



[Issue](#) | [Background](#) | [Findings](#) | [Conclusions](#) | [Recommendations](#) | [Responses](#) | [Attachments](#)

Summary of Emergency Planning for Dam or Levee Failures in San Mateo County

Issue

What improvements can be made within San Mateo County to assure public safety in the event of a dam or levee failure?

Summary

Within the physical boundaries of San Mateo County (County) there are 12 dams listed by government agencies as posing high or significant risk in the event of failure. Furthermore, at least four levees between Brisbane and East Palo Alto are shown on a recent FEMA map as uncertified to withstand a hundred-year flooding event. Failure of certain of these structures could threaten the lives of many thousands of County residents.

The 2006-2007 San Mateo County Civil Grand Jury (Grand Jury) interviewed personnel in the Office of Emergency Services and Homeland Security (OES/HS), a division of the County Sheriff's Office. This agency is responsible for coordinating emergency response within the County including those emergencies that would ensue as the result of a dam or levee failure. Other information came from pertinent newspaper articles and web pages such as those of the Army Corps of Engineers' National Inventory of Dams (NID), the American Society of Civil Engineers, the Federal Emergency Management Agency (FEMA) Flood Map Modernization Program and the Association of Bay Area Governments.

The OES/HS has four parallel methods for notifying citizens facing emergencies such as possible inundation from a dam or levee failure. These methods are: 1) a telephonic emergency notification system, 2) a notification system that contacts registered wireless devices and cell phones, 3) loud speakers/sirens in hazard areas, and finally, 4) street-to-street law enforcement warnings. Although warning methods are in place, the information about dams and levees needed both for planning and to ensure timely warnings in emergencies is not readily available to OES/HS. Examples of this lack of

information are: 1) a lack of Emergency Action Plans (EAP) which are supposed to be prepared by dam and levee operators, 2) inadequate information about the structural integrity of the County's dams and levees, and 3) recent denial of public access to the NID website without a password, and the failure to promptly issue a password as duly requested by OES/HS.

To correct these problems, the Grand Jury recommends that: 1) dam and levee owners be required to prepare Emergency Action Plans and submit them annually to the OES/HS, 2) the OES/HS do what is necessary (without duplicating other information gathering efforts) to gather the information required to assess risk and develop response plans for levee and dam emergencies, and 3) the County Public Works Director work with city and special district public works officials and engineers in the County to evaluate and report on the integrity of dams and levees throughout San Mateo County.

Emergency Planning for Dam or Levee Failures in San Mateo County

Issue

What improvements can be made within San Mateo County to assure public safety in the event of a dam or levee failure?

Background

Earlier in its term, the 2006-2007 San Mateo County Civil Grand Jury (Grand Jury) issued a report on readiness within San Mateo County (County) to respond to a tsunami. While the tsunami study was still fresh in the minds of the Grand Jurors, the New York Times published an Op-Ed piece (see Appendix for references and web sites used as source material) on the poor condition of the nation's dams that aroused the Jury's interest as to the level of preparation within the County for dam failures.

For the purposes of this report, a dam is a barrier used to contain a body of fresh water. When asked about dams, most people in the County think of the one at the Crystal Springs reservoir. However, that dam is only one of eight dams in the County listed as "high hazard" by the Army Corps of Engineers (ACE) in its National Inventory of Dams (NID). High hazard means a probable loss of life should the dam fail, and that it is likely that there will be significant economic losses, environmental damage and human casualties. Another five dams in the County are listed as being of significant risk, where loss of life is not likely, but economic and other losses are. The presence of such dams in the County, combined with the American Society of Civil Engineers (ASCE) finding that in 2005 "... *the number of dams identified as unsafe is increasing at a faster rate than those being repaired ...*" makes this an important topic, especially in our seismically active area.

During the course of this investigation, it also became apparent to the Grand Jury that levees, which we define here as barriers constructed to contain streams, or keep out the Bay or ocean, may pose a greater danger than dams. The Grand Jury was unable to locate information about the levees in the County as detailed as that found for dams in the NID. As a consequence, this report tends to emphasize dams and treats levees less completely, although levees are no less important.

The County government and the 20 incorporated cities recognized the need for a unified emergency services organization and entered into a Joint Powers Agreement (JPA) more than 30 years ago. The JPA is governed by the Emergency Services Council (ESC), comprised of one representative from each city, and one County Supervisor. The ESC approves budgets and provides strategic direction for emergency response activities in the

County. The cities contribute money to fund the JPA based upon a formula that takes into account the population and average assessed property value of each city. The County then matches the funds contributed by the cities. The ESC budget also includes state and federal Emergency Management Assistance program funds in substantial amounts.

The ESC reviews and recommends emergency plans, programs and agreements for adoption by the Board of Supervisors and city councils in order to carry out the purposes of an emergency services organization. The Office of Emergency Services/Homeland Security (OES/HS) is in the Office of the Sheriff. The OES/HS reports to the ESC, and serves as that agency's emergency services organization. The OES/HS is responsible for minimizing the effects of disasters and major emergencies on the citizens of the County. The OES/HS is responsible for the Emergency Operations Plan (EOP), that describes planned response within the County to extraordinary emergencies associated with natural disasters, man-made technological incidents, and national security alerts.

Investigation

Several information sources were consulted during the course of this investigation. As noted above, the impetus for the investigation was the January 22, 2007 Op-Ed piece in the New York Times by Jacques Leslie, and subsequent discovery of the ASCE website, which grades the nation's infrastructure. The most recent ASCE "report card" gave U.S. dams a D grade, meaning that they were judged to be poor in terms of "*... condition and performance, capacity vs. need, and funding vs. need*"

The Grand Jury then consulted the ACE web site and downloaded NID information for San Mateo County. Access to the NID has been denied to the public since shortly after the Grand Jury obtained information about the dams. The website for the California Department of Water Resources (DWR) Division of Safety of Dams also provided information about the dams in the County. Much of the State information duplicated that found earlier in the NID. (The NID is also available for sale by Investigative Reporters and Editors, Inc., which describes itself as, "a grassroots nonprofit organization dedicated to improving the quality of investigative reporting.") The Federal Emergency Management Agency (FEMA) Flood Map Modernization Program and the Association of Bay Area Governments' (ABAG) websites were also useful sources of information.

Personnel in the San Mateo County Sheriff's OES/HS were interviewed and proved to be very cooperative and extremely valuable sources of information. OES/HS personnel, in turn, contacted a representative of the State DWR Division of Safety of Dams, who was quite responsive in supplying requested information to OES/HS, after which the OES/HS provided the information to the Grand Jury.

Findings

The findings listed below have been grouped into several major topic areas.

Dams in the County

- The Army Corps of Engineers National Inventory of Dams descriptive information for the 12 dams listed as high or significant risk is shown in Table 1

Table 1 Information about dams in San Mateo County listed by the Army Corps of Engineers in the National Inventory of Dams as being of high or significant risk to property and life

Dam name	Type¹	built	lng.²	ht.²	Storage.³	Area	Inspection	Hazard⁴
Lower Crystal Spr	PG	1888	600	140	57910	1323	12/13/2001	H
Pilarcitos	ER	1866	520	103	3100	109	12/13/2001	H
San Andreas	ER	1870	727	107	19027	550	12/13/2001	H
Laurel Creek	ER	1969	287	40	55	3	09/21/2001	S
Emerald Lk. Low.	ER	1885	280	57	45	4	10/29/2001	S
Searsville	PG	1890	260	68	952	90	10/11/2001	H
Crocker	ER	1890	200	45	22	2	10/10/2001	H
Spenser Lake	ER	1876	400	87	73	4	10/10/2001	H
Notre Dame	ER	–	210	51	120	8	09/21/2001	H
Bear Gulch	ER	1896	730	61	672	25	11/21/2001	H
Coastways	ER	1951	1000	46	100	9	10/29/2001	S
Pomponio Ranch	ER	1952	245	63	256	13	07/19/2001	S
Rickey	ER	1951	200	64	47	4	10/10/2001	S

Notes: **1. dam type:** ER=Rock fill PG=Gravity

2. Length & height: feet

3. Normal Storage: acre-feet

4. Hazard potential: S= significant, no loss of life expected, significant property damage
H=high, probable loss of lives and significant property damage.

Access to information about dams in the County

- When OES/HS personnel tried to obtain National Inventory of Dams information from the Army Corps of Engineers website in April 2007, OES/HS was denied access without a password.
- OES/HS applied for the required password in April 2007, but had not received it by late May 2007.
- As noted earlier, National Inventory of Dams information is no longer publicly available directly from the Army Corps of Engineers, yet it appears to be available from other sources.
- The California Department of Water Resources Division of Safety of Dams inventory is not organized by county, which makes it very difficult to use.

Emergency Action Plans

- The OES/HS recently contacted owners of 19 dams located in San Mateo County that were listed in the National Inventory of Dams (the 19 included some low risk dams); the OES/HS found that none of those dams had an Emergency Action Plan, although the National Inventory of Dams indicated that all the dams listed in Table 1 had such plans.
- A representative of the California Department of Water Resources Division of Safety of Dams told the OES/HS that no Emergency Action Plans are on file for dams in our County, and in fact, there are very few Emergency Action Plans on file for dams located elsewhere in California.
- The California Department of Water Resources Division of Safety of Dams has no authority to require that Emergency Action Plans be prepared by the dam owners.

Dam inspections

- The California Department of Water Resources Division of Safety of Dams apparently inspects all dams annually, including Crystal Springs Dam, although the National Inventory of Dams lists the last inspection dates for dams as in 2000 or 2001 (See Table 1).

Preparedness

- The OES/HS has maps on file that show areas that would be inundated in case of a failure of the dams listed in Table 1.
- Table 2 lists types of facilities that are in potential inundation zones.

Table 2. Important facilities located in dam inundation zones

(Source: Association of Bay Area Governments, 2004)

Type of facility	Total in County	In inundation zones
HEALTH CARE FACILITIES:	69	15
Hospital	12	2
Long-Term Care Facility	18	2
Primary Care or Specialty Clinic	19	5
Home Health Agency or Hospice	20	6
SCHOOLS:	227	27
Elementary School	160	21
Intermediate, Middle, or Jr. High School	29	3
High School	29	2
Continuation High School	4	0
College or University	5	1
CRITICAL FACILITIES:	615	109
City-Owned	516	104
County-Owned	49	4
Owned by Special Districts	50	1
BRIDGES AND INTERCHANGES:	358	76
Locally-Owned	153	45
State-Owned	205	31

- OES/HS has four parallel methods for notifying citizens of a variety of hazards, including residents facing possible inundation from a dam failure. Those methods are:
 1. The Telephonic Emergency Notification System (TENS) from Dialogic Communications Corporation, which is an Internet-based calling system that rapidly alerts residents in their homes and mobilizes first responders. Phone lists are being generated so that residents living in areas identified on inundation maps can be notified by TENS in the event of an imminent dam or levee failure.
 2. A voluntary notification system from Roam Secure, Inc. that contacts wireless devices such as personal digital assistants (PDA) and cell phones of those who have registered with OES/HS. This system is being implemented.
 3. Loud speakers/sirens in hazard areas such as inundation zones.
 4. Street-to-street law enforcement warnings.
- Although the OES/HS is responsible for emergency planning and mitigation, it has no authority to mandate that dam owners prepare Emergency Action Plans.
- The role of the OES/HS is largely that of a coordinating agency rather than a responder.
- Cities and special districts are responsible for making sure that the OES/HS is given the information it needs to coordinate emergency response.
- OES/HS cannot effectively plan for dam failures without emergency action plans, but dam owners are not required by law to prepare these plans or provide them to OES/HS.
- State and Federal statutes provide the framework for coordination of emergency responses. The OES/HS deals with the State and the State deals with the Federal agencies such as Federal Emergency Management Agency.
- When the Federal Emergency Management Agency becomes directly involved in an emergency at the local level, there is direct contact between the OES/HS and that Federal agency.
- OES/HS considers participation in mock disaster drills put on by various local, state and federal agencies to be important, and dam and levee owners do not participate in these exercises.

Levees

- Emergency officials have estimated, based on numbers of dwellings in areas that would be flooded, that there is a potential for the loss of tens of thousands of lives should certain levees fail catastrophically.
- OES/HS officials are very concerned about the disaster potential of levees.
- At least four levees between Brisbane and East Palo Alto are shown on a recent Federal Emergency Management Agency map (available for download from Federal Emergency Management Agency Region IX Flood Map Modernization Program web site listed in the appendix) as uncertified to withstand a hundred-year flooding event.

- The County Department of Public Works has a detailed list of levees in the County.
- The Federal Emergency Management Agency is currently gathering information for two County levees for which there is insufficient information to assess risk.
- Most levees in San Mateo County are city properties, but some are owned by the County, some by the State, some by corporations, and one is owned by the City of San Jose.
- Maintenance of some levees owned by cities within the County is reputed to be inadequate and those levees may pose a high risk.
- Apparently, cities and special districts have no authority to request other levee owners in their jurisdictions to take actions such as preparing Emergency Action Plans.
- Some repairs were recently completed on East Palo Alto levees that had been damaged by a series of heavy rains and high creek volumes in January 2006.
- Levees are not listed in the State list of dams and therefore may not be required to have Emergency Action Plans.

Conclusions

Based on the above findings, the Grand Jury concludes that:

- The potential for loss of life in the event of a catastrophic dam or levee failure is great, running into the tens of thousands of lives.
- The OES/HS is generally well prepared to coordinate an appropriate emergency response for citizens in identified inundation zones provided timely information is received about a threat from a dam or levee.
- The OES/HS has little authority to require that dam and levee operators provide all the information necessary for it to prepare adequately.
- The lack of plans prepared by dam and levee operators poses a significant danger to those living in inundation zones.
- The State of California's information about dams and levees in San Mateo County (and in the State as a whole) is inadequate for planning for responses to emergencies.
- The sharing of information about dams and levees among facility operators, cities, the County and the OES/HS is insufficient for emergency preparedness planning.
- Dam and levee owners should participate in county-wide mock disaster drills.

Recommendations

The Grand Jury recommends that the Emergency Services Council:

1. Authorize and fund, by December 31, 2007, the Office of Emergency Services/Homeland Security to work with other entities in our County to acquire whatever information is necessary to assess risk and develop response plans for levee and dam emergencies. This effort should use all available information, including that collected by the Federal Emergency Management Agency, to formulate plans specific to our County and to incorporate those plans into the Office of Emergency Services/Homeland Security countywide Emergency Operations Plan by July 31, 2008.
2. Adopt a resolution by December 31, 2007, requesting all jurisdictions – whether County, City, Special District, or private entity – having authority or responsibility for dam or levee integrity cooperate with the Office of Emergency Services/Homeland Security to develop credible emergency plans for responding to dam failure and levee degradation or breach.

The Grand Jury recommends that the Sheriff instruct the Office of Emergency Services/Homeland Security to:

1. Cooperate with affected cities and dam and levee owners to develop credible Emergency Action Plans by March 31, 2008, for responding to a prospective dam or levee failure, degradation or breach. These Emergency Action Plans should be prepared and submitted immediately upon completion to the Office of Emergency Services/Homeland Security, followed by annual updates. An Emergency Action Plan would include at least the following information:
 - A list of three or more separate telephone contacts to insure that at least one responsible official or responder is made aware of an emergency at the facility
 - Other actions that would be undertaken to mitigate the danger in the event of an emergency
 - The most recent inspection report
2. Cooperate with Cities, the County Public Works Director and with the Federal Emergency Management Agency to identify, evaluate and report on the integrity of dams and levees in the County.

The Grand Jury recommends that the city councils of Belmont, Burlingame, East Palo Alto, Foster City, Pacifica, Redwood City, San Carlos, San Mateo and South San Francisco do the following:

1. Cooperate with the Office of Emergency Services/Homeland Security to develop credible Emergency Action Plans by March 31, 2008, for responding to a

prospective dam or levee failure, degradation or breach. These Emergency Action Plans should be prepared and submitted immediately upon completion to the Office of Emergency Services/Homeland Security, followed by annual updates. An Emergency Action Plan would include at least the following information:

- A list of three or more separate telephone contacts to insure that at least one responsible official or responder is made aware of an emergency at the facility
 - Other actions that would be undertaken to mitigate the danger in the event of an emergency
 - The most recent inspection report
2. Direct the appropriate City department to work with the County Public Works Director and with the Federal Emergency Management Agency to identify, evaluate and report on the integrity of dams and levees in the County.

The Grand Jury recommends that the County Board of Supervisors:

1. Adopt a resolution to encourage all jurisdictions to cooperate with the Office of Emergency Services/Homeland Security to develop credible Emergency Action Plans by March 31, 2008, for responding to a prospective dam or levee failure, degradation or breach. These Emergency Action Plans should be prepared and submitted immediately upon completion and be followed by annual updates. The Emergency Action Plans would include at least the following information:
 - A list of three or more separate telephone contacts to insure that at least one responsible official or responder is made aware of an emergency at the facility
 - Other actions that would be undertaken to mitigate the danger in the event of an emergency.
 - The most recent inspection report.
2. Direct the County Manager to instruct the County Public Works Director to work with appropriate City Departments and the Federal Emergency Management Agency to identify, evaluate and report on the integrity of dams and levees in the County to the Office of Emergency Services/Homeland Security.

Appendix: Source material used for this report

Text documents

1. Albach, B., 2007: Work wraps up on damaged East Palo Alto Levees, *Palo Alto Daily News*, May 10, 2007.
2. American Society of Civil Engineers, 2003: 2003 Progress Report, *An Update to the 2001 Report Card for America's Infrastructure*, ASCE, 7 pp.
3. Federal Emergency Management Agency, 2007: *Letter to Community Floodplain Administrators in San Mateo County requesting Existing Certification Documents for Levees Recognized on Effective Flood Insurance Rate Maps* - letter dated January 23, 2007
4. _____, 2007: *San Mateo County Levee Status*, Map created April 20, 2007 by Michael Baker Jr., Inc.
5. _____, 2007: *San Mateo County Levee Status*, Table created April 20, 2007 by Michael Baker Jr., Inc.
6. Leslie, J., 2007: Before the Flood, *New York Times*, Op-Ed Page, January 22, 2007.
7. San Mateo County (California) Civil Grand Jury, 2006-2007: *Tsunami Alert and Evacuation on the San Mateo County Coast*, 11 pp.
8. San Mateo County (California) Civil Grand Jury, 2005-2006: *When the Big One Comes Will We Respond with a Bang or a Whimper?*, 40 pp.

Websites

9. American Society of Civil Engineers (ASCE) report card, <http://www.asce.org/reportcard/2005/page.cfm?id=23>
10. Army Corps of Engineers, National Inventory of dams. <http://crunch.tec.army.mil/nid/webpages/nid.cfm>
11. Association of Bay Area Governments. <http://www.abag.ca.gov/levees.html>
12. California Department of Water Resources, Division of Safety of Dams, <http://damsafety.water.ca.gov/>
13. Flood Map Modernization Program, Federal Emergency Management Agency Region IX, http://rmc.mapmodteam.com/rmc9/San_Mateo.htm#Levee

14. Investigative reporters and editors, Inc.,
http://www.ire.org/inthenews_archive/damresources.html
15. San Mateo County Civil Grand Jury 2006-2007, published reports,
<http://www.sanmateocourt.org/director.php?filename=./grandjury/2006/index.php>
16. San Mateo County Civil Grand Jury 2005-2006, published reports,
<http://www.sanmateocourt.org/director.php?filename=./grandjury/2005/index.php>
17. Office of Emergency Services/Homeland Security,
http://www.co.sanmateo.ca.us/smc/departments/home/0,,14095463_14132044_59210022,00.html