

## **FINDING OF EMERGENCY**

The Department of Water Resources (department) finds that an emergency exists, pursuant to Water Code Section 6162, which calls for immediate action to avoid serious harm to the public peace, health and safety, or general welfare.

Water Code Section 6161(a) requires owners of state jurisdictional dams, except those classified as low hazard, to prepare and submit inundation maps for department approval. The proposed emergency regulation is needed to clarify and make specific the details of this requirement. Water Code Section 6161(a)(3) requires owners to develop and submit Emergency Action Plans (EAPs) based on department-approved inundation maps. Failure to take immediate action will delay inundation map and EAP submittal, potentially endangering public safety. This could lead to time delays in evacuation and potential loss of life in the event of a dam emergency.

### **Background**

The Oroville spillway incident that began on February 7, 2017 called attention to the need for inundation maps and emergency action plans (EAPs) for dams and critical appurtenant structures. During the emergency, an evacuation was ordered because failure of the emergency spillway was considered imminent. Before the incident, an inundation map and associated EAP existed for the potential failure of Oroville Dam. However, an inundation map and EAP did not exist for the potential failure of the emergency spillway, which is considered a critical appurtenant structure. This lack of critical information led to confusion regarding areas that required evacuation during the emergency.

The state legislature passed SB92 that went into effect on July 1, 2017 and added new sections to the Water Code requiring owners of all state jurisdictional dams, except low hazard dams, to prepare inundation maps. Before the SB92, there were no requirements to develop inundation maps for many state jurisdictional dams, all critical appurtenant structures, or to update inundation maps. The Oroville spillway incident highlights the need for inundation maps and EAPs to be prepared and submitted for all dams and their critical appurtenant structures, except dams classified as low hazard. Dams classified as low hazard are not expected to cause any loss of life should they fail, and any potential downstream impacts are expected to be confined to the dam owner's property.

### **Specific Facts Showing Existence of Emergency and the Need for Immediate Action**

Water Code Section 6162 states that any regulations promulgated pursuant to Article 6 related to inundation maps shall be deemed to be an emergency and are necessary for the immediate preservation of the public peace, health and safety, or general welfare.

The Oroville spillway incident called attention to the urgent need for inundation maps and EAPs for dams and critical appurtenant structures. Water Code Section 6161(d) requires owners of state jurisdictional dams, except those classified as low hazard, to submit inundation maps and EAPs prioritizing dams by highest hazard. Dams classified as "extremely high" hazard are required to prepare and submit EAPs by January 1, 2018.

The dam owners' ability to meet the statutory deadlines is contingent upon the swift approval of these emergency regulations. Once the emergency regulations are approved, dam owners will need time before the mandated EAP submittal deadline to contract consulting engineers, prepare inundation maps for dams and critical appurtenant structures, and prepare EAPs. Section 6161 specifies that the department must review the inundation maps. Upon the department's approval of inundation maps for a dam and its critical appurtenant structures, the owners must prepare and submit their EAPs to the Governor's Office of Emergency Services (CalOES) for approval. For owners of "extremely high" hazard dams, EAPs must be submitted by January 1, 2018. Upon CalOES's approval of the EAP, the department must make the inundation maps publically available.

Regulations concerning inundation maps were previously contained in CCR Title 19; however, the statutory authority was repealed by newly enacted statutes in SB 92. Government Code Section 8589.5 was updated to incorporate the change in regulatory oversight of inundation maps from CalOES to the department. Since the department is now responsible for the review and approval of inundation maps, the emergency regulations that are the subject of this rulemaking are necessary to establish authority and will be incorporated into CCR Title 23.

Given the short deadlines in the Water Code, the lack of existing authority, and the statutorily deemed emergency, emergency regulations are needed for the immediate preservation of public safety.

### **Need for Proposed Regulation to Effectuate Purpose of Statute**

Water Code Sections 6160 and 6161 require owners of state jurisdictional dams, except those classified as low hazard, to prepare and submit inundation maps and EAPs for dams and their critical appurtenant structures, prioritizing dams by highest hazard. The proposed emergency regulations are needed to implement, interpret, and make specific Water Code Sections 6160 and 6161.

### **Authority and Reference**

Authority citations: Water Code Sections 6078, 6160, 6161, 6162; Water Code Section 6078; Water Code Section 123; Government Code Section 8589

Reference citations: Water Code Sections 6002, 6002.5, 6004.5, 6005, 6006, 6007, 6008, 6009, 6160, 6161, 6162, 6431; Government Code Sections 8589, 8589.5; Business and Professions Code Section 6700; Public Safety Code Sections 2575-2578 (repealed); FEMA 2013, *Federal Guidelines for Inundation Mapping of Flood Risks Associated with Dam Incidents and Failures* (FEMA P-946); FEMA 2004, *Federal Guidelines for Dam Safety: Hazard Potential Classification System for Dams* (FEMA 333).

## **Informative Digest**

### **Summary of Existing Laws and Regulations**

CalOES previously administered the inundation map and EAP program. Regulations concerning inundation maps were previously contained in California Code of Regulations (CCR) Title 19, Division 2, Chapter 2, Subchapter 4, Sections 2575-2578.3. These regulations authorized CalOES to administer the process of requiring inundation maps and supporting technical studies for all new or existing state jurisdictional dams, and described the required content and format of the inundation maps and technical studies, along with deadlines for their submittal.

The authority contained in the CCR Title 19 regulations has since been repealed by newly enacted statutes in Government Code Section 8589.5, which changed regulatory oversight for inundation maps from CalOES to the department. Since the department is now responsible for the review and approval of inundation maps, the proposed emergency regulations that are the subject of this rulemaking are needed to establish authority for incorporation into CCR Title 23.

The Federal Emergency Management Agency (FEMA), as part of the National Dam Safety Program, published federal guidelines for inundation mapping (FEMA P-946). These guidelines are a resource for state and local governments to develop guidelines for dam safety and for dam owners to develop inundation maps.

SB 92 added Water Code Section 6161 requiring owners of extremely high hazard state jurisdictional dams to submit EAPs by January 1, 2018. Owners of high hazard state jurisdictional dams are required to submit EAPs by January 1, 2019. Owners of significant hazard state jurisdictional dams are required to submit EAPs by January 1, 2021.

**Policy Statement and Objectives.** The department finds that the lack of inundation maps and emergency action plans for state jurisdictional dams and their critical appurtenant structures, except dams classified as low hazard, endangers public safety. The overall objective of the proposed emergency regulations is to compile and maintain up-to-date inundation maps to support preparation of emergency action plans for the subject dams and critical appurtenant structures. The specific objective is to provide the subject dam owners with standards regarding the details of preparing and submitting the required inundation maps so they can meet the statutory deadlines.

**The department has determined that the proposed regulations are not inconsistent or incompatible with existing state and federal law.**

**Overview.** This regulation establishes standards for the preparation of new inundation maps for certain state-regulated dams and their associated critical appurtenant structures as required by Water Code Section 6161.

Inundation maps provide a graphical representation of the timing and extent of inundation to be expected by the failure of a dam and its critical appurtenant structures. Such maps must be reviewed and approved by the department as a precondition to the preparation of emergency action plans required by Water Code Section 6160.

The proposed regulation contains eleven sections within one new article. The following describes the general objectives and benefits of each section. Clarification of the rationale behind the section is provided to aid in understanding the overall process.

Section 335. Scope of Regulations: This section establishes the scope of the regulations as limited to the development and submittal of inundation maps and supporting technical studies.

Section 335.2 Definitions: This section defines specific terms used in the regulations.

Section 335.4 Hazard Potential Classification: Water Code Section 6160 requires the department classify the public safety risk of all state jurisdictional dams. Water Code Section 6161 requires the owner of a state jurisdictional dam, except a dam classified by the department as a low hazard dam, to prepare an inundation map and emergency action plan. This section describes the four hazard classes identified in Water Code Sections 6160 and 6161. The criteria used for the four hazard classes are in accordance with FEMA guidelines, as required by Water Code Section 6160(b), with the exception that the FEMA high hazard class is subdivided into extremely high and high hazard. Inclusion of this section is necessary to these regulations because applicability of the regulations depends on hazard classification, pursuant to Water Code Section 6160(a).

Section 335.6 Inundation Map Updates: This section describes circumstances under which a dam owner must update an inundation map.

Section 335.8 Civil Engineering: This section ensures that inundation maps and all supporting information and analyses will be prepared by a licensed civil engineer with expertise in hydraulics and hydrologic studies of dams.

Section 335.10 Reporting Standards: This section ensures standard units are reported for all variables required for display on each inundation map and supporting data. Labeling standards are included to ensure all inundation maps are easily understandable and clear.

Section 335.12 Technical Study: This section describes the supporting technical information, comprising the technical study, utilized in the preparation of an inundation map. The technical study must be submitted along with the inundation map.

Subsection (a) ("Study Contents") describes technical and non-technical information about the dam system that must be provided.

Subsection (b) ("Modeling Requirements") describes the modeling technologies to be used. A two-dimensional model is required in all cases unless, as specified, conditions justify the use of a less detailed model. Two-dimensional modeling is becoming widely available, such as the open source software HEC-RAS recently made available from the U.S. Army Corps of Engineers.

Subsection (c) ("Failure Scenarios") describes failure scenarios and initial conditions that must be employed by each model.

The general assumption of a sunny-day failure is a baseline for each modeled failure scenario. An assumed sunny-day failure eliminates the need for expensive watershed and spillway studies and provides a reasonable upper limit estimate for warning and evacuation<sup>1</sup>. The regulations describe conditions that are assumed in the event that a storm-induced failure or sequential dam failure simulation is modeled. Though rare for state jurisdictional dams, the cascading effect of multiple dams failing in series must be considered. The intent of this provision is to consider the potential for a downstream pool to entirely or partially absorb an upstream release. However, if the failure of an upstream dam leads to another dam failure further downstream, the inundation area for the upstream dam causing this scenario must include all downstream reservoirs and floodplain reaches for which the model indicates an impact. Such considerations are important for the statutorily-required accurate characterization of the inundation area, but may also serve to facilitate coordinated operations between neighboring dam owners during an emergency.

Section 335.14 Inundation Maps: This section establishes the required components of each inundation map. The intent of this section is to ensure the inundation map's efficacy during an emergency. Information capturing the time when flooding begins and recedes must be identified, as well as the locations of all affected critical facilities. Likewise, the amount and depth of flow must be provided, along with the speed of the water. These variables are standard outputs from two-dimensional hydraulic models. Likewise, a gridded representation of the maximum inundation depths at all locations is a standard output from two-dimensional models and can be displayed graphically using colors rather than labeled callouts at discrete locations. Such a grid may require post-processing work to develop for some one-dimensional modeled outputs.

Notwithstanding the importance of standardization, the provision allowing for the additional reporting of inundation elevations to a local benchmark is included. The intent is to accommodate the use of a local, well-known landmark that is commonly referred to in the local community and emergency management agencies and where its use would enhance the efficacy of the inundation map.

The requirement of utilizing suitable aerial imagery is intended to aid emergency responders in quickly understanding the land use and locations of downstream development.

The provision requiring a disclaimer statement addressing the approximate nature of the inundation map is intended to ensure that users of the map do not regard its contents as truth. That is, the inundation area delineated by the modeled failure scenario and other variables reported on the map offer one possible scenario. Each unique scenario is merely a simulation and is approximate. Limitations of the model and input data may result in inaccuracies. Evacuation areas should be planned with an understanding that each inundation map is inherently approximate.

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<sup>1</sup> NDSRBB (National Dam Safety Review Board Emergency Action Plan Workgroup). 2009. Simplified Inundation Maps for Emergency Action Plans.

Section 335.16 Submission of Inundation Maps and Technical Study: This subsection describes the format in which inundation maps and supporting studies are to be submitted.

Section 335.18 Department Review and Approval: This section describes the manner in which the department will evaluate the submitted inundation maps and technical study for each dam system. If the submittal is deemed incomplete, the owner may remedy any deficiencies within a specified timeframe.

Subsection (b) explains that the department will review maps prepared on or before January 1, 2018 for consistency with FEMA Guidelines.

Section 335.20 Public Availability of Inundation Maps: This section specifies that the department will post copies of approved inundation maps to the department's website, pursuant to Water Code Section 6161(c)(1).

### **Mandate on Local Agencies or School Districts**

The department has determined that, because a violation of the statute relating to an EAP or the willful neglect to obey any order or regulation relating to an EAP would be a crime, the proposed regulations impose a mandate on local agencies. No reimbursement is required pursuant to Section 6 of Article XIII B of the California Constitution because the only costs that may be incurred by a local agency will be incurred because the statute being implemented by the proposed regulations creates a new crime or infraction within the meaning of Government Code Section 17556.

The department has determined that the proposed regulations do not impose a mandate on school districts.

### **Economic and Fiscal Impact Estimates**

The department has determined that the proposed emergency regulations may incur combined economic and fiscal costs exceeding \$50 million and constitute a major regulation. A Standardized Regulatory Impact Assessment will be completed during the regular rulemaking process.

Private Businesses and Individuals: The department has determined that the proposed regulations will involve additional costs and savings to private businesses and individuals. Private businesses and individuals own a total of 382 dams that will be subject to the proposed regulations and will incur costs to develop inundation maps. In addition, utility rate-payers may incur costs if public utilities that own dams subject to the proposed regulations pass along their costs. Private dam owners and the public will potentially incur savings from being better-prepared to respond to dam-related emergencies. There will be an increased demand for engineering businesses.

State Agencies: The department has determined that the proposed regulations will involve additional costs and savings to state agencies. The department and CalOES will incur costs to review and approve inundation maps and EAPs, respectively. In addition, various state

agencies own a total of 35 dams that will be subject to the proposed regulations and will incur costs to develop inundation maps. The state will potentially incur savings from being better-prepared to respond to dam-related emergencies.

Local Agencies: The department has determined that the proposed regulations will involve additional costs and savings to local agencies. Local agencies, including public utilities, own a total of 528 dams that will be subject to the proposed regulations and will incur costs to develop inundation maps. Local agencies, including emergency management agencies and those that own dams, will potentially incur savings from being better-prepared to respond to dam-related emergencies.

Reimbursable Cost to Local Agencies or School Districts: The department has determined that the proposed regulations will not result in any additional cost or savings to any local agency or school district that is required to be reimbursed under part 7 (commencing with Section 17500) of division 4 of the Government Code. No reimbursement is required pursuant to Section 6 of Article XIII B of the California Constitution because the only costs that may be incurred by a local agency will be incurred because the statute being implemented by the proposed regulations creates a new crime or infraction within the meaning of Government Code Section 17556.

Cost or Savings in Federal Funding to the State: The department has determined that there may be cost or savings in federal funding to the state as a result of the proposed regulations.