

Tapping Storm Flows to Boost California's Urban Water Supplies

State officials are promoting stormwater capture as a new way to boost the reliability of local water supplies. Steven Kuo of the Los Angeles Department of Water and Power explains how the city has made this a focus of its water management for decades.

Matt Weiser, Water Deeply, 9-26-16

Stormwater capture is becoming a big deal in California. Once viewed merely as a nuisance – or worse, a flooding threat – runoff from storms is now embraced as a water supply that can be captured.

The State Water Resources Control Board recently announced \$9.5 million in grants for stormwater capture projects. Water board chairwoman Felicia Marcus said utilizing this water supply is “a smart investment in the future.”

It may be a new idea to some, but making use of storm flows is a longstanding practice in Los Angeles. The County of Los Angeles manages more than two dozen “spreading grounds” to capture stormwater flows, many in operation for decades. Some are managed jointly with the city of Los Angeles, which began a project in August to expand one of the largest spreading grounds, known as Tujunga Spreading Grounds, in the San Fernando Valley. The expansion will double its capacity to capture storm flows to recharge groundwater aquifers.

Water Deeply recently spoke with Steven Kuo, project engineer at the Los Angeles Department of Water and Power, to learn more about this project and the role stormwater plays in L.A.'s water supply picture.

Water Deeply: As much as 40 percent of Los Angeles County's water supply comes from local groundwater. What role does stormwater capture play?

Steven Kuo: Our focus is to identify uses of stormwater and recharge or reuse and add that to our water resources. We work on big and small projects. Tujunga is one of the biggest, but we also have lots of smaller projects, like the Green Streets projects.

Ultimately our goal here is to decrease our dependency on imported water and really try to improve our local resources. Stormwater capture and recharging groundwater is a main objective for us.

We have a huge list of projects in planning and also in construction. Some of our other spreading ground projects include Bradford Spreading Grounds, across the channel from Tujunga. These spreading grounds haven't really been improved, so the infiltration rate has reduced over the years. There is a project to connect them to Tujunga so we can use them jointly. We also have plans to improve their infill capacity.

Hansen, Lopez, Pacoima – all these spreading grounds are in the San Fernando Basin. We have plans to improve these spreading grounds. Conceptually, we want to create more capacity so we can utilize the stormwater better and improve the connections between our water supplies.

In addition to these centralized projects, we also have smaller Green Streets projects where we partner with other departments in the city of Los Angeles to improve streets that are prone to flooding during rain events. We will design and install bioswales so they can absorb and capture rainfall.

Water Deeply: What's the origin of the Tujunga Spreading Grounds?

Kuo: The current Tujunga Spreading Grounds were actually built in, I believe, the 1930s. The location was selected because it has really good granular soil – sandy soil like the beach – so water is able to infiltrate very quickly and percolate down into the groundwater. It's a very strategic location. This is a large-scale, centralized stormwater capture facility. It has potential to take in a lot of water at once.

This location was built before L.A. was so big and populated. We had lots of excess water coming to us from the L.A. Aqueduct, and the spreading grounds were used to store this excess. Over time, Los Angeles got really big, so the demand for water increased and we weren't able to recharge the basin using water from the L.A. Aqueduct anymore. So engineers decided to build this basin so they can use stormwater to recharge groundwater. The San Fernando Basin is one of the largest aquifers available to the city of Los Angeles, and now we are identifying this stormwater as a valuable resource.

The stormwater system was originally designed so it will be directed into the channels and out to the ocean as soon as possible, because we don't want any floods. These channels have been working well.

But now we're thinking, hey, these are resources we can actually use. With the new direction in which the state is going, we have to start looking at local resources available to us. Stormwater is one of the underutilized resources that we need to take a better look at and utilize more strategically. That's why now these spreading grounds are being used primarily for stormwater capture and recharge.

Ultimately, the water is going to percolate down to the groundwater in the San Fernando Basin. We have pumping stations to pump out the water, and then we treat it to drinking standards and put that into our drinking system for our consumers. There is a pumping station at Tujunga Spreading Grounds that's able to pump groundwater for that purpose.

Water Deeply: How does stormwater capture work at Tujunga Spreading Grounds?

Kuo: The Tujunga Spreading Grounds were strategically located next to an existing channel, Tujunga Wash, that collects stormwater from all the upstream tributary areas. So potentially it gets a lot of flow during a larger storm, even here in Los Angeles. In addition to that, there is also the Pacoima Diversion Channel adjacent to the project. But in the current configuration, we're only able to divert stormwater from the Tujunga Wash.

As part of this project, we're adding two more intake structures that will allow us also to take stormwater from the Pacoima Diversion Channel. So basically, instead of one straw into the channel, now we're going to have three straws. Essentially, we're increasing our intake capacity here and thus increasing our stormwater capture potential overall.

The current mechanism is, we have a really large flood control channel. In the middle of it, we have something called a rubber dam. Imagine a balloon, but it's really strong with a plastic liner. When there's a storm event, the balloon will get filled up, thus allowing the water to get diverted through a pipe and then fill the spreading grounds.

With the spreading grounds, essentially we have these basins. Currently they're about 10 to 15ft [3 to 4.5m] deep. We're consolidating the existing 20 basins into nine larger and deeper basins. So we're creating more volume for stormwater. We're hoping that by doing this, we're able to double the recharge capacity based on our estimates, and capture more water.

Water Deeply: How much water can the Tujunga Spreading Grounds capture?

Kuo: The site can currently capture about 8,000 acre-feet [9.9 million cubic meters] per year. The expansion will increase that to 16,000 acre-feet [19.7 million cubic meters] – or enough to serve 48,000 households for a year. Those numbers are an annual average. So some years you're going to have more, some years you're going to have less.

However, we do have flow meters installed at all these intake channels and the county does record them. So every year, we get a report to see how much water is actually being diverted from the channel into the spreading grounds. That way, we can more accurately capture the volume of stormwater being utilized.

Water Deeply: What are the soil requirements you look for in these stormwater capture and groundwater recharge projects?

Kuo: There are a couple of factors with respect to how fast this water will go down into the aquifer. This location has really granular soil, so the infiltration rate is more favorable than other soil types, such as clay. So from what we've seen, it will go down fairly fast.

But it also depends how clean the water is. If it's really silty, it will take longer to infiltrate. The bottoms of the basin, they do infiltrate slower after 40 years of not cleaning the bottom. So right now we're cleaning the bottom, and we're exposing the nice, native, granular soil so that basically the sponge is not clogged again. So it will go significantly faster than what has been seen in the past 20 years.

Water Deeply: What are the city's practices for tapping the aquifer fed by these stormwater capture projects?

Kuo: Currently, we take about 5 percent of our overall aquifer water each year. The plan is to increase groundwater usage significantly over the next 10 to 20 years.

The San Fernando groundwater basin is one of the largest basins here in Los Angeles. It's also a prime basin compared to the other ones, because the city has the sole right to this basin versus some other ones we share with other cities.

So we do want to take good care of this groundwater basin. We recognize you need to feed it to use it. That's why we want to recharge it. Groundwater capture and recharge is one of the steps we're taking to make sure of the longevity and sustainability of this groundwater basin as we move forward and pump more water from it.