

# The Oroville Dam 2017 Spillway Incident

And Lessons from the Feather River Basin

## EXECUTIVE SUMMARY



September 2017

### Authors

RON STORK, FRIENDS OF THE RIVER

CHRIS SHUTES, CALIFORNIA SPORTFISHING PROTECTION ALLIANCE

GARY REEDY, SYRCL, CONTRACTED PROJECT MANAGER

KATRINA SCHNEIDER, RIVER SCIENCE CONSULTANT

DAVE STEINDORF, AMERICAN WHITEWATER

ERIC WESSELMAN, FRIENDS OF THE RIVER

We thank California Resources Agency staff for providing information and photos. We appreciate the many citizens who have shown resilience to the Oroville incident of 2017, and who stepped up to contribute their concerns and knowledge to a positive aftermath. This project was funded through the California Hydropower Reform Coalition.

# Executive Summary

## Oroville Dam gained worldwide attention in February 2017

when crumbling spillways at the nation's tallest dam triggered one of the largest evacuations in California history. The near catastrophe remains a socioeconomic blow to downstream communities. It will require substantial ecological remediation, as more than 1.7 million cubic yards of sediment washed into the Feather River below Oroville Dam—enough to cover a football field 80 stories high.

While repair work is moving forward at Oroville, significant issues remain to be addressed. This incident is a wake-up call for action on several fronts at this facility and at thousands of other high-hazard dams in the United States. Dam operators and regulators must ensure a safe and reliable water system that protects communities and the rivers that flow through them. A warming climate with changing precipitation patterns is putting even greater pressure on these dams and underscores the urgency.

The Oroville Dam 2017 Spillway Incident: Lessons from the Feather River Basin makes 18 recommendations and dozens of sub-recommendations. It calls for action to address California's aging dam infrastructure, operate dams more safely and efficiently, advance multi-benefit flood management projects, and increase transparency and public engagement.



Debris in the Feather River below Damaged Main Spillway. Source: Dale Kolke, DWR.

Pyramid Dam, San Luis Dam, Success Dam, and Trinity Dam. At New Exchequer Dam on the Merced River, plans to wall off most of the emergency spillway and reduce the flood-control space in the reservoir would increase the risk of a catastrophic incident.

"This disaster is one of the worst nightmares any elected official could imagine for their community."

*Linda Dahlmeier, Mayor of Oroville*

A chief recommendation is the need for a complete emergency spillway at Oroville Dam. Such a facility would have prevented the near catastrophe and the evacuation of thousands of people. At this time, there is no evidence that the Department of Water Resources plans to address this fundamental problem. The report also identifies several other water infrastructure projects in California that may require investment in maintenance, repair or reconstruction. These include Clifton Court Forebay,

Improving dam operations is also critical to avoiding another incident like the one that occurred at Oroville. This requires better flood modeling. It also requires scheduled updates of flood-control manuals, with opportunities for substantive public involvement. The Federal Energy Regulatory Commission (FERC) should also address dam safety issues as a part of its relicensing of hydropower projects, or through a more expeditious public process. In the San Joaquin Basin, studies need to explore opportunities to increase maximum controlled flood flows from facilities like Don Pedro Dam on the Tuolumne River.



**Emergency Spillway Flows and Erosion, February 12, 2017.** Source: Kelly M. Grow, DWR.

The report has several recommendations for multi-benefit flood management projects to reduce downstream risk in the event of flooding or infrastructure failure. Funding the Central Valley Flood Protection Plan is critical to implementing several of these projects. The most important of these projects include the expansion of the Yolo Basin Bypass and the Sacramento Bypass. They also include upgrades of the weirs that allow flood flows in the Feather River/Sutter Bypass and American River to enter the Yolo Bypass. Other Sacramento Basin priorities include expansion of the floodplain in the Oroville Wildlife Area and the implementation of the Lower Feather River Corridor Management Plan. In the San Joaquin Basin, reservoir-based floodwater management is far less reliable than in the Sacramento Basin. This problem will only get worse as precipitation patterns shift with climate change. Key projects there include setback levees and a San Joaquin River floodwater bypass in the lower Delta.



**The Feather River Setback Levee.**  
Source: Eric Ginney / Zeke Lunder.

Finally, the report calls for a shift in the relationship between out-of-area water project developers and members of the local communities that house those projects. This relationship should be based on equality, fairness, respect, and transparency. In the case of Oroville, and similar projects, this requires public release of forensic investigations, new inundation maps, and Emergency Action Plans, combined with comprehensive assessments of impacts and mitigation actions for communities like Oroville.

The main lessons from the Oroville Incident and a summary of recommendations are provided in the following table. **The full report is available online at: [www.friendsoftheriver.org](http://www.friendsoftheriver.org).**

# Lesson

# Recommendations Summary

## California's dam infrastructure is aging and needs to meet modern standards

- Complete planned reconstruction of the Oroville main spillway and relocation of powerline transmission towers and lines.
- Plan a real auxiliary/emergency spillway without risk of large quantities of hillside soil and rock being eroded into the Feather River.
- Conduct a thorough review of the Oroville Dam complex's physical deficiencies and undertake appropriate upgrades.
- Systematically inspect dams across California and the U.S. to meet upgraded design and maintenance standards and procedures.

## Dam operations need periodic reviews

- Update flood-control manuals for the Feather and Yuba River Basins.
- Re-evaluate the duration and character of floods modeled to exist in the future and make necessary modifications.
- Provide public involvement in the manual update process.
- Require the Army Corps to review and update flood manuals for all jurisdictional dams on a defined schedule.
- Require FERC to include dam safety in hydropower relicensing.

## Floodplain capacity is limiting flood protection, environmental quality, and local economies

- Fund and implement the Central Valley Flood Protection Plan.
- Assemble diverse stakeholders to define and plan floodplain improvements.
- Evaluate and design multi-benefit floodplain projects (e.g., setback levees) that increase flood protection while creating more floodplain habitat.
- Develop and implement plans to create greater floodway capacity in the San Joaquin Basin.

## People and communities matter

- Complete forensic investigations at Oroville and release to the public.
- Conduct comprehensive assessment of impacts to the Oroville and adjacent communities from 2017 spillway incidents.
- Establish new opportunities for mitigation and community development.
- Develop and make public new inundation maps and Emergency Action Plans.
- Reform the relationships between out-of-area water developers and local communities to create partnerships based on equality, fairness and respect.