Chapter 1: The Dam is Not Going to Break

By 6 June 1983, operators of Glen Canyon Dam on the Arizona-Utah border had run out of options. High temperatures had begun to melt the late spring snowfall that blanketed the western slopes of the Rocky Mountains, sending half a million gallons of snowmelt each second rushing down the length of the Colorado River and into Lake Powell. The reservoir's two giant spillways, designed to convey high water around the dam and discharge it harmlessly below, had begun to crumble. Water entering the spillways was clear as glass, but, emerging below the dam, the water had turned red, once again earning the river the name the Spaniards had given it: El Río Colorado. Chunks of concrete, some the size of a Volkswagen, shot out with the red spillway discharge. Evidently, water under high pressure was eroding through the concrete spillway linings and into the rust-colored bedrock below, the same bedrock that held up the massive dam.

The United States Bureau of Reclamation now faced its darkest nightmare. Only a few hundred feet of soft, porous sandstone separate the spillway tunnels from the base and sides of the dam. If the spillways continued to erode, water could exploit even the tiniest opening in the weak rock, like a supersonic water-pick drilling through a loaf of bread. As the opening widened, pressure would force still more water through the opening, enlarging it, until the nine trillion gallons of water in Lake Powell drained.

Below Glen Canyon Dam, a 580-foot tidal wave would blast through the Grand Canyon at twenty-five miles per hour, denuding its steep walls and leaving nothing alive. Three hundred miles downstream, a wall of water 70-feet high would surge over the parapet of Hoover Dam, likely causing it to collapse.[i] Each of the smaller dams below Hoover on the Colorado River's stutter-step way to Mexico—Davis, Parker, Headgate Rock, Palo Verde, Imperial, Laguna, and Morelos—would topple in turn. From Glen Canyon to the Gulf of California, the river would have destroyed each obstacle that Man had placed in its path, just as it had destroyed many natural obstacles in its five-million year history.

Today, reservoirs on the Colorado River supply thirty million people. Glen Canyon and Hoover Dams generate part of the electricity that powers a $1 trillion regional economy. Colorado River water and power sustain Las Vegas, Los Angeles, Phoenix, and Tucson, metropolises that needed only water to rise from the dusty soil of Sidewinder and Gila Monster.

When the Bureau of Reclamation completed Hoover Dam in 1935, it was the tallest dam in the world. Glen Canyon Dam, completed some thirty years later, is almost as large. Had both dams collapsed in 1983, replacing them might not have been possible. Not only would the clean-up and reconstruction costs have been enormous, neither dam could pass today's environmental reviews. Without its megadams, the Southwest might never have recovered.

Commencement speaker Woody Allen once advised an assembly of college students, "Graduates, as you embark on your life's journey, you will come to a fork in the road. The way to the left leads to inevitable destruction. The one to the right, to despair and misery. Choose wisely."

For the managers who had to decide how to handle the high water entering Lake Powell in 1983, using the vulnerable spillways risked the destruction of Glen Canyon Dam and the other dams downstream. Keeping the spillways closed—the other fork in Allen's road—could indeed bring despair and misery, for without its spillways, Glen Canyon dam could release no more than half the water entering that June. But the reservoir was already brim-full. Seen from the air, the azure lake sat in the red and buff slickrock of the Colorado Plateau like a bowlful of water teetering on the edge of a high table. If the lake could not contain all the water that entered Lake Powell, a thousand tons each second would have poured over the dam crest and destroyed the $200 million powerplant at the downstream toe of the dam, ending power generation at Glen Canyon.

Tom Gamble, Power Operations Manager at the dam, said at the time that despite the problems in the spillways, "There's no fear of jeopardy to the dam." Asked if the undeniable erosion in the spillway tunnels was a danger to the dam, Gamble replied, "We don't think so." The shaking, rumbling, and booming noises that could be heard throughout the dam were "nothing to be concerned about," he said, "The dam is not going to break."[ii]

Privately the Bureau told a different story: "The concern upon the June 6 report of noises from the left tunnel was for the safety of the dam and its foundation. This concern predominated throughout the spill period," said one report.[iii] According to author T. J. Wolf, a bureau official warned that "Any direct connection (of the reservoir through the spillway tunnels to the river downstream) could lead to erosion of the sandstone and the potential for uncontrolled release into Lake Mead."[iv] For "uncontrolled release," read catastrophic flood.

The public would have been justified in taking Gamble at his word. After all, the Bureau of Reclamation is the premier dam-building agency in the world. Surely its projects provide such a margin of safety that for one to fail is unthinkable. Yet dams do fail. Only seven years before, in 1976, the Bureau's Teton Dam collapsed with fatal consequences.

No sooner had the reservoir behind the earthen Idaho dam filled than the dam fell to pieces. Eighty billion gallons of water tore downstream. The disaster forced 300,000 people to evacuate, took eleven lives, wiped entire towns from the map, and cost nearly $1 billion in property damage. According to former Bureau and U.S. Geological Survey geologist Luna Leopold, more than one scientists had written the Bureau of Reclamation saying, "Look, this is wrong. You're putting that dam in a very unsafe place."[v]

Another example, though not on the Bureau's watch, took place in March 1928. Los Angeles Water Czar William Mulholland had inspected the city's St. Francis Dam and pronounced it sound. A few hours later, the abutment turned to mud and the dam collapsed, sending a seventy-five foot wall of water downstream. In less than one hour, 1. 5 billion gallons drained. The flood killed over 600 people and destroyed 1,200 homes. To his credit, Mulholland took true responsibility for the disaster. It cost him his career and his health and left him to die a broken man.

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In the decades after Hoover Dam, the Bureau of Reclamation provided pork barrel projects to western politicians and water to thirsty irrigators and cities. In the

process, "BuRec" achieved God-like infallibility. One photograph from the Bureau's early days captures a hard-bitten Dust Bowl couple with Model T Ford, mule team, and in the background, scrub brush as far as the eye can see. Beside them a home-made sign proudly announces: "Desert-Ranch: H. J. Mersdorf-Prop." The second line reads, "Have Faith in God and US Reclamation."[vi] The sign reflected not only the couple's confidence that the Bureau would take care of them, but the dam-builders assumed Biblical mandate from Isaiah (35:1): "The wilderness and the dry land will be glad; and the desert will rejoice and blossom like a rose."

According to then-Commissioner of Reclamation Robert Broadbent, the 1983 crisis *was* an Act of God. "Sure, in retrospect we could have been releasing 30,000 to 40,000 cubic feet per second [225,000 to 300,000 gallons per second] a long time ago," Broadbent told the *Los Angeles Times*. "But how could you predict that Salt Lake City was going to have 100-degree temperatures on Memorial Day? It was the late May snowstorm and then the heat wave that caused the problem." The Bureau "couldn't really have done anything differently," the Commissioner explained, "except maybe save a few days, that's all."[vii]

Was he right? Was the crisis unpredictable, or could the Bureau have foreseen and better managed the high water? To answer, we first have to understand why the great dams and reservoirs on the Colorado exist in the first place. That knowledge will have the added benefit of helping us to judge proposals for new megadams, proposals that the current western water crisis is already spawning.

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[i]**Chapter 1**

[i] Latham, Stephen E. "Glen Canyon Dam, Arizona: Dam Failure Inundation Study." (1998) pp. 7-9

[ii] West, Richard, and Richard Meyer. "Glen Canyon Dam Groans under Flooding." *Los Angeles Times*, 1 July 1983 B4.

[iii] Wolf, T. J. "How Lake Powell Almost Broke Free of Glen Canyon Dam." In *Water in the West: A High Country News Reader*, edited by Char Miller. Corvallis: Oregon State University Press, 2000. p. 87

[iv] Ibid. p. 89

[v] Leopold, L. B. "Oral Interview." University of California at Berkeley, 1993. p. 181

[vi] Cover photograph, Robinson, Michael C. Water for the West: The Bureau of Reclamation, 1902-1977. Chicago: Public Works Historical Society, 1979.

[vii] Meyer, Richard. "Raging Colorado Flood Batters Grand Canyon." *Los Angeles Times*, 25 June 1983 A1.