Green Infrastructure and Water Supply: A Case Study of the City of Los Angeles

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About the Study

This study explores the potential for groundwater recharge from stormwater infiltration within the City of Los Angeles. The study uses the Los Angeles Basin Groundwater Augmentation Model (GWAM), developed by the U.S. Bureau of Reclamation as part of the Los Angeles Basin Water Augmentation Study, to identify favorable areas for increased stormwater infiltration. The results provide data to support the creation of new laws, policies, incentives and both centralized and decentralized projects within the City, encouraging use of a largely untapped water source in a manner that provides a host of benefits, including improved water quality, reduced water imports and increased wildlife habitat.

Results of the study highlight the critical role that green infrastructure can play in augmenting the City's local water supply. The model and study results provide a tool that aids in prioritizing green infrastructure project areas and developing policy mechanisms to meet the City's water supply reliability goals.

The study was undertaken in 2010 through collaboration among the Los Angeles Department of Water and Power, TreePeople and the Council for Watershed Health (formerly the Los Angeles & San Gabriel Rivers Watershed Council).

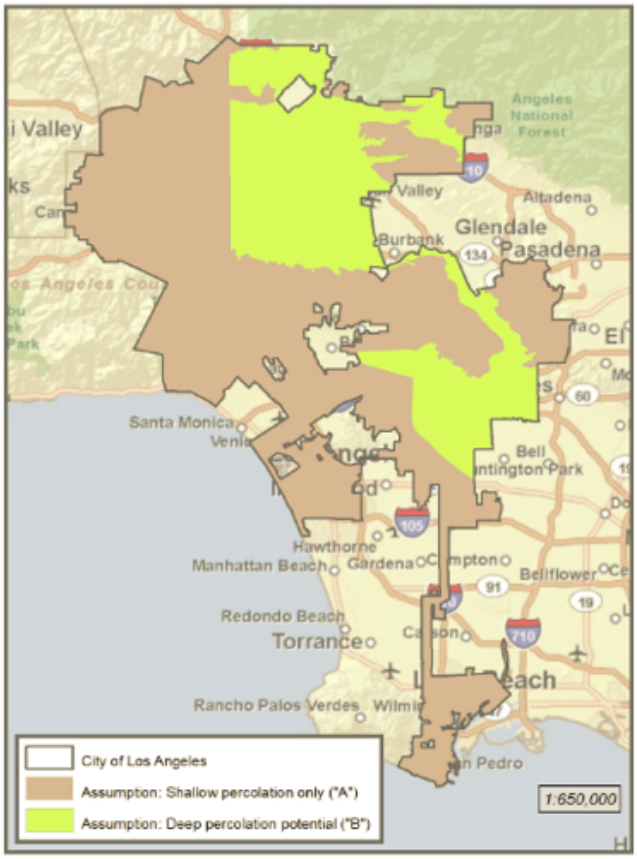


Figure 1

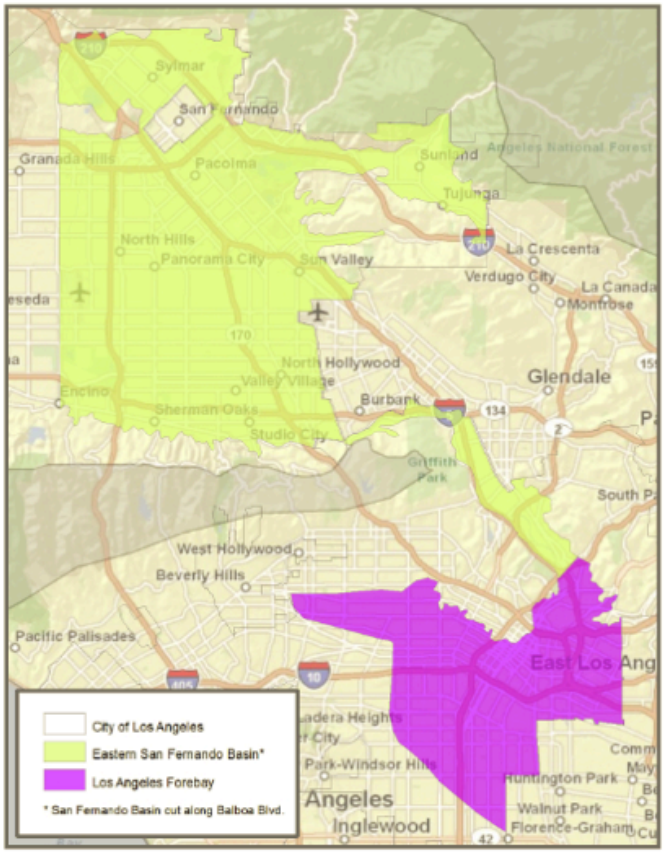


Figure 2

Methodology

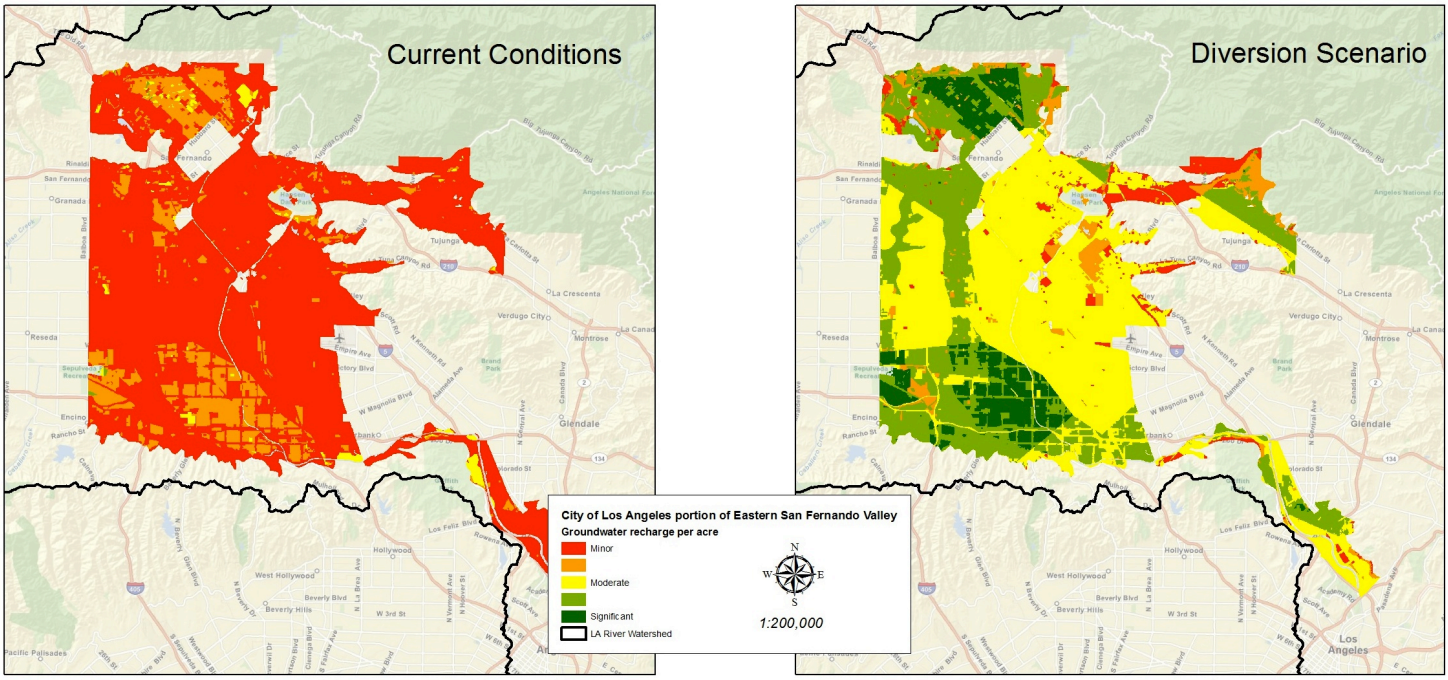
For the purposes of the study, the City was divided into two areas (Fig. 1). "A regions" are portions of the city where hydrogeological conditions are less favorable for groundwater recharge through infiltration. "B regions" are areas where hydrogeological conditions suggest groundwater recharge from stormwater infiltration will be effective. These distinctions were guided by experts at LADWP and provided an outline for the modeling.

The model considers many characteristics including slope, soil saturation and evapotranspiration rates. It allows for a comparison between current conditions and user-defined "diversion" scenarios, in which a portion of precipitation is designated to be captured through low-impact development techniques. It should be noted that important factors including underlying geology and groundwater condition are not factored in due to limitations of the model. Modeling results therefore should be considered preliminary and useful in identifying the general potential for groundwater augmentation, but additional characteristics must be considered before planning can occur.

Study Findings

Modeling results suggest that the "B regions" are indeed conducive to stormwater infiltration efforts. Results show that both the Eastern San Fernando Valley and the Los Angeles Forebay (a geologic feature associated with the Central Groundwater Basin) (Fig. 2) offer opportunities for stormwater infiltration. Both areas are virtually built-out, which means little rainfall currently penetrates urban surfaces and infiltrates soil.

Despite the prevalence of impermeable surfaces, the hydrogeological characteristics of the Eastern San Fernando Valley region indicate that retrofitting this area to allow stormwater infiltration would result in significant aquifer recharge. Study results indicate that the Los Angeles Forebay also offers opportunities, but this area warrants further study due to sub-surface geologic conditions beyond those considered by the Los Angeles Basin Groundwater Augmentation Model.



Eastern San Fernando Basin

- **Area**: 69,350 acres
- **Average annual precipitation**: 17.81 inches (based on a 50-year average)
- **Average annual runoff**: 55,506 acre-feet
- **Current groundwater recharge condition**: Approximate average of 0.275 acre-feet per acre (AF/ac).
- **Potential groundwater recharge condition**: If a range of low-impact development practices were to be implemented, recharge would increase to an approximate average of 0.97 AF/ac. Dark green areas in map range from 0.9 to 1.7 AF/ac.