



vantage point

What We Don't Plan For



We are now in the aftermath of a phenomenal series of rain events in northern California, where my early April vacation plans to Yosemite National Park were affected (but not destroyed). A little flexibility and patience were all that was required from me, unlike the demands, both physical and emotional, required of the local inhabitants. In the face of a possible disastrous break of the Oroville Dam, about 186,000 people had to leave the area below the dam in a hurry. In all likelihood, most had never looked up the hill to notice that they were in an area of residual risk and were unprepared for evacuation. But enough has been written and said about that drama, so I will address other unplanned repercussions of California's second wettest season since record keeping began in 1895.

In my early days of working in surveying and engineering, the design goal for lot grading was to drain the site as quickly as possible, just make the water go away. While somewhere in our semi-consciousness there may have been a glimmer of recognition that the water didn't magically disappear once offsite, that was not a guiding design factor.

At that time stormwater management and floodplain management seemed to be two

separate worlds, and wetlands were simply nuisances in the way of speedy development because they needed to be drained and stabilized before becoming "useful" land. Stormwater runoff was all about water quality and Total Maximum Daily Loads, especially when an improvement was anticipated in the transition from the non-point contamination from farming to a presumably less harmful residential output. Floodplain management wasn't even a term I heard until much later, and then primarily related to water quantity. Emergency planning and response were not even on the radar. Needless to say, I have learned a lot in the intervening years, and this trip provided some vivid reminders.

Sediment and debris flow

The scouring power of moving water loosens anything in its path from its usual moorings. When the flow stops and the floating matter settles, the aftermath can be anything from a sheen of silt to trees and trucks settling in inopportune places. I saw plenty of inconvenient sediment this trip, but perhaps my most dramatic experience was a few years ago in Kihei on the south shore of Maui. Low-lying Kihei hadn't had rain overnight, but somewhere further upland of us certainly had. We woke to the sound of condo staff shoveling more than a foot of brown sludge

away from the building and pumping water to free the cars mired in the parking lot. Municipal crews struggled to shovel what heavier equipment could not clear from the main roadways, a task not completed until several grueling work days later.

Landslides

Saturated soils are particularly prone to give in to gravitational forces on their increased weight. A section of California Highway 140 heading to and from the Park entrance is usually split with one lane in each direction on opposite sides of the Merced River. We found ourselves waiting in a long line over a temporary bridge to take turns over a single lane with traffic going in the other direction. It took a moment to register that what I was seeing across the Merced was not just a small mountain of soil and rock but used to be the other road, just peeking out from the landslide's sides.

Turbidity

When all that floating scoured material doesn't settle out but continues to cloud our waterways, that cloudiness is termed turbidity. Aside from creating more work for water intakes treating drinking water, there are non-anthropocentric repercussions. To relate to a fish taking in floating particles through its gills, remember what it feels like to breathe on a smoggy day, or in a location where soot or chemicals fill the air. I grew up several miles from a Rohm and Haas chemical facility, but the stench still managed to scorch my lungs on summer nights when the windows were open. More recently, a trip to Beijing proved that USA air quality regulations really make a difference, when I couldn't see across the street clearly. But turbidity also darkens the water, causing its temperature to rise and making it less hospitable to resident plant, fish, and animal species.

Navigation—moving sandbars and islands

Submerged land is affected by storm events in ways that we can't predict or control. When channels erode and shift with increased water volume and velocity, navigation becomes a dangerous guessing game when buoys no longer properly mark their intentions. From my plane window over California, I saw shifted soils in inopportune locations at marinas. Islands also move, generally shifting southwardly as the current scours sediment from the upper end and redeposits it on an island's southerly shore. Dams or other constructions changing the flow of water may have an opposite effect, making an island migrate northwardly. Yet another possibility is that southwardly flowing sediment gets stuck between the mainland and the island, attaching the former island to the shore with dry land. I can personally attest to the kind

of ownership disputes island movement can raise, but not today.

Migrating stream and river banks

The course of flowing water can alter over time. Scouring erodes a bank in one area and deposits the loose material in another. Ownership boundaries that are intended to include shorelines or to the center of the stream or river depend up the time frame over which such changes occur. Seeing an avulsive change that drained one branch of a stream reminded me of yet another boundary dispute. Another story for a different day.

Washouts

When water flow undermines and weakens a structure's foundation, it sets the stage for a washout. The resultant shifting and sinking of sections of California Highway 120 were merely an inconvenience to me, requiring

a plan for a longer and less direct route to my destination. However, local businesses missed any opportunity to offer me a snack or tempt me with local attractions during leg stretching breaks from the long drive. I am sure commuters are suffering as well. Once inside the park, there was no direct route to the giant redwood forest without a 2-1/2 hour detour out of the park and then back in due to massive interior road washouts. So I will just have to go back some day.

Whether focused on boundaries or construction or site design, there is much about water that affects our work—and our daily lives. ■

Wendy Lathrop is licensed as a Professional Land Surveyor in NJ, PA, DE, and MD, and has been involved since 1974 in surveying projects ranging from construction to boundary to environmental land use disputes. She is a Professional Planner in NJ, and a Certified Floodplain Manager through ASFPM.