

**Prepared Testimony of John Laird, Secretary
Natural Resources Agency
State of California**

before the

**Committee on Environment and Public Work
United States Senate**

Oversight Hearing on “Flood Control Infrastructure: Safety Questions Raised by Current Events”

March 1, 2017

Good morning Chairman Barasso, Ranking Member Carper, Senator Harris, and members of the Committee. On behalf of the state of California, Governor Brown, and over 16,000 dedicated state employees of the 25 departments, conservancies, and commissions that comprise the California Natural Resources Agency, I thank you for the opportunity to provide testimony before this Committee on a critical and timely topic.

As you know, our nation’s aging infrastructure is at a crossroads. One path is characterized by continued inaction; insufficient funding; a lack of local, state, and federal cooperation; and further deterioration, putting human lives, our natural resources, and economy at risk. Another path is shaped by deliberative policies, meaningful investment, coordination across all levels of government, and the incorporation of new science that can provide multiple benefits to common outcomes. California approaches this situation with a sense of urgency. I hope my testimony helps provide some insight into California’s flood control and water infrastructure systems, answers questions raised, and contributes constructively as Congress considers how best to address the nation’s significant infrastructure needs and the safety of our citizens.

Current Events

Droughts and floods have always driven the evolution and growth of California water policy, investment, and scientific/technical understanding. This year is no different.

After five years of severe drought, California is in the midst of what is likely to be the wettest water year (Oct-Sept) on record. Severe winter storms—powered by atmospheric rivers—have brought torrential amounts of rain and significant snow to the state, particularly in the Northern Sierra (fig. 1). On satellite images the aptly named ribbons of moisture are fed by warm equatorial waters (fig. 2) and stream into the state with the equivalent of 7.5-15 times the rate of water at the mouth of the Mississippi River. California often receives a significant amount of its yearly precipitation from a handful of these weather events. But their number, size, and severity this water year has strained the state’s flood control and water management infrastructure; forcing evacuations, damaging roads, destroying homes, communities, and livelihoods.

Impacts to California are ongoing, and a myriad of local and state agencies are at this moment working to address emergency needs, battling swollen rivers, surveying troubled levees, and making necessary repairs. It’s estimated that damage to California’s highways alone from storms this year is over \$595 million so far. In San Jose, 50,000 residents had to be evacuated as the worst flooding in a century there inundated neighborhoods when local dam releases overwhelmed a creek’s capacity.

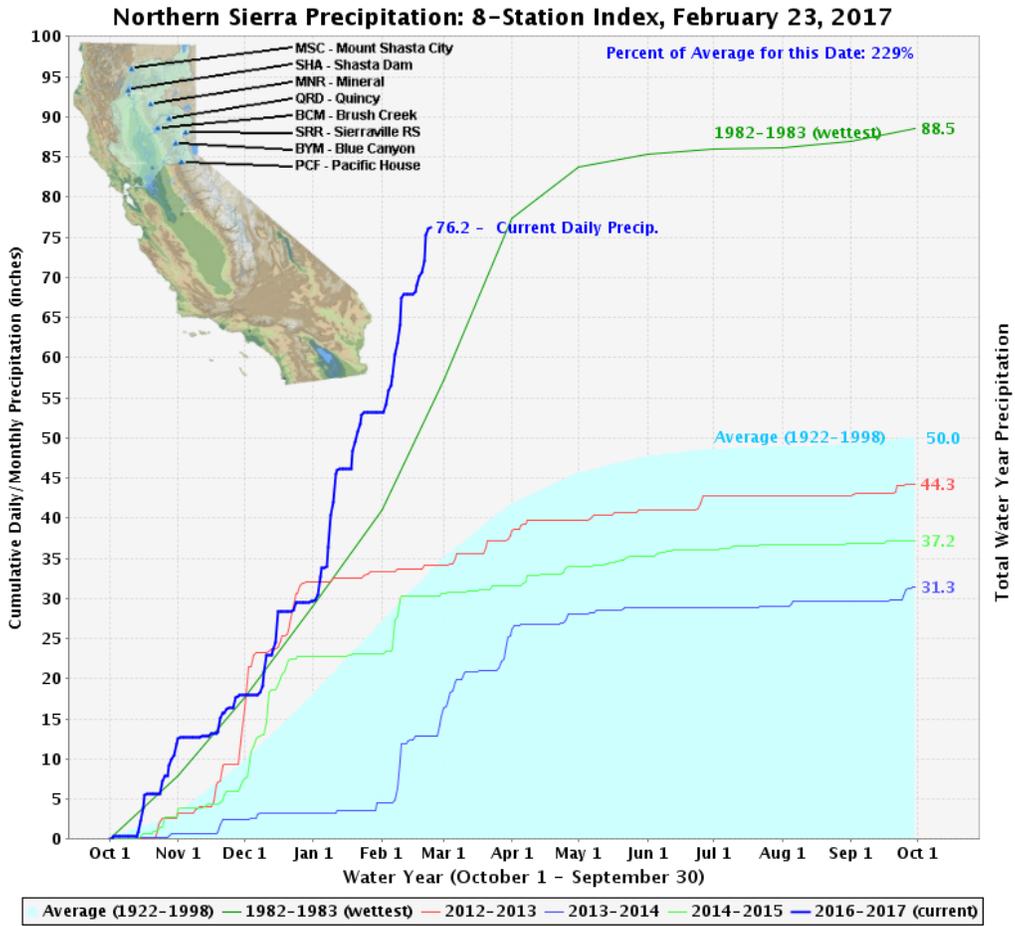


fig. 1

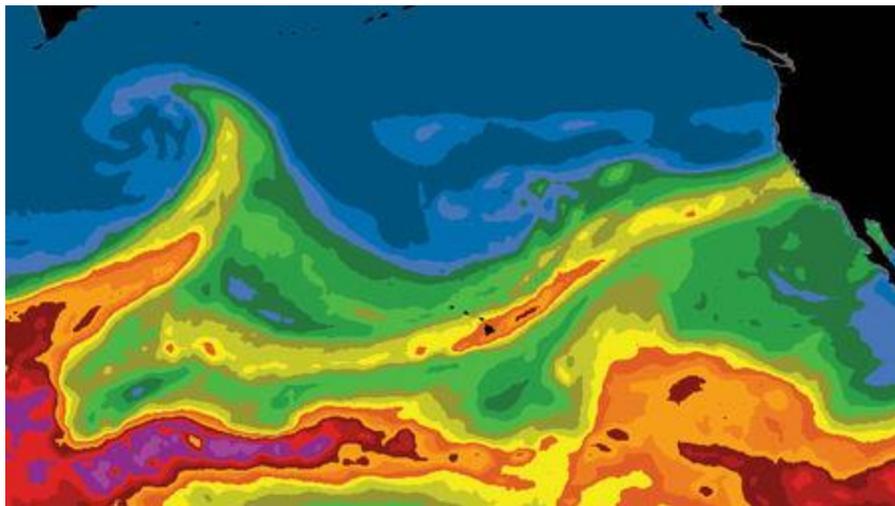


fig. 2

Most dramatically, damage to the main spillway on Oroville Dam—the tallest dam in the United States and the second largest reservoir in California that serves as the keystone of the State Water Project—was observed on February 7th by water managers. The damage diminished the capacity for safe reservoir releases, and relentless inflows from storms continued to fill the lake. These conditions led to the use of the dam’s emergency spillway for the first time since the project was completed in 1968. Significant erosion of the emergency spillway began to occur as water flowed over the feature, though it was working as designed and engineered to prevent overtopping and damage to the dam itself. Yet, the possibility of the emergency spillway’s rapid failure if the erosion continued warranted the emergency evacuation of nearly 200,000 downstream residents in Yuba, Sutter and Butte counties.

In an effort to prevent catastrophe, dam operators made a critical trade-off and drastically increased releases through the damaged main spillway, knowing that further deterioration of the spillway would occur with months of use still needed through the season. While there was additional damage to the main spillway, and the situation is ongoing, the spillway is holding up to intense use. After a three-day mandatory evacuation, residents were allowed to return to their homes on February 14. With the reservoir’s water level now 50 feet below the emergency spillway, the immediate danger has passed. The situation has stabilized, but the emergency conditions and heightened awareness remain. Crews have been working around the clock, pouring tons of rock and concrete to fill erosion and secure the emergency spillway in case it needs to be used again. Dam operators are managing the reservoir’s elevation to well below the top of the emergency spillway and balancing inflow and releases to remain prepared for future storms and the melting of the heavy snowpack that remains higher in the watershed. Debris removal operations at the base of the main spillway and dam are also under way in order to restore the function of the hydroelectric plant and its outlets. [\(fig 3\)](#)

California continues to prioritize the protection of human life, public safety, and property, while preparing for the possibility of additional severe winter storms. Local, state, and federal communication, coordination, and resources have benefited from critical investments and planning in previous years. Over the last decade alone over \$11 billion has been spent by federal, state and local agencies in California on flood control projects. And experience battling California’s cyclical floods has developed critical expertise in our community’s flood managers, scientists, engineers and emergency responders. The request and granting of a major federal disaster declaration for affected counties was important, and augments local and state resources overwhelmed by the scale of the storms, emergency response activities and costs for recovery. California’s extraordinary response to this year’s storms was only possible due to local, state and federal cooperation, and significant prior investments in the state’s water, flood control, safety and emergency response systems.

California’s dam safety program, one of the oldest in the nation, came into being after the 1928 collapse of the St. Francis Dam, which killed more than 450 people. The program is widely recognized as the best in the nation. But we can and must always do better. While the exact cause and circumstances that led to the damage to Oroville’s main spillway are yet unknown, this event has drawn needed attention to the age, condition, maintenance and financial needs of California and the nation’s flood control and water management systems. Critically, we must not simply view infrastructure through the lens of single purpose, single function undertakings, but instead should use the opportunity to fund innovative projects that leverage science to meet the challenge of extreme weather and variable precipitation, and accomplish multiple benefits and goals with the investment.

Bolstering Dam Safety and Immediate Investments in Water Infrastructure

While we welcome the partnership, California is not waiting for the federal government to alone meet this urgent need and real opportunity. As a first step, last Friday, Governor Brown redirected \$50 million from the state's General Fund and requested a \$387 million Proposition 1 appropriation from the state Legislature to fund near-term flood control and emergency response actions. In 2014, more than 67 percent of voters statewide passed Proposition 1. This \$7.5 billion water bond was put on the ballot through a bipartisan effort in the state Legislature that involved only two "no" votes. Proposition 1 advances the [California Water Action Plan](#), the five-year blueprint of near- and long-term actions pursued by the Brown Administration in order to create more resilient, reliable water systems and to restore important ecosystems. If the Legislature grants the Governor's requests on General Fund and Proposition 1 spending, California will be set to invest \$1.2 billion over the next two years in multi-benefit projects.

While California already boasts a model dam safety program, Governor Brown has proposed the passage of state legislation that would additionally direct the California Department of Water Resources (DWR) Division of Safety of Dams to require the owners of all 1,250 dams under its jurisdiction to complete an emergency action plan that is updated every ten years (subject to exemption by DWR for smaller, low risk dams) and to map inundation zones every ten years or sooner if local development patterns change. The Governor also proposes to require the DWR to identify additional scenarios beyond a complete dam failure that warrant separate inundation maps and to provide supplemental appropriations totaling \$7.5 million to forward fund the necessary staffing to do immediate, more extensive evaluations of dams and their ancillary components.

These investments are an important start, but more is needed to satisfy the \$50 billion in flood project needs statewide that DWR and the U.S. Army Corps of Engineers estimate exist.

To complement the immediate actions of our state agencies, as Secretary of Natural Resources, I have requested the following actions from our partner federal agencies:

- Expand inspection and review of all federally-owned dams in California. The inspections should parallel state efforts, including review of ancillary structures such as spillways.
- Update the federal operating manuals for key California reservoirs. It is imperative to revise these manuals to reflect current scientific knowledge. The Corps needs to be fully funded to complete these updates or allow non-federal authorities to finance this work.
- Fund the recently enacted Water Infrastructure Improvements for the Nation Act, which authorizes a program for rehabilitation of high hazard dams at the Federal Emergency Management Agency. Also, prioritize the publication of the programs rules to assist California and other states in this rehabilitation effort.

Understanding California's Flood Control/Water Infrastructure

"Flooding in the midst of drought is likely... Nothing focuses Californians' attention on our water resources like the extremes of flood and drought." – California Water Action Plan 2016 Update

Through five years of historic drought in California, thousands of rural drinking water wells went dry from groundwater depletion, urban and agricultural water deliveries were reduced or eliminated,

streams and rivers dwindled, fish and wildlife populations declined, and millions of trees died and fed catastrophic forest fires. This year's change in hydrology is welcome, but it presents its own set of difficult, yet related, challenges.

The dramatic shift from drought to deluge is a familiar pattern for Californians, and one that has shaped the development of our state and its water infrastructure.

No other state in the nation has a more varied and uncertain climate and hydrology than California (fig. 4). That variability in precipitation extends within the water year (Oct-Sept), between water years, and also to the geographic distribution of precipitation. The vast majority of California's snow and rain falls on the northern and eastern parts of the state during the winter months, with vast stretches of its southeast corner a hydrologic desert. While nearly two-thirds of the state's precipitation falls in the north and on the eastern slope of our state, the majority of Californians – who represent nearly 1 in 12 Americans – live far to the south and west.. Much of that precipitation falls on and along the Cascade range and the Sierra Nevada range as moisture-rich storms are forced up its slopes, condense, and shed their cargo as rain or snow. The Sierra Nevada snowpack acts as the state's largest natural reservoir, accumulating vast amounts of precipitation through the winter, and melting during the warm dry spring and summer months.

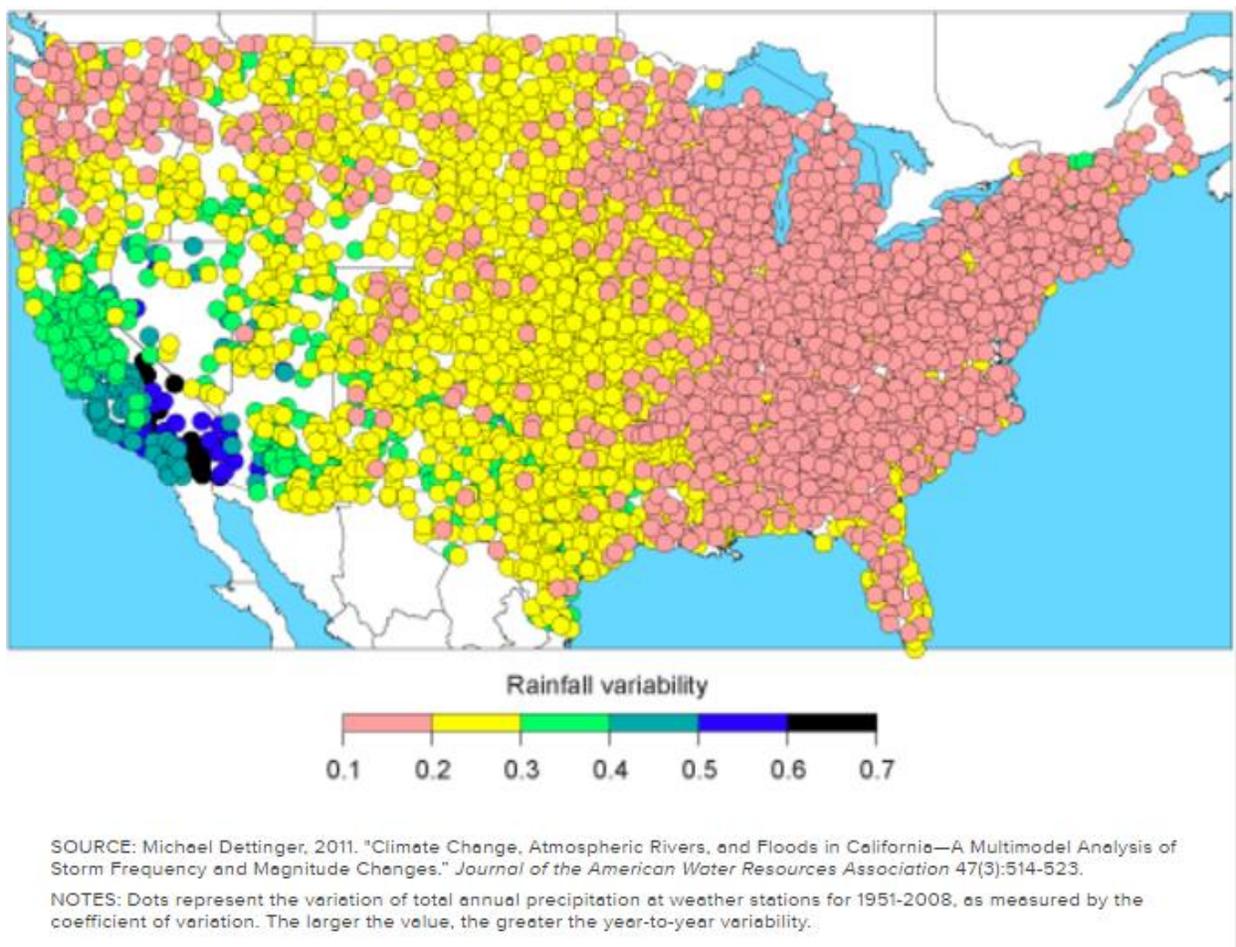


fig. 4

Before California was settled by westerners, the cycles of dry and wet periods that dominate California’s hydrology fed and shrank vast wetlands that covered the Great Central Valley and the Sacramento-San Joaquin River Delta (Delta), and would fill Lake Tulare at the southern end of the San Joaquin Valley—once the largest lake west of the Mississippi. The discovery of gold in California in 1849 changed California’s landscape forever. The Gold Rush ushered in settlers and miners who set to work building hundreds of miles of flumes and ditches to divert water so it could be used to sluice out gold. In the following years, as the precious metal became more difficult to find, miners turned to farming, spurring significant levee construction in the Central Valley, San Francisco Bay, and Delta as land was reclaimed for cultivation. And local water systems were first built in the early part of the 20th century to bring water to cities that were developing into booming metropolitan centers like San Francisco and Los Angeles. From the 1920’s through the 1950’s, the U.S. Army Corps of Engineers and U.S. Bureau of Reclamation ushered in an era of significant federal investment in California water conservation, water supply, flood management and wildlife protection projects. And it was the construction of the Bureau of Reclamation’s Central Valley Project, originally a project by the state of California before the Great Depression hit, and California’s development of the State Water Project in the 1960’s, that time capped the most ambitious and expansive water system in the world. (fig. 5)

Californians today are the inheritors of a water system born from the necessity of building certainty into California’s hydrologic variability. Now, our state population is growing. Our hydrology and climate are changing. Our infrastructure is aging. As the assumptions and understandings of the earlier eras give way to better science, advances in technology, and new understandings, the limitations of today’s failing water infrastructure means we must invest in the infrastructure of tomorrow.

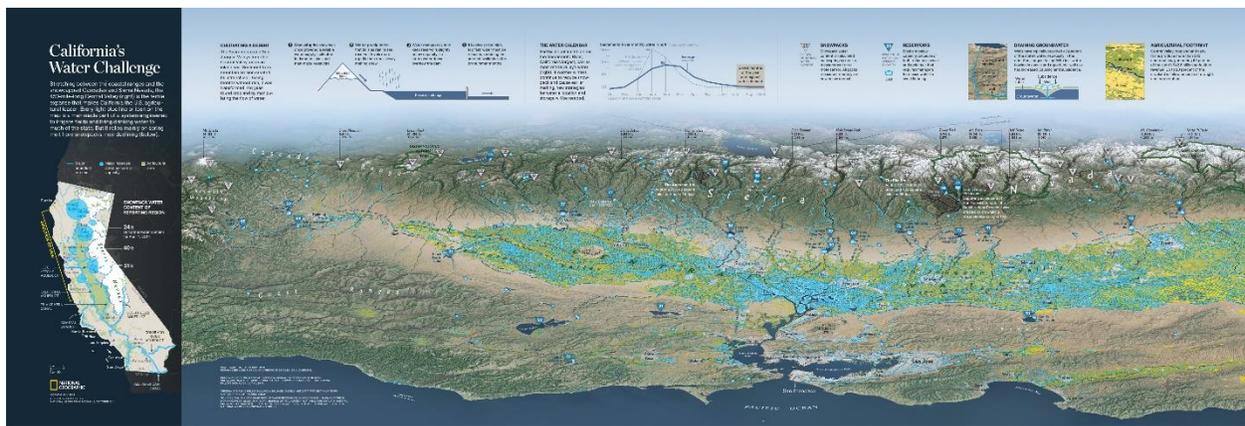


fig. 5