

MEETING SUMMARY
Oroville Dam Citizens Advisory Commission
Meeting #9: December 3, 2021
10:00 a.m. – 12:00 p.m.
Virtual Meeting via Zoom Webinar

This meeting summary provides an overview of the December 3, 2021 Oroville Dam Citizens Advisory Commission (CAC) meeting and focuses primarily on capturing the comments and questions posed by Commissioners and members of the public. It is organized by agenda topic to assist readers in cross-referencing the meeting materials. This document is not intended to serve as minutes of the meeting or a transcript of the discussion. A transcript and materials from the meeting are available on the Oroville Dam CAC

website: <https://resources.ca.gov/Initiatives/Oroville-Dam-Citizens-Advisory-Commission>

MEETING AGENDA

- Welcome and Introductions
- Action Items, Meeting Roadmap, and Commission Report
- Joint Operations Center Tour Recap
- Winter Operations Plan
- Downstream Flood Management and Preparedness
- Water Control Manual Update
- Public Comment & Questions
- Adjournment

ACTION ITEMS

- Update on Proposition 1 and the Sites Reservoir
- Update on safety work at the Palermo Tunnel
- Update on piezometers

WELCOME & INTRODUCTIONS

As mandated by the requirements set forth in Senate Bill 955 (2018, Nielsen), the Commission comprises representatives from the following agencies and public bodies. Attendance at Meeting 9 on December 3, 2021 is noted in the table below.

Agency or Public Body	Commissioner (or Alternate)	Present
California Natural Resources Agency	(Chair) Secretary Wade Crowfoot	x
California State Senate	(Vice Chair) Senator Jim Nielsen	x
California State Assembly	Assembly Member James Gallagher	x
Department of Parks and Recreation	Director Armando Quintero (represented by Matt Teague)	x

Department of Water Resources	Director Karla Nemeth	x
California Office of Emergency Services	Director Mark Ghilarducci (represented by Deputy Director of Planning, Preparedness and Prevention Christina Curry)	x
Oroville City Council	Council Member David Pittman	x
Oroville City Council	Mayor Chuck Reynolds	
Butte County Board of Supervisors	Supervisor Tod Kimmelshue	x
Butte County Board of Supervisors	Supervisor Bill Connelly	
Butte County Board of Supervisors	Genoa Widener	x
Yuba County Board of Supervisors	Supervisor Seth Fuhrer	x
Yuba County Board of Supervisors	Supervisor Andy Vasquez	
Sutter County Board of Supervisors	Supervisor Mat Conant	x
Sutter County Board of Supervisors	Supervisor Dan Flores	x
California Highway Patrol	Sergeant Larry Starkey (represented by Officer Joseph Stokes)	x
Butte County Sheriff's Office	Lieutenant Steve Collins	x
Yuba County Sheriff's Office	Captain Joe Million	
Sutter County Sheriff's Office	Deputy Andre Licon	

Secretary Wade Crowfoot began by welcoming commissioners, presenters and the public to the ninth public meeting of the Oroville Dam Citizens Advisory Commission. He provided an overview of the statutory background of the commission and then laid out a roadmap for the meeting and touched on upcoming agenda items. The Secretary introduced Valerie Pryor, General Manager, Zone 7 Water Agency, who was attending the meeting on behalf of the State Water Contractors. Secretary Crowfoot shared that Elizabeth Williamson, who had served as CRNA's Deputy Secretary for Strategic Initiatives is now with the Department of General Services. He then welcomed Nancy Vogel, Deputy Secretary for Water at CNRA.

Senator Nielsen expressed his concern at the lack of progress on Proposition 1 and the proposed Sites Reservoir. Senator Nielsen said the Joint Powers Authority needs to finish the reservoir and that the State a decade ago did work to anticipate the next drought. Secretary Crowfoot explained that later in the month the state Water Commission would meet to provide an update on projects funded by Proposition 1. He said an update on the Sites Reservoir would be provided.

Assemblyman Gallagher touched on the Joint Operations Center Tour in early November and the development of a new Water Control Manual from the U.S. Army Corps of Engineers. He inquired whether safety concerns about the Palermo Tunnel were being addressed. Secretary Crowfoot ensured that the question had been noted and would be answered.

DWR Director Karla Nemeth stated that the U.S. Army Corps Water Control Manual update is expected to be finished in the next five years. DWR put forward strategies including Forecast-Informed Reservoir Operations to the Corps.

On the topic of drought, Nemeth noted that even with October's atmospheric river, California still had its driest year on record since 1924. Due to deep drought conditions, 22 of the 29 State Water Project contractors received an initial allocation of zero on December 1. The remaining seven contractors received allocations only for supplies to meet human health and safety needs. That water will come mainly from the San Luis Reservoir. Oroville's storage is being used to help manage salinity in the Delta. Nemeth reported that the drought barrier installed in the Delta this summer will remain, another indication of the severity of the drought.

Nemeth provided several other updates: There will be an upcoming public process on a request to the State Water Resources Control Board to waive certain water quality requirements; in 2021 the Feather River settlement contractors received 50 percent of the usual allotment due to the drought; the Administration provided funding for rice growers to flood their fields to support the Pacific Flyway; and the Administration will increase the number of salmon raised at the Feather River hatchery to help mitigate for drought. She stressed that this is likely to be a tight water year and that the State Water Resources Control Board will be balancing needs across the system.

Assemblymember Gallagher asked which water contractors would be receiving health and human safety allocations other than Yuba City and Plumas. Director Nemeth and Deputy Director Craddock listed County of Butte, Santa Clara Valley Water District, Napa County Flood Control and Water Conservation District, County of Kings, and Antelope Valley- East Kern Water Agency.

Senator Nielsen commented on work he did a decade ago that inserted language placing the human right to water into law, and he thanked regulators for respecting and implementing this.

Supervisor Kimmelshue informed Director Nemeth of Sutter Butte Flood Control Agency's (SBFCA) request for funding to remove sediment at the confluence of the Yuba and Feather Rivers. The agency has a permit to work on the Feather River until 2026.

ACTION ITEMS, MEETING ROADMAP & REPORTING

Kearns & West delivered an update on Commission action items and the 2022 meeting roadmap. The action item tracker is updated quarterly and included:

- Tour of the Joint Operation Center
- Invitation to the State Water Contractors
- Report on how instrumentation performed and was managed during winter operations
- Provide regular updates and milestones developments from DWR on Forecast-Informed Reservoir Operations (FIRO) as well as Oroville and New Bullards Bar water control manual processes
- Follow-up on the status of the Federal Energy Regulatory Commission (FERC) relicensing
- Follow-up on the status of Federal Emergency Management Agency (FEMA) reimbursement for spillway reconstruction
- Discussion to help state agencies and local partners address homelessness concerns around the Feather River.
- DWR updates on debris and storm inflows
- Agendize discussion on lessons learned from 1986 and 1987 water events
- DWR to respond to Commissioner question regarding what constitutes “failure”
- Request to develop single tracking log cataloging ongoing or future safety projects
- Continue to discuss Risk Assessment and hear from outside experts
- Update on water theft prevention
- Resources for sediment removal
- Capital Improvement Projects discussion and expenditure chart for 2010–2017
- Recreation expansion project updates, including Bidwell Ramp

Kearns & West proposed topics, subject to change, for 2022 meetings including:

Q1 Meeting scheduled for March 2022:

- FERC Relicensing
- Public Safety Partnerships: Evacuation Routes, Inundation Maps
- Status Updates
- Commission Report

Q2 Meeting TBD 2022

- Dam Safety
- Facilities Annual Maintenance Plan
- Sutter Butte Flood Control Agency (SBFCA)
- Status Updates
- Commission Report

Nick Saffold of Kearns & West also gave an update on the development of the Commission’s first report, which will be delivered at the end of 2022. He gave an overview of the report development timeline and proposed an outline of the report. The informal report subcommittee comprises Supervisor Connelly, Lieutenant Collins, and the office of Senator Nielsen.

Proposed sections include:

- Introduction with information on the background and purpose of the Commission.
- Executive summary detailing more specifics of the report
- Content (addressing all the topics that are mandated for inclusion by the legislation)
- Conclusion
- Appendix

Supervisor Conant asked if there would be any discussion of the replacement of piezometers in upcoming meetings. Secretary Crowfoot suggested that that would be a useful topic to cover and ensured it would be included in the first meeting of 2022.

JOINT OPERATIONS CENTER TOUR RECAP

Mike Mierzwa, State Floodplain Manager, gave a recap of the Commission's tour of the Joint Operations Center on November 1, 2021. Agencies represented included the National Weather Service, the U.S. Army Corps of Engineers, the California Office of Emergency Services, the California Natural Resources Agency, and the Department of Water Resources' executive division, State Water Project team, and the Division of Flood Management.

The tour included a robust discussion and questions. Participants toured the State-Federal Flood Operations Center. In this portion of the meeting, topics discussed included pre-season coordination meetings with local and federal agencies, general forecasting procedures, real-time coordination and operations work, and long-term reservoir operation coordination, including the Water Control Manual update. Participants also heard about the importance of using data to inform short-term and long-term operations, public notifications of forecasts, and the use of inundation maps.

The tour finished with a tour and presentation at the operations center for the State Water Project and Central Valley Water Project. Participants received information on the layout, staffing, and coordination of both projects. They learned how data from the Flood Operations Center inform the operations of both projects and promote coordination with local water management entities statewide.

WINTER OPERATIONS PLAN

John Leahigh, the Lead Water Operations Manager for the State Water Project, presented an update on winter operations.

Due to the low soil moisture in the watershed, lake levels at Oroville increased only 7 percent as a result of October's atmospheric river. Lake Oroville currently holds 30 percent of its capacity, which is only 60 percent of normal winter levels. However, the trajectory of storage was better than normal due to the atmospheric river.

Leahigh reviewed the requirements for vacant space outlined in the current U.S. Army Corps of Engineers' Water Control Manual. The amount of vacant space required for flood control ranges from 11 percent to 22 percent, depending on the level of soil saturation — the more saturated the soil in the watershed, the more vacant space is required to absorb peak inflows from large storms. He indicated that these requirements may be subject to change, depending upon data from Forecast-Informed Reservoir Operations and the development process for the new Water Control Manual.

Adherence to the current flood control requirement of 13 additional feet of flood pool has not had much effect on storage in 2021. Given the unpredictable nature of precipitation in California, there is still a 25 percent to 30 percent chance that the flood pool could become relevant in the winter.

DOWNSTREAM FLOOD MANAGEMENT AND PREPAREDNESS

Gary Lippner, Deputy Director of Flood Management and Dam Safety at the Department of Water Resources, provided this presentation.

Lippner reviewed the organization of DWR's flood management programs, which include three broad categories: responsive services that occur before and during events, proactive service that enhances local capacity to avoid or respond to flood events, and active services which function to reduce losses during events. Within these three basic categories of services are five more specific subsets of programs: planning, floodplain management, flood risk reduction projects, systemwide maintenance, and flood emergency response.

Lippner underscored the public safety benefit that the Flood Operations Center (FOC) provides during flooding events. The FOC provides situational awareness during emergency declarations or evacuation orders, releases data to the public through the California Data Exchange Center and the Flood Emergency Information Exchange, houses Forecast-Informed Reservoir Operations (FIRO), and holds pre-season coordination meetings with first responders.

The Central Valley Flood Protection Plan is a long-range blueprint for Central Valley flood management and is updated every five years. The Flood Management Plan is a prescriptive document that sets state flood management priorities but does not itself permit projects. The newest version of the Flood Management Plan will be released in 2022 and will include an emphasis on climate resilience.

Mr. Lippner also discussed continued flood risk reductions projects, a key element of climate resilience. He congratulated Sutter Butte Flood Control Agency (SBFCA) on one such project that would bring a 200-year-level of protection to its local region. Lippner discussed the Small Community Flood Risk Reduction programs and Rural Flood risk reduction programs. Lastly, Lippner mentioned that the National Flood Insurance Program, which has been championed by DWR in California, is a key program in assessing and mitigating flood risk. There will always be some residual risk of flooding, which is why continued preparedness is key.

Supervisor Kimmelshue thanked Lippner for mentioning SBFCA's work on the Feather River and expressed hope that there could be funding found for the agency to work on the Sutter Bypass next. Supervisor Conant echoed Supervisor Kimmelshue's comment on the importance of receiving funding for that project.

Commissioner Widener asked about what level of releases from Oroville Dam are considered in making risk assessments. Mike Mierzwa explained different types of risk assessments and asked for clarification of the question. Commissioner Widener added that she wanted to understand how much water was being released when terms like "100 year" or "200 year" storm events are used, as many such events appear to have happened in her lifetime. Director Nemeth clarified that in storm events, the downstream levees are the real limitation on Oroville Dam releases, as they have a capacity to hold flow of around 150,000 cubic feet per second.

Assemblyman Gallagher asked if real-time data could be used in the coming season to adjust the flood space factor if there were another atmospheric river, increased snowpack, or similar event. DWR Deputy Director Ted Craddock assured him that the flood control space could be adjusted depending on whether the watershed was wet or dry. Supervisor Conant later added that releases from Shasta reservoir and reservoirs operated by the Yuba Water Agency also would affect flows downstream of Oroville Dam.

WATER CONTROL MANUAL UPDATE

Joe Forbis, Chief of the Water Management Section of the U.S. Army Corps of Engineers, gave a preview of the updates being made to the Water Control Manuals for both Oroville Dam and the New Bullards Bar Dam.

The U.S. Army Corps of Engineers has three objectives in its water control management: operating to the authorized purposes of a dam or project, maintaining the integrity of the project, and avoiding risk to public health and safety, life, and property both upstream and downstream. Forbis added that the Corps is responsible for water management at Corps-owned facilities as well as prescribing rules and regulations for other projects that are partially federally funded, like Oroville. Those regulations form a water control plan embodied in the project's Water Control Manual.

Forbis explained that the update to the Water Control Manual will be an extensive process that spans multiple years. The process requires establishing the project management plan, ensuring that the public and stakeholder outreach and communication and coordination is ongoing throughout the project, setting up the baseline hydrology, understanding existing conditions, developing alternatives, and reviewing and approving the proposed manual update. In addition, changes to the Oroville and New Bullards Bar Water Control Manual will be made collaboratively to benefit the entire region. Updates to the Forecast Informed Reservoir Operations, or FIRO, manual will also be made in sync with the development of updates to the other two manuals.

Forbis disclosed that the project management, data management and hydraulic plans for the Water Control Manual had already been developed and are being implemented. Additionally, task one of manual development — establishing and defining the flood operation objectives and performance metrics for each project — has been completed. In the future, scheduled deadlines will ensure that FIRO is shaping the Water Control Manual update and vice versa.

Forbis stated that there had been kickoff meetings between the Corps, Yuba Water Agency, and DWR for planning the environmental modeling required for the Water Control Manual update. The Corps is also in the process of scheduling workshops with upstream and downstream stakeholders to collect information about potential operational constraints.

PUBLIC COMMENT AND QUESTIONS

A member of the public asked why Oroville uses 150,000 cfs of releases for flood protection planning when the standard project flood is greater than 180,000 cfs. The public commenter also asked if the Commission would endorse Dr. Storesund's proposal from the May meeting that covered incremental releases of up to 400,000 cfs.

DWR staff and Joe Forbis, U.S. Army Corps of Engineers, responded that the Water Control Manual update would include recommended releases that reflect current conditions and the pressures of climate change.

A member of the public requested that several questions posed in advance that were not answered in presentations be responded to as part of the official record. The speaker also stated that several questions raised in the previous meeting were not included in the recommendation log in the appendix of the last meeting summary. The same commenter also

asked if the Commission had considered reverse engineering of the 1997 flood. The commenter suggested that the exercise would reveal human points of intervention that could have taken place to prevent flooding but were not because authorities relied too heavily on regulatory permissibility.

Secretary Crowfoot acknowledged the commenter's request and asked facilitators to capture questions from the previous meeting that may not have been answered. He also asked that the DWR team consider the reverse engineering proposal.

Supervisor Conant asked if an alternate spillway and/or an alternate powerhouse had been ruled out that could be used to release lower-flow water out of the reservoir during a critical storm event. Secretary Crowfoot expressed that because of the magnitude of that question it should be addressed at one of the next two meetings.

The first public commenter asked again if the commission would express support for Dr. Storesund's proposal. Secretary Crowfoot suggested that lacking full context, the Commission should address that question in the next meeting to be fully transparent.

Public comments concluded when the Secretary read two written comments complimenting the U.S. Army Corps of Engineers on their presentation and asking Forbis if the Corps had downgraded the flow reliability of the levees downstream.

ADJOURNMENT

Secretary Crowfoot concluded the meeting by noting that he would be amenable to slightly extend the meetings in the future if necessary to cover all content.

Secretary Crowfoot announced that the next meeting would be in March 2022.

Senator Nielsen concluded by thanking the Commission.

Secretary Crowfoot adjourned the meeting.

APPENDIX

The following communication was submitted to the commission by a stakeholder on 11.20.21

*Scheduled for this upcoming meeting is Action Tracker #13 - “**Lessons learned from 1986 and 1997 flood events.**” The request made 10 months ago at the 2-19-21 meeting talked of a reverse engineering approach that goes beyond the simple conclusion of levee failure. It should break down all contributing factors in the event chain that could be re-engineered to minimize the likelihood of recurrence.*

We are not looking for individuals to blame or liabilities to settle, instead it should provide DWR and levee agencies the opportunity to highlight what was learned, the improvements made, and the vulnerabilities that still need to be addressed.

When reverse engineering the past events, four major contributing factors stand out:

- 1. Rain Event / Reservoir Inflows*
- 2. Facility Limitations / Knowledge*
- 3. Dam Operations / Human Factors*
- 4. Levee Vulnerabilities*

Drilling down further, there are numerous points for possible human intervention, or gates within a Fault Tree Analysis (FTA). It's time we understand how these lesser gates affect the whole system. FTA is a graphical tool to explore the causes of system level failures. It uses boolean logic to combine a series of lower level events to identify the component level failures (basic event) that cause the system level failure (top event) to occur.

Therefore, it is respectfully recommended that a Fault Tree Analysis be created.

- 5. It would be a great visual tool for senior management and the Finance Committee during the CNA plan selection process*
- 6. Serve as a roadmap during the development of the new FIRO water control manual*
- 7. Act as a quick reference guide for those in Oroville's operation center during an event*
- 8. And provide the Citizen Advisory Commission the means to monitor the “Who, When and How” these intervention points are managed in the future*

Following are some of the points of intervention that may have been missed in the past, or could be utilized in the future. These Advance Questions could either be incorporated into the December 3rd presentations, or answered later in the official meeting summary report. More importantly, these and others need to be included in the creation of the Fault Tree Analysis.

Rain Event / Reservoir Inflows

The 1986 event was said to be a 1 in 70 year event, yet we have had 4 to 5 similar storms in a 70-year period indicating that improved forecast modeling was needed.

Question 1 - *What does Atlas 14 tell us to prepare for in amounts, frequency and duration for future storms? How is that being utilized in future facility design and operations updates?*

Question 2 - *Has accelerating climate change and recent historical storms already made the guidance of Atlas 14 outdated?*

Question 3 - *How frequently should Atlas 14 guidance change, and how will the revisions continuously change the joint water control manual for Oroville/Bullards?*

In the original operations manual spillway release were not required, until real time reservoir inflows at lake-level were measured.

Question 4 - *How has inflow forecasting improved in regards to upstream reservoir coordination, watershed rain monitors and river gauges? How will the additional lead time be utilized in the future?*

Pre-event lake levels were guided by the Moisture Index of the watershed on a scale of 1 to 11 in ground saturation. There was no additional requirement to adjust levels for heavy snowpacks.

Question 5 - *How will the snowpack affect pre-event lake levels going forward?*

In the past we didn't know the moisture content of the snowpack at different elevations within the watershed to accurately forecast runoff associated with warm atmospheric rivers.

Question 6 - *How will the water content of the snowpack at different elevations be measured and used to trigger early releases in the future?*

Water Control Manual / Human Factors

Marysville Reservoir was to provide an additional 150,000 AF of flood storage for the Feather/Yuba watershed when the first water control manual was created. Instead of increasing the hard storage at Oroville or Bullards, surcharge flows of 11 feet were to overtop the emergency spillway at Oroville as the FCO throttled back to maintain a maximum of 300,000 cf river flows at Marysville.

Question 7 - *How will the lack of hard flood storage at Marysville Reservoir be accounted for in the new FIRO water control manual?*

One objective of Forecast Informed Reservoir Operations (FIRO) is to customize the reservoir operations for the current rainy season. If properly designed and managed it could eliminate maximum flows of 300,000 cf at Marysville.

Question 8 - *Please explain all the various weather, watershed and reservoir data points that FIRO will calculate for both lake levels and releases.*

Question 9 - *Please include all those possible FIRO "gates for human intervention" in the requested Fault Tree Analysis.*

Question 10 - *Who is gathering all this various real-time data?*

Question 11 - *Is there a software application being developed to process the modeling for projected reservoir inflows / durations that will guide the proactive outflows?*

Another objective of FIRO is improved water supply during drought conditions. As we heard last meeting SWP water is worth \$800- / AF to the East Bay. Therefore every 10,000 AF of improved delivery equals an additional \$8 million in revenue.

Question 12 - *With this kind of financial incentive, how do we ensure an equitable balance between flood protection and water delivery? Will it be measurable and trackable?*

Facility Limitations / Understanding

As we all witnessed during the 2017 Spillway Event, use of surcharge flows over the emergency spillway was not within the facility's capabilities. It was the last resort, and as such, we operated decades without the 150,000 AF of flood storage Marysville Reservoir was to provide.

Question 13 - *Will further improvements be made to the Auxiliary spillway for surcharge operations, or will FIRO account for the lack of storage with early releases?*

Due to the current elevation of the Flood Control Outlets (FCO), early releases needed for FIRO are very limited. Most of the proposed CNA plans include a low-level outlet, but it could be 10 years before it is operational.

Question 14 - *Will low-level outlet construction time delay the implementation of FIRO? Can FIRO be continually modified as facility improvements are completed?*

Question 15 - *How will FIRO be modified as facility conditions deteriorate?*

Will this create an environment for non-disclosure due to financial incentives?

The Independent Forensic Team went in depth on the decision making within the operational center and the lack of available information to make critical decisions such as the geology report for the Auxiliary Spillway.

Question 16 - *Are we confident that all such reports are readily available?*

Question 17 - *Are those in operations aware of both the known and unknown facility vulnerabilities per the recent Part 12 inspection? Is that pertinent material also available for those in the operation center?*

Question 18 - *Are the vulnerability of downstream levees also known and available for the decision makers during high water events?*

Levee Vulnerability

Levee failure has occurred 3 of 4 (75%) of the time the Feather River channel reached its maximum carrying capacity in 1956, 1986, 1997. Yet 300,000 cf flows at Marysville are still considered standard operating procedures for the water control manual.

Question 19 - *How will this risk factor be incorporated into FIRO?*

The 1986 levee failure was thought to be from underground head pressure seeping through a gravel pit or old river bed. Old river beds have been mapped under our levee system in numerous places.

Question 20 - *What mitigating actions such as relief wells or extended levee toes have been completed at these locations?*

Another cause of levee failure is the slouching of the saturated levee crest that occurs during rapid downramping of the river flows. This was a possible factor in the 1956 and 1997 events. The process was evident in 2017 when 100 year old river banks failed during downramping.

Oroville's current operation manual regulates spillway down ramp rates to 10,000 cf every 2 hours. However, the Middle and South Fork of the Yuba is largely unregulated so the actual down ramping is much greater when measured at the river gauges.

Question 21 - *What is considered safe down ramping rates for the levee following 150,000 cf or 300,000 cf outflows? Should the rate be measured by the actual river gauges?*

Levees have been greatly improved since the last failure, and downstream communities are grateful for the role DWR and ACOE have played in this effort. Yet the near levee failure in Yuba City during the 2017 event with less than 50% of allowed outflows is evidence that levee certification is not equivalent to dependability. Most levee districts look to this expert guidance for planning work projects and maintenance.

Question 22 - *How has our knowledge of levee vulnerabilities improved since?*

What potential vulnerabilities are yet unlearned? Are there ongoing studies to resolve?

As we've previously agreed, advanced questions inform the meeting presenters the information downstream citizens truly want to know. The public comment time for these meetings has not been sufficient enough to meet this goal. When questions are received timely, it provides presenters enough time to prepare their responses. When presentation time is limited, their answers can be submitted later within the official Meeting Summary Report.