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A system of dams, percolating ponds, rubber barriers saved 95% of torrential rain

L.A. County uses dams, blow-up barriers on rivers, gravelly spreading grounds to save rainfall in aquifers.

Morris Dam, between storms on Wednesday, Feb. 7, 2024. Part of the "Big 3 Dams" of the San Gabriel Mountains, where water is saved behind the dam from recent storms but also being released from one of two large pipes to allow more space for future rainstorms and to put water into the San Gabriel River and spreading grounds for underground water storage. (Photo by Dean Musgrove, Los Angeles Daily News/SCNG)

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Do you ever wonder what happens to the stormwater that starts out as rain during a monster deluge in Southern California?

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If you answered, "It all flushes down to the Pacific Ocean," you would be wrong, according to flood control and water supply managers in Los Angeles County.

The San Gabriel Dam, between storms on Wednesday, Feb. 7, 2024. It is one of "The BIg 3" San Gabriel Mountain dams operated by LA County Public Works. (Photo by Dean Musgrove, Los Angeles Daily News/SCNG)

Morris Dam, between storms on Wednesday, Feb. 7, 2024. (Photo by Dean Musgrove, Los Angeles Daily News/SCNG)

Morris Dam, between storms on Wednesday, Feb. 7, 2024. The release of water makes room for more rain water behind the dam. Water is released, flows into some of the county's 27 spreading grounds. (Photo by Dean Musgrove, Los Angeles Daily News/SCNG)

An overhead view of Morris Dam, between storms on Wednesday, Feb. 7, 2024. (Photo by Dean Musgrove, Los Angeles Daily News/SCNG)

With the Los Angeles skyline behind it, runoff water flows down the Los Angeles River through Vernon on Tuesday. Feb. 6, 2024. (Photo by Dean Musgrove, Los Angeles Daily News/SCNG)

As a result of the recent storms, runoff water flows at the beginning of the Los Angeles River in Canoga Park on Tuesday. Feb. 6, 2024. (Photo by Dean Musgrove, Los Angeles Daily News/SCNG)

About 90% to 95% of rainwater is captured behind 14 dams and then slowly released into the Los Angeles and San Gabriel rivers. The captured water pools in 27 permeable “spreading grounds” where it percolates into natural underground basins called aquifers, said Sterling Klippel, interim assistant deputy director of L.A. County Public Works.

From these below-ground reservoirs that contain groundwater, 200 local water agencies pump up the water from their wells and deliver potable water to millions of customers across L.A. County, he added.

It’s like dipping a straw into a tall drink.

“When it rains, and pours, that is our opportunity to get that rainwater and keep it from being wasted,” Klippel said.

Engineers and managers for L.A. County Public Works will be tested again Sunday and Monday, when a winter storm is expected to drop between 1.5 inches and 3.0 inches of rain on coastal and valley areas of Ventura and L.A. County, said Rich Thompson, National Weather Service meteorologist on Wednesday, Feb. 14.

Of course, between 5% and 10% of the rain doesn’t get stored and that’s mostly when rain is falling at high volumes and rushing down flood control channels at a fast clip. It also depends where the rain falls. If mostly on the lower elevations, the twin rivers can slow the flow. But that water has passed by the higher-elevation reservoirs in the San Gabriel Mountains and the San Fernando Valley.

Dams and water capture

Dams play a critical role in the capture of rainfall, including the water stored after the recent atmospheric river event on Feb. 4, Feb. 5 and Feb. 6 that dropped 10 inches on many residential areas. The rainfall totals are 24 inches to date this season in the San Gabriel Mountains, a few inches shy of the seasonal average.

Cogswell Dam, San Gabriel Dam and Morris Dam in the San Gabriel Mountains north of the San Gabriel Valley foothill communities held back 20,000 acre-feet of water from the recent winter storms, Klippel reported. An “acre-foot” is the amount of water, one foot

deep, and stretched across an acre of land, or about 325,851 gallons. The increase in water storage at these dams equaled about 6.5 billion gallons of water.

The water stored behind the big three dams in San Gabriel Canyon on Feb. 12 totaled 42,000 acre-feet or approximately 14 billion gallons, Klippel reported. For comparison, the average Californian used 83 gallons of water per day in April 2022, according to a recent study. That amounts to 30,295 gallons per year.

Water was also captured behind Hansen Dam in the San Fernando Valley, and some was sent down the L.A. River, Klippel said. L.A. Mayor Karen Bass estimated that Los Angeles Department of Water and Power (LADWP) in conjunction with county Public Works, captured 7 billion gallons of stormwater in Los Angeles alone from the storms earlier this month.

As of Feb. 9, Klippel estimated total stormwater captured at all the county dams and the spreading grounds equaled 87,000 acre-feet or about 28 billion gallons since Oct. 1, 2023.

“We were able to capture a lot of water immediately downstream of Hansen Dam,” Klippel said. “And also, farther downstream where we operate the Tujunga Spreading Grounds with LADWP.”

“I will say they do a good job. But I will always say we all can do more,” said Conner Everts, executive director of the Southern California Watershed Alliance, an environmental group that works on water conservation projects and water quality issues.

Last year, when downtown L.A.’s rain gauge topped at 33.4 inches, almost double the average rainfall year, the county conserved a total of 628,000 acre-feet of storm water or about 200 billion gallons, the second-highest amount ever stored in one year, the county reported.

How does this help water retailers? By raising the groundwater levels and allowing for more pumping, he said.

In the largest underground basin in the region, the Main San Gabriel Basin, as of Feb. 1, 2024, the key well measured 221 feet above the mean sea level, 40 feet higher than the previous year, the San Gabriel Valley Municipal Water District reported.

To supplement local water, L.A. County on average imports about 65,000 acre-feet from Northern California through the State Water Project. Also, the county has been increasing its supply of highly-treated recycled water, which is now at about 45,000 acre-feet per year, Klippel said.

“That is not a bad start,” Everts said on the amount of recycled water produced. Usually, recycled water is wastewater that is treated in many stages, then injected into the ground where it undergoes natural filtration before reaching aquifers.

Rivers and rubber dams

The early February storms sent social media hounds scurrying to post pictures of water flowing down the L.A. River, from Studio City to Glendale to Long Beach. About 14.6 inches of rain has fallen in Downtown Los Angeles since Oct. 1, close to the 15.4 seasonal average. After this weekend’s rains, the amount should exceed the average.

But actually, the L.A. River at Wardlow Road near the Long Beach (710) Freeway during the peak of the storms earlier this month was running at 65,000 cubic feet per second, only one-third the maximum capacity for that

section of the river of 182,000 cubic feet per second, Klippel said.

"We were capturing most of that water upstream," he explained.

And despite social media posts, the L.A. River was nowhere near overflowing its banks.

Besides keeping water behind the dams, the county inflated seven rubber dams in the L.A. River near the Wardlow Road channel, he said, which pools water for percolation into underground aquifers.

During the storms, the county inflated the largest rubber dam in North America near Irwindale across the San Gabriel River. "Once that rubber dam is inflated, it is keeping water from going downstream and that water is going into the spreading grounds," Klippel said.

Seven other rubber dams are used in the San Gabriel River below the Whittier Narrows Damlocated between South El Monte and Whittier, he said. "It is a soft-bottom river so the water will percolate into the ground," he said. This differs from many parts of the L.A. River which has a concrete bottom.

Whittier Narrows Dam on Friday, Jan. 18, 2019. (Photo by Dean Musgrove, Los Angeles Daily News/SCNG)

Everts mentioned a project at Jackson Elementary School in Altadena where asphalt was replaced with decomposed granite and gravel — water storage on a smaller level. This curbs the heat island effect and allows more water to seep into the ground, stopping runoff and preventing local flooding, he said.

"In areas where they put in just gravel and sand, a teacher poured out a jug of water and the water just disappears. It is amazing. And the kids love it," Everts said. "We have more infrastructure in place for capturing storm water than we have had in the past."

Reservoirs, snowpack and cisterns

The state's major reservoirs are at 118% of average as of this week. "They are still in a good position thanks to carry-over storage (from last year's storms) and efforts by the DWR (state Department of Water Resources) and our partner agencies to capture as much water as possible from this winter's storms," wrote Jason Ince, DWR spokesperson in an emailed response.

When the snowpack in the Sierra Nevada melts in the spring, it sends clean water down the aqueduct known as the State Water Project, which serves one-third of California's water supply and is the source of imported water for Southern California water agencies.

The early February storms provided a significant boost to the snowpack, which was just 50 percent of average on Jan. 31 and is now 73 percent of average as of Feb. 14, Ince reported and DWR data shows. But the snowpack has not reached its April 1 average yet.

With some climatologists predicting a return to La Niña conditions next year, that could bring back drier, even drought conditions to Southern California. The cyclical nature of water and snowpack is a constant reminder not to get complacent, Everts said.

Homeowners can pursue rebates to replace thirsty front lawns with drought-tolerant landscaping, he said. Or buy cisterns to put underground to capture rain water.

Some new houses are being built with underground tanks, he said. A 200,000-gallon cistern under the Santa Monica Library holds and filters rainwater runoff from the roof, keeping the water from overburdening the storm system or flooding the streets. The stored water is used to irrigate the landscaping.

"We will never capture all of the runoff so we need to adapt," Everts said.

The good news, bad news on California's water supplies, drought after record rainfall

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