

## Spillway and Flood Management Discussion, FERC Oroville Dam FEIS

**Comment 24:** Friends of the River, Sierra Club, and the South Yuba River Citizens League comment that the draft EIS does not demonstrate continued adequacy of the proposed project facilities as stated in section 2.1.5, Project Safety. These groups comment that the draft EIS includes none of the project-safety facilities or operational changes they or Sutter County proposed be included or any description of special articles. The exclusion of flood management functions from the draft EIS suggests to these organizations that the goals of project safety have not been met. They also comment that it is possible that the Commission and DWR staff concluded that the operational or emergency use of the unarmored spillway will not result in any risk of failure of crest control at the dam; however, since this information is not available to the public because of security concerns, they are unable to form an independent opinion. They also point out that under the current Corps manual, the first 10 feet of the ungated spillway should be characterized as an auxiliary spillway.

**Response:** Ensuring the safety of Commission-licensed hydroelectric projects is an on-going process with evaluations by Commission-approved independent consultants for high hazard dams such as Oroville every 5 years. Work on dam safety issues is critical energy infrastructure information (CEII) that, as you point out, is not available to the public. A memorandum dated July 27, 2006, that summarizes our responses to several of the parties' concerns about the safety of the Oroville dam is available to the public via eLibrary under docket P-2100. This memorandum, from the Commission's Division of Dam Safety and Inspections, concludes that the spillway is properly characterized as an emergency spillway and is structurally adequate. Congress has given the responsibility for flood management at the Oroville dam to the Corps; however, we added information to section 3.3.2.3, Water Resources, Cumulative Effects in the final EIS about the Corps' on-going studies that pertain to flood management and the need for DWR to coordinate with the Corps.

---

**Comment 55:** Friends of the River, Sierra Club, and the Citizens League note that the draft EIS states that Lake Oroville be operated to maintain up to 750,000 acre-feet of storage space to capture significant inflows for flood control (section 3.3.2.2). However, these three groups comment that this does not properly capture DWR's flood-control space obligations and fails to recognize that operational floodwater management operations require a 900,000 acre-feet flood-space reservation to accomplish regulation of project-design outflows to no more than the project-design objective release.

**Response:** The license application states that the storage capacity is 750,000 acre-feet. We revised the text in section 3.3.2.2 of the final EIS to include the surcharge storage for a total of 900,000 acre-feet.

---

**Comment 56:** American Rivers, Sutter County, the California Sportfishing Protection Alliance, Friends of the River, Sierra Club, and the South Yuba River Citizens League disagree with the Commission's decision not to address the impacts of flood control operations "because the Corps is primarily responsible for flood control operations." American Rivers, Sutter County, Friends of the River, Sierra Club, and the South Yuba River Citizens League cite FPA section 10(a)(1) stating that it mandates flood control as one of the beneficial uses to be addressed in a comprehensive plan of development. While the Corps is responsible for flood control operations, commentors say that NEPA provides that the Commission will coordinate with other agencies that have regulatory jurisdiction over any impact of a project, prior to making its licensing decision. In addition, since the impacts of flood control, water supply, and power operation are cumulative, the Commission has an obligation to analyze the impacts of flood control operations and consider reasonable alternative measures to prevent or mitigate such impacts, even though it does not have direct authority to implement such measures. Friends of the River, Sierra Club, and the South Yuba River Citizens League also cite the Commission's duties under Section 10(b) and 15(b) of the FPA, as well as the Commission's Engineering Guidelines and 18CFR 4.51(g)(2). American Rivers requests that the Commission affirmatively request the cooperation of the Corps, analyze the environmental impacts of existing flood control operations, consider reasonable alternative measures, and reserve its authority in the new license to require any necessary changes. Sutter County requests that the final EIS analyze the environmental consequences of flood control operations at Oroville, including the absence of the Marysville dam, the interim flood control rules that have been applied for the last 35 years, and the recent reports that address flood control issues (2002 Sacramento and San Joaquin River Basins Comprehensive Study; Yuba County Water Agency Technical Memoranda 2002a and 2002b; Yuba-Feather River Forecast-Coordinated Operations Program; and environmental review documents associated with the Yuba-Feather Supplemental Flood Control Project). Sutter County also requests that the Commission issue several relicensing orders including: (1) make a formal request to the Corps for the Corps to immediately develop a revised operational plan for Oroville to establish flood-control management on the Feather River system that accounts for the absence of Marysville dam and full regulation of Yuba River, without the necessity for surcharge operations of or at the project above the ungated spillway; (2) direct the licensee to investigate the adequacy and structural integrity of Oroville dam's ungated auxiliary spillway that may currently pose a risk to the project facilities and downstream levees in Sutter County and take all necessary actions to correct identified deficiencies; and (3) direct the licensee to investigate the adequacy and structural integrity of levees on Feather River, in the context of its hydroelectric, water supply and flood control operations and to repair, replace, and maintain those levees to provide appropriate levels of flood protection in light of license operations. Sutter County requests these license orders be issued in the event licensing action is delayed and annual licenses become necessary.

**Response:** In Congress's original authorization of the project, the Corps acknowledged that the dam would provide considerable flood benefits by regulating a flood. In the original license, two existing articles address flood control. Article 50 states "The operation of the project in the interest of flood control as provided in Article 32 of the license shall be in accordance with the rules and regulations to be prescribed by the Secretary of the Army pursuant to Section 204 of the Flood Control Act of 1958 (Order amending license-major, Issued January 22, 1964)." Article 32

states “The licensee shall collaborate with the Department of the Army in formulating a program of operation for the project in the interest of flood control (Order issuing license-major, December 14, 1956).” As noted in our response to comment 24, we agree that DWR should continue to coordinate with the Corps and agree that an article similar to the existing article should be included in any new license issued for the project. As stated in the EIS, any dam safety issues associated with the emergency spillway are properly addressed through the Commission’s ongoing dam safety program, not the relicensing process. C-20

---

**Comment 66:** Friends of the River, the Sierra Club, and the South Yuba River Citizens League comment that the draft EIS states that under Proposed Article A130, Flood Control, DWR would operate the project in accordance with rules and regulation prescribed by the Corps pursuant to section 204 of the Flood Control Act of 1958 and that this is consistent with the existing license requirements. These groups state that this license requirement has already been violated; major downstream levee breaks have occurred and people have died. They comment that the existence of requirements to follow Corps and Commission rules will not solve the problem of operators exceeding design release objectives to avoid surcharge operations; the problem is that operators are demonstrably reluctant to conduct Corps and Commission required flood control operations in the absence of a spillway on the auxiliary spillway. This is a matter that is the Commission’s principal responsibility to address. The draft EIS does not address how the existing structural deficiencies of the Oroville Dam facilities that affect the willingness of its operators to conduct operations required by existing Corps regulations will be addressed and if the Commission will consider this operational impact of a structural deficiency to be properly addressed by the dam safety program, or whether only the risk of loss of crest control from such operations is properly addressed by the program.

**Response:** We contacted the Sacramento District Corps office to discuss flood management at the Oroville Facilities (see telephone report with Mr. Townsley on March 21, 2007). The Corps is satisfied that DWR is operating the project during flood events in accordance with the Corps Water Control Manual and Field Working Agreement. Further, there is no evidence in the public record that indicates levee failure or loss of life attributable to DWR project operations.

---

**Comment 67:** According to Friends of the River, Sierra Club, and the South Yuba River Citizens League, footnote 46 of the draft EIS assumes that the Work Group is a reference to one of the work groups established for relicensing. They indicate that this is a reference to the group members of the Yuba Feather Work Group (Work Group), a stakeholder-based collaborative formed to work on flood management and related environmental restoration issues in the Yuba and Feather River watersheds. The Work Group is composed of the South Yuba River Citizen’s League, Friends of the River, Nevada County, Sutter County, Sierra Club, Yuba County Water Agency, and state and federal agencies comprising Cal Fed.

**Response:** We clarified in footnote 51 (formerly footnote 46) that we are referring to the Yuba Feather Work Group.

---

*Flood Control and Early Warning System (Proposed Articles A130 and A131)*

DWR operates Lake Oroville to maintain up to 750,000 acre-feet of storage space to capture significant inflows for flood control under the direction of the Corps. This operation provides storage space for springtime flood waters and provides for subsequent flows releases to meet minimum targets of 150,000 cfs downstream of Lake Oroville, 180,000 cfs upstream of Yuba River, 300,000 cfs downstream of Yuba River, and 320,000 cfs downstream of Bear River. The Corps has not recommended any changes to project flood control measures under this proceeding. Lake Oroville would continue to be operated in accordance with the Corps' 1970 Reservoir Regulation Manual.<sup>48</sup>

Under Proposed Article A130, *Flood Control*, DWR would operate the project in accordance with the rules and regulations prescribed by the Corps pursuant to section 204 of the Flood Control Act of 1958. This is consistent with the existing license requirements.

Under Proposed Article A131, *Early Warning System*, DWR would improve communication and coordination with affected agencies by developing and filing for Commission approval an early warning plan for flood events. The plan would describe how DWR would communicate and coordinate project operations with the Corps, the California Office of Emergency Services, and the Butte County Office of Emergency Services before and during flood emergency events. DWR already communicates and coordinates with these entities regarding flood events, but would formalize communication and coordination through the early warning plan. The plan would be developed and filed with the Commission within 1 year following license issuance. DWR would consult with the Corps, the U.S. Bureau of Reclamation, the California Office of Emergency Services, and the Butte County Office of Emergency Services in developing this plan. Upon Commission approval, DWR would implement the plan, including any changes required by the Commission and the Commission would have the right to make further changes to the plan.

Section 4.10 of the Settlement Agreement acknowledges that DWR would comply with the rules and regulations prescribed by the Corps and that the Settlement Agreement Parties reserve the right to present evidence or argument relative to the effects posed by any flood control proposal raised by any intervenor or otherwise before the Commission or the Corps.

Butte County, Sutter County et al.,<sup>49</sup> Friends of the River, and Anglers Committee, in their letters dated April 26, 2006, April 26, 2006, October 17, 2005, and December 15, 2005, respectively, recommend that additional measures be undertaken with respect to flood control. Butte County

---

<sup>48</sup> The 1970 Reservoir Regulation Manual implements the rules and regulations that are prescribed pursuant to section 204 of the Flood Control Act of 1958. Specifically, Article 32 of the original license states that "the Licensee shall collaborate with the Department of the Army in formulating a program of operation for the project in the interest of flood control.

<sup>49</sup> The Sutter County Intervenor include Sutter County, the City of Yuba City, and Levee District Number 1 of Sutter County.

recommends that DWR should be directed to work with the County to address potential flood risks by providing additional security at the Oroville dam and relocate the Butte County Emergency Operations Center outside of the project flood plain in order to ensure that DWR would have an appropriate emergency action and dam safety plan in place.

Sutter County et al. recommend that DWR address the following critical flood protection and control issues as outlined in their Amended Motion to Intervene:

- Make a formal request to the Corps for the agency to immediately develop a revised operational plan for Oroville to establish flood-control management on the Feather River System that accounts for the absence of Marysville dam and full regulation of the Yuba River without the necessity for surcharge operations of or at the project above the ungated spillway.
- Investigate the adequacy and structural integrity of Oroville dam's ungated auxiliary spillway that may currently pose a risk to the project facilities and downstream levees in Sutter County in the event extreme flood releases are required, as recently experienced in flood release events of 1986 and 1997, and take all necessary actions to correct any identified deficiencies, in this regard.
- Investigate the adequacy and structural integrity of levees on the Feather River, in the context of its hydroelectric, water supply, and flood control operations and repair, replace, and maintain those levees to provide appropriate levels of flood protection, in light of project operations.

Friends of the River recommend that DWR work with the Corps and other interested parties, such as the Work Group,<sup>50</sup> to develop revisions to the Oroville dam reservoir regulation manual concerning surcharge, forecast, and coordinated operations.

The Anglers Committee et al. recommend that the Oroville dam emergency spillway deficiency be corrected by DWR to protect public safety in the downstream areas downstream of Oroville dam. Plumas County, in its March 15, 2006, Motion to Intervene, recommends that a new license for the Oroville Facilities address flood planning to protect downstream communities and give consideration to the open questions and uncertainty about levee improvements and future land use decisions. As one component of the flood control solution, it recommends that the licensee should continue the pilot program it initiated as part of the Plumas Watershed Forum, with the new license incorporating a program of upstream reinvestment in projects that restore natural infrastructure to attenuate flood flows. Plumas County also recommends that DWR address the possibility of climate change impacts on water supply and flood control. Because of its relatively low elevation, the Feather River Watershed would be one of the first areas to experience a reduced snowpack and altered hydrograph as a result of rising temperatures. For that reason, according to Plumas County, the new license should provide the opportunity to review changing conditions and make operational adjustments to respond to changes in the quantity and timing of flows into Lake Oroville.

---

<sup>50</sup> This refers to the Yuba Feather Work Group that is not connected to the Oroville relicensing. We note that DWR has participated in this work group and provided grant funding.

In its May 26, 2006, filing with the Commission (DWR, 2006a), DWR states its opposition to Butte county's recommendation to relocate the Butte County Emergency Operations Center. It also states that the project provides significant flood control benefits to Butte County and that many of Butte County's requests are redundant with what is already contained in the Settlement Agreement. The State Water Contractors and the Metropolitan Water Districts of Southern California (Metropolitan) in their joint May 26, 2006, filing (SWC and Metropolitan, 2006) state that global warming could be addressed under the Commission's ongoing regulatory role, including a possible license reopener. They also recommend issues related to the emergency spillway be addressed under the Commission's Part 12 process and/or by the Corps. Similarly, they recommend that any changes in flood control operations be addressed by the Corps. They also recommend rejecting the transfer of levee maintenance costs to DWR.

### *Staff Analysis*

DWR would continue to operate the project for the purpose of flood control as directed by the Corps. Any modification of the project's flood control operation would be the responsibility of the Corps. To the degree that modifications would potentially affect dam safety, the Commission's Division of Dam Safety and Inspections and DWR's California Division of Safety of Dams would also be involved in the review process. Reservoir regulation manuals are strictly maintained and revised by the Corps, although DWR could be consulted by the Corps. If major operational revisions to the project are required as a result of future changes in hydrology, those could be addressed through the standard license reopener article.

Article 50 of the existing license states "The operation of the project in the interest of flood control as provided in Article 32 of the license shall be in accordance with the rules and regulations to be prescribed by the Secretary of the Army pursuant to Section 204 of the Flood Control Act of 1958 (Order amending license-major, Issued January 22, 1964)." Article 32 of the existing license states "The licensee shall collaborate with the Department of the Army in formulating a program of operation for the project in the interest of flood control (Order issuing license-major, December 14, 1956)." Continuation of the flood control stipulation of articles 32 and 50 into a new license would ensure that DWR operates the project consistent with Corps mandates.

Any dam safety issues associated with the emergency spillway are properly addressed through the Commission's ongoing dam safety program, not the relicensing process.

We encourage voluntary efforts by DWR to continue the pilot program it initiated as part of the Plumas Watershed Forum. The Oroville Facilities currently contribute up to 750,000 acre-feet of storage without compensation for the purpose of attenuating flood flows. We consider that providing additional attenuation upstream of Lake Oroville and outside the project boundary represents a discretionary, rather than an obligatory, measure on the part of DWR. We reviewed the bylaws for the Plumas Watershed Forum (Plumas County, 2006) and note that DWR is included as a participant. According to the bylaws, the Plumas Watershed Forum is a locally driven program. As such, we consider that imposing a federal obligation would seem contrary to its mission.

Formalizing communication and coordination with the affected flood control agencies through an early warning plan would improve flood safety and communication during emergencies. Staff considers that Sutter and Yuba counties could also be included in this process. Because any changes to flood control operations could affect Sutter and Yuba counties, and would use USGS data, these entities should be included in the development of communication protocols.

We analyze the recommendation for relocating the Butte County Emergency Operations Center in section 3.3.10, *Socioeconomic Resources*.

#### *Additional Gaging (Measure B103)*

Under Measure B103, *Additional Gaging*, DWR would evaluate and potentially implement additional stage and/or precipitation gaging locations to improve flood forecasting and monitoring. Butte County recommends that, within 1 year following license issuance, DWR prepare a compliance and monitoring plan for existing project and non-project gages and submit to the Commission for its approval. Butte County recommends that DWR evaluate the existing project and non-project gages located within and upstream of the project boundaries, but within the Feather River Watershed, that measure precipitation, snow, reservoir stage, and stream flow. DWR's evaluation would determine the location and type of additional telemetered gages that would be needed to improve project flood flow forecasting, monitoring, and emergency management. Additionally, Butte County recommends that DWR install all such gages within 2 years of Commission approval of the plan and that all such gages be telemetered to the California Data Exchange Center real-time network. It recommends that the plan be developed in coordination and consultation with the Corps; USGS; and Butte, Yuba, and Sutter counties.

#### *Staff Analysis*

Stream gaging and forecasting (including other weather stations such as precipitation gages and snow pack measurement sites) aid the ability to forecast flood behavior and coordinate flood response. We have reviewed the existing stream gaging at the project and find that it is adequate to ensure operational compliance with existing and proposed license articles. However, we recognize the concerns about flood control and would encourage DWR's efforts to coordinate with other agencies in developing plans, including additional stream gaging, to improve forecasting in the case of severe flood events as intended in Measure B103, *Additional Gaging*. We see an advantage in linking the compliance monitoring to the flood communications and coordination plan for purposes of consultation. We do not see Butte County's recommendation and Measure B103 as mutually exclusive because preparing a compliance plan for gages both within the project boundary and outside the boundary would appear to support this measure.

---

### **3.3.2.3 Cumulative Effects**

#### **Water Quantity**

Since construction of the Oroville Facilities and other FERC-licensed projects upstream of the Oroville Facilities, project operations have affected water quantity throughout much of the Feather River Basin. No dedicated flood control exists in the upper basin. However, typically hydroelectric projects will refill during the spring runoff period and may provide incidental flood control. The Integrated Regional Water Management Plan (Ecosystem Sciences Foundation, 2005) does include flood control as one of seven strategy elements and this may eventually result in improved flood flow management in the Upper Feather River Watershed.

The Proposed Action would slightly increase flows in the low flow channel; however, such changes would not be expected to produce a major shift in flows downstream of the Oroville Facilities. Under all the alternatives, we would expect average annual Feather River service area deliveries under existing conditions and year 2020 conditions to remain 994,000 acre-feet, and average annual South Delta deliveries to increase from the existing 3,051,000 acre-feet to 3,247,000 acre-feet in year 2020. Although the annual flows in the Feather River downstream of Thermalito afterbay would remain similar over time, there is a seasonal change in flow distribution with higher flows occurring from May through August and lower flows occurring from September through April under year 2020 conditions as compared to existing conditions. DWR bases its water use projections presented in its application using the year 2020. We view Feather River flood control activities as cumulative effects because flood control at the Oroville Facilities is the responsibility of the Corps. The Corps is currently involved in several studies and reports that were summarized in *SP-E4: Flood Management Study* and appended to the final license application. We summarize briefly the conclusions and status of several of these flood related items. The Feather River Floodplain and Water Surface Profiles report presents, for the Feather River from Oroville Dam to the mouth of the Yuba River, maps of floodplains for the floods with 1 percent and 0.2 percent probability of exceedance, floodway boundaries for the flood with 1 percent probability of exceedance, and water surface profiles for the floods with 10 percent, 2 percent, 1 percent, and 0.2 percent probability of exceedance. It also includes various input parameters and was performed to FEMA specifications to support federal flood insurance purposes.

The Yuba Feather Supplementary Flood Control Project began in 1997. Its goal is to define and implement as soon as possible a cost-effective, practicable program of measures to achieve a reliable level of protection against floods from the Feather and Yuba Rivers. Five measures for probable implementation include a storage increase at New Bullards Bar Reservoir, enlargement of outlets at New Bullards Bar Reservoir, tailwater depression at New Colgate Power Plant, forecast-based operations at New Bullards Bar Reservoir and Lake Oroville, and levee setback on the Feather River. In the opinion of Yuba County Water Authority, these measures collectively fall short of meeting the stated goal, therefore, YCWA is considering additional projects in the future.

The Yuba River Basin Project Feasibility Report and Final EIS and EIR were completed in April 1998. Congress authorized the project in the Water Resources Development Act of 1999, and the Record of Decision was signed in June 2000. The authorized project included specific levee modifications on 6.1 miles of the left bank of the Yuba River upstream of the confluence with the Feather River; 10 miles of levee on the left bank of the Feather River downstream of the confluence of the Yuba River; and 5 miles of the Marysville ring levee. The levee modification

work as authorized was intended to bring the level of protection for these levees up to about a 200-year level of protection. On March 17, 2004, a notice of Intent to Prepare a Draft Supplemental EIS and EIR for the Yuba River Basin Project was posted in the Federal Register, with the Corps as the lead federal agency. A Supplemental Draft EIS, an EIR, was noticed on January 19, 2006, in the Federal Register. The proposed action would be a general reevaluation of the authorized project and other alternative plans to provide the level of flood protection previously planned and to restore riparian and aquatic habitats in the project area. Another Corps regional study with an interim report was issued in December 2002 and was focused on the Sacramento and San Joaquin river basins.

The goal of the *Sacramento and San Joaquin River Basins Comprehensive Study* is to develop an approach for projects on those rivers and their major tributaries that will solve flooding and ecosystem problems more effectively than present methods do.

A third major regional Corps study involves Sutter County. The notice of Intent to Prepare a Joint EIS and EIR for the Sutter County Feasibility Study, Sutter County, CA was published in the Federal Register on September 12, 2001. The objective of the Sutter County Feasibility Study is to present the purpose and status of alternatives to reduce future flood damages on the Sacramento River, the Feather River, the Sutter Bypass, and other watercourses in Sutter County. The study focuses on the integrity of the facilities of the Sacramento River Flood Control Project, particularly at those locations where flooding problems have been most likely to occur. The Sutter County Feasibility Study will also investigate opportunities to integrate ecosystem restoration measures and will produce an environmental document.” The Corps, Reclamation Board, and Sutter County are all participants in the study. Some of the alternatives under consideration in this study include (1) enlarging existing levees along the Feather and Sacramento Rivers, and the Natomas Cross Canal; (2) realigning levees along the Feather, Bear, and Sacramento Rivers; (3) constructing a ring levee to the east of Yuba City; (4) constructing a channel or levee intercepting flows above Yuba City; (5) reoperating Feather and Yuba River upstream reservoirs; (6) adopting a local flood plain management plan; (7) removing sediment from the Sutter Bypass, Feather and Sacramento River, and canal systems; (8) reoperating state pumps and drain lines; (9) improving levees along the Sutter Bypass; and (10) modifying the Tisdale Bypass to convey higher flows sooner.