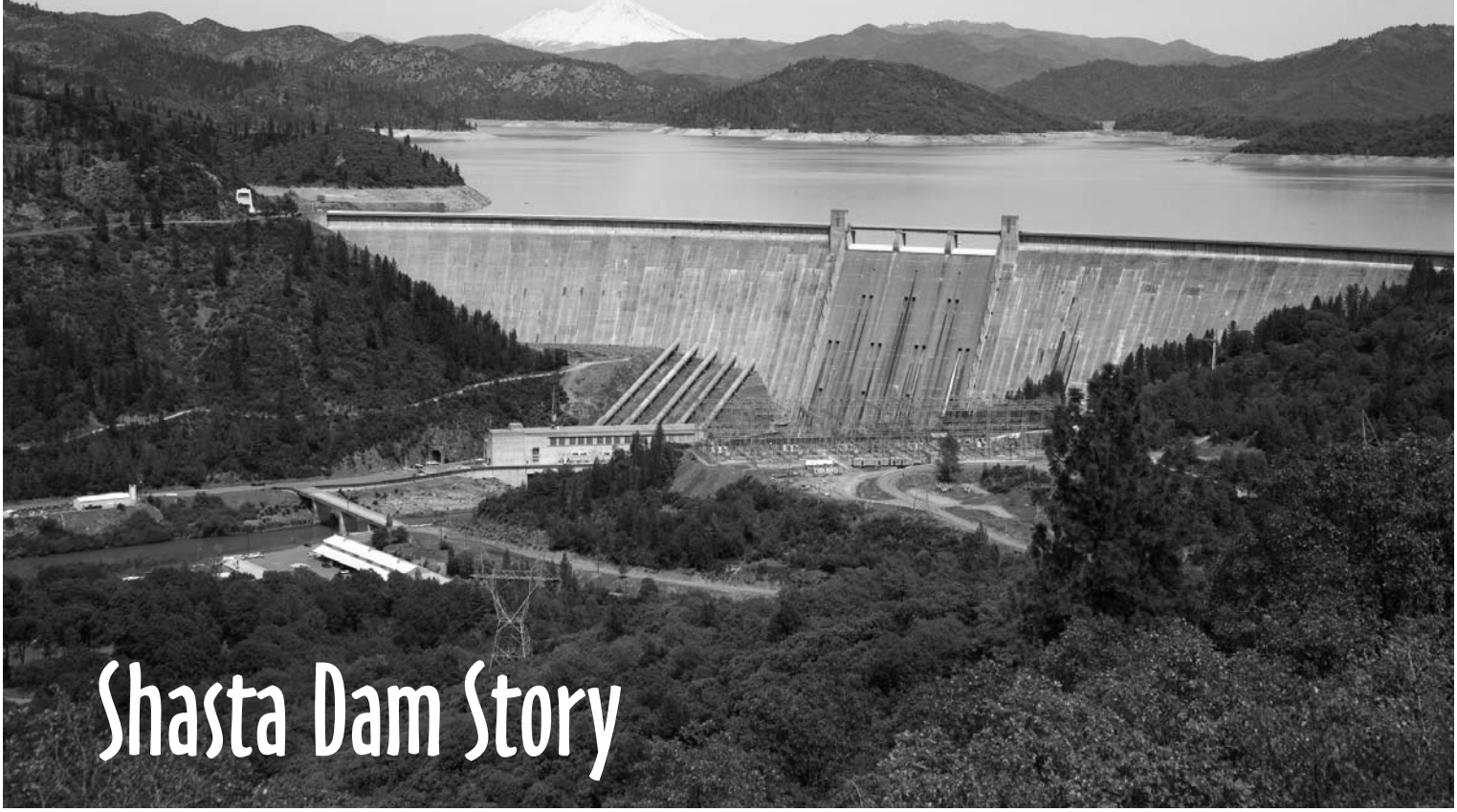

Shasta Dam Story

Shasta Dam, with Lake Shasta and Mt. Shasta in the distance

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ARIEL RUBISSOW OKAMOTO

You don't go out fishing on the Sacramento River above Red Bluff without "a cushion for your tush," according to the locals. The water floating your raft or rowboat is too darn cold, especially when the salmon are spawning. This mid-summer chill isn't natural in a river you could once walk all the way across in warm shallows, or swim through without turning blue. But then, not much is natural about the way water flows out of the mountains down into California's Central Valley anymore.

Ever since workers poured 6.5 million cubic yards of concrete into a canyon above the town of Redding, backing up the waters of the Sacramento, Pit, and McCloud Rivers for 35 miles behind Shasta Dam, Californians have been less thirsty and freer of floods. It's dams like this that Buford Holt, a biologist with the U.S. Bureau of Reclamation, says have "made possible a bounty of food production and kept us functioning as a state, because obviously we don't have any rain for six months out of the year." His agency runs the world's largest water development and management system: the Central Valley Project, with 20 dams, 11 power plants, and 500 miles of canals. Shasta is one of California's five large foothill dams around the Central Valley that help control floods and store snowmelt for water customers up and down the state (the others are Oroville, Folsom, New Melones, and Friant); hundreds of smaller, private dams criss-cross rivers up in the mountains, built long ago by miners, private landowners, PG&E, and various public entities.

Standing on the top, looking down the sheer, streaked face of the 602-foot-high dam, you cannot help but feel a wave of vertigo. Everything around the dam seems small and far away—snow-topped Mount Shasta in the distance, the other end of the green-blue lake created by the dam, the specks of ducks bobbing in the light chop, the pin-sized pines along the river at the bottom of this massive edifice.

Inside the dam lie some hollow galleries, but it's mostly solid. Touring these inner hallways, visitors will see swastikas imprinted on some pipes, evidence that those ordering plumbing supplies during the dam's construction (1938 to 1945) got some from Germany before World War II broke out. Newer hardware includes a device that enables operators to withdraw and release water from different lake depths—selecting the coldest bottom water, rather than the warmer upper layers, so that the eggs of spawning salmon stuck below the dam won't die in the river. That's why you need a cushion to boat on the river.

Before the dam got in their way, salmon spawned in the 187 miles of snow-chilled streams of the upper watershed. The dam brought with it a constellation of new facilities, including a hydroelectric power plant, a connection to the Coast Range's Trinity River via a tunnel and Whiskeytown Reservoir, and a smaller

Lake Shasta

dam, Keswick, nine miles downstream. Spawning salmon that make it as far upriver as Keswick are trapped and trucked to a fish hatchery at the mouth of nearby Battle Creek. Keswick also serves as what is known in water engineering lingo as an "afterbay," a place where the powerful flows released from Shasta for maximum power and revenue generation can be stored temporarily, then meted out slowly to the river. This way, the water level downstream doesn't change too dramatically.

The Central Valley and State Water Projects smooth out the dramatic seasonal swings in drainage across the 42 percent of California's landscape that is the watershed of San Francisco Bay. These projects collect, store, and release fresh water so that it fills irrigation ditches and city faucets when needed. Before the projects were built, Central Valley inhabitants had a lot more water than they needed in winter. Flow gauges placed in the Sacramento River in the early 1900s confirmed that the river sometimes rose from its normal flow of 5,000 cubic feet per second (cfs) to 600,000 cfs in a matter of days—an amount that could never be contained within its natural banks. Even today, a train of storms can cause a very rapid rise in valley rivers; one former water manager remembers the reservoir coming up 16 feet in 24 hours. "You've got a kind of martini glass shape, so the lower the water level in the reservoir, the faster it can rise in a short period of time," explains Holt.

The geography of the Central Valley is also unusually conducive to flooding. Its rivers drop quickly out of the mountains onto a vast flat basin, unlike the Mississippi River Valley, for example, whose waters gather and flow over half the continent. In his 1988 book *Battling the Inland Sea*, historian Robert Kelley described the scene before European settlement, after winter storms and spring snowmelt: "The Sacramento River and its tributaries rose like a vast taking in of breath to flow out over their banks onto the wide Valley floor, there to produce terrifying floods. On that remarkably level expanse the spreading waters then stilled and ponded to form an immense, quiet inland sea a hundred miles long. . . . Not until the late spring and summer months would it drain away downstream."

Native Americans warned early settlers of the inland flooding, but the newcomers went ahead and built on the riverbanks anyway. Whereas the natives migrated between winter and summer villages to accommodate seasonal changes and collect different foods, the settlers weren't so flexible. In the 1860s, the fledgling towns of Sacramento and Marysville spent months at a time underwater, and more than 80 years of ineffectual levee-building ensued.

Shasta Dam put a stop to such widespread flooding. But this year, the danger of any abundance of water is low. Listening to the chitchat on the streets of Redding, you hear talk of the size of the bathtub ring around the lake, and arguments about whether it looks worse or better than the droughts of '76 or '91. The ring is a pretty red color from the underlying sandstone, and a very rare plant called the Shasta snow wreath grows right above this sometimes wet, sometimes dry zone. The white-flowered shrub, like the salmon and everything else in California, will have to try to adapt to a new climate-changed hydrography in which snow melts sooner and rain comes later, and in which a higher dam may expand the bathtub ring into the shrub's habitat. These are ecological challenges that more concrete may or may not be able to meet. ■

Ariel Rubissow Okamoto lives in San Francisco, writes on water issues, manages an organic vineyard, and is bringing up two daughters not to flush, not to run the tap while doing dishes, and to think of recycling not as an option, but as a way of life.

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