the potential for restoration.[1]

Objective

- Quantify how wastewater effluent, and effluent reductions, affect aquatic and terrestrial invertebrate composition and structure.

Figure 2: Santa Clara River upstream of effluent influence.

Figure 3: Santa Clara River downstream of effluent influence.

Methods

- Monitor aquatic and terrestrial invertebrates at three sites upstream and downstream of effluent discharges along the Los Angeles River and Santa Clara River, for a total of twelve sites.
- At each site, monitor aquatic invertebrates using a d-frame net (if there is wetted habitat) and terrestrial invertebrates using ramp traps within a 180m transect (Figure 4).
- Set up three sets of three terrestrial traps, with each set including channel, riparian, and upland habitats (Figure 5).

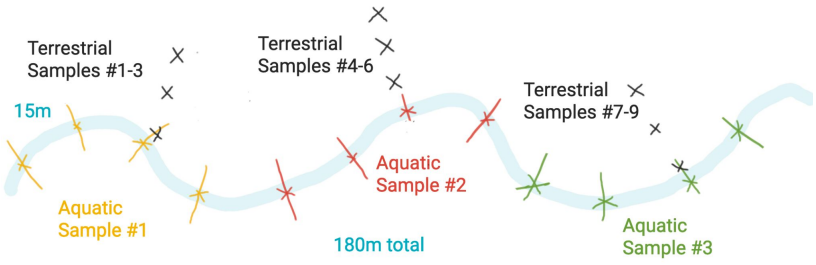

Figure 4: A schematic of the transect layout for each study site.

Channel

Riparian

Upland

Figure 5: The terrestrial traps set up at each of the three habitat types.

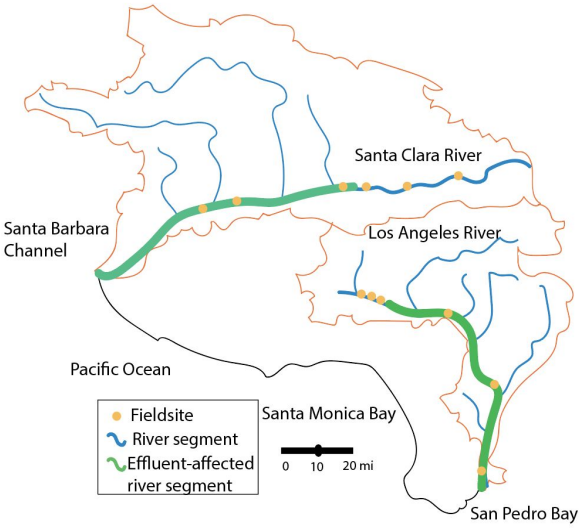

Figure 1: Map of the study watersheds.

The Los Angeles River and Santa Clara River are part of the ancestral and unceded watersheds of the Chumash, Kizh, Tataviam, and Tongva People.

Hypotheses

1. Terrestrial invertebrates upstream of effluent inputs will be more diverse, less sensitive, and less abundant than at downstream sites.[2]
2. In habitats of comparable hydroperiod, aquatic invertebrate communities upstream of WTP effluent inputs will be more diverse, more sensitive, and less abundant than at downstream sites of these inputs.
3. Upstream and downstream aquatic and terrestrial communities become more similar in composition and structure after effluent reductions.

Next Steps

- Identify invertebrates collected in July and September 2021.
- Continue monitoring through 2023 to assess community responses to flow change.
- Quantify spatial patterns of drying via remote sensing and incorporate social science aspects (access, valuation).

1 Hamdhani et al, 2020, *Freshwater Biology*

2 Sánchez-Montoya, M.M. et al, 2020, *Biological Conservation*