Did Phoenix Lake Avert Flooding During the Big October Storm?

by Erik Stromberg
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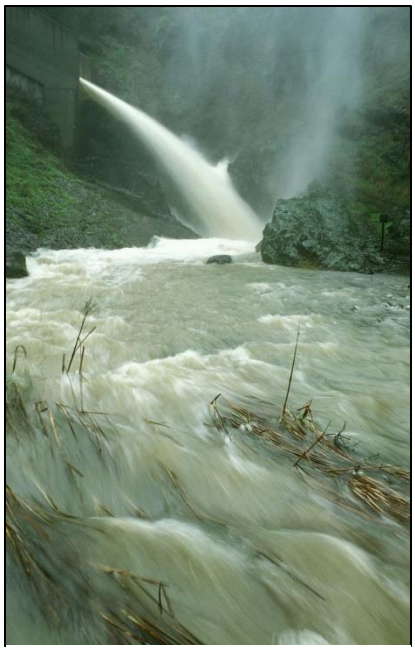
Add the October 24th 2021 storm to the list of storms that have caused flooding in Ross Valley. Water escaped the banks of San Anselmo Creek and flooded houses at known trouble spots including Nokomis and Madrone avenues in San Anselmo. We now know that it could have been worse.

Every large storm is unique. This is partially what makes managing flood risk in Ross Valley tricky. Large downpours following a few days of steady rain are usually what overwhelm the creek and cause flooding. The downpours don't need to last long. If the hillsides are saturated, and the creek has a strong base flow, the creek can spill over into our neighbor-hoods with as little as 30 minutes of heavy rain. This makes predicting which incoming atmospheric river will deliver the next disaster to Ross Valley difficult. It is also why adding detention basins into the valley can reduce flooding. The runoff from these intense downpours can be stored in the basins and slowly released in the hours following the peak rainfall.



Phoenix Lake spillway. Photo by Charles Kennard

What made the October 24th storm unusual was that heavy rain persisted for hours. Typically flooding is not a concern when hillsides and creeks are dry at the start of a storm. However, after 12 hours of steady rain the hillsides were saturated, and the creek was rising fast. By 3 p.m., after more than 15 hours of constant rain, the storm moved on and Corte Madera Creek and all the tributaries began to recede. The water levels crested right at flood stage in downtown San Anselmo and Fairfax, just as officials ordered the flood sirens to sound. Once again, we escaped a large-scale disaster.

According to MMWD storage data and observations by community members, Phoenix Lake rose 27 feet during the storm. This provided approximately 311 acre-feet of storage prior to spilling between 2 and 3 p.m. Sunday afternoon. Prior to the storm, Phoenix Lake held an unusually low volume of 99 acre-feet of water. This had me wondering, did Phoenix Lake prevent flooding in Ross Valley?

To help answer this, I analyzed the discharge data for Ross Valley to estimate the discharge that would have occurred if Phoenix Lake had been full prior to the peak discharge. The analysis indicated that Phoenix Lake likely prevented flooding in Kentfield, Ross, and San Anselmo by reducing the peak discharge by about 17% and lowering water surface elevations on the order of a foot at the Corte Madera Creek gauge near the Lagunitas Road bridge. Considering the creek peaked at the top of bank, this extra foot of rise if Phoenix Lake had been full would have instead flooded streets and homes in our neighborhoods and businesses in San Anselmo, Ross, and Kentfield.

We can't count on Phoenix Lake to save us during the next storm— after all every storm is different and the lake is not usually drawn down. But we now have a real example of how detention basins in the Ross Valley can make the difference between inconvenience and disaster.