Royce Hall at UCLA following a rain event, Los Angeles, CA (Charlie Nguyen, Flickr)

(Note: I previously wrote a law review article published in 2016 in the Villanova Environmental Law Journal, accessible here, about related policy suggestions for improving rainwater capture in reference to the Sustainable Groundwater Management Act.)

If you live in California, or have been in the state over the last couple weeks, you'll know that we experienced the first big rain events of the season. In fact, reports indicate that some parts of Southern California received the most November rain in nearly a decade. But for many Californians, the natural word association from "rain" is "drought." Following several years of extremely dry conditions, which prompted a declaration of a state of emergency from former Governor Jerry Brown in January 2014, the state has only just rebounded from the prolonged drought that affected parts of the state for over 7 continuous years.

Nevertheless, although heavy rains like those from the recent storms benefit the state's overall water supply, much of the rainfall that hits Southern California during these storm events is lost to the ocean as runoff. In this post, I will briefly explain where Los Angeles currently gets its water and will highlight efforts the region is taking to improve rainwater capture for local use.

Los Angeles' water economy

According to a 2019 environmental report card from UCLA's Sustainable LA Grand Challenge, in 2017, approximately 59% of Los Angeles County's water was imported from three external sources: (1) the California Aqueduct, which transports fresh water to Southern California from the Sacramento Bay Delta in the northern portion of the state; (2) the Colorado River Aqueduct, which directs water from Lake Havasu and the Colorado River into Southern California; and (3) the Los Angeles Aqueduct, which transports water to Los Angeles from around Mono Lake and the Owens Valley. The remainder of the county's water source comprises mostly of local groundwater, with only about 9% of the water source coming from local recycled water. The numbers are more startling for the City of Los Angeles; from 2017-2018, over 90% of the city's water supply originated from distant sources hundreds of miles away.

Naturally, these figures reveal that Los Angeles does not rely on local rainfall as the primary source of fresh water. There are 29 reservoirs in the South Coast region of California, which, as of November 26, stored a total of 1.144 million acre-feet of water in 2019 (equivalent to over 372 billion gallons), constituting around 5.6% of the entire reservoir water supply throughout the state for the same year. Those reservoirs do collect some of the rainwater that lands within its watershed, leading to replenishment of water resources, but generally reservoir water is preserved for use only during dry conditions or other emergencies.

Outside of the reservoir watershed regions, rain either percolates into the ground and becomes groundwater—the primary local source of water—or runs off into the Pacific Ocean. However, most rain in Los Angeles falls on streets, buildings, and other urban development, which are impervious substrates and prevent water from percolating into the groundwater table. As has been reported for years, the widespread development in Los Angeles County leads to **billions** of gallons of stormwater runoff into the Pacific Ocean after a single rain event. (See a 2014 issue brief on stormwater collection from NRDC, and two recent Los Angeles Times articles on the same subject here and here.) With more widespread rainwater capture initiatives, these billions of gallons of stormwater could instead be collected as clean, locally usable water, reducing the city's heavy reliance on imported water.

Rainwater capture developments in Los Angeles

During the region's dramatic growth over the last few decades, Los Angeles County

has not prioritized efforts to enhance local water resources through rainwater capture. But recent policy developments have begun to turn the tide.

In November 2018, voters in Los Angeles County passed Measure W, also called the Safe Clean Water Program, which imposes a parcel tax of 2.5 cents per square foot of impermeable land—estimated to generate approximately $300 million annually—in order to raise money for municipal and regional projects that capture and clean up stormwater. Taxes are set to be levied starting this month, and efforts are already underway to form the appropriate review committees and to issue calls for projects that fit within Measure W's funding criteria. The influx of funding for these types of projects is a crucial step toward more active management and collection of stormwater throughout the county, assuming effective agency governance of project selection and implementation.

Here are some categories of existing initiatives within the county to improve rainwater collection that may fall within the scope of Measure W:

- **Spreading Grounds**: One mechanism to enhance groundwater recharge is the operation of "spreading grounds," or water conservation facilities consisting of large portions of highly permeable land where water is collected and can easily percolate into the ground. Another strategy is the use of "rubber dams" placed directly in a river or creek at soft-bottom channels, slowing the rate of water flow and allowing for more water to percolate into the groundwater table in front of the dam. The County Department of Public Works operates 26 spreading grounds facilities within the county, and the recent water report card from UCLA's Sustainable LA Grand Challenge observed that the total surface storage capacity for the county's spreading grounds is 21,259 acre-feet. DPW is currently engaged in the Tujunga Spread Grounds Enhancement Project in the San Fernando Basin to double the spreading grounds' storage and intake capacity up to 12,200 acre-feet of annual groundwater recharge.
- **Green Infrastructure**: Most streets, sidewalks, and parking lots are made from impervious pavement that does not allow water to percolate into the soil below, instead directing rain into stormwater drains. This problem is easily rectified through street design, including the creation of "bioswales" or infiltration cutouts on the side of roads that funnel water into the groundwater table. There are also permeable types of pavement available that allow for water to infiltrate into the ground directly under the street. Some local agencies in the greater Los Angeles area are already implementing green

infrastructure solutions; for example, in April 2019, LA Metro embarked on a pilot project in Downey to replace a 40,000 square-foot bus parking lot with permeable pavement and a bio-retention area, which is expected to capture and filter over 130,000 gallons of water in a single rain event.

- **Low Impact Development**: The City of Los Angeles passed an ordinance in May 2012, since amended in 2015, requiring all new development in the city to incorporate "low impact development" (or LID) best management practices. Among other goals, these best management practices seek to reduce the quantity of stormwater produced from the development site—and, consequently, allow for more infiltration of rainwater into the groundwater table. The LID ordinance will effectively reduce the impermeability of Los Angeles' urban landscape over time, which is arguably the most important action to improve local rainwater capture. Moreover, the financial burden of the LID ordinance is borne by developers, meaning that the increased funding generated by Measure W can be used for other green infrastructure or groundwater infiltration projects.
- **Rainwater Harvesting**: Individuals living in Los Angeles can also participate in the collective efforts to improve rainwater capture in a direct, distributed manner. The SoCal Water$mart Rebate Program includes rebates for residential and commercial owners wishing to obtain a rain barrel or cistern that can be used to collect and store rainwater that falls on the impervious portion of the owner's property. That rainwater can then be applied to beneficial uses such as gardening, landscaping, or local groundwater infiltration.

The county has acknowledged the utility of Measure W as a means to enhance local water sources in approving the Los Angeles County Sustainability Plan over the past summer, developed with significant contributions from UCLA researchers. The Sustainability Plan sets specific targets for achieving a 50% local water source by 2025, 65% local water source by 2035, and 80% local water source by 2045. The plan also calls for the development of local water supply plans and refers to some of the above measures to improve rainwater capture in its discussion of building design and sustainable "living streets." (For more information about the Sustainability Plan, refer to a recent post from my colleague Harjot.)

Lastly, in April 2019, Mayor Eric Garcetti announced the City of Los Angeles' version of a Green New Deal, a policy document supplementing the city's Sustainable City pLAn and setting forth numerous city-wide environmental objectives, including the

goal to increase local stormwater collection to 75,000 acre-feet per year by 2021, and double that amount by 2035. The L.A. Green New Deal specifically seeks to improve rainwater capture efforts by completing groundwater remediation facilities in the San Fernando Basin (*e.g.*, the Tujunga Spreading Grounds Enhancement Project referenced above) and calls for building 10 new multi-benefit stormwater collection projects by 2025, 100 such projects by 2035, and 200 projects by 2050. The document aims to dedicate $80 million annually from the funding collected under Measure W to support and develop these projects, which are to include green infrastructure, residential and commercial rainwater capture, permeable pavement, and nature-based solutions.

Final takeaway

With the robust policy objectives under the county's Sustainability Plan and the city's Green New Deal, the necessary funding from Measure W, and existing programs already in place to supplement local water supply with enhanced rainwater capture, Los Angeles has only just begun its transformation into a fully precipitation-conscious region. Climate change threatens to cause further disruptions to Southern California's water supply: droughts are likely to be longer and more severe moving forward, impairing both local water resources and the guarantee of imported water availability. Therefore, continued rainwater capture efforts at the municipal, commercial, and residential levels will be instrumental to realize Los Angeles' ambition to establish a resilient local water supply and to reduce—or perhaps eliminate—its ingrained dependence on imported water.