How do dams and debris basins help Los Angeles?

Addressing sediment management in Los Angeles County

Rain does not occur often in Los Angeles, but when it does, the rain can be intense. These intense storms cause erosion where rainwater collects and carries sediment and debris downstream. Naturally, the larger pieces of sediment would settle at the foot of the mountains and in the flat areas surrounding the rivers, which are also known as floodplains. Construction of neighborhoods within these floodplains began at the turn of the 20th century, when Los Angeles experienced tremendous growth. In the past, when large, intense storms occurred, rainwater and sediment would travel down the mountains and cause catastrophic property damage.

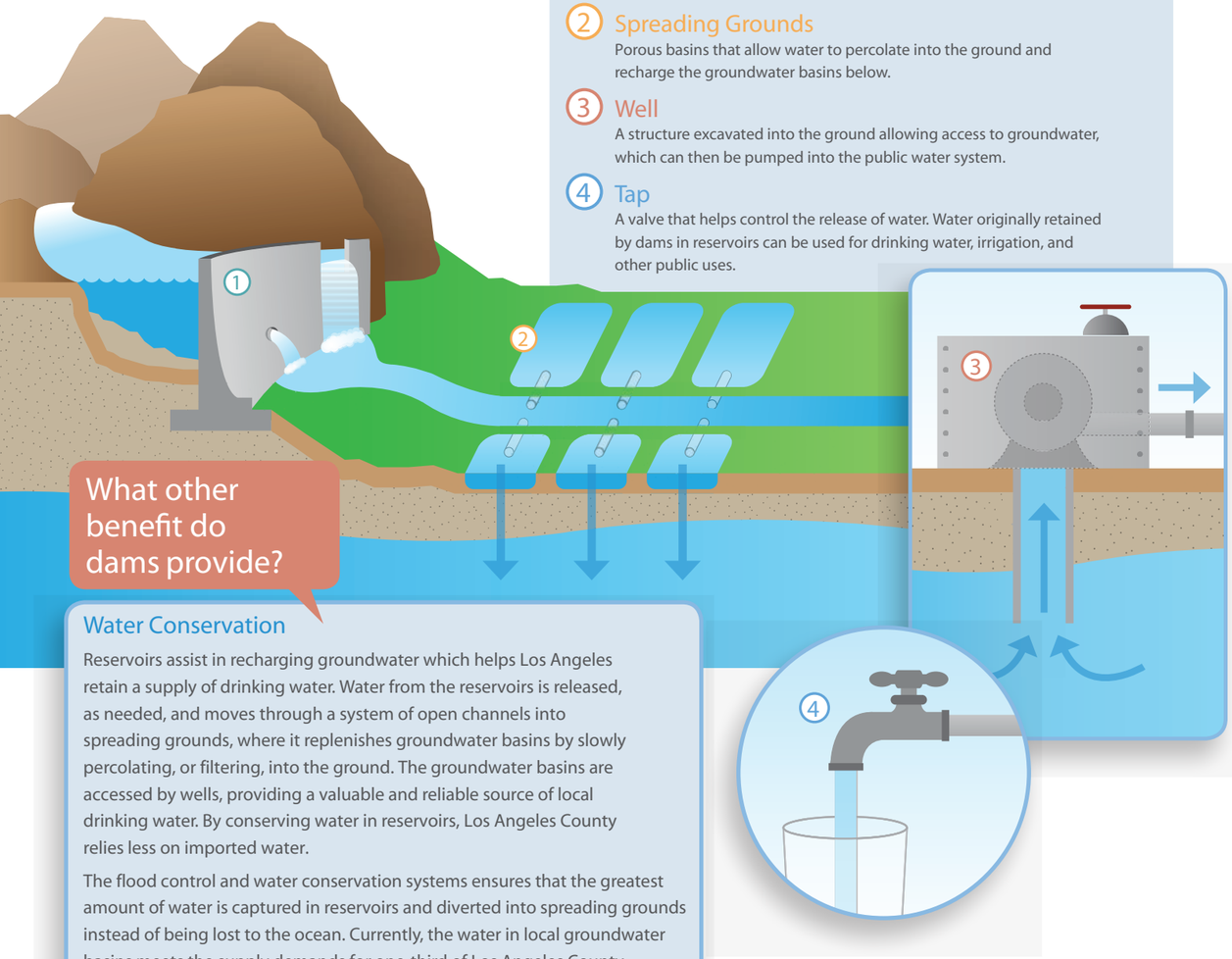
In 1915, at the request of the people of Los Angeles County, the Los Angeles County Flood Control District was created to reduce flood risk and conserve water. The District built a system of dams and debris basins to capture sediment and debris and manage the risk of flooding. Subsequently, Los Angeles was able to build more and more neighborhoods within floodplains. Now, although erosion still occurs when it rains, once unpredictable rivers and sediment are diverted into protective channels. Water, sediment, and debris are captured in the flood control system as opposed to being able to spread and damage Los Angeles' vast network of neighborhoods. The dams and associated reservoirs help conserve water by capturing stormwater and allowing its timely release so that local groundwater aquifers can be recharged.

In a natural system, larger sediment materials are deposited at the foot of the mountains and floodplains, while the smallest sediment materials are carried to the coast. Rivers naturally flood and their paths change from year to year.

Challenges

The Los Angeles County Flood Control District must consider many factors as they address sediment management. Some of these factors include:

- Rain
- Wildfires
- Erosion
- Debris Flow
- Flooding
- Water Supply
- Development



1. **Dam**
   A barrier that retains water in a reservoir behind it. This water can then be released and routed to spreading grounds.
2. **Spreading Grounds**
   Porous basins that allow water to percolate into the ground and recharge the groundwater basins below.
3. **Well**
   A structure excavated into the ground allowing access to groundwater, which can then be pumped into the public water system.
4. **Tap**
   A valve that helps control the release of water. Water originally retained by dams in reservoirs can be used for drinking water, irrigation, and other public uses.

What other benefit do dams provide?

Water Conservation

Reservoirs assist in recharging groundwater which helps Los Angeles retain a supply of drinking water. Water from the reservoirs is released, as needed, and moves through a system of open channels into spreading grounds, where it replenishes groundwater basins by slowly percolating, or filtering, into the ground. The groundwater basins are accessed by wells, providing a valuable and reliable source of local drinking water. By conserving water in reservoirs, Los Angeles County relies less on imported water.

The flood control and water conservation systems ensures that the greatest amount of water is captured in reservoirs and diverted into spreading grounds instead of being lost to the ocean. Currently, the water in local groundwater basins meets the supply demands for one-third of Los Angeles County.

The Flood Control District

The Flood Control District is charged with maintaining flood risk management by keeping dams and debris basins operational. The District has provided flood risk management and water conservation for nearly 100 years. Its system includes 14 major flood control dams and reservoirs, along with 36 sediment placement sites, 162 debris basins, and 26 spreading facilities. The District's vast network of flood control facilities helps prevent flooding where it has a natural tendency to occur and has contributed to the growth of Los Angeles into the region it is today.

For more information, visit our website: www.LASedimentManagement.com

Managing Flood Risk and Sediment

What is erosion?

Vegetation

Trees, plants, and shrubs all have roots that hold rocks and soil in place. But this vegetation is also a source of fuel for wildfires.

Wildfires

When wildfires occur, vegetation is burned away and rocks and soil are exposed to the elements, making them vulnerable and causing them to loosen from the mountain face.

Erosion

Erosion is the process by which soil and rock fall off, or are carried off, the face of mountains as sediment. The steeper the mountain, the more prone it is to erosion.

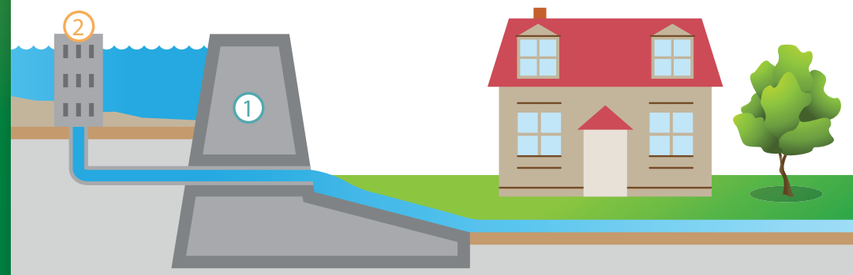
How does a debris basin work?

1 Debris Basins

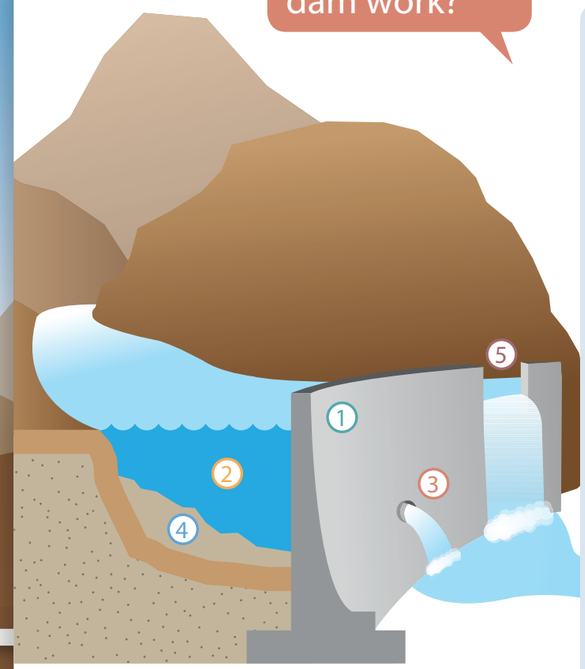
On a much smaller scale than dams, debris basins also capture the sediment, and debris that are washed out of the canyons during storms. However, debris basins are not designed to retain water.

2 Outlet Works

The outlet works consist of an outlet tower and pipe that drains the debris basin while preventing the sediment from entering the downstream flood control system. The outlet tower is a standing, perforated pipe that will drain the debris basin even as sediment accumulates in the basin.



How does a dam work?



1 Dam

A structure, built across a river or stream, that limits the amount of water, sediment, and debris moving downstream. The dam reduces the risk of flooding for downstream communities by releasing water in controlled amounts. Dams also store water for groundwater recharge.

2 Reservoir

The area behind the dam where the water and sediment are captured and stored.

3 Outlet Valve

An outlet constructed through the face of a dam used to control the flow of water. Depending on the purpose of the dam, released water may be used as a local source of drinking water or to help generate electrical power.

4 Sediment

Soil, sand, and rock from the mountains that are broken down by weather and erosion are referred to as sediment. Large build-ups of sediment and debris within reservoirs have the potential to block outlet valves and reduce storage capacity for both flood risk management and water conservation, consequently preventing proper functioning of the flood control and water conservation system.

5 Spillway

A passage that allows for overflow of flood waters if the reservoir behind the dam is filled to capacity.