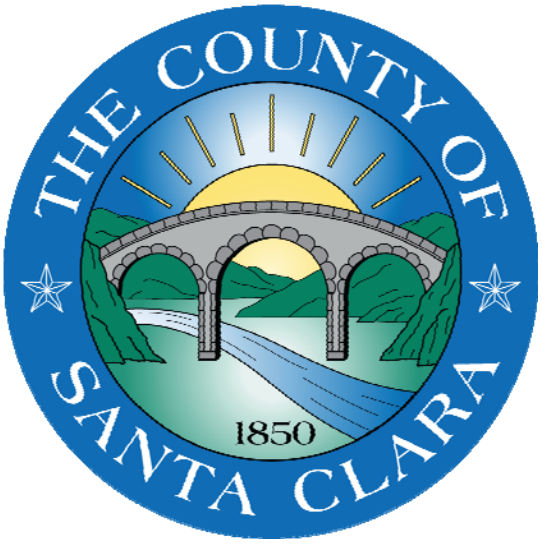
Santa Clara County, CA
Annex to 2010 Association of Bay Area Local Hazard Mitigation Plan
Taming Natural Disasters

County of Santa Clara
City of Campbell
City of Cupertino
City of Gilroy
City of Los Altos
Town of Los Gatos
City of Monte Sereno
City of Morgan Hill
City of Mountain View
City of Palo Alto
City of San Jose
City of Santa Clara
City of Saratoga
City of Sunnyvale



Prepared by the Santa Clara County Office of Emergency Services
with support from Dewberry Consultants
and participation by the above listed cities

December 2011

Table of Contents

Figures

Tables

SECTION 1 INTRODUCTION

This annex to the 2010 Association of Bay Area Governments (ABAG) Local Hazard Mitigation Plan, *Taming Natural Disasters*, was created through a collaborative planning process and serves as Santa Clara County's Local Hazard Mitigation Plan (the Plan) pursuant to the Disaster Mitigation Act of 2000. Development of this annex was lead by Santa Clara County's Office of Emergency Services (OES) with participation from representatives of many County departments, 13 of the 15 incorporated cities, and several private sector businesses. OES's goal for the collaborative planning process was to identify mitigation priorities and actions shared across jurisdiction borders. Through development of a Local Planning Team (LPT), the OES facilitated development of the county-wide mitigation strategies contained in this plan based on an updated hazard risk assessment and priorities shared by the LPT members.

With a diverse population of more than 1.7 million residents (based on the 2008 census estimate), the Santa Clara County Operational Area encompasses the 15 incorporated cities and county comprising the southern portion of the San Francisco Bay Area known as Silicon Valley. This includes the three largest cities of San Jose, Santa Clara, and Sunnyvale; the west valley communities of Los Altos, Los Altos Hills, Los Gatos, Monte Sereno, and Saratoga; the high-tech communities of Campbell, Cupertino, Mountain View, and Palo Alto; industrial Milpitas, and the south county suburban expansion/rural interface areas of Gilroy, Morgan Hill, and their surrounding unincorporated areas.

Figure 1-1: ABAG region of nine bay area counties

Santa Clara County has experienced a variety of natural hazards and is at risk to many different man-caused hazards. The most notable of all hazards are earthquakes. In Santa Clara County's recent history the 1984 Morgan Hill Earthquake (Magnitude 6.2) and the 1989 Loma Prieta Earthquake (Magnitude 7.1) significantly impacted infrastructure in the region. In addition to earthquakes, Santa Clara County's primary concern is infrastructure failure.

The County recognizes that water, power, natural gas, wastewater, communication, and transportation systems may fail as a result of many potential events. The threat to the communities within Santa Clara County if infrastructure fails could be catastrophic. Resources allocated to preparation of this plan did not allow for an exhaustive evaluation of infrastructure failure scenarios, but these are addressed to the extent possible and will continue to be discussed by the Local Planning Team (LPT) as they implement county-wide action to mitigate risk. Wildfire and flood hazards follow

closely behind earthquake and infrastructure failure as priority concerns by the LPT. These hazards threaten the county on an annual basis.

The updated risk assessment and mitigation strategies contained in this plan present the results of the Local Planning Team's collaborative planning process in a format that may be implemented by the participating agencies in order to reduce risk and increase resiliency throughout Santa Clara County.

SECTION 2 PLAN PURPOSE AND AUTHORITY

Authority to create this Plan is derived from the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Public Law 93-288), as amended by the Disaster Mitigation Act of 2000 (DMA 2000). The requirements and procedures for mitigation plans are found in the Code of Federal Regulations (CFR) at Title 44, Chapter 1, Part 201 and the associated Interim Final Rule changes of February 26, 2002, October 1, 2002, October 28, 2003, September 13, 2004, and October 31, 2007. This federal law and associated regulation establishes planning and funding criteria for states and local communities.

The Plan is intended to serve many purposes, including:

- *Enhance Public Awareness and Understanding* – to help residents of the County better understand the hazards that threaten public health, safety, and welfare; economic vitality; and the operational capability of important institutions;
- *Create a Decision Tool for Management* – to provide information that managers and leaders of local government, business and industry, community associations, and other key institutions and organizations need to take action to address vulnerabilities to future disasters;
- *Promote Compliance with State and Federal Program Requirements* – to insure that Santa Clara County and its incorporated cities can take full advantage of state and federal grant programs, policies, and regulations that encourage or mandate that local governments develop comprehensive hazard mitigation plans;
- *Enhance Local Policies for Hazard Mitigation Capability* – to provide the policy basis for mitigation actions that should be promulgated by participating jurisdictions to create a more disaster-resistant future; and
- Provide *Inter-Jurisdictional Coordination of Mitigation-Related Programming* – to ensure that proposals for mitigation initiatives are reviewed and coordinated among the participating jurisdictions within the County.
- Achieve *Regulatory Compliance* – To qualify for certain forms of federal aid for pre- and post-disaster funding, local jurisdictions must comply with the federal DMA 2000 and its implementing regulations (44 CFR Section 201.6). DMA 2000 intends for hazard mitigation plans to remain relevant and current. Therefore, it requires that State hazard mitigation plans are updated every three years and local plans, including Santa Clara County's, every five years. Thus, this Hazard Mitigation Plan for Santa Clara County uses a "five-year planning horizon". It is designed to carry the County through the next five years, after which its assumptions, goals, and objectives will be revisited and the plan resubmitted for approval.

The following pages contain all resolutions adopting this plan.

RESOLUTION OF THE BOARD OF SUPERVISORS
OF THE COUNTY OF SANTA CLARA
ADOPTING THE ASSOCIATION OF BAY AREA GOVERNMENTS
LOCAL HAZARD MITIGATION PLAN

WHEREAS, the Bay Area is subject to various earthquake-related hazards such as ground shaking, liquefaction, landsliding, fault surface rupture, and tsunamis; and

WHEREAS, the Bay Area is subject to various weather-related hazards including wildfires, floods, and landslides; and

WHEREAS, the County of Santa Clara recognizes that disasters do not recognize city, county, or special district boundaries; and

WHEREAS, the County seeks to maintain and enhance both a disaster-resistant County and region by reducing the potential loss of life, property damage, and environmental degradation from natural disasters, while accelerating economic recovery from those disasters; and

WHEREAS, the County is committed to increasing the disaster resistance of the infrastructure, health, housing, economy, government services, education, environment, and land use systems in the County, as well as in the Bay Area as a whole; and

WHEREAS, the federal Disaster Mitigation Act of 2000 requires all cities, counties, and special districts to have adopted a Local Hazard Mitigation Plan to receive disaster mitigation funding from Federal Emergency Management Agency; and

WHEREAS, on March 17, 2005, the Association of Bay Area Governments (ABAG)approved and adopted the attached ABAG report ***Taming Natural Disasters*** as the multi-jurisdictional Local Hazard Mitigation Plan for the San Francisco Bay Area; and

WHEREAS, County staff from several agencies and departments participated in the ABAG multi-jurisdictional planning process and contributed to the development of the ABAG plan;

//

//

//

//

//

//

APR 1 9 2

NOW, THEREFORE, BE IT RESOLVED that the County adopts the ABAG plan as its Local Hazard Mitigation Plan, including the plan's "Annex" concerning the County of Santa Clara.

BE IT FURTHER RESOLVED that the County commits to continuing to take those actions and initiating further actions, as appropriate, as identified in the Santa Clara County Annex of the ABAG plan.

PASSED AND ADOPTED by the Board of Supervisors of the County of Santa Clara, State of California on this 19th day of April, 2005, by the following vote:

AYES: ALVARADO, BEALL, GAGE, KNISS, MCHUGH

NOES: **NONE**

ABSENT: **NONE**

ABSTAIN: **NONE**

Liz Kniss, Chair
Board of Supervisors

Signed and certified that a copy of this document has been delivered by electronic or other means to the Chair, Board of Supervisors.
ATTEST:

Phyllis A. Perez, Clerk, Board of Supervisors

APPROVED AS TO FORM AND LEGALITY:

Jared Goldman, Deputy County Counsel

RESOLUTION NO. 2012-42
RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF SANTA CLARA ADOPTING THE SANTA CLARA COUNTY ANNEX TO THE ASSOCIATION OF BAY AREA GOVERNMENTS LOCAL HAZARD MITIGATION PLAN

WHEREAS, the Bay Area is subject to various earthquake-related hazards such as ground shaking, liquefaction, landslides, fault surface rupture, and tsunamis; and

WHEREAS, the Bay Area is subject to various weather-related hazards including wildfires, floods, and landslides; and

WHEREAS, the County of Santa Clara recognizes that disasters do not recognize city, county, or special district boundaries; and

WHEREAS, the County seeks to maintain and enhance both a disaster-resistant County and region by reducing the potential loss of life, property damage, and environmental degradation from natural disasters, while accelerating economic recovery from those disasters; and

WHEREAS, the County is committed to increasing the disaster resistance of the infrastructure, health, housing, economy, government services, education, environment, and land use systems in the County, as well as in the Bay Area as a whole; and

WHEREAS, the federal Disaster Mitigation Act of 2000 requires all cities, counties, and special districts to have adopted a Local Hazard Mitigation Plan to receive disaster mitigation funding from FEMA; and

WHEREAS, on February 18, 2011, the Association of Bay Area Governments ("ABAG") approved and adopted the ABAG report, Taming Natural Disasters, as the multi-jurisdictional Local Hazard Mitigation Plan for the San Francisco Bay Area; and

NOW, THEREFORE, BE IT RESOLVED that the County adopts, and adapts with its local annex, this multi-jurisdictional plan as its Local Hazard Mitigation Plan.

NOW, THEREFORE, BE IT FURTHER RESOLVED that the County commits to continuing to take those actions and initiating further actions, as appropriate, as identified in the Santa Clara County Annex of that multi-jurisdictional Local Hazard Mitigation Plan.

Adopted

Resolution Adopting the Santa Clara County Annex
To the ABAG Local Hazard Mitigation Plan 1

FEB 07 2012

PASSED AND ADOPTED by the Board of Supervisors of the County of Santa Clara, State of California, on the 7th day of February, 2012, by the following vote:

AYES: CORTESE, KNISS, SHIRAKAWA, WASSERMAN, YEAGER
NOES: NONE
ABSENT: NONE
ABSTAIN: NONE

GEORGE SHIRAKAWA, President
Board of Supervisors

ATTEST:

MARIA MARINOS,
Clerk of the Board of Supervisors

APPROVED AS TO FORM AND LEGALITY:

MARK A. GONZALEZ,
Lead Deputy County Counsel

525089

Adopted

SECTION 3 PLANNING PROCESS

Thirteen jurisdictions participated with Santa Clara County in the development of this annex. These jurisdictions are listed below with a status as to whether this is a new or updated plan. For those jurisdictions which previously participated with ABAG to develop a 2005 hazard mitigation plan, this annex including the city specific subsections serves as their updated local hazard mitigation plans. For several jurisdictions, this annex including the city specific subsections serves as their original local hazard mitigation plan.

Participating Jurisdictions:

City of Campbell (previous participant with ABAG, council resolution September 6, 2005)
City of Cupertino (previous participant with ABAG, council resolution July 19, 2005)
City of Gilroy (previous participant with ABAG, council resolution April 18, 2005)
City of Los Altos (no previous local hazard mitigation plan)
Town of Los Gatos (no previous local hazard mitigation plan)
City of Monte Sereno (no previous local hazard mitigation plan)
City of Morgan Hill (previous participant with ABAG, council resolution October 26, 2005)
City of Mountain View (no previous local hazard mitigation plan)
City of Palo Alto (previous participant with ABAG, council resolution December 12, 2005)
City of San Jose (no previous local hazard mitigation plan)
City of Santa Clara (previous participant with ABAG, council resolution April 12, 2005)
City of Saratoga (no previous local hazard mitigation plan)
City of Sunnyvale (previous participant with ABAG, council resolution April 26, 2005)

This section details the collaborative planning process of these cities and Santa Clara County during 2010 - 2011. Milestone meetings with the Local Planning Team and work group sessions were conducted to review the existing hazard mitigation planning materials, updated risk assessments, and discuss mitigation strategies. This plan (annex to Taming Natural Disasters) was developed as an update but derived using a new format to highlight the priorities of the County and Local Planning Team.

3.1 REGIONAL PARTICIPATION

Prior to development of the Local Planning Team and facilitation of the county-wide collaborative planning process, Santa Clara County and each of the incorporated jurisdictions participated in various workshops, conferences, and meetings facilitated by ABAG. These are documented in Appendix H of *Taming Natural Disasters* (Table 1 – City and County Government Participation).

For more information on these meetings and for rosters of attendees, please see Appendix A and H in the ABAG Multi-Jurisdictional Local Hazard Mitigation Plan 2010 (MJ-LHMP). In addition, Santa Clara County and the incorporated jurisdictions have provided written and oral comments on the multi-jurisdictional plan and provided information on facilities that are defined as “critical” to ABAG.

3.2 LOCAL COLLABORATIVE PLANNING PROCESS

3.2.1 Preliminary Meetings

Santa Clara County OES hosted a series of meetings with the emergency managers of the Operational Area to discuss the most effective means of conducting a countywide collaborative planning process building on the risk assessment and mitigation strategies completed through coordination with ABAG. OES encouraged the 15 incorporated cities to participate in discussions to identify risks and mitigation strategies specific to Santa Clara County's Operational Area. OES and their contractor, Dewberry met individually with incorporated jurisdictions interested in the mitigation planning process to discuss details of the countywide collaboration process. Additionally, Santa Clara County OES invited five large employers within the County to participate in the collaborative planning process. OES's contractor met with each of these employers to discuss the hazard mitigation plan requirements and methods for private sector participation. A summary of these preliminary meetings is presented in the following table.

Table 3-1: Preliminary Meetings

Meeting Purpose	Date, Time, Location	Notes
Internal Kick Off Meeting	February 5, 2010, 11:30am, Santa Clara County OES	Corinne Bartshire, Dewberry, met with the Santa Clara County OES Planners to discuss the purpose of the hazard mitigation plan, the approach to gaining participation from the 15 cities, and the composition of the Local Planning Team.
Santa Clara County Operation Area Meeting	March 25, 2010, 1:30pm, Santa Clara County OES	Corinne Bartshire, Dewberry, met with the Santa Clara County Operational Area Emergency Managers to discuss the hazard mitigation planning process and answer questions regarding jurisdictional participation and its benefits.
City of Cupertino Individual Jurisdiction Meeting	March 30, 2010, 4:00 pm, City of Cupertino	Corinne Bartshire, Dewberry, and Miguel Grey, County OES, met with representatives from the City of Cupertino (Public Works, Community Development, and the Public Information Officer) to discuss the hazard mitigation planning process and the City's participation.

Meeting Purpose	Date, Time, Location	Notes
City of Campbell Individual Jurisdiction Meeting	April 1, 2010, 3:30 pm, Santa Clara County OES	Corinne Bartshire, Dewberry, and Miguel Grey, County OES, met with Dan Campbell, Emergency Services Coordinator for the City of Campbell, to discuss the hazard mitigation planning process and the City's participation. Dan expressed concern on behalf of the City of Campbell regarding duplication of efforts completed by ABAG.
City of Gilroy Individual Jurisdiction Meeting	April 20, 2010, 1:00 pm, Santa Clara County OES	Corinne Bartshire, Dewberry, met with Roy Shackel, Assistant OES Coordinator for the City of Gilroy, to discuss the hazard mitigation planning process and the City's participation.
Santa Clara County Operation Area Meeting	April 20, 2010, 1:30pm, Santa Clara County OES	Corinne Bartshire, Dewberry, addressed the Operation Area Meeting to clarify the countywide hazard mitigation planning process. Corinne proposed maintaining the County's goal of a collaborative planning process involving review of the ABAG risk assessment for local focus, and integrating this process into the annexes to ABAG's regional hazard mitigation plan. This allows the cities to maintain their commitment to ABAG and benefit from countywide collaboration and contractor support in developing their annex.
City of Los Altos Individual Jurisdiction Meeting	April 21, 2010, 1:00 pm, 1 North San Antonio Road, Los Altos	Corinne Bartshire, Dewberry, met with representatives of the City of Los Altos (Planning, Police, and Maintenance Departments) to discuss the hazard mitigation planning process and the City's participation. The City of Los Altos expressed intent to participate in the collaboration.

Meeting Purpose	Date, Time, Location	Notes
ABAG Collaboration Meeting	May 4, 2010 3:30 pm, Phone Conference	Santa Clara County OES and Executive Directors Office, Corinne Bartshire, Dewberry, and ABAG discussed development of the Santa Clara County-wide Hazard Mitigation Plan as an annex to the ABAG regional Hazard Mitigation Plan. All parties agreed the Cities could annex to both the ABAG plan and the County annex as a result of the County-wide collaborative planning process.
Emergency Managers Association (EMA) Meeting	May 6, 2010 2:00 pm - 4:00 pm, Santa Clara County OES	At this regularly scheduled EMA meeting, Miguel Grey, County OES, and Corinne Bartshire, Dewberry, presented the results of the conversation with ABAG and the option for all cities to participate in the County's hazard mitigation planning process resulting in annexing to both the ABAG plan and the County's annex.
Town of Los Gatos Individual Jurisdiction Meeting	May 24, 2010, 2:30 pm, 101 E. Main Street, Los Gatos	Corinne Bartshire, Dewberry, met with representatives of the Town of Los Gatos (Jim Yoke, Emergency Services Coordinator, and Wendie Rooney, Director of Community Development) to discuss the hazard mitigation planning process and the Town's participation. Wendie Rooney expressed interest and intent for the Town of Los Gatos to participate.
Cisco Meeting	May 28, 2010, 10:00 am, 350 East Tasman Drive, Santa Clara	Corinne Bartshire, Dewberry met with Erica Agiewich of Cisco Corporation to discuss the hazard mitigation planning process and Cisco's involvement. Cisco tentatively committed to participating in the process.
Lockheed Martin Meeting	June 1, 2010, 11:30am, 1111 Lockheed Martin Way, Sunnyvale	Corinne Bartshire, Dewberry met with Bob Fields of Lockheed Martin to discuss the hazard mitigation planning process and Lockheed Martin's involvement. Lockheed Martin committed to participating in the planning process and completed the private sector questionnaire.

Meeting Purpose	Date, Time, Location	Notes
City of Saratoga Individual Jurisdiction Meeting	June 1, 2010, 1:30 pm, 13777 Fruitvale Ave, Saratoga	Miguel Grey, County OES, and Corinne Bartshire, Dewberry, met with representatives of the City of Saratoga (Jim Yoke, Emergency Services Coordinator, and Barbara Powell, Assistant City Manager) to discuss the hazard mitigation planning process and the City's participation. The City of Saratoga agreed to attend the first local planning team meeting and participate in the collaborative planning process.
Oracle Meeting	June 7, 2010, 2:00 pm, 4040 Palm Drive, Santa Clara	Corinne Bartshire, Dewberry met with Sandra Silva, Steven Weeks, and Doug Bartl of Oracle to discuss the hazard mitigation planning process and Oracle's involvement. Oracle determined that they do not have the available man hours to participate in the process effectively due to their current transition period of integrating Sun Microsystems.
Applied Materials Meeting	June 8, 2010, 1:00 pm, 3050 Bowers Ave, Santa Clara	Corinne Bartshire, Dewberry met with Raelene Wong of Applied Materials to discuss the hazard mitigation planning process and Applied Materials' involvement. Applied Materials committed to participating in the planning process.
Intel Meeting	June 8, 2010, 1:00 pm, 3600 Juliette Lane, Santa Clara	Corinne Bartshire, Dewberry met with Celeste Sierra of Intel to discuss the hazard mitigation planning process and Intel's involvement. Intel committed to participating in the planning process.

Meeting minutes from each of the meetings summarized above may be found in chronological order in County Attachment 1: Preliminary Meetings. All County Attachments can be found in Section 9 of this Plan.

3.2.2 Local Planning Team

Santa Clara County OES established a Local Planning Team (LPT) for the purpose of collaborating on development and implementation of this local hazard mitigation plan. The LPT consists of representatives from many County departments, 13 of the 15 incorporated cities, several private sector businesses, and other stakeholders as appropriate.

Santa Clara County OES invited each of the 15 incorporated cities (via letters to the city managers and operational area emergency managers) to participate on the Local Planning Team (LPT). These letters may be found in County Attachment 2: City Invites. Through phone and email coordination by Miguel Grey, County OES, the following County departments and stakeholders were invited to participate:

County Office of Emergency Services
County Planning & Development
County Roads & Airports (public works)
Santa Clara Valley Water District
County Fire
County Fire Marshal
County Emergency Medical Services
County Capital Programs Division
County Department of Agriculture
County Facilities & Fleet
County OSEC Risk Management
County Central Fire Dept
County Communications
County Environmental Health
County Parks
County Property Management
County Public Health
County Sheriff's Office
Valley Transit Authority
American Red Cross Valley Chapter
County Geologist
County District Attorney Office
County Hazardous Materials Compliance Division County Integrated Waste Management County Office of Affordable Housing County Traffic Operations
School Districts
PG&E
AT&T

In addition, five of the County's largest employers were invited to participate in the Local Planning Team. These are Applied Materials, Cisco, Intel, Lockheed Martin, and Oracle. Oracle was the only firm that declined the invitation due to limited resources.

Table 3-2 Local Planning Team Members shows the list of individuals representing their agencies on the Local Planning Team. The LPT 1, LPT 2, LPT 3, and LPT 4 columns indicate attendance at the four Local Planning Team milestone meetings summarized in Section 3.2.3.

Table 3-2: Local Planning Team Members

*Note: This table is presented in alphabetical order by Organization. The County Office of Emergency Services maintains an excel spreadsheet with the LPT members contact information.

Category	LPT 1	LPT 2	LPT 3	LPT 4	Last	First	Organization*
Private	x				Wong	Raelene	Applied Materials
State		x			Braga	Robert	Caltrans - District 4
Private	x	x			Agiewich	Erica	Cisco
Private	x				Bandoni	Tom	Cisco
City							City of Palo Alto
City			x		Mallonee	Richard	City of Palo Alto
City					Jewell	Judy	City of Palo Alto
City		x			Salvador	Albert	Cupertino Building Department
City				x	Abrams	Kristi	Gilroy
City	x	x	x	x	Shackel	Roy	Gilroy FD / OES
Private	x				Fields	Bob	Lockheed Martin Space Sys. Co.
Private	x				Staley	Richard	Lockheed Martin Space Sys. Co.
City			x		Hartley	Matthew	Los Altos PD
City	x	x			Galea	Andy	Los Altos PD
City		x		x	Arguelles	Paul	Los Altos PD
City		x	x		Rooney	Wendie	Los Gatos Community Development
City					Loventhal	Brian	Monte Sereno
City			x		McGranahan	Erin	Monte Sereno
City			x	x	Ponce	Jennifer	Morgan Hill
City		x	x		Sampson	Joe	Morgan Hill OES
City			x	x	Garrett	Jaime	Mountain View Fire
City		x			Brown	Lynn	Mountain View OES
Federal		x			Bala	Lynn	NASA - Ames
Federal		x			Johnson	Ken	NASA - Ames
City		x			Minshall	Suzan	Palo Alto Fire
City							San Jose
City	x	x			Godley	Christopher	San Jose OES
City		x			Saffarzadeh	Saman	San Jose OES
City		x	x	x	Sawyer	Gene	Santa Clara City
County			x		Albert	Peggy	Santa Clara Valley Medical Center
City		x			Powell	Barbara	Saratoga, City Manager's Office
County							SCC
County	x	x			Matthews	Margie	SCC
County	x				Escobar	Albert	SCC - ACC
County	x				Brown	Laurie	SCC - Communications
County	x	x			Darnell	Curtis	SCC - Communications
County		x			Blamey	Jim	SCC - Haz Mat
County	x				O'Day	Kevin	SCC Ag & Env Mgmt
County	x				Ribardo	Michele	SCC Ag & Env Mgmt
County		x			Constantino	Elizabeth	SCC Ag & Env Mgmt
County		x			Wylde	Eric	SCC Ag & Env Mgmt

Category	LPT 1	LPT 2	LPT 3	LPT 4	Last	First	Organization*
County	x	x			Rado	Ken	SCC Capital Programs Division, FAF
County			x		Pinder	Renee	SCC Communications
County	x				Wien	Martha	SCC- DEH
County		x			Arila	Michelle	SCC District Attorney
County		x			Cabano	Michael	SCC EMS and Public Health
County		x			Blain	John	SCC EMS and Public Health
County	x				Linebarger	Dean	SCC ISD
County	x		x	x	Colley	Robert	SCC ISD-GIS
County		x	x	x	Schenk	Doug	SCC ISD-GIS
County		x			Sahasrabuddhe	Durga	SCC ISD-GIS
County	x	x			Grey	Miguel	SCC OES
County	x	x	x		Hofmann	Kirstin	SCC OES
County			x		Reinstein	Harry	SCC OES
County			x	x	Foot	Ken	SCC OES
County					Coats	Barbara	SCC Office of Education
County	x				Pierow	Zohreh	SCC OSEC
County					Klett	Kelly	SCC Parks and Recreation
County				x	Mark	Julie	SCC Parks and Recreation
County					Hall Esser	Jody	SCC Planning and Development
County	x	x			Whisler	Tom	SCC Planning and Development
County			x	x	Harrison	Mike	SCC Planning and Development
County		x	x	x	Baker	Jim	SCC Planning and Development
County	x	x			Murdter	Michael	SCC Roads & Airports Department
County	x	x		x	McCoy	Jeffrey	SCC Sheriff
County	x	x			Staump	Steven	SCCFD
County				x	Grey	Miguel	SCCFD
County				x	Vega	Ron	SCCFD
City	x	x	x		Campbell	Dan	SCCFD - Campbell
City	x	x	x	x	Yoke	Jim	SCCFD - LG/MS/SARA
City	x	x	x	x	Hovey	Marsha	OES - Cupertino
County	x				Walker	Barb	SCCPHD Preparedness
County	x	x		x	Hamer	Michael	SCVWD
County	x			x	Ledesma	Juan	SCVWD
City							Sunnyvale
City		x	x		Sampson	Cherel	Sunnyvale OES
Special District		x			Reid	Robert	West Valley Santitation District

3.2.3 Local Planning Team Meetings and Outcomes

3.2.3.1 Local Planning Team Milestone Meeting #1

On June 28, 2010, County OES hosted the first milestone meeting of the Local Planning Team with the following agenda:

LPT 1	Description	Lead	Est. Time
1	Welcome / Introductions / Complete Sign-in-Roster	Miguel Grey	1:00 – 1:10
2	Overview of Agenda / Meeting Objectives	Dewberry	1:10 – 1:15
3	Review Plan Update Requirements	Dewberry	1:15 – 1:30
4	Roles & Responsibilities	Dewberry / All	1:30 – 1:40
5	Review documented hazard events	Dewberry / All	1:40 – 2:00
6	Break		2:00 – 2:10
7	Review ABAG Risk Assessment	Dewberry	2:10 – 3:00
8	Hazard ID & Ranking	Dewberry / All	3:00 – 3:45
9	Identify Extended Stakeholders	Dewberry / All	3:45 – 4:00
10	Project Schedule – Next Steps	Dewberry	4:00 – 4:30
11	Questions / Open Discussion	All	4:30 – 5:00

Kirstin Hofmann, Santa Clara County OES Director, opened the meeting with a warm welcome to the 30 attendees and expressed appreciation for their participation. She highlighted the importance of collaborative planning to build a resilient county.

Miguel Grey, Santa Clara County OES, was introduced as the project manager and asked all attendees to introduce themselves.

Corinne Bartshire, Dewberry, led the attendees through the items as noted on the above agenda using a Power Point presentation, handout, and Risk Prioritization tools. These documents, along with a copy of these notes, were made available to all attendees via an FTP site on June 29th, 2010. They are presented in County Attachment 3: Local Planning Team Meeting #1, of this plan.

ABAG Risk Assessment Review

The following items were raised by attendees during the review of ABAG's risk assessment:

- San Jose International Airport is located on an area of liquefaction concern.
- The 203 critical facilities identified by ABAG to be within earthquake-induced landslide risk areas should be reviewed for accuracy.
- The RCPGP (Recovery/Catastrophic Planning) effort should be consulted for synergies with this hazard mitigation plan update.

- With regard to tsunamis, it is important to know which critical facilities are within the mapped inundation area. It is likely that Moffet Field, some areas of Milpitas, and the residential community of Alviso may be within the mapped tsunami inundation area.

Hazard Identification & Prioritization

During the Hazard Identification & Prioritization exercise, attendees reviewed an exhaustive list of natural hazards and identified the applicable hazards to Santa Clara County. Preliminary disposition for each hazard was reached by evaluating the following three questions:

1. Is it a local responsibility?
2. Can it be mitigated?
3. Is it worth the time investment?

Each hazard received a prioritization ranking score based on likelihood of occurrence, size of expected area of impact, and expected severity of primary and secondary impacts. This ranking and further discussion of the identified hazards are included in Section 4: Hazards Assessment.

Extended Stakeholders

In addition to the stakeholders listed in the Power Point, the attendees identified the following for review and input into the hazard mitigation planning process:

Schools (PTAs or folks responsible for outreach to assist with an education campaign about hazard mitigation)
VTA & other Transportation Hubs (airports)
CalTrain
Wastewater utilities
Southern Pacific Rail
Laura Phillips (UASI projects, state representative)
CRA (Peter Otaki)
Telecommunication Providers (AT&T, Verizon, etc)
City Owned Utilities
Stanford University
Santa Clara University
San Jose State University
San Jose Airport

Note: City of San Jose completed a collaborative mitigation planning process with the airport and other utilities. This information is available to the County-wide planning process.

3.2.3.2 Local Planning Team Milestone Meeting #2

On August 3, 2010, County OES hosted the second milestone meeting of the Local Planning Team with the following agenda:

LPT 2	Description	Lead	Est. Time
1	Welcome / Introductions / Complete Sign-in-Roster	Miguel Grey	8:00 – 8:10
2	Overview of Agenda / Meeting Objectives	Dewberry	8:10 – 8:15
3	Hazard Profile Data Confirmation	Dewberry	8:15 – 8:45
4	Vulnerability Analysis – Preliminary Review	Dewberry / All	8:45 – 9:15
5	Break	Dewberry / All	9:15 – 9:30
6	Mitigation Strategy Priority Review		9:30 – 10:15
7	Mitigation Action Identification	Dewberry	10:15 – 11:00
8	Mitigation Action Prioritization	Dewberry / All	11:00 – 11:30
9	Project Schedule – Next Steps	Dewberry	11:30 – 11:40
10	Questions / Open Discussion	All	11:40 – 12:00

Miguel Grey, Santa Clara County OES, welcomed everyone to the second milestone meeting with a refresher quiz of the top 7 hazards identified during the June 28th meeting. These are EQ – groundshaking, infrastructure failure, EQ – liquefaction, Delta Levee Failure, Wildfire, EQ – Surface Rupture, and EQ – Landslides. Miguel asked all attendees to introduce themselves.

Corinne Bartshire, Dewberry, led the attendees through review and discussion of items noted on the above agenda using an accompanying handout. This handout and all components in MS Word format, along with a copy of these notes, were made available to all attendees via an FTP site on August 4th 2010. They are presented in County Attachment 4: Local Planning Team Meeting #2 in Section 9 of this plan.

The goal of this meeting was to brainstorm mitigation action ideas and collaboratively identify Operational Area (Santa Clara County geographical region) priorities. The discussion resulted in eight drafted mitigation actions using the provided Mitigation Action form and several additional ideas to be developed into mitigation actions.

Organizations Represented
The following organizations participated in Milestone Meeting #2.

City Participants:
City of Campbell
City of Cupertino
City of Gilroy
City of Los Altos
City of Monte Sereno
City of Morgan Hill
City of Mountain View
City of Palo Alto
City of San Jose
City of Santa Clara
City of Saratoga
City of Sunnyvale
Town of Los Gatos

Partner Organizations:
Santa Clara Valley Water District
West Valley Sanitation District
Caltrans – District 4
Cisco
NASA – Ames

County Participants:
SCC – Communications
SCC - EMS and Public Heath
SCC - ISD (GIS)
SCC – OES
SCC – Sheriff
SCC – Roads and Airports
SCC – Agriculture and Environmental Management
SCC – Facilities and Fleet
SCC – Fire
SCC – Planning and Development
SCC – Hazardous Materials
SCC – District Attorney

Summary of Key Topics

The Local Planning Team, during Milestone Meeting #2, agreed upon the following as a summary of priority topics and associated mitigation actions. These do not include all of the ideas shared, but reflect those agreed upon as priorities.

1. Soft story / Unreinforced Masonry (URM)
    a. Leverage ASCE
    b. Leverage CA Earthquake Authority
2. Community / Education Outreach
    a. Leverage communications (integrate water district outreach into CERT programs)
    b. Encourage preparedness w/ food & shelter
3. Information Sharing (mapping / GIS / Coordinate w. Private Sector)
    a. Sharing of information across infrastructure (Water coordinate w/ sanitary, inter ties)
4. Communications (Effective in emergency situation)
    a. Emergency notification integrated with evacuation planning (not phone based) (need an instant sound that people know to turn on their radio) (dam warning - similar to Tsunami warnings)
    b. Effective in power outage situation
    c. 211 redundancy / support mechanism for 911
5. Climate Change awareness [Sea level rise, Salt water intrusion issues (corrosion of underground utilities), Increased severity of natural hazards]
    a. Ensure local gov't is monitoring climate change and participating in adaptation. (climate action plans)
    b. Accept UN's climate change panel recommendations for mid-scenario
6. Power (solar panels for critical facilities)
7. Landslide Potential (Hillside development, transportation interruption)
8. Wildland Urban Interface
9. Multiplicity of dependence on a variety of things for the functionality of government (interdependencies)
    a. Each building relies on multiple things which present their own vulnerability (power, water, sewer, access, parking, etc...)
10. Flooding
    a. Dam inspections
    b. Evacuation planning

Informal votes were solicited from the City Representatives, County Departments, and Operational Area Partners to identify consensus:

- **"Communications"** was identified as the highest priority strategy area by a substantial margin throughout the Local Planning Team, broadly supported across all three groups.
- **"Soft Story/URM"**, **"Flooding"** and **"Information Sharing"** were identified as strategy areas with high priority. Soft Story/URM was heavily supported by City Representatives and supported by others as well. Flooding was heavily supported by City Representatives and

County Departments and supported by others as well. Information Sharing was broadly supported across all three groups, although not to the same level as Communications.

- **"Community / Education Outreach", "Power", "Climate Change" and "Wildland Urban Interface"** were identified as strategy areas with some priority. Community / Education Outreach received the most support from County Departments with some support from others. Climate Change received the most support from City Representatives and some support from Op Area partners. Wildland Urban Interface received the most support from City Representatives and County Departments.
- **"Landslide Potential" and "Interdependencies"** were identified during the brainstorming session, but received minimal and zero votes respectively.

3.2.3.3 Work Group Meetings

Following the second milestone Local Planning Team Meeting, Miguel Grey, County OES, organized several work group meetings to further discuss the identified key topics and develop specific mitigation actions. These meetings are summarized in the table below.

Table 3-3: Mitigation Action Week

Meeting Purpose	Date, Location	Notes
Communication / Public Warning Workshop	November 15, 2010 Santa Clara County OES	The group discussed a siren warning system for catastrophic dam failure and associated mitigation actions.
Unreinforced Masonry/Soft Story Buildings Workshop	November 16, 2010 Santa Clara County OES	The group discussed the status of unreinforced masonry and soft story structures throughout the county and associated mitigation actions.
Wildland Urban Interface Workshop	November 17, 2010 Santa Clara County OES	The group discussed the wildfire risk present in the wildland urban interface areas and associated mitigation actions.
Flood Workshop	November 18, 2010 Santa Clara County OES	The group identified mitigation actions for addressing flood risk on a more macro level through collaboration of various jurisdictions and agencies.
Information Sharing Workshop	November 19, 2010 Santa Clara County OES	The group discussed ways to improve information sharing across agencies.

The sign in sheets from these meetings are included in County Attachment 5: Mitigation Action Week Sign In Sheets. Summaries of these meetings and identified mitigation actions are included in Section 7 Mitigation Strategy.

3.2.3.4 Local Planning Team Milestone Meeting #3

On January 19, 2011, County OES hosted the third milestone meeting of the Local Planning Team with the following agenda:

LPT 3	Description	Lead	Est. Time
1	Welcome / Introductions / Complete Sign-in-Roster	Kirstin Hofmann	2:00 – 2:10
2	Overview of Agenda / Meeting Objectives	Dewberry	2:10 – 2:15
3	Status of Plan Drafts (need all comments by January 31, 2011)	Dewberry	2:15 – 2:30
4	Summary of Survey Results & Stakeholder Review (concurrent with Cal EMA submittal)	Dewberry	2:30 – 2:45
5	Mitigation Action Prioritization	Dewberry / All	2:45 – 3:30
6	Plain Maintenance & Continued LPT Operations -monitoring -project tracking -public involvement -LPT meetings	Dewberry/All	3:30 – 3:50
7	Questions / Open Discussion	All	3:50 – 4:00

Corinne Bartshire, Dewberry, led the attendees through review and discussion of items noted on the above agenda using an accompanying handout. This handout was emailed to all members of the LPT prior to the meeting and the draft plan sections were made available via an FTP site. The handout and results of the mitigation action prioritization are presented in County Attachment 6: Local Planning Team Meeting #3, in Section 9 of this annex.

The ideas discussed regarding plan maintenance and continued operation of the Local Planning Team are presented in Section 8 Plan Maintenance. The members of the Local Planning Team are generally pleased with the coordination that has occurred over the past year and would like to continue the momentum towards implementing mitigation actions.

3.2.3.5 Local Planning Team Milestone Meeting #4

On June 29, 2011, County OES hosted the fourth milestone meeting of the Local Planning Team. The focus of this meeting was to refine the initially identified mitigation priorities into an implementable mitigation strategy with prioritized actions. The Local Planning Team reviewed the initial list of mitigation actions and collaboratively discussed effective ways to consolidate ideas and focus initial mitigation efforts where they are needed most. Section 7 of this plan has been updated to reflect the results of milestone meeting #4.

3.2.4 Private Sector Participation

As noted in Table 3-1: Preliminary Meetings, the contractor met with five large private sector businesses to discuss the hazard mitigation planning process and invite them to participate. Meeting notes from the preliminary meeting with each business may be found in County Attachment 1: Preliminary Meetings. Applied Materials, Cisco, and Lockheed Martin actively participated in the first milestone meeting of the LPT where hazards were prioritized for the operational area. Cisco participated in the second milestone meeting of the LPT and contributed a mitigation action idea for private sector preparedness training.

3.2.5 Private Sector Capabilities

Each of the five private sector participants were asked to complete a private sector questionnaire (included in the meeting notes). Based on the preliminary meetings and responses to the questionnaire, the following profiles were developed for each of the private sector partners. These may be updated and used for implementation of further collaboration between the private sector and the Local Planning Team.

3.2.5.1 Applied Materials

Point of Contact: Raelene Wong, Director, Global Business Continuity Planning, Corporate Asset Services

Applied Materials is heavily regulated because of their work with semiconductor research and development. They have strong emergency response plans and incredible risk assessments. Applied Materials has an executive leadership team and risk management coordinating council concerned with safety on the campus. The company works with the local jurisdiction's emergency responders on a regular basis and conduct joint trainings as appropriate.

Applied Materials has two campuses within the City of Santa Clara, one campus in Sunnyvale, and one campus in Fremont. They have dedicated employees for emergency management response. There are Memorandums of Understanding in place with the local emergency responders for certain events that Applied Materials can respond to sufficiently in house. There are 5200 alarm sensors which are monitored in Austin. They have a volunteer ERT on first shift Monday – Friday. There are 75 Full ERT staff highly trained EMTs certified in hazardous materials. There are 30 auxiliary ERT. Last year Applied Materials responded to 359 calls.

Emergency Planning: Emergency Preparedness Plan
Emergency Operations / Response Plan
Continuity of Operations Plan

Existing Relationship with local emergency management services: Yes

Natural Hazards of risk: Earthquakes, severe weather, power outages

Primary Concern: Limited professional emergency resources for support

Facilities: Applied Materials is in the process of structurally retrofitting some facilities to be safer and more resilient to natural hazards. The high hazard buildings are at most risk to the above identified hazards. The vulnerability of these facilities can be quantified based on revenue generated, incident probability, and expected downtime. Approximately 3,000 people occupy these facilities.

Current or Previous Mitigation Projects:

1. Installation of emergency generators at key facilities (Emergency Operations Centers, Data Centers). Not for manufacturing operations.
2. Seismic retrofit of high priority facilities.
3. Stockpiling emergency supplies (care & comfort, search & rescue). Including communication equipment (dedicated radio frequency, satellite, phones, etc.)

Future Mitigation Projects:

1. Seismic retrofit of all buildings

3.2.5.2 Cisco Systems, Inc.

Point of Contact: Erica Agiewich, Business Resiliency Manager

Emergency Planning: Emergency Preparedness Plan
Emergency Operations / Response Plan
Continuity of Operations Plan

Existing Relationship with local emergency management services: Yes

Natural Hazards of risk: Earthquakes, liquefaction, flooding, and wildfire

Primary Concern: Protecting Cisco's employees, the business, customers/partners and the community.

Facilities: Cisco owns some facilities and leases other facilities. All of the facilities are currently designed to be resilient to earthquake, flood, and wildfire. Some facilities are susceptible to flooding. Some facilities are within a wildland urban interface zone and/or are at risk to wildfire. All facilities share the same level of risk to natural hazards. Cisco has a variety of tools to quantify vulnerability such as site-based Threat & Impact Assessments, Total Insurable Values, and insurance reports. Approximately 36,000 people occupy Cisco's facilities.

Current or Previous Mitigation Projects:

1. Building retrofit in early 1990s
2. Sprinkler bracing safety work, seismic gas shut off valves

3. Proactive monitoring of severe weather and natural hazards

Future Mitigation Projects:

1. Improve ARK program and provide additional emergency supplies on campus.
2. Ensure vegetation around campus is trimmed to protect from wildfires.

3.2.5.3 Intel

Point of Contact: Celeste Sierra, Security

Intel previously coordinated with Santa Clara County to become a designated Point Of Distribution (POD), but the project has been delayed. Intel has an Emergency Preparedness Plan and a Business continuity plan. With regards to natural hazards, they are mostly concerned with earthquakes and floods.

Intel did not complete a private sector survey or attend any milestone Local Planning Team meetings.

3.2.5.4 Lockheed Martin

Point of Contact: Bob Fields, Chief, Emergency Operations

Headquartered in Bethesda, MD, Lockheed Martin is a global national defense and security critical infrastructure entity that employs about 136,000 people worldwide and is principally engaged in the research, design, development, manufacture, integration and sustainment of advanced technology systems, products and services. The majority of Lockheed Martin's business is with the U.S. Department of Defense and federal government agencies. Lockheed Martin is the largest provider of IT services, systems integration, and training to the U.S. Government. In Santa Clara County and vicinity, the company employs approximately 10,000 people involved in research, production, and miscellaneous services.

The highly classified nature of Lockheed martin’s work for the Department of Defense requires that risk assessment, emergency planning, and continuity of operations planning (COOP) be also treated and protected as classified material. Consequently, the company engages in robust natural and technological hazard mitigation and has developed extensive and comprehensive emergency response and recovery capabilities and protocols. The Lockheed Martin campus in Sunnyvale is surrounded by bay water levees. To aid in managing flood response operations, they have constructed an intricate canal and drainage system to manage surface runoff. Lockheed Martin has a new world class EOC on the campus and an internal 911 dispatch system which patches into the local and county public safety infrastructure. The company responds to most of their own calls. If they need help the 911 call is heard by the local dispatcher at the same time the call is made on campus.

Emergency Planning: Emergency Preparedness Plan
Emergency Operations / Response Plan

Continuity of Operations Plan

Existing Relationship with local emergency management services: Yes

Natural Hazards of risk: Earthquakes, flood (rain, bay), fire (urban and wildland)

Primary Concern: Flood and Earthquake
Facilities: Lockheed Martin's facilities are currently designed to be resilient to earthquakes, flood, and wildfire as appropriate. Some facilities are susceptible to flooding. Some facilities are within a wildland urban interface zone and/or are at risk to wildfire. Lockheed Martin has experienced damages in the past due to earthquakes, flooding, or wildfire. Lockheed Martin is in the process of retrofitting some facilities to be safer and more resilient to natural hazards. All of the facilities are at risk to the above identified natural hazards. Approximately 10,000 people occupy these facilities.

Current or Previous Mitigation Projects:

1. Not Applicable

Future Mitigation Projects:

1. Strong emphasis on response and recovery operations

3.2.5.5 Oracle

Point of Contact: Sandra Silva, Manager, Safety and Facility Operations

Collaboration with the local government on emergency management matters is normally something that Oracle participates in; however, they were too busy with the integration of Sun Microsystems during the time of this plan preparation to participate. They may be available in 2011 to join the collaboration.

3.2.6 Public Outreach

3.2.6.1 Online Survey

On November 1, 2010, the Local Planning Team released an online survey to solicit public input regarding concerns for hazard risk. The Local Planning Team also used this survey to gauge the level of public preparedness for emergencies. A copy of the survey and draft materials provided to the LPT for use disseminating the survey are included in County Attachment 7: Survey Outreach Materials.

Santa Clara County issued a press release on November 17, 2010 and linked the survey to the County's website as a "Hot Item". The Sherriff's Office emailed the survey link to all of their employees (badge and civilian) and linked to the survey on their webpage as "Featured Information". These materials may be found in County Attachment 8: County Outreach – County Exhibits.

As of January 17, 2011, 541 survey responses were received. Below is a county-wide, all-inclusive summary of responses to the survey. More detailed, City specific results can be found in each jurisdiction's subsection of this plan.

3.2.6.2 County-wide Survey Results

1. The following jurisdictions responded to the 2010 Santa Clara County Hazard Mitigation Plan Survey:

Table 3-4: Respondents to Online Survey

Jurisdiction	Number of Respondents
Campbell	21
Cupertino	25
Gilroy	16
Los Altos	13
Los Altos Hills	2
Los Gatos	21
Milpitas	5
Monte Sereno	25
Morgan Hill	13
Mountain View	21
Palo Alto	50
San Jose	144
Santa Clara	24
Saratoga	28
Sunnyvale	108
Santa Clara County Unincorporated	25
Total	**541**

2. Respondents were asked which five hazards, out of the 31 hazards the LPT identified, are of most concern to their neighborhood or home. Below is a County-wide summary of these responses (in order of most responses):

Table 3-5: Hazards of Most Concern

Hazard	Number of Responses
Infrastructure: Water System Disruption (no potable water)	383
Earthquake: Ground Shaking	366
Infrastructure: Electrical System Disruption (no power)	346
Infrastructure: Wastewater System Disruption (sewer backup)	200
Infrastructure: Telecommunication System Disruption (no phone / cell	179

Hazard	Number of Responses
service)	
Infrastructure: Energy System Disruption (no gas)	168
Infrastructure: Transportation Disruption (blocked roads / failed bridges)	138
Disease and Outbreak	105
Earthquake: Surface Rupture	98
Wildfire	97
Hazardous Materials Spills (chemical/biological)	94
Flood	86
Additional Hazards that Pose a Threat to Neighborhood/Home	78
Drought	65
Earthquake: Liquefaction	56
Dam Failure	49
Agricultural Pests and Diseases	35
Earthquake: Landslides	32
Wind (high winds)	28
Heat (extreme heat)	27
Delta Levee Failure	18
Expansive Soils	10
Landslide and Debris flow	10
Thunder/Lightning Storms	10
Land Subsidence (soil compaction due to subsurface water removal)	7
Solar Storm	7
Bay Area Silting	6
Tornado	4
Tsunami	4
Freeze	2
Hailstorm	0
Volcano	0

3. Respondents were asked if a severe hazard event occurred today, such that all services were cut off from their home and they were unable to leave or access a store for 72 hours, which items they would have readily available. Below is a summary of County-wide responses:

Table 3-6: Items Readily Available to Respondents

Item that is Readily Available	Responses
Flashlight (with batteries)	513
Blanket(s)	496
Canned/Non-perishable foods (ready to eat)	450

Item that is Readily Available	Responses
First Aid Kit	445
Portable AM/FM Radio (Solar Powered, Hand Cranked, Batteries)	380
Potable Water (3 gallons per person)	347
Extra Medications	311
Cash	291
Handheld "Walkie-Talkie" Radios (with batteries)	206
Other items in emergency kit	182
Important family photos/Documentation in a water/fire proof container	126

4. Respondents were asked if they were familiar with the special needs of their neighbors in the event of a disaster situation.
   - 383, or **71.5%** of respondents, answered that they **are not** familiar with the special needs of their neighbors.
   - 153, or **28.5%** of respondents, answered that they **are** familiar with the special needs of their neighbors.

5. Respondents were asked if they are trained members of their Community Emergency Response Team (CERT).
   - 214, or **40.3%** of respondents, indicated that they **are part of CERT**.
   - 130, or **24.5%** of respondents, indicated that they are not part of CERT, but **would like to learn more about CERT.**
   - 187, or **35.2%** of respondents, indicated that they are not part of CERT and **are not interested** in being a trained CERT member.

6. Respondents were asked what the most important thing their local government can do to help communities be more prepared for a disaster. The following are categories that many of the responses from respondents fall under:
   - **Disaster Planning and Preparedness**
   - **Emergency Backup**
   - **Warning Systems**
   - **Education and outreach**
   - **Training/CERT**
   - **Restrictive Zoning/Building Codes (seismic retrofits)**
   - **Maintain Quality of Infrastructure**
   - **Emergency Communication**
   - **Remove debris from creeks/waterways to help prevent flooding**
   - **Hazard Mitigation Plans/ Emergency Operations Plans**

7. Respondents were asked if they live in an apartment building or home with a living space above a garage or parking area.
   - 416, or **78%** of respondents, indicated that they **do not** live in an apartment or home with living space above a garage or parking area.
   - 118, or **22%** of respondents, indicated that they **do** live in an apartment building or home with living space above a garage or parking area.

8. Respondents who are homeowners were asked if they have adequate homeowners insurance to cover the hazards that could impact their home. Below is a summary of responses:

Table 3-7: Adequate Homeowners Insurance

Answer	Responses
Yes, my insurance coverage should be adequate	319
No, I don't believe my insurance coverage would be adequate for a major disaster	98
Unsure	49
I do not have an insurance policy	3
Not applicable, I rent my current residence	60

9. Respondents were asked if they have earthquake insurance. Below is a summary of responses:

Table 3-8: Earthquake Insurance

Answer	Responses
Yes, I own my home and have earthquake insurance	144
Yes, I rent my home and have earthquake insurance	14
No, but I am interested in reviewing earthquake insurance options	49
No, earthquake insurance is too expensive	279
No, I do not need earthquake insurance	41

10. Respondents were asked if they have flood insurance. Below is a summary of responses:

Table 3-9: Flood Insurance

Answer	Responses
Yes, I own my home and have flood insurance	92
Yes, I rent my home and have flood insurance	11
No, but I am interested in reviewing flood insurance options	53
No, I do not need flood insurance	364

11. Respondents indicated the following as additional insurance listed for their home or property:
    - **Fire**
    - **Home insurance**
    - **Renters**
    - **Condo insurance**
    - **Water Damage Insurance**
    - **Umbrella Insurance (Life, Home Owner, Personal)**

12. Respondents were asked what they are doing to their property or within their home to reduce future damage from the hazards identified above. Below is a summary of responses:

Table 3-10: Property Changes to Reduce Future Damage from Hazards

Property Mitigation	Responses
Roof Retrofit using fire resistant materials	142
Defensible space landscaping (clear vegetation around house to reduce wildfire risk)	106
Seismic Retrofit of structure /foundation	95
Other	68
Installed backflow prevention device	59
Strengthened openings to reduce high hazard wind risk	59
House elevation or first flood modification to prevent flood damage	19

13. Respondents were asked if they work in Santa Clara County.
    - 401, or **76.4%** of respondents, indicated that they **do** work in Santa Clara County.
    - 124, or **23.6%** of respondents, indicated that they **do not** work in Santa Clara County.

14. Respondents were asked if their place of work is in an area susceptible to natural hazards. Below is a list of natural hazards and responses from survey respondents:

Table 3-11: Place of Work in Hazard Areas

Natural Hazard	Response
Earthquake fault zone	214
I don't know	160
High-risk flood zone	81
Liquefaction zone	53
Other	47
Wildland Urban Interface	40
Landslide risk area	11

15. Respondents were asked if their employer has a plan for disaster recovery in place.
    - 301, or **67.2%** of respondents, **indicated that their employer does have a disaster recovery plan in place.**
    - 44, or **9.8%** of respondents, indicated that their employer **does not** have a disaster recovery plan in place.
    - 103 respondents were **unsure** if their employer has a disaster recovery plan in place.

16. Respondents were asked if their employer has a workforce communications plan to implement following a disaster so they may contact their employees.
    - 264, or **59.5%** of respondents, indicated that their **employer does** have a workforce communications plan.
    - 55, or **12.4%** of respondents, indicated that their **employer does not** have a workforce communications plan.
    - 125, or **28.2%** of respondents, indicated that they are **unsure** if their employer has a workforce communications plan.

17. Respondents were asked to list any studies that they are aware of being conducted within their community or the county regarding the risk to future hazard events. The following are some of the studies respondents included in their survey answers:
    - **Dam inundation analysis**
    - **Liquefaction analysis**
    - **Flood studies**
    - **Geologic soil type**
    - **Hillside evacuation plan**
    - **Studies of seismic retrofits and unreinforced masonry and soft story**
    - **Dam structural problems**
    - **"Most Vulnerable Buildings"**
    - **USGS Groundshake studies**

- **Well studies**
- **Sea Level Rise**
- **Natural gas fault line analysis**
- **Tsunami inundation maps**

18. Respondents were asked what recommendations they have for Santa Clara County and the incorporated cities to improve identification, prioritization, and implementation of actions intended to reduce future damage and increase resiliency. The following are some of the recommendations respondents included in their survey answers:
    - **Enforce Building Codes and Permits**
    - **Integrate Airports into Disaster Recovery Plan**
    - **Information on Seismic Retrofitting (for owners and renters)**
    - **Provide maps of local hazards**
    - **Community training/education**
    - **Retrofit assistance**
    - **County website with list of hazards and ways to mitigate them**
    - **Infrastructure emergency response plans**
    - **Underground utilities**
    - **Mandatory sprinklers in schools and public buildings**
    - **Hydrants in mountains**
    - **Transportation evacuation plans**
    - **Conduct a critical facility inventory**
    - **Home inspections**
    - **Update Infrastructure**
    - **Reduce cost of earthquake insurance**
    - **Disaster planning by neighborhood**

19. Respondents were asked to recommend any companies or local associations that should be involved in the Santa Clara County hazard mitigation planning process. The organizations recommended by Santa Clara County Unincorporated respondents are listed below and were given the opportunity to review the draft plan (as noted in the following section).
    - **Our Lady of Fatima Villa**
    - **Stanford Campus Residential Leaseholders**

20. Respondents were asked if they would like to review and comment on a draft of their jurisdictions annex to the Multi-Jurisdictional Multi-Hazard Mitigation Plan.
    - 144, or **32%** of respondents **said they would** like to review and comment on the draft plan.
    - 305, or **68%** of respondents said **they would not** like to review and comment on the plan draft.

    There were seven respondents from Santa Clara County Unincorporated who said they would like to review and comment on the draft plan, included their contact information, and were given the opportunity to review the draft plan, as noted in the following section.

21. Respondents were asked to provide any additional comments/suggestions/questions. The following represent responses to this question:
    - **Outreach and disaster preparedness for schools**
    - **Education on disaster supplies needed for homes**
    - **Promotion of CERT and other organizations**
    - **Animal disaster response planning**
    - **Funding for CERT**
    - **For this plan, work more with Non-Profits**
    - **Please put this plan and pertinent information on website, readily available**
    - **Include crime prevention after major disaster in plan**
    - **Evacuation plan maps (including those for cars, bikes, and pedestrians)**
    - **Maps of shelters/places to find help**
    - **Include environmental pollution**
    - **A plan for the rupture of the Hetch Hetchy pipeline during earthquakes**
    - **Emergency response plans for industrial companies that border residential neighborhoods**
    - **Plans for Flu-epidemics**
    - **Communication and Planning between all cities of Santa Clara County (Monte Sereno should work with Los Gatos, Saratoga, and Campbell)**
    - **Publish a series of newspaper articles to create awareness and to educate**

3.2.6.3 Public and Stakeholder Review

County OES posted a review draft of this plan along with the City annexes on their website and welcomed public comment. A few emails were received with public comments. One suggested the runways at Moffett Field remain intact and available to assist the region as needed for recovery purposes. The received comments and other relevant outreach documentation is available in Attachment 8 County Outreach.

SECTION 4 HAZARDS ASSESSMENT

4.1 HAZARD IDENTIFICATION AND PRIORITIZATION

As noted in Section 3, the Local Planning Team reviewed an exhaustive list of potential hazards in coordination with the hazards addressed in ABAG's main plan "Taming Natural Disasters". Each hazard received a prioritization ranking score based on likelihood of occurrence, size of expected area of impact, and expected severity of primary and secondary impacts. The Local Planning Team agreed Santa Clara County is not at risk to the following hazards: Coastal Erosion, Coastal Storm, Hurricane, Severe Winter Storm (snow and ice), and Avalanche. The identified hazards potential to Santa Clara County are presented in Table 4-1 in order of the ranking score.

The prioritization ranking scores indicate the amount of intended planning consideration for each hazard. The hazards with the highest score deserve the most consideration and analysis with regard to quantifying vulnerability. Attendees suggested that future ranking exercises incorporate factors for the length of anticipated recovery time, and differentiate the risk of life from impact to property/structures.

Infrastructure Priority

It is noted that the highest priority risk is Infrastructure Failure. This may happen as a result of a catastrophic earthquake or severe natural hazard, but it may also happen independently of natural hazards. The attendees recognize failure of infrastructure systems as a priority threat.

Climate Change Considerations

The Local Planning Team recognizes that climate change is not a single hazard that can be prioritized in line with the other identified hazards. It acts as an amplifier of existing hazards. As such, climate change is both a present threat and a slow-onset disaster. Extreme weather events have become more frequent over the past 40 to 50 years and this trend is projected to continue. Rising sea levels, changes in rainfall distribution and intensity are expected to have a significant impact on coastal communities, including portions of Santa Clara County. More intense heat waves may result in more heat-related illnesses, droughts, and wildfires. The applicable hazard profiles include discussion of how climate change might impact the frequency, intensity, and distribution of these hazards. As climate science evolves and improves, the Local Planning Team might consider including climate change as a parameter in the ranking or scoring of natural hazards in future updates to this plan.

Table 4-1: Hazard Identification and Prioritization

Santa Clara Countywide Local Hazard Mitigation Plan
Hazards Identified by Local Planning Team on June 28, 2010

Hazard	Preliminary Disposition	Ranking Score	Ranking Category
EQ - Ground Shaking	**yes**	**64**	Significant
INFRA -water system disruption (potable)	**yes**	**64**	Significant
INFRA -electrical system disruption	**yes**	**64**	Significant
INFRA -energy system disruption	**yes**	**64**	Significant
INFRA -wastewater system disruption	**yes**	**64**	Significant
INFRA -telecommunication system disruption	**yes**	**64**	Significant
INFRA -transportation disruption	**yes**	**64**	Significant
EQ - Liquefaction	**yes**	**57.6**	Significant
Delta Levee Failure	water supply concerns, no structural risk directly	**48**	Significant
Wildfire	**yes**	**47.2**	Significant
EQ - Surface Rupture	**yes**	**44.8**	Significant
EQ - Landslides	**yes**	**44.8**	Significant
Flood	**yes**	**41.6**	Moderate
Drought	**yes**	**40.8**	Moderate
Solar storm	**yes**	**35.2**	Moderate
Dam Failure	**yes**	**32**	Moderate
Disease and outbreak	**yes**	**32**	Moderate
Freeze	**yes**	**30.6**	Moderate
Wind (high winds)	**yes**	**28.8**	Moderate
Extreme Heat	**yes**	**26.4**	Moderate
Agricultural Pests	**yes**	**25.6**	Moderate
Thunder/Lightning Storms	**yes**	**21.6**	Moderate
Bay Area Silting	**yes**	**16**	Moderate
Tornado	**yes, minimal risk**	**16**	Moderate
Hazardous Materials (Chemical/Biological)	**yes**	**16**	Moderate
Landslide and Debris flow	**yes**	**15.6**	Moderate
Land Subsidence	**yes**	**8.8**	Limited
Expansive soils	**yes**	**8**	Limited
Hailstorm	**yes**	**8**	Limited
Tsunami	**yes, minimal risk**	**4**	Limited
Volcano	**yes, minimal risk**	not ranked	Limited

**Discuss Climate Change as it exacerbates the above identified hazards

EQ - denotes Earthquake category
INFRA - denotes Infrastructure Failure category

Future Considerations

The LPT discussed Disease Outbreak/Pandemic as equal risk as Dam Failure with a preliminary ranking of 32. Based on the online public survey results, after infrastructure loss categories (6 of them) and Earthquake - Disease and Outbreak received the most votes - ahead of the remaining 23 categories. For these reasons, it is noted that future updates to this plan include further consideration of infectious diseases, potential pandemics and appropriate mitigation strategies.

Overview of Natural Hazard Risk

While it is difficult to determine the magnitude, frequency and probability of natural hazard events specific to Santa Clara County - some considerations of the national probabilities and risk to people due to natural hazards, such as infectious disease, should be considered. Risk is defined as the probability of an event times the consequences of that event. The table below provides a ranking of the annual risk percent of death per year for those affected [**100%*ave. per event/ Total People Affected/112 yrs**], calculated from the US data:

Table 4-2: Summarized Table of Natural Disasters in the US from 1900 to 2011

Event Category	Specific Event	# of Events	Killed	Total Affected	Annual Risk Probability %	Damage (000 US$)
Mass movement wet	ave. per event		153.8	35	3.92E+00	-
Mass movement wet	Landslide	4	615	140	3.92E+00	-
Epidemic	Viral Infectious Diseases	3	217	3602	5.38E-02	-
Epidemic	ave. per event		72.3	1200.7	5.38E-02	-
Storm	Local storm	225	6037	118192	4.56E-02	67594700
Storm	ave. per event		26.8	525.3	4.56E-02	300420.9
Earthquake (seismic activity)	Earthquake (ground shaking)	38	2825	71965	3.50E-02	41040770
Earthquake (seismic activity)	ave. per event		74.3	1893.8	3.50E-02	1080020.3
Volcano	Volcanic eruption	2	90	2500	3.21E-02	860000
Volcano	ave. per event		45	1250	3.21E-02	430000
Storm	Unspecified	184	6533	284838	2.05E-02	32178000
Storm	ave. per event		35.5	1548	2.05E-02	174880.4
Wildfire	Forest fire	44	1216	103303	1.05E-02	10557100
Wildfire	ave. per event		27.6	2347.8	1.05E-02	239934.1
Flood	Unspecified	52	1963	280040	6.26E-03	11867430
Flood	ave. per event		37.8	5385.4	6.27E-03	228219.8

Event Category	Specific Event	# of Events	Killed	Total Affected	Annual Risk Probability %	Damage (000 US$)
Flood	Flash flood	12	139	20120	6.17E-03	736830
Flood	ave. per event		11.6	1676.7	6.18E-03	61402.5
Storm	Tropical cyclone	99	15983	13063848	1.09E-03	341501810
Storm	ave. per event		161.4	131958.1	1.09E-03	3449513.2
Extreme temperature	Heat wave	22	4656	9025000	4.61E-04	9025000
Extreme temperature	ave. per event		211.6	410227	4.61E-04	410227.3
Epidemic	Parasitic Infectious Diseases	1	100	403000	2.22E-04	-
Epidemic	ave. per event		100	403000	2.22E-04	-
Flood	General flood	89	598	11810271	4.52E-05	37033000
Flood	ave. per event		6.7	132699.7	4.51E-05	416101.1
Wildfire	Scrub/grassland fire	13	18	682208	2.36E-05	3031100
Wildfire	ave. per event		1.4	52477.5	2.38E-05	233161.5
Wildfire	Unspecified	2	1	55187	1.62E-05	2016000
Wildfire	ave. per event		0.5	27593.5	1.62E-05	1008000
Drought	Drought	9	-	-		7135000
Drought	ave. per event		-	-		792777.8
Earthquake (seismic activity)	Tsunami	2	61	-		900
Earthquake (seismic activity)	ave. per event		30.5	-		450
Epidemic	Unspecified	1	-	101		-
Epidemic	ave. per event		-	101		-
Extreme temperature	Cold wave	9	360	-		4560000
Extreme temperature	ave. per event		40	-		506666.7
Extreme temperature	Extreme winter conditions	1	-	-		-
Extreme temperature	ave. per event		-	-		-
Flood	Storm surge/coastal flood	1	72	-		-
Flood	ave. per event		72	-		-
Storm	Extratropical cyclone (winter storm)	1	12	-		1000000
Storm	ave. per event		12	-		1000000

Created on: Feb-1-2011. - Data version: v12.07, Source: "EM-DAT: The OFDA/CRED International Disaster Database www.em-dat.net - Université Catholique de Louvain - Brussels – Belgium

4.2 EARTHQUAKE PROFILE

4.2.1 Nature of Hazard

Several active faults present potential danger to Santa Clara County. On the north western boundary, the San Andreas Fault runs through the hills separating the County from Santa Cruz County. On the east side of Highway 101, the Hayward and Calaveras separate the developed urban areas from the more rural mountains in the eastern part of the County. In the southern portion of the County the Sargent Fault runs west of Gilroy. These are presented in Figure 4-1 as provided by ABAG's online mapping system.

The Local Planning Team concurred with the assessment in Appendix C of *Taming Natural Hazards* (2010) that earthquake events along these faults lead to four types of earthquake hazards:

Ground Shaking
Liquefaction
Surface Rupture
Landslides

The Local Planning Team ranked Ground Shaking and Infrastructure Failure as the two highest priority hazards to the County with Liquefaction as the second highest priority. Surface Rupture and Landslides are also of "significant" concern, following Delta Levee Failure and Wildfire, as shown in Table 4-1: Hazard Identification and Prioritization. For simplicity, all four earthquake related hazards are discussed in this profile.

The earthquake hazard information provided in Appendix C of Taming Natural Hazards (2010) presents a summary of the regional risk to these four earthquake related hazards, how scientists measure that risk, and explanations for reading earthquake hazard maps. This profile highlights the specific risk to Santa Clara County without duplicating the information presented in Appendix C.

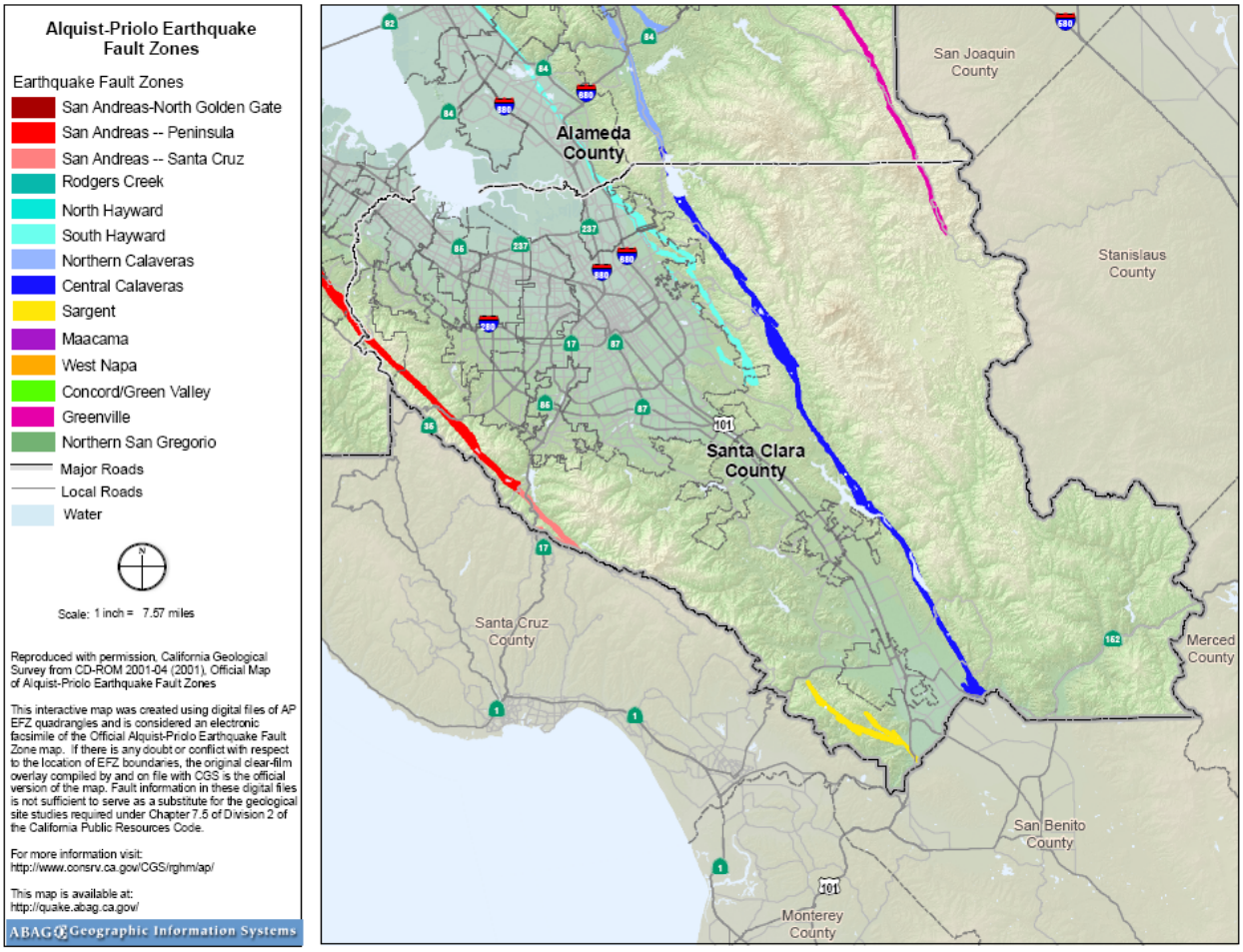


Figure 4-1: Alquist-Priolo Earthquake Fault Zones

4.2.2 History of Earthquakes

Based on search results of USGS earthquake archives[1], between 1769 and June 30, 2010, Santa Clara County experienced 1508 earthquake events. The Figure 4-2 shows the location of the events on record.

[1] Rectangular Search Performed at (http://earthquake.usgs.gov/earthquakes/eqarchives/epic/epic_rect.php); SEARCH OF...California, 1769 - 1974 (California Historical Earthquake Online Database) and SEARCH OF...USGS/NEIC (PDE) 1973 – Present (June 30, 2010).

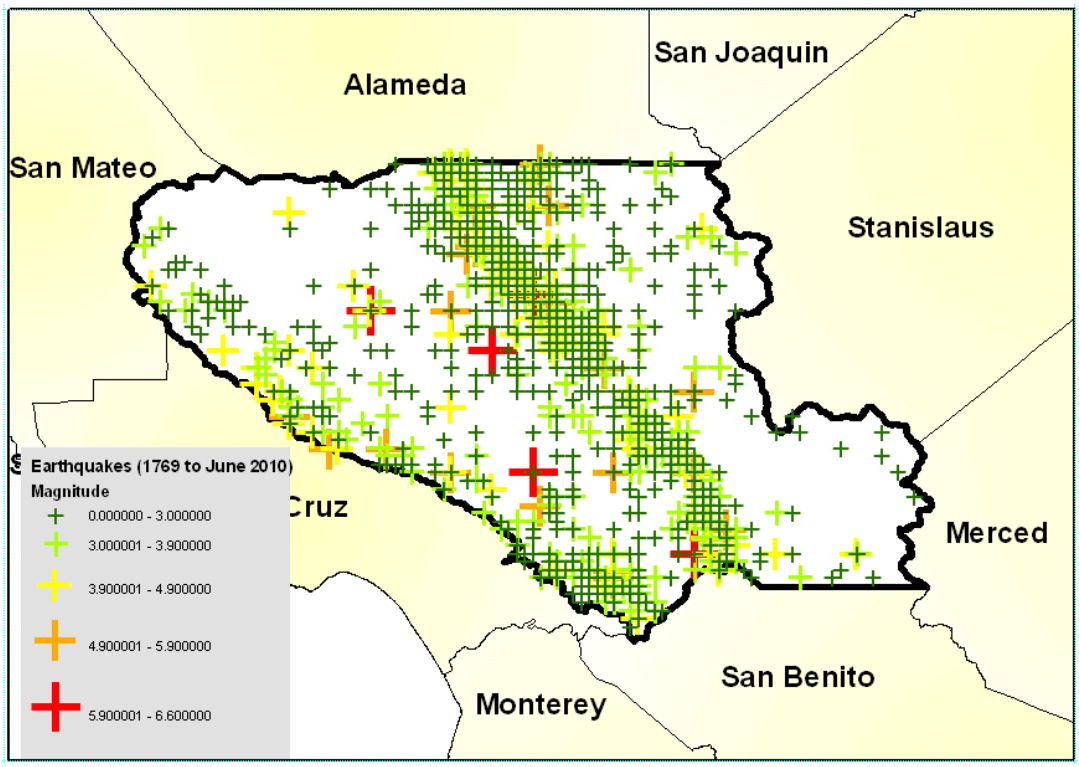
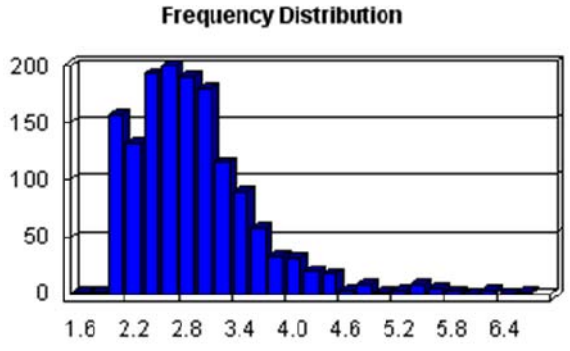


Figure 4-2: Locations of Historical Earthquakes (1769 - June 2010)

The top ten earthquakes having the largest magnitude occurred in both the valley and in the western hills of Santa Clara County. Fifty-nine (59) of these earthquake events had no data regarding magnitude. The remaining 1449 events produce the following statistics:

Magnitude of Archived USGS EQ Events

Events: **1449 (Events w/ Mag. Reported)**
Minimum Magnitude: **1.6 (03/27/1989)**
Maximum Magnitude: **6.6 (07/01/1911)**
Mean Magnitude: **2.89**
Standard Deviation: **0.67**



Two earthquakes in recent history have been declared disasters by FEMA, the 1984 Morgan Hill Earthquake (Magnitude 6.2) and the 1989 Loma Prieta Earthquake (Magnitude 7.1). The Morgan Hill Earthquake epicenter is within Santa Clara County whereas the Loma Prieta epicenter was in Santa Cruz County near. This section includes a complete profile and summary of the damages attributed to these two events.

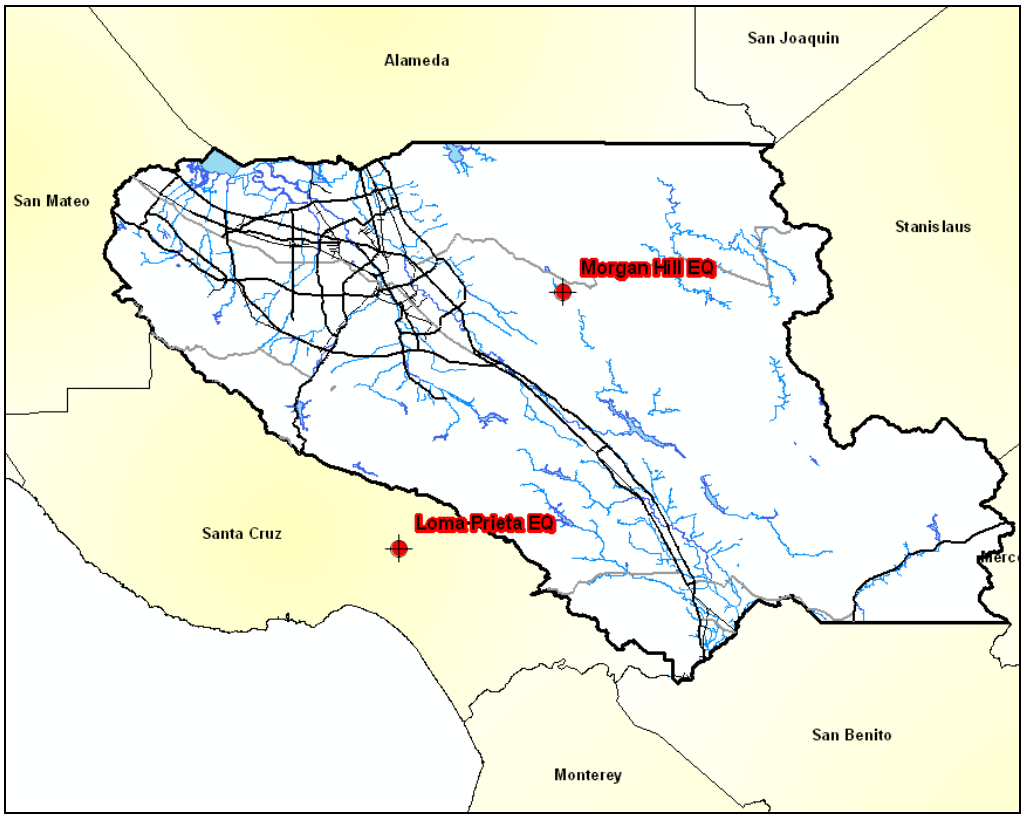


Figure 4-3: Locations of Recent Declared Earthquake Disasters

Table 4-3: Historical Records of Earthquakes (EQ) in Santa Clara County

Date	Injuries / Fatalities	Damages	Source of Estimate	Comments
1979	0 / 0	$50,000.00	NCDC	Damages Adjusted to 2008; $148,570.75
1984	13 / 0	$3,750,000.00	NCDC	Damages Adjusted to 2008; $7,799,987.52
1989	3757 / 63	$737,500,000.00	NCDC	Damages Adjusted to 2008; $1,278,340,151.15
NOTE:	2008 adjusted dollars from SHELDUS.			

The following paragraphs summarize the historic events. Information in this section has been obtained and compiled from County documents, committee and public input, and federal and state declared disaster information.

Santa Clara-area historical earthquake activity is near California state average. It is 1752% greater than the overall U.S. average.
On **4/18/1906** at 13:12:21, a magnitude 7.9 (7.9 UK, Class: Major, Intensity: VIII - XII) earthquake occurred 72.0 miles away from Santa Clara center, causing $524,000,000 total damage
On **8/6/1979** at 17:05:22, a magnitude 5.9 (5.4 MB, 5.7 MS, 5.7 MW, 5.9 ML) earthquake occurred 28.4 miles away from the city center
On **1/24/1980** at 19:00:09, a magnitude 5.9 (5.3 MB, 5.9 MS, 5.8 MW, 5.5 ML, Class: Moderate, Intensity: VI - VII) earthquake occurred 28.1 miles away from Santa Clara center
On **1/27/1980** at 02:33:36, a magnitude 5.8 (5.0 MB, 5.0 MS, 5.8 ML) earthquake occurred 29.3 miles away from Santa Clara center
On **4/24/1984** at 21:15:19, a magnitude 6.2 (5.7 MB, 6.1 MS, 6.2 MW, 6.2 ML, Class: Strong, Intensity: VII - IX) earthquake occurred 14.8 miles away from the city center
On **10/18/1989** at 00:04:15, a magnitude 7.1 (6.5 MB, 7.1 MS, 6.9 MW, 7.0 ML) earthquake occurred 20.2 miles away from the city center, causing 62 deaths (62 shaking deaths) and 3757 injuries, causing $1,305,032,704 total damage
Magnitude types: body-wave magnitude (MB), local magnitude (ML), surface-wave magnitude (MS), moment magnitude (MW)
Read more: http://www.city-data.com/city/Santa-Clara-California.html#ixzz0uMFgesR7

4.2.2.1 1984 "Morgan Hill" Summary

Epicenter: 37.32 N 121.70 W; depth: 8 km; magnitude: 6.2; damage: $8 million; no deaths.

On April 24, 1984 at 1:15 p.m. PST, a moderate-size earthquake occurred on the Calaveras fault to the east of San Jose, California. This earthquake was felt over an area of approximately 120,000 km2 in California and western Nevada. The area of moderate damage extended southward from the epicenter rather than centering on the epicenter. This pattern indicates that the Morgan Hill earthquake may have been a double event with the second event being located about 17 km southeast of the main shock.

In Santa Clara County, where most of the damage occurred, more than 550 structures incurred minor damage. Major structural damage was mainly confined to a very small area on two streets of the Jackson Oaks subdivision located east of Morgan Hill (population 19,000). Five houses were condemned; two of these had fallen off their concrete foundations and suffered partial collapse. Several masonry buildings on Main Street in Morgan Hill were damaged and later condemned. Well-engineered industrial buildings and residential structures sustained only minor damage, but many mobile homes fell off their supports causing considerable damage to the furnishings inside. There were many reports of fires resulting from the quake. Minor damage also occurred at San Martin and

Coyote. Twenty-seven people were injured. – *copied from* *http://www.smate.wwu.edu/teched/geology/eq-CA-central.html*

This wood-frame structure in Jackson Oaks moved horizontally and fell off its foundation when inadequate nailing and ground failure resulted in failure of its walls. Photograph Credit: Bay Area Regional Earthquake Preparedness Project (BAREPP).

Cracks caused by lateral spreading of the pavement on Dunne Avenue. Part of the roadway has slumped toward the embankment. Photograph Credit: Bay Area Regional Earthquake Preparedness Project (BAREPP).

4.2.2.2 1989 "Loma Prieta" Summary

On October 17, 1989, at 5:04 P.M. (PDT), a 7.1 magnitude earthquake occurred near Loma Prieta in the Santa Cruz Mountains, California. Movement occurred along a 40-km segment of the San Andreas Fault from southwest of Los Gatos to north of San Juan Bautista. Measurements along Earth's surface after the earthquake show that the Pacific plate moved 1.9 m to the northwest and 1.3 m upward over the North American plate. The upward motion resulted from deformation of the plate boundary at the bend in the San Andreas Fault. At the surface, the fault motion was evident as a complex series of cracks and fractures.

This earthquake was not unexpected. During the 1906 San Francisco earthquake, there was only about one meter of movement on the Santa Cruz segment of the San Andreas Fault, while farther north in the San Francisco area, there was more than 2.5 meters of movement. This indicated that all of the strain had not been released in the Santa Cruz segment in the 1906 earthquake so this segment was likely to break before the northern segment.

Thousands of landslides occurred throughout the area blocking roads and highways, hampering rescue efforts, and causing damage to structures. Landslides were particularly prevalent in the Santa Cruz Mountains, where they occur regularly even without earthquakes. These slides resulted in at least two deaths. One slump slide near Laurel took with it several dozen houses, damaging them severely.

Thirty percent of the buildings in the Pacific Garden Mall in downtown Santa Cruz were damaged severely by amplified ground shaking and ground deformation. The mall lies on unconsolidated deposits. One hundred and thirty buildings, many of which date from the last century, were damaged in this historic section. Several hundred houses were either severely damaged or destroyed.

The worst ground shaking appeared to occur in the Santa Cruz Mountains, close to the epicenter. Many buildings were damaged or destroyed by ground cracking and shaking and by landsliding. Scores of mountain homes were also destroyed. Initial damages were estimated at $350 million in Santa Cruz.

In Watsonville, two adjacent buildings of a department store sustained extensive structural damage due to a weak first story, insufficient shear reinforcement of the columns, and possible pounding of the two structures. Recently constructed buildings with tilt-up walls performed well.

At the Stanford University campus, 30 miles northwest of the epicenter, 60 buildings sustained varying degrees of damage, with an estimated repair cost of $160 million.

Concrete sidewalks and curbs were systematically fractured and buckled on northeast trending streets throughout downtown Los Gatos. Hollister also experienced severe damage. Sand boils appear in irrigated fields near Hollister. Collapsed and damaged buildings were also reported from Gilroy and San Jose.

Boulder Creek, Redwood Estates, Los Gatos, Scott's Valley, Santa Cruz, and Watsonville all experienced strong ground shaking and had a high percentage of damaged structures. These towns were only 16 to 32 km from the epicenter. The older structures in these towns were vulnerable for one or more of the following reasons: (1) deterioration of the structure, (2) lack of ties to the foundation, (3) unreinforced masonry (brick or stone), (4) lack of shear resistance in the ground floor, (5) pounding of adjacent structures, and (6) timber diaphragms not tied to unreinforced masonry walls, which allowed separation or pushing out of the walls.

In the epicentral area, most of the damage resulted from the strong ground shaking and landsliding. Ground shaking primarily affected unreinforced masonry structures, and was enhanced in areas of fine-grained sand. Landslides occurred on steep slopes, where ground shaking was most severe. – *copied from http://www.smate.wwu.edu/teched/geology/eq-CA-Loma1.html*

4.2.3 Location and Extent/Probability of Occurrence and Magnitude

While the prediction of when earthquakes will occur is not a possibility at this time, models are available for evaluating estimated damage caused by hypothetical earthquake scenarios. Appendix C of Taming Natural Hazards (2010) identifies several scenarios that result in considerable damage within Santa Clara County.

ABAG's online mapping site provides maps showing potential for the four earthquake hazards:

Ground Shaking
Liquefaction
Surface Rupture
Landslides

These maps for Santa Clara County are included on the following pages with the exception of Figure 4-1: Alquist-Priolo Earthquake Fault Zones, which is in Section 4.1.1 and reflects potential surface rupture areas.

Figure 4-4, shows ground shaking potential throughout Santa Clara County. The areas in darker red are anticipated to experience more intense shaking than the areas in lighter red or yellow.

Figure 4-5, shows liquefaction susceptibility throughout Santa Clara County.

Figure 4-6, shows landslides susceptiblity throughout Santa Clara County.

Maps showing areas of potential earthquake impact for each participating city are included in the respective City Annexes.

County Mapping

The Santa Clara County Planning Office has compiled mapping of the earthquake fault zones and seismic hazard zones in addition to other zones mapped by USGS and the County Geologist to develop a reviesed Geologic Hazards Ordinance. The mapping prepared by the County Planning Office indicates areas where potential fault rupture, landsliding, liquefaction, dike failure inundation, or compressible soils must be evaluated. The mapping is designed to be used at a property specific level and is available at www.sccplanning.org under "Maps & GIS". A sample map showing the Santa Clara County Convention Center in relation to "Other Geologic Hazard Zones" is included as Figure 4-7.

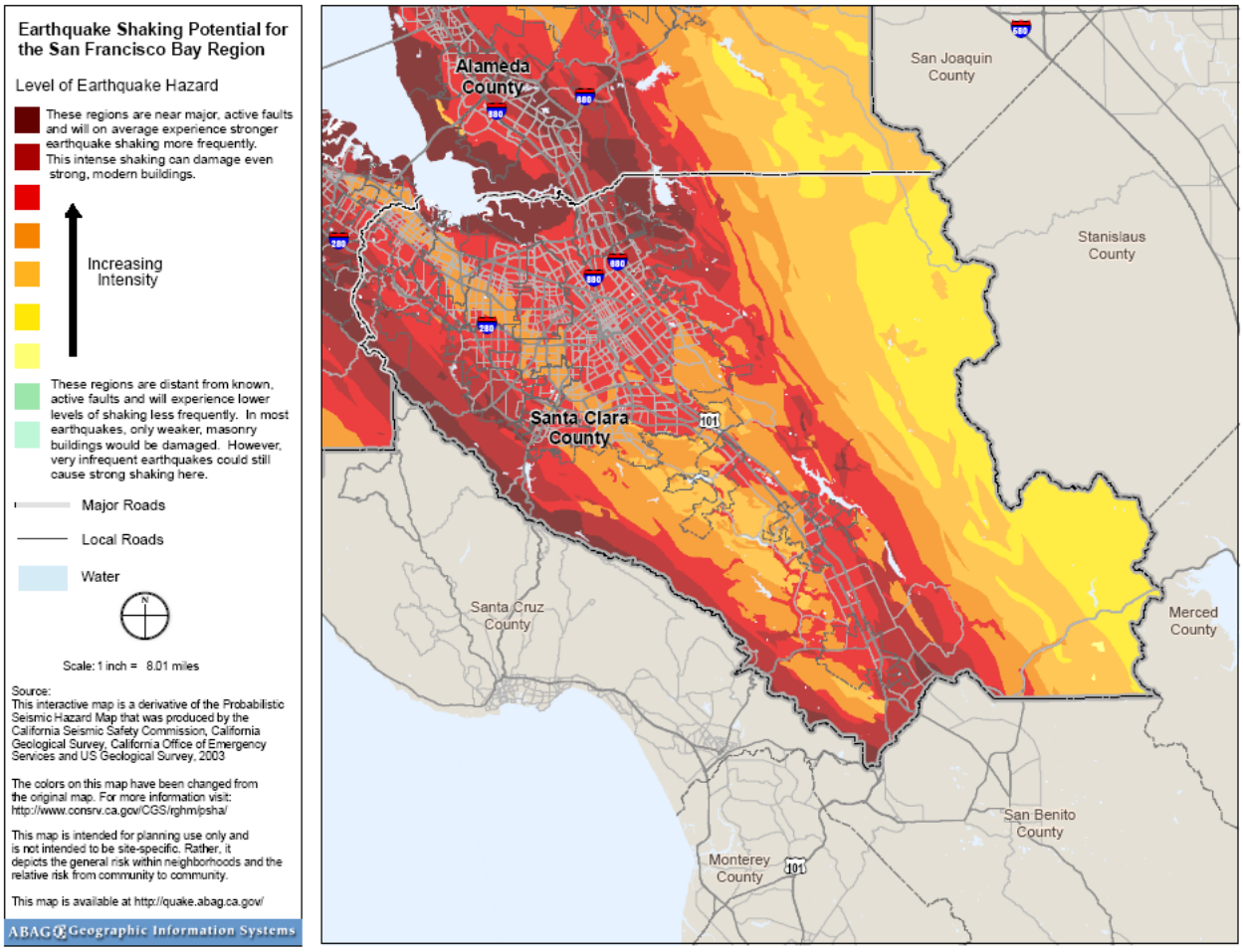


Figure 4-4: Shaking Potential

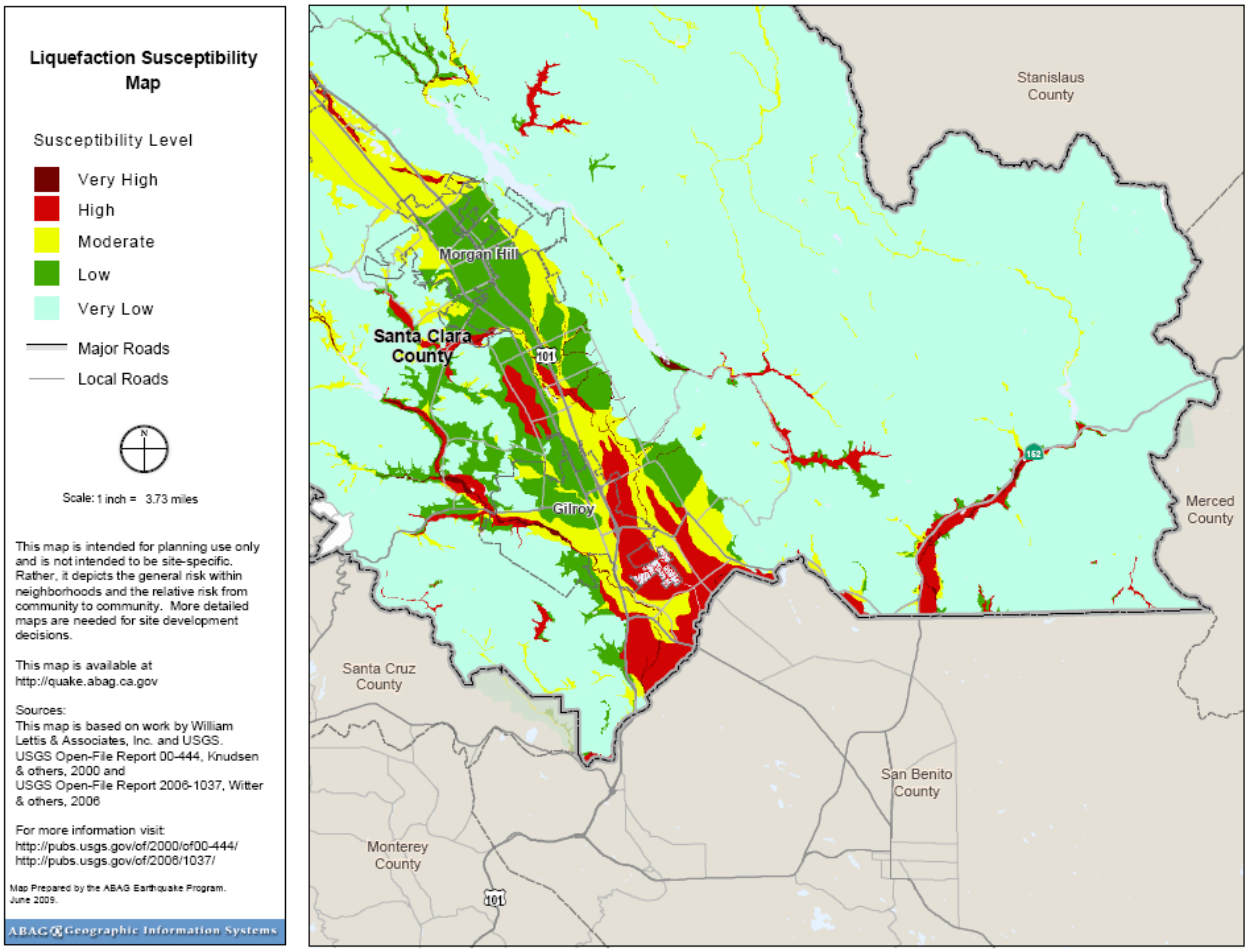


Figure 4-5: Liquefaction Susceptibility

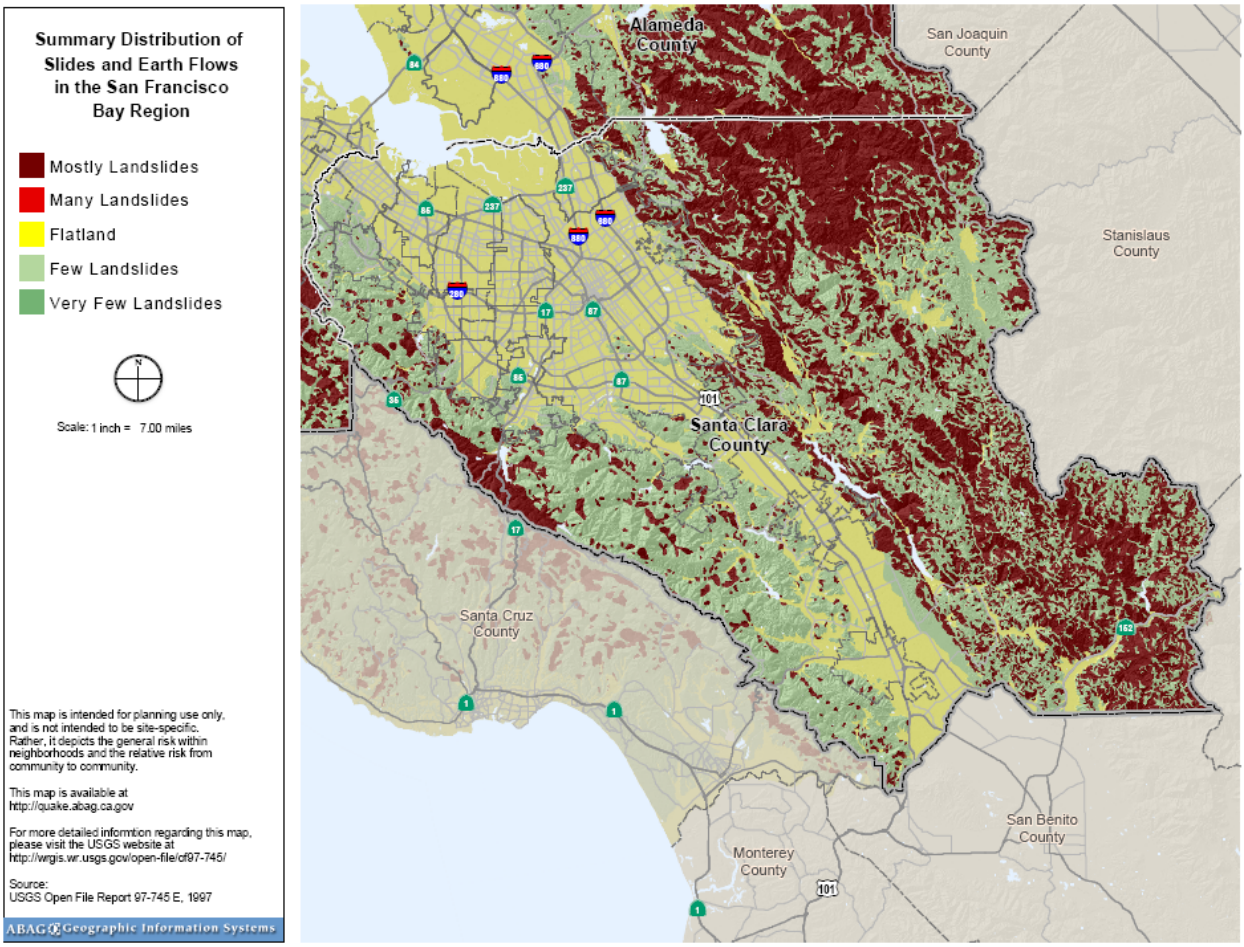


Figure 4-6: Landslides Susceptibility

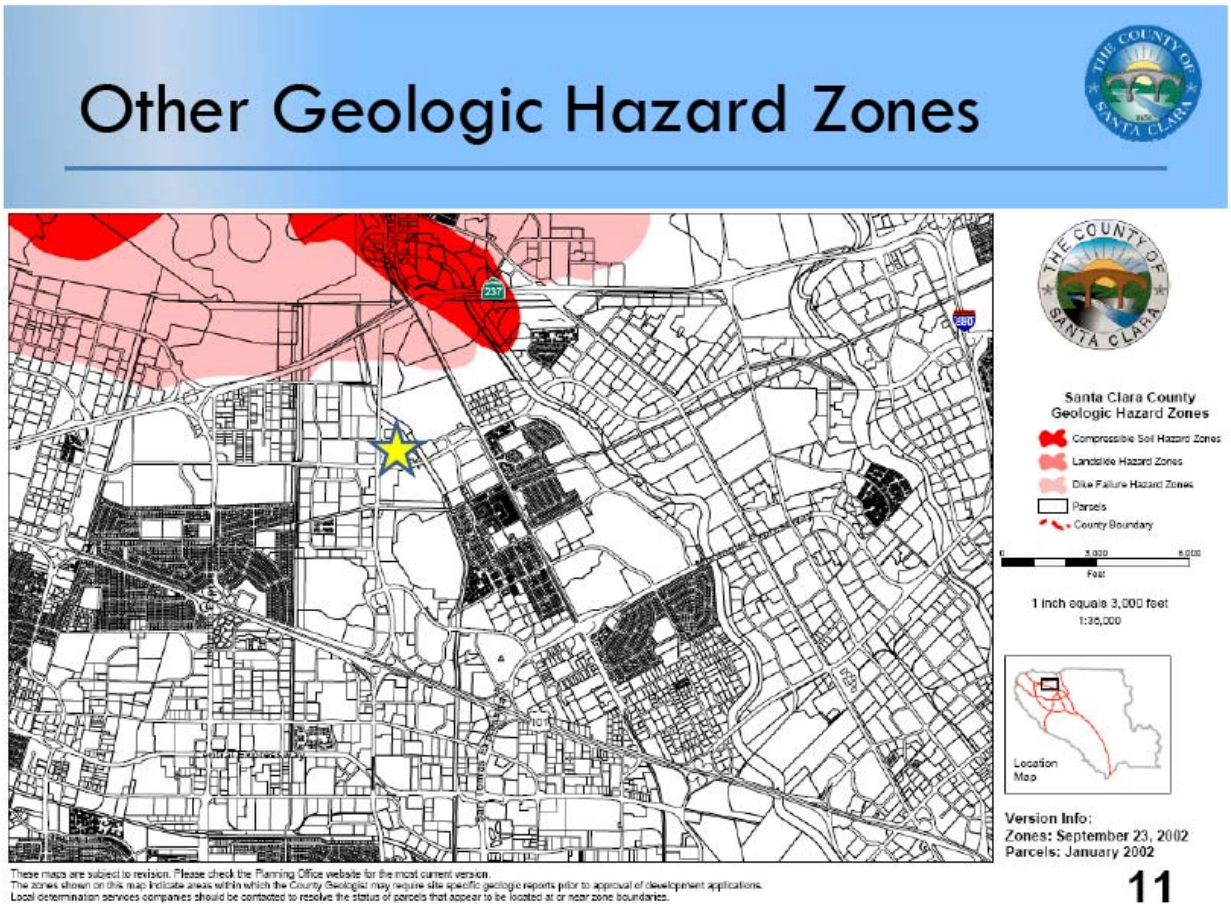


Figure 4-7: Sample Map of Other Geologic Hazard Zones

4.2.3.1 Liquefaction Potential

The interactive Cone Penetration Test data map available from the USGS (http://earthquake.usgs.gov/regional/nca/cpt/data/?map=santaclara) has been included as a reference to show potential areas of liquefaction occurrence. In the following study, the authors conducted soundings at sites shaken by five earthquakes with magnitudes ranging from 6.5 to 6.9. The typical approach by the USGS following most earthquakes is to select a few ground failure sites for detailed subsurface investigation. However, following the magnitude 6.9 1989 Loma Prieta, California earthquake, a comprehensive regional investigation of multiple sites, including sites without liquefaction, was conducted. The soundings presented are not an accurate representation of historical liquefaction occurrence, but serve as reference material.

The Study[2]

Cone penetration test (CPT) soundings were used to evaluate the predictive capability of the liquefaction potential index (LPI). LPI combines depth, thickness, and factor of safety of liquefiable material inferred from a CPT sounding into a single parameter. Figure 4-8 (below) shows the locations of soundings, but not the LPI. Characteristics of each sounding may be reviewed online at: http://earthquake.usgs.gov/regional/nca/cpt/data/?map=santaclara.

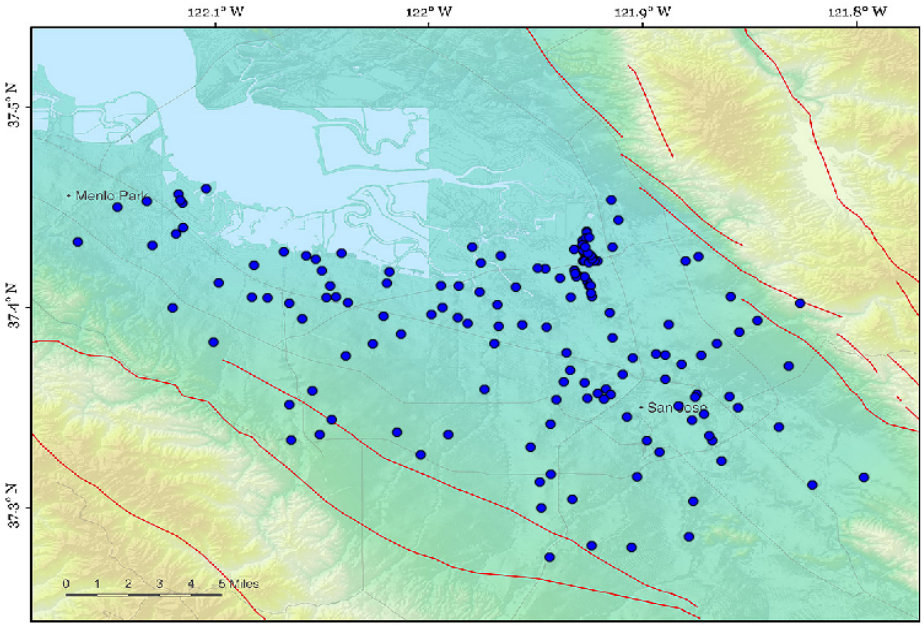


Figure 4-8: Sounding Locations

[2] Liquefaction Potential Index: Field Assessment by Selcuk Toprak, A.M.ASCE, 1 and Thomas L. Holzer2; JOURNAL OF GEOTECHNICAL AND GEOENVIRONMENTAL ENGINEERING © ASCE / APRIL 2003 (*http://earthquake.usgs.gov/people/tomholzer/papers/Toprak_Holzer_LPI_JGGE_2003.pdf*)

In 2008, Thomas L. Holzer, Thomas E. Noce, and Michael J. Bennett published liquefaction hazard maps for three earthquake scenarios for the communities of San Jose, Campbell, Cupertino, Los Altos, Los Gatos, Milpitas, Mountain View, Palo Alto, Santa Clara, Saratoga, and Sunnyvale. These are available at the following URL and shown on the following pages:
http://pubs.usgs.gov/of/2008/1270/

Additionally, Appendix C of *Taming Natural Disasters* (2010) includes a detailed discussion of the regional susceptibility to liquefaction.

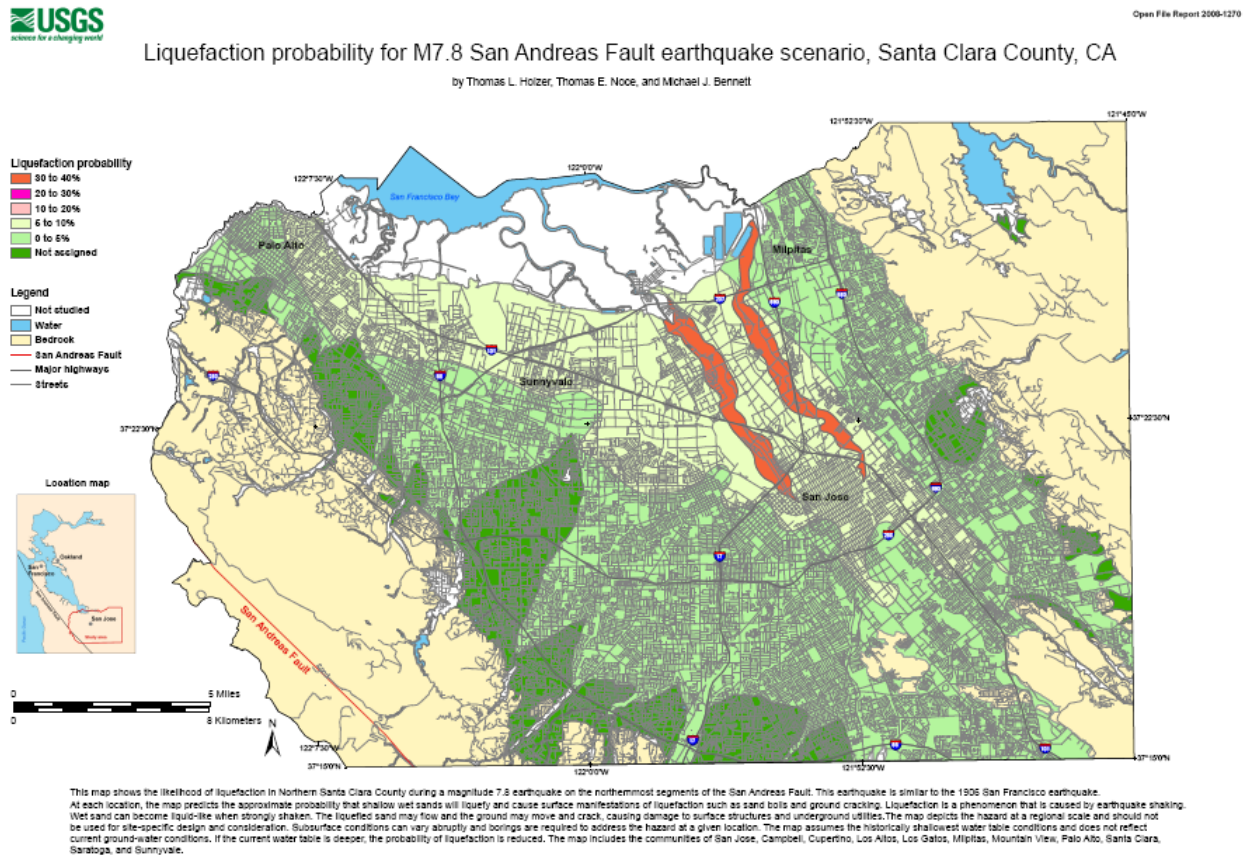


Figure 4-9: Liquefaction Probability for M7.8 San Andreas Fault Earthquake Scenario

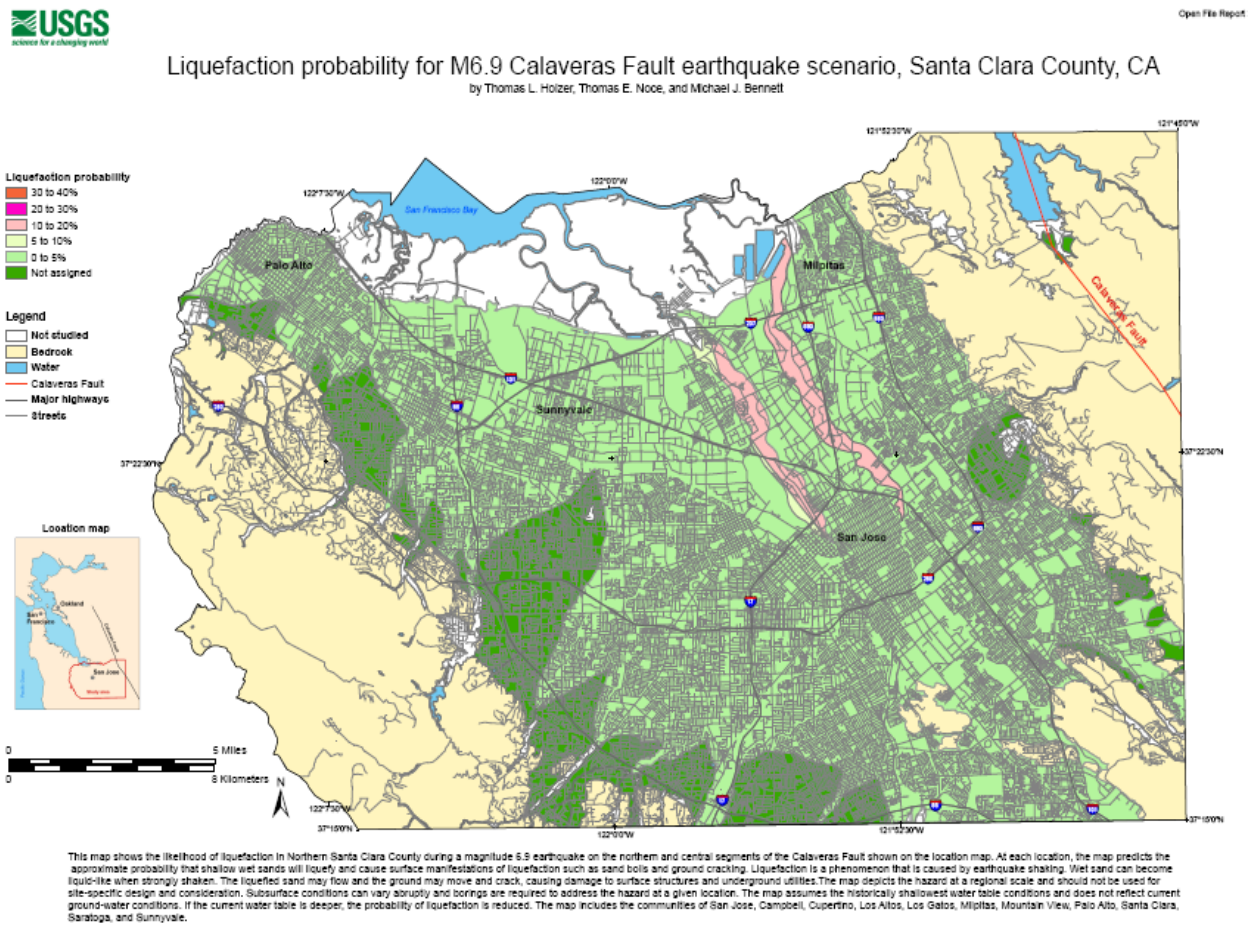


Figure 4-10: Liquefaction Probability for M6.9 Calaveras Fault Earthquake Scenario

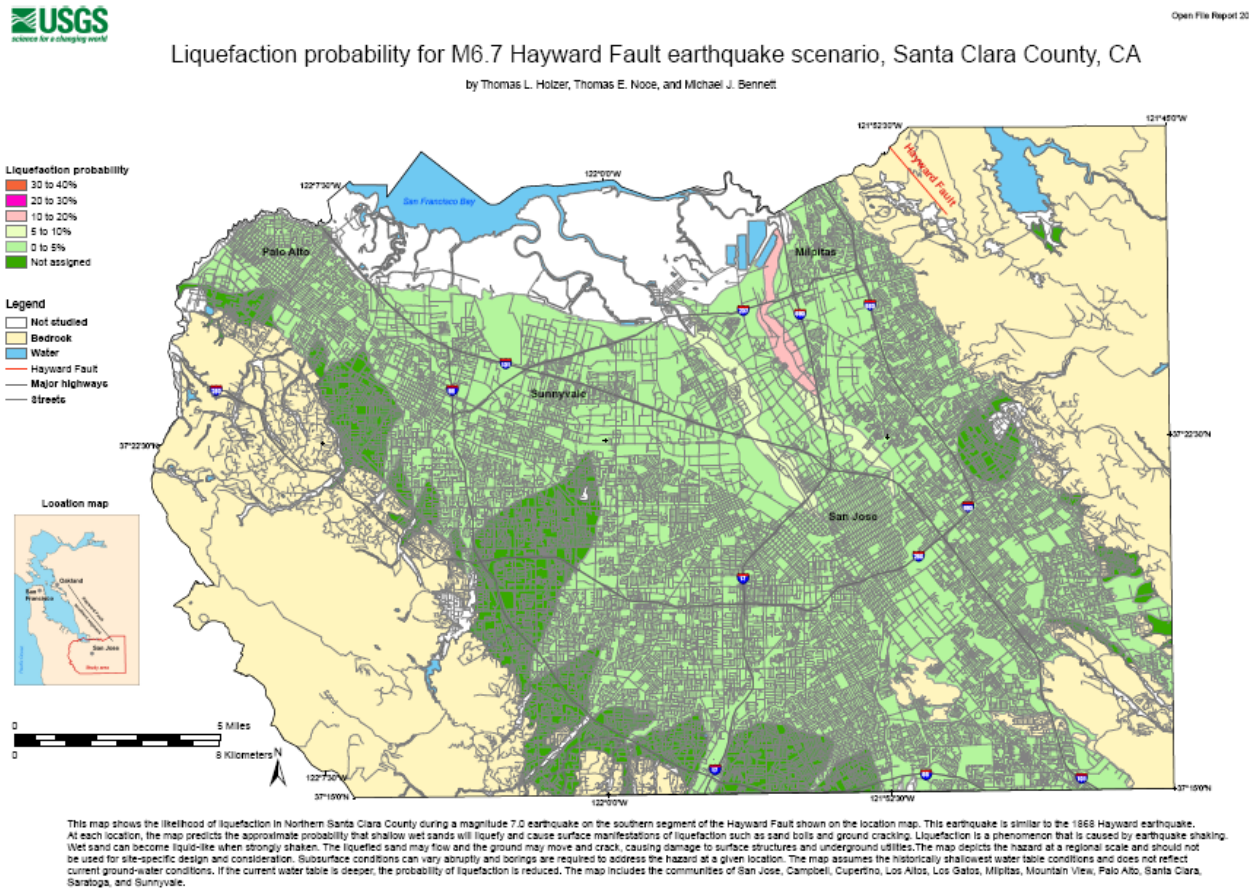


Figure 4-11: Liquefaction Probability for M6.7 Hayward Fault Earthquake Scenario

4.3 INFRASTRUCTURE FAILURE PROFILE

4.3.1 Nature of Hazard

The Local Planning Team ranked Infrastructure Failure as the highest priority risk alongside earthquake – ground shaking. They recognize that a variety of infrastructure systems may fail as a result of a catastrophic earthquake or other severe natural hazard, but failure may also occur independently of natural hazards. Therefore, infrastructure failure is included in this plan as a potential hazard separate from the identified natural hazards.

Chapter 1 of *Taming Natural Hazards* (2010) presents a regional understanding of our interdependence on many lifeline infrastructure systems and highlights significant infrastructure vulnerabilities based on potential natural hazard events. The Local Planning Team identified the following systems for consideration in this annex:

- Potable Water System
- Power System
- Natural Gas System
- Waste Water System
- Communication System
- Transportation System

Understanding the specific vulnerabilities within the County will be crucial to mitigating risk of infrastructure failure and speeding recovery of infrastructure systems following a hazard event. This profile was created based on available data during preparation of this annex. The Local Planning Team intends to increase dialogue with utility providers and develop collaborative strategies for understanding and minimizing risk to infrastructure failure.

4.3.1.1 Potable Water System

Potable water is water that is fit for consumption by humans and animals. The Santa Clara Valley Water District (SCVWD) supplies clean reliable water throughout the county. Half of this water originates in the Sierra Nevada and is delivered through the Sacramento-San Joaquin River Delta or the Hetch Hetchy system. Most of the remainder comes from local rainfall captured in the water district's ten local reservoirs.

The reservoir water is released into creeks and percolation ponds to replenish local groundwater aquifers and manage environmental needs, or is piped directly to one of our three district water treatment plants.

Water conservation and recycling are important parts of the water district's water supply planning. To provide greater reliability, the district also "banks" water in groundwater storage outside of the county, which can be called upon during dry times.

The district sells treated water to 13 water retailers, including five private companies, which, in turn, sell it to end users. There are also private well-owners in Santa Clara County.

The largest threat to disruption in the potable water system for Santa Clara County stems from potential failure of the Delta levees. Delta Levee Failure is identified as a separate hazard and discussed in Section 4.3. The following threats have been identified by SCVWD:

- **Fragile levees and sinking islands -** Failure of the Delta levees would lead to flooding and seawater intrusion. The central Delta islands are up to 25 feet below sea level, subsiding at a rate of about two inches per year. The levees protecting these islands are old and weak, and are highly vulnerable to catastrophic events such as earthquakes and flooding, as well as daily ongoing threats such as animal burrows and wear and tear caused by age.
- **Earthquakes and levee failure -** The Delta lies in close proximity to at least five major faults and it has been estimated that there is a two-in-three probability that the Bay Area will experience a large magnitude earthquake in the next 30 years. A recent State study predicts that a 6.5 magnitude earthquake near the Delta would cause 30 levee breaches resulting in the flooding of 16 islands. The influx of seawater would make the Delta an unusable drinking water supply for a prolonged period of time. It would likely be three to five years before a significant water supply could be delivered from the Delta.
- **Loss of drought supply -** The loss of the Bay Area's water supplies due to Delta levee failures would be magnified during a drought. Without Delta conveyance, Bay Area agencies would not be able to access the dry year reserves stored in Central Valley groundwater banks, meaning dry year shortages would be more severe and longer in duration.
- **Global warming and rising sea levels -** Scientists estimate that global warming will increase the mean sea level between one and three feet over the next 100 years, placing greater pressure on the levee system and increasing the likelihood and impacts of levee failures. Regional climate changes may also result in an increase in the magnitude and frequency of extreme rainfall events, further stressing the stability of the Delta levee system.

Additional threats the SCVWD considers are toxicity to water storage areas such as the reservoirs and aquifers.

"Continued sinking of Delta islands, sea level rise and likely increases in the severity of flooding make the Delta's fragile levee network increasingly vulnerable to failure from earthquakes, floods, and other causes,"
-Public Policy Institute of California
Source: Santa Clara Valley Water District http://www.valleywater.org/Services/Delta.aspx

4.3.1.2 Power System

Power outages can occur as a result of almost any kind of natural or manmade disaster (flood, earthquake, explosion, etc.). They also can be the cause of certain accidents or incidents

(transportation accidents, hazardous material release, etc.). They can affect a concentrated group of facilities, or they can be widespread, affecting an entire region.
Some dangers typical of power outages include:

- Overabundance of carbon monoxide due to use of generators, grills;
- Food spoilage;
- Compromised water purification systems resulting in water that may be unsafe to drink;
- HVAC malfunction, resulting in vulnerability to extreme heat and cold;
- Electric shock resulting from loose power lines; and,
- Power surge that may occur when electricity is restored.

Power outages can be particularly dangerous for critical facilities. Hospitals and medical centers, for example, rely on electricity to serve patients and support clinical research. In addition, many vaccinations and medications must be refrigerated, and a power outage could impact delivery of services.

Source: "What You Need to Know When the Power Goes Out Unexpectedly." Centers for Disease Control and Prevention. http://www.bt.cdc.gov/disasters/poweroutage/needtoknow.asp

4.3.1.3 Natural Gas System

Rupture of a gas pipeline could lead to an explosion and catastrophic damage. PG&E maintains a list of gas pipeline segments for monitoring, longer-term evaluation, and planning. A few segments have been in the northern part of Santa Clara County have been noted as part of PG&E's Top 100 segments of concern. The "Top 100" list is one element of PG&E's pipeline safety practices that include, among other measures, regularly conducting leak inspections and patrols on all of its natural gas pipelines.

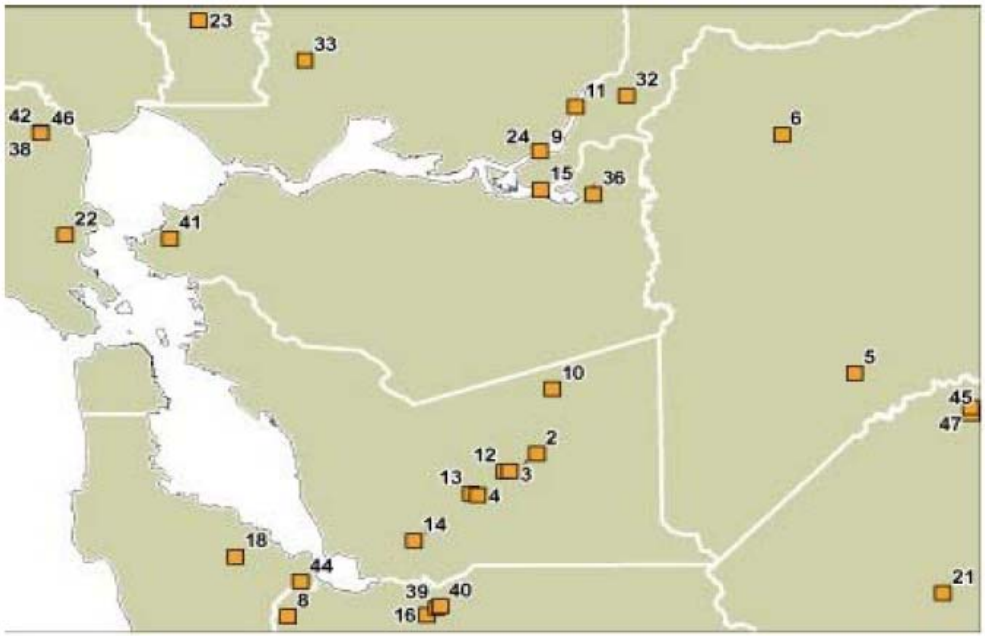


Figure 4-12: Bay Area Map of PG&Es "Top 100" Pipeline Segments for Evaluation and Planning

The status of segments 8, 16, 39, 40, and 44, as of September 20, 2010, is listed below. Further details may be found by viewing the entire list of the Top 100 by visiting: http://www.pge.com/myhome/customerservice/response/planninginput/

Map #	Description	Factor	Status
8	PG&E conducted an analysis of the cathodic system that protects this pipeline segment from corrosion. Based on this analysis, the system was adjusted for better protection. Analysis of the system in 2009 showed a marked improvement. Engineering will continue monitoring the segment, but no further action is contemplated at this time.	Potential for Corrosion	Monitoring
16	Replace pipe at several locations and install other facilities in order to internally inspect L132 through the urban areas between Milpitas and Crystal Springs reservoir due to the potential for ground movement. Based on this inspection, PG&E will determine whether any repair or replacement action is warranted. Construction currently is scheduled for 2012-13.	Potential for Ground Movement	Engineering

Map #	Description	Factor	Status
39	PG&E is conducting an engineering review of the potential for ground movement along 10 feet of pipe near Milpitas-Alviso Rd and Ranch Dr in San Jose. Based on this review, PG&E will determine whether any repair or replacement action is warranted.	Potential for Ground Movement	Initiated
40	PG&E is conducting an engineering review of the potential for ground movement along 10 feet of pipe near Milpitas-Alviso Rd and Ranch Dr in San Jose. Based on this review, PG&E will determine whether any repair or replacement action is warranted	Potential for Ground Movement	Initiated
44	PG&E is conducting an engineering review of 18 feet of pipe near Dunbarton St. and Donahoe St. in Menlo Park. Based on this review, PG&E will determine whether any repair or replacement is warranted.	Overall	Initiated

Source: http://www.pge.com/myhome/customerservice/response/pipelineplanning/

4.3.1.4 Waste Water System

Disruption of the waste water system may be caused by several potential events. A severe health risk could occur if a water treatment plant is not operational, or if residences and businesses in the area experience a backup of sewage leading to the inability to flush toilets.

4.3.1.5 Communication System

The communication system is comprised of telephone, internet, and cellular capabilities. Loss of communication can occur as a result of almost any kind of natural or manmade disaster (flood, earthquake, explosion, etc.). Lack of communication capabilities severely impacts the ability of emergency responders to move people to safety during and following a hazard event.

4.3.1.6 Transportation System

The transportation system is comprised of roads, highways, bridges, railroad, and air transportation. A closed airport, fallen bridge, or blocked railroad could severely impact evacuation following a hazard event. Failure of any piece of the transportation system would have repercussions throughout the County for residents, public services, and private businesses.

4.3.2 History of Infrastructure Failure

South County Phone Outage: In 2009, the southern portion of Santa Clara County experienced an 18 hour phone outage. Cisco Systems, Inc. partnered with the County and set up an ERV to help respond to the event.

North County Power Outage: In 2010, a power outage in the northern portion of Santa Clara County was triggered by a small airplane crash in Palo Alto. Several major hospitals were without power.

Table 4-4: Historical Records of Power System Disruptions in Santa Clara County

Date	Source Event
1/29/1993	High Wind
3/10/1995	High Wind (Winter Storm)
12/9/1995	High Wind (Winter Storm)
12/10/1996	Flooding (Urban/Small Stream)
2/13/2000	Flooding (Flash)
6/14/2000	Extreme Heat
12/25/2008	High Wind
4/14/2009	High Wind
10/13/2009	Flooding

Table 4-5: Historical Records of Transportation System Disruptions Due to Natural Hazard Events in Santa Clara County

Date	Source Event
3/9/1995	Flooding (Flash)
12/9/1995	High Wind (Winter Storm)
12/12/1995	Flooding (Localized)
12/10/1996	Flooding (Urban/Small Stream)
1/1/1997	Flooding (Flash)
2/3/1998	Flooding (Flash)
2/7/1998	Flooding (Flash)

Date	Source Event
2/8/1998	Flooding (Flash)
2/13/2000	Flooding (Flash)
10/13/2009	Flooding
10/13/2009	High Winds

The following summaries of infrastructure failure events include events throughout the greater Bay Area with similar potential of occurring in Santa Clara County. These event summaries were retrieved from the National Climactic Data Center database unless otherwise noted.

1/29/1993 Summary – Alameda, Amador, and El Dorado Counties CA02-09 Gusts as high as 60-70 mph were reported on the west slopes of the Sierra Nevada, the East Bay hills of the San Francisco Bay area, and the Santa Cruz mountains. Trees and power lines were felled with damage to structures. The city of Oakland reported eighty trees down.

3/9/1995 Event Summary – Coyote Creek in Gilroy, Santa Clara County went six feet over flood stage. Flooding on the Guadalupe River in San Jose caused extensive damage to low lying areas and closed major roads such as 101.

3/10/1995 Summary – Several feet of snow a day fell in the Mountains winds to 80 mph were reported in mountains. Winds to 55 mph were reported along the coast south of Pt. Reyes. More than 1.5 million people were without power during this period, primarily the San Francisco Bay area. Eighty-nine mph winds in Belmont. Roof ripped off the San Ramon Valley High School.

12/9/1995 Summary – Widespread winds over 40 mph many report 60 to 80 mph. Max Wind 135 mph from PG&E in San Francisco Area before it blew away. Major Damage in the San Francisco Bay Area where $15 million was reported to the Arboretum and still unestimated damage to the magnificent trees in the Golden Gate park which was closed for nearly three weeks. Power outages to around 1.5 million people resulted from this storm and some power was out for more than a week causing great financial damage and personnel hardship particularly in the mountainous areas. The wind strength and area coverage was labeled as the worst in the San Francisco Area since 1962-63. Two to five inches of rain fell over with a max of 11.3 inches reported at Kentfield in Marin County a good part of the area with some flash flooding but mainly small stream and local flooding occurred. Two dozen roads closed due to flooding and downed trees in Sonoma County Many reports of houses and other building damaged by falling trees and broken glass due to wind driven debris. One hundred sixty-nine schools closed in the area. Fourteen inches of rain in a 36-hour period over the Russian River Basin. From some of the paths of damage across the San Francisco area it could be determined that a wet down burst mechanism may have contributed to the wind damage.

12/12/1995 Summary – Interstate 80 Flooded at Richmond at San Pablo Dam road.

12/10/1996 Summary – 5.67" of rain fell at Morgan Hill in the Santa Clara Valley. This is a very low precipitation location. The heavy rain caused widespread street flooding and flooded a Trailer Court that had to evacuate. State Hwy 17 was closed by mudslides. Some 113,000 people were out of power at some time during the storm.

1/1/1997 Summary – Spotter report that Highway 101 at Gilroy is closed due to flooding 1105 PST. Moderate to heavy rain continues over most of the San Francisco Bay region. 88D radar showing the heaviest rain over San Mateo, Santa Cruz, and Alameda counties with more rain coming over the next several hours.

2/3/1998 Summary – Guadalupe River at Blossom Hill Blvd. Levee Breached along Arroyo Mocha (a dry Creek) and caused damage to roads and property

2/7/1998 Summary – Ross Creek at Cherry Street. Levee Breached along Arroyo Mocha (a dry Creek) and caused damage to roads and property

2/8/1998 Summary – Coyote Creek at Edenvale Levee Breached along Arroyo Mocha (a dry Creek) and caused damage to roads and property

2/13/2000 Summary – Widespread rain with twenty four hour accumulations of more than 5 inches occurred over the area on Feb 13 into February 14th. Urban and small stream flooding occurred in most counties of the area. Many roads including Hwy 1 and Hwy 116 were closed. Hwy 129 was closed by a mudslide in Santa Cruz County. 29 people were evacuated in Pescadero due to high waters. . A number of houses in Daly City had to be abandoned and eventually destroyed due to mudslides which were a result of the consecutive years of above average rain. Winds of more than 50 mph were recorded in Marin County and a number of trees were downed knocking out power to as many as 42,000 residents throughout the bay area. A tree blew down into one residence causing in excess of $250,000 damage. There were no deaths and only minor injuries. The Russian river in Sonoma County reached near flood stage but, damage was confined to low lying areas near the river such as some trailers and camping areas near Forestville. Numerous traffic accidents and flight delays at SFO occurred during the storm.

6/14/2000 Summary – This unusual early summer record breaking heat wave was responsible for 10 deaths in the Bay Area and a large number of heat related injuries. Temperature record of 103 degrees in San Francisco tied the all time record high temperature. Other record highs for the day were Livermore had 107 degrees, Oakland 106 degrees, Santa Rosa 108 degrees High temperature caused over loading of power resources and rolling blackouts were implemented to keep the power system from exceeding capacity so many people lost power for a period during the heat. M70OU, F73VE, M79VE, M78PH, F40PH, M90PH, F47PH, F88PH, F97PH

12/25/2008 Summary – Strong and gusty winds shattered a power pole in San Jose leaving around 900 homes without power for several hours. EPISODE NARRATIVE: A strong fast moving low pressure system brought strong southerly winds and mountain snow to the San Francisco Bay area. This holiday wind event toppled trees and left many without power in San Mateo and Santa Clara counties.

4/14/2009 Summary – Windblown trees fell onto roadways and into a home in La Honda. Alpine Road was closed for about eight hours as trees were removed while Redwood Drive was closed for almost 24 hours after a large Douglas Fir tree fell over and into a home. On Highway 84 near the intersection of Redwood Terrace a downed power line sparked a small grass fire. EPISODE NARRATIVE: A mainly dry Pacific storm produced damaging wind to the San Francisco and Monterey Bay Areas. Widespread power outages, downed power lines and trees, boats broken loose from their moorings, and even a big-rig forced onto its side were casualties of this powerful system. Over 55,000 customers lost power during this storm.

10/13/2009 Summary – Monterey Road between Third and Fourth Streets was submerged due to flooding. Flood waters entered a restaurant on Fourth Street causing damage. Streets were flooded throughout Morgan Hill with water as high as two feet is some locations. The city actually ran out of moveable flooded signs and barriers, unable to mark all flooded locations. Here are some of the locations experiencing flooding: south end of town near the Morgan Hill Post Office on Monterey Road; Fountain Avenue; Llagas Creek Road, Monterey Road north of Morgan Hill, near Cochrane Road; Old Monterey Road from Monterey to Llagas Roads; Butterfield Boulevard at several locations, including at San Pedro and Diana Avenues; Watsonville Road at Monterey Road; Monterey Road at Burnett Avenue; Tennant Avenue; and Wright Avenue from Del Monte to Hale Avenues. Also, a sewage pipe connecting Morgan Hill to the Gilroy sewage treatment plant backed up causing 40,000 gallons of raw sewage to spill into the Ludewig Ranch causing the cancellation of the Harvest Festival in San Martin, an event to raise funds and food for the homeless.
A strong low pressure system made its way through Northern and Central California accompanied by deep tropical moisture and very strong winds. Heavy rain combined with the wind to cause numerous trees, tree limbs and pole/telephone powers to fall. Pacific Gas and Electric reported over 277,000 customers had lost power in the San Francisco and Monterey Bay Areas with a cost of over thirteen million dollars in damages. The record breaking heavy rain also led to flooding and debris flows.

10/13/2009 Summary – A 40-foot acacia tree toppled onto a garage roof in Campbell on West Rincon Avenue. The 30-year-old tree became wedged between the roof and the second story and blocked the entire entrance to the home. At the Blossom Hill Elementary School in Los Gatos, a row of young trees were broken and bent lying on the ground due to the strong wind. At the intersection of Highway 17 and Interstate 280 a tree fell blocking a lane of traffic. In Milpitas, a large tree landed on a house on the 1300 block of Lassen Avenue clipping on side of the house causing minor gutter and roof damage. EPISODE NARRATIVE: A strong low pressure system made its way through Northern and Central California accompanied by deep tropical moisture and very strong winds. Heavy rain combined with the wind to cause numerous trees, tree limbs and pole/telephone powers to

fall. Pacific Gas and Electric reported over 277,000 customers had lost power in the San Francisco and Monterey Bay Areas with a cost of over thirteen million dollars in damages. The record breaking heavy rain also led to flooding and debris flows.
9/9/2010 Summary – Rupture of a natural gas transmission line in San Bruno caused an unexpected explosion. According to the San Bruno chief of police seven were dead and six were missing as of Saturday September 11, but the coroner's office questioned the information from the police department, stating only four deaths were confirmed. Many were hospitalized with injuries. 37 homes were destroyed by the blaze, with about 8 badly damaged. USGS registered the explosion and resulting shock wave as a magnitude 1.1 earthquake. Eye witnesses reported the initial blast "had a wall of fire more than 1,000 feet high". (Source: Wikipedia, September 23, 2010)

4.3.3 Location and Extent/Probability of Occurrence and Magnitude

The entire county is susceptible to impacts from infrastructure failure. A review of infrastructure facilities (power lines, communication towers, treatment plants, highways, etc) and their strength would help quantify the likelihood of these systems failing. This information was not available for this plan update. The Local Planning Team intends to improve coordination with utility providers to gain a better understanding of the vulnerability of the identified infrastructure systems. The magnitude or amount of impact from infrastructure failure will vary for each system and depend on the severity of the event.

4.4 DELTA LEVEE FAILURE PROFILE

4.4.1 Nature of Hazard

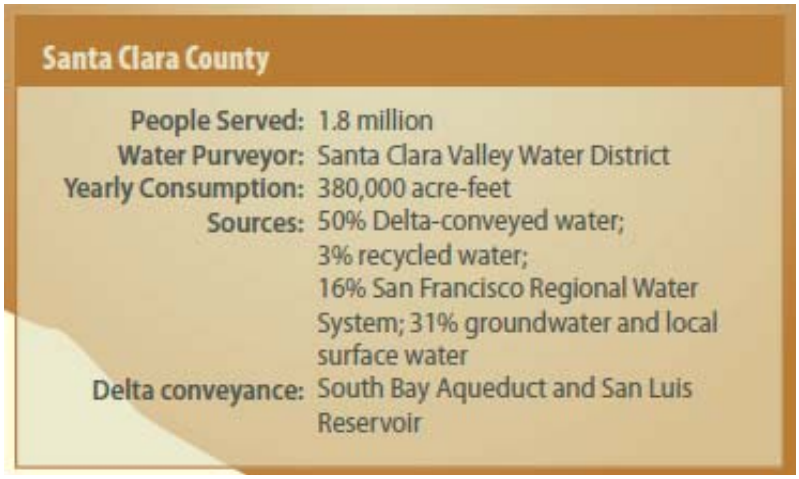
Approximately 150 years ago, the levees of the Sacramento-San Joaquin Delta were raised to prevent flooding on what remains some of the most fertile farmland in the nation. While the peat soils were excellent for agriculture, they were not the best choice to create strong foundations for levee barriers meant to contain a constant flow of river water. Nevertheless, it was these native soils that were primarily used to create the levee system.

As farmers settled the valleys, the Gold Rush drew prospectors to the hills. As mining in the Sierra Nevada turned to the more "efficient" methods of hydraulic mining, the use of environmentally destructive high-pressure water jets washed entire mountainsides into local streams and rivers. As a result, the enormous amounts of silt deposited in the riverbeds of the Central Valley increased flood risk. As a remedy to these rising riverbeds, levees were built very close to the river channels to keep water velocity high and thereby scour away the sediment.

However, the design of these narrow channels has been too successful. While the Gold Rush silt is long gone, the erosive force of the constrained river continues to eat away at the levee system. In addition, the peat soils of the Delta have subsided, gradually lowering the elevations of Delta islands. As a result, some of these parcels are now more than 20 feet below sea level.

Many other changes have also taken place in the Delta over the past 150 years. Today, the levees protect not only farms but also hundreds of thousands of people who live and work in Central Valley communities. State highways, railroad lines, water supply pipelines that serve much of the San Francisco Bay area, energy transmission lines, and petroleum pipelines also now cross the Delta and rely on the continued stability of Delta levees. Altogether, more than $47 billion in infrastructure is protected by Central Valley levees. – *copied from* http://www.water.ca.gov/levees/history/

No levee system provides full protection from all flooding events to the people and structures located behind it. Thus, some level of flood risk exists in these levee-impacted areas. Catastrophic levee failure is (also) a growing threat. The Public Policy Institute of California, a nonpartisan think-tank, estimates there is a 66 percent chance of major levee failure in the Delta within the next 50 years. A major levee failure could completely shut down the SWP (State Water Project) and CVP (Central Valley Project) Delta pumps for six to 18 months, depending on when and where it occurred, devastating Santa Clara County and the California economy.



4.4.2 History of Delta Levee Failure

- **1862** – Parts of Sacramento under 20 feet of flood waters.
- **1955** – Floods in northern and central California result in 67 deaths.
- **1964** – Huge storm hits northern coast of California; resulting flood on Eel River kills 24 people.
- **1986** – Central California flooding leaves 14 dead and causes more than $1.5 billion in property damage.
- **1997** – Flooding kills eight and causes more than $2 billion in property damage; 48 counties declared disaster areas.
- **2004** – Upper Jones Tract levee break in June results in federal disaster declaration and $90 million in damage.
- **2006** – Governor declares state of emergency due to threat of major flooding in northern California and San Joaquin Valley.

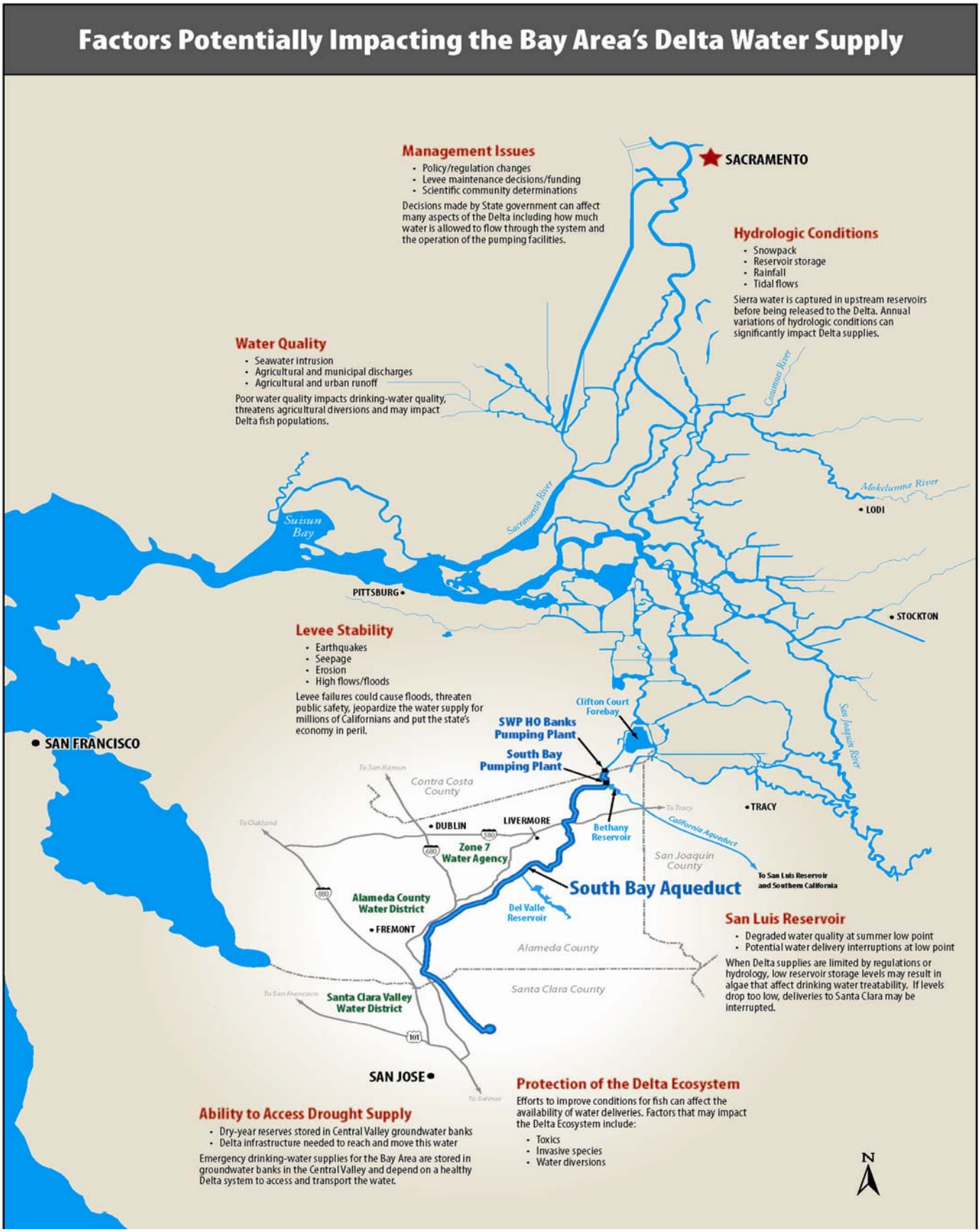
- *Copied from* http://www.water.ca.gov/levees/history/floods.cfm

4.4.3 Location and Extent/Probability of Occurrence and Magnitude

The entire County would experience impacts if Delta Levee Failure led to reduced potable water supply. If imported Delta water is reduced or eliminated, Bay Area residents and businesses could face significant economic hardships and a lowered quality of life. These hardships include:

- Water supplies for nearly 3 million people could be cut by as much as 50 percent.
- Business development could be hampered by unstable water supplies.
- Local municipalities and park districts could have insufficient supplies available to maintain their investments in landscaping.
- Residents and businesses alike could face significant cost increases for scarce water supplies.

Information for this section was retrieved from – The Delta[1].pdf at http://www.scvwd.com/Services/Delta.aspx and shown on the following page.


Factors Potentially Impacting the Bay Area's Delta Water Supply
Management Issues
• Policy/regulation changes
• Levee maintenance decisions/funding
• Scientific community determinations
Decisions made by State government can affect many aspects of the Delta including how much water is allowed to flow through the system and the operation of the pumping facilities.
SACRAMENTO
Hydrologic Conditions
• Snowpack
• Reservoir storage
• Rainfall
• Tidal flows
Sierra water is captured in upstream reservoirs before being released to the Delta. Annual variations of hydrologic conditions can significantly impact Delta supplies.
Water Quality
• Seawater intrusion
• Agricultural and municipal discharges
• Agricultural and urban runoff
Poor water quality impacts drinking-water quality, threatens agricultural diversions and may impact Delta fish populations.
Cosumnes River
Mokelumne River
LODI
Suisun Bay
Sacramento River
PITTSBURG
STOCKTON
Levee Stability
• Earthquakes
• Seepage
• Erosion
• High flows/floods
Levee failures could cause floods, threaten public safety, jeopardize the water supply for millions of Californians and put the state's economy in peril.
Clifton Court Forebay
SWP HO Banks Pumping Plant
South Bay Pumping Plant
San Joaquin River
SAN FRANCISCO
To San Ramon
Contra Costa County
To Tracy
TRACY
To Oakland
DUBLIN
LIVERMORE
Bethany Reservoir
California Aqueduct
Zone 7 Water Agency
San Joaquin County
To San Luis Reservoir and Southern California
South Bay Aqueduct
Alameda County Water District
Del Valle Reservoir
FREMONT
San Luis Reservoir
• Degraded water quality at summer low point
• Potential water delivery interruptions at low point
When Delta supplies are limited by regulations or hydrology, low reservoir storage levels may result in algae that affect drinking water treatability. If levels drop too low, deliveries to Santa Clara may be interrupted.
Alameda County
Santa Clara County
To San Francisco
Santa Clara Valley Water District
SAN JOSE
To Salinas
Protection of the Delta Ecosystem
Efforts to improve conditions for fish can affect the availability of water deliveries. Factors that may impact the Delta Ecosystem include:
• Toxics
• Invasive species
• Water diversions
Ability to Access Drought Supply
• Dry-year reserves stored in Central Valley groundwater banks
• Delta infrastructure needed to reach and move this water
Emergency drinking-water supplies for the Bay Area are stored in groundwater banks in the Central Valley and depend on a healthy Delta system to access and transport the water.
N

4.5 WILDFIRE PROFILE

4.5.1 Nature of Hazard

A wildfire is an undesirable fire occurring in the natural environment and is a serious and growing hazard over much of the United States. Wildfires pose a great threat to life and property, particularly when they move from forest or rangeland into developed areas. An average of five million acres burn every year in the United States as a result of wildfires; causing millions of dollars in damage. Each year more than 100,000 wildfires occur in the United States, almost 90 percent of which are started by humans; the rest are caused by lightning. Weather is one of the most significant factors in determining the severity of wildfires[3].

4.5.2 History of Wildfire

Based on search results of NCDC and SHELDUS, with data records spanning from 1950 to 2009, there was only one recorded instance of wildfire in Santa Clara County. This single data record is clearly not the only time wildfire has occurred within the County. Consequently, CAL FIRE (Fire Perimeters) archives, with data records spanning from 1878 to 2009, included 62 instances of recorded wildfire occurrences in Santa Clara County. The fire perimeter data is not a complete database due to the following limitations:

National Park Service, Bureau of Land Management, and US Forest Service, fires of 10 acres and greater are reported. For CAL FIRE, timber fires greater than 10 acres, brush fires greater than 50 acres, grass fires greater than 300 acres, and fires that destroy three or more residential dwellings or commercial structures are reported.

Considering the fire perimeter data shown in Figure 4-13, 218,320 acres, or 341 square miles, of land were affected by these events, of which 113,345 acres, or 177 square miles, were physically within Santa Clara County. It is also important to note that this data is explicitly not to be used for probability. Other data, such as Fire Hazard Severity Zones, include the appropriate analysis for suitable use in hazard mitigation planning.

[3] HAZUS-MH Risk Assessment and User Group Series How-to-Guide: Using HAZUS-MH for Risk Assessment (FEMA 433/August 2004)

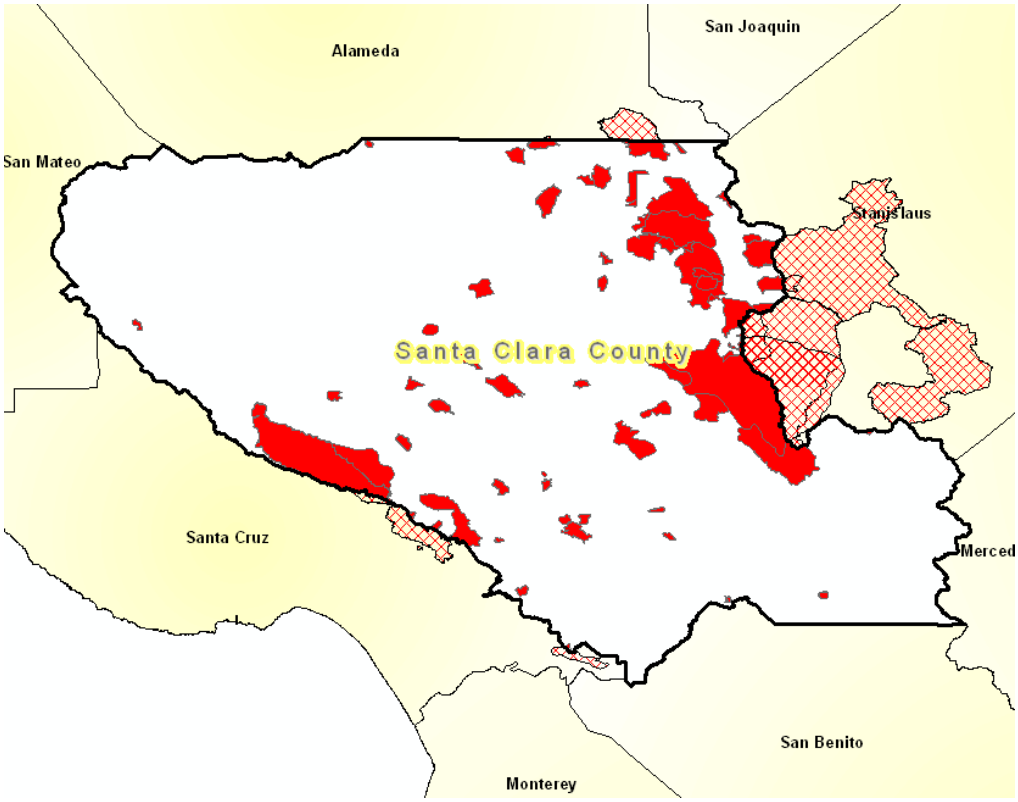


Figure 4-13: Historical Wildfire Perimeters

4.5.3 Location and Extent/Probability of Occurrence and Magnitude

Appendix C of Taming Natural Hazards (2010) presents mapped Fire Hazard Threat Zones. Within Santa Clara County there are no Extreme Fire Threat zones. Figure 4-14 shows the Fire Hazard Threat Zones throughout Santa Clara County. Very High Fire Threat zones are shown in red. High Fire Threat areas are shown in orange. Moderate Fire Threat areas are shown in yellow.

Three Community Wildfire Protection Plans have been submitted to Cal FIRE for areas within Santa Clara County. These are the Croy Fire Area CWPP, East Foothills CWPP, and Lexington Hills CWPP.

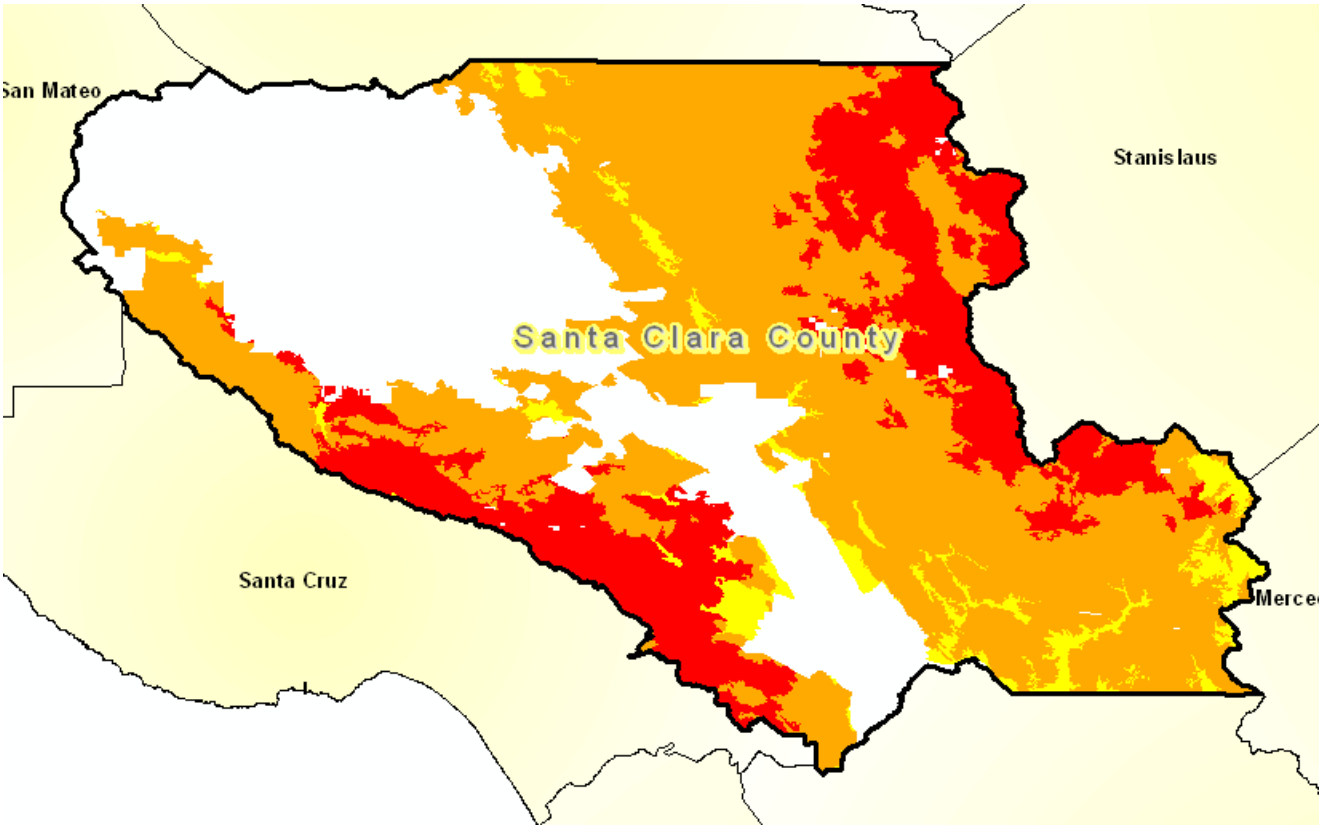


Figure 4-14: Fire Hazard Threat Zones

Each of the City Annexes (Sections 10 through 22) contains a map of Fire Hazard Threat Zones for that city.

4.6 FLOOD PROFILE

4.6.1 Nature of Hazard

A flood occurs when water from rainfall flows into rivers and streams where it exceeds the bank capacity and is forced onto the river's floodplains. Floodplains are lowlands adjacent to rivers, lakes, and oceans that are subject to recurring floods. Most injury and death from floods occur when people are swept away by flood currents, and property damage typically occurs as a result of inundation by sediment-filled water. Most areas around the globe are subject to some form of flooding.

Several factors determine the severity of floods, including rainfall intensity and duration, surface permeability, and geographic characteristics of the watershed such as shape and slope. A large amount of rainfall in a short time can result in flash flood conditions, as can a dam failure, or other sudden spill. The National Weather Service's definition of a flash flood is a flood occurring in a

watershed where the time of travel of the peak of flow from one end of the watershed to the other is less than six hours.

4.6.2 History of Flooding

Based on search results of NCDC and SHELDUS archives, between 1950 and 2010 there were 26 instances of flood recorded. These events include flooding from a variety of event sub-types to include flash flood, flood from winter storm, urban and small stream flooding, and flood from heavy rain. Of the 26 records, three events (3) were declared by FEMA.

Table 4-6: Historical Records of Flood in Santa Clara County

Date	Injuries / Fatalities	Damages	Source of Estimate	Comments
2/26/1958	Data not available			
2/26/1963	Data not available			
1/16/1973	0 / 0	$86,206.90	SHELDUS	Damages Adjusted to 2008; $426,935.92
1/3/1982	154 / 5.1	$7,143,571.00	SHELDUS	Damages Adjusted to 2008; $15,807,158.35
3/30/1982	0.67 / 0	$166,834.00	SHELDUS	Damages Adjusted to 2008; $369,167.10
4/2/1982	0 / 0	$505,000.00	SHELDUS	Damages Adjusted to 2008; $1,117,454.42
1/25/1983	0.27 / 0.15	$388,461.53	SHELDUS	Damages Adjusted to 2008; $841,663.85
1/26/1983	1 / 0.17	$8,341,666.66	SHELDUS	Damages Adjusted to 2008; $18,073,550.85
3/1/1983	2 / 0	$500,000.00	SHELDUS	Damages Adjusted to 2008; $1,083,329.72
2/17/1986	0 / 0	$5,000,000.00	SHELDUS	Damages Adjusted to 2008; $9,811,231.90
2/11/1992	0 / 0	$11,627.91	SHELDUS	Damages Adjusted to 2008; $17,783.76
2/14/1992	0 / 0	$9,090.91	SHELDUS	Damages Adjusted to 2008; $13,903.66
12/10/1992	0 / 0	$1,315.79	SHELDUS	Damages Adjusted to 2008; $2,012.37
1/13/1993	0 / 0	$111,111.12	SHELDUS	Damages Adjusted to 2008; $165,078.62
3/1/1995	0 / 0	$11,241,379.31	SHELDUS	Damages Adjusted to 2008; $15,798,661.09
3/9/1995	0 / 0	$650,000.00	SHELDUS	Damages Adjusted to 2008; $913,511.54
12/10/1996	Data not available			
1/25/1997	Data not available			
2/3/1998	Data not available			

Date	Injuries / Fatalities	Damages	Source of Estimate	Comments
2/7/1998	Data not available			
2/8/1998	Data not available			
2/13/2000	Data not available			
12/15/2002	Data not available			
12/15/2002	Data not available			
10/13/2009	Data not available			
10/13/2009	Data not available			
NOTE:	2008 adjusted dollars from SHELDUS.			

The following paragraphs summarize the historic events. Information in this section has been obtained and compiled from County documents, committee and public input, and federal and state declared disaster information.

2/26/1958 Summary – Storm and Flood Damage, Northern California (Southern boundaries of Santa Cruz, Santa Clara, Stanislaus, Tuolumne, Alpine Counties to the Oregon border)

2/26/1963 Summary – Flooding, Flood and Rainstorms, Declared: Alpine, Nevada, Placer, Plumas, Sierra (2/7/63), Amador, Colusa, El Dorado, Glenn, Lake, Lassen, Tehama, Santa Clara, Santa Cruz, Siskiyou, Yolo, Tulare (2/26/63), Mono, Trinity (2/29/63), Yuba (4/22/63) Federal: 145 (2/25/63), amended 1/30/63 to include Orange County and Redondo Beach. Damage information not available.

1/16/1973 Summary – Flooding - Severe Storm/Thunder Storm, HEAVY RAINS, FLOODS

1/3/1982 Summary – January 1982 - Winter Storms, Heavy winds, rain, flooding, and mud slides

3/30/1982 Summary – Flooding

4/2/1982 Summary – Flooding

1/25/1983 Summary – Winter '82-'83 - Winter Storms, Heavy rains, high winds, flooding, levee breaks

1/26/1983 Summary – Winter '82-'83 - Winter Storms, Heavy rains, high winds, flooding, levee breaks

3/1/1983 Summary – Flooding

2/17/1986 Summary – Flash Flooding, Early February 1986 – Storms, Rains, winds, flooding, and mud slides

2/11/1992 Summary – Flooding - Winter Weather, Winter Storm, Flash Flood

2/14/1992 Summary – Flooding - Winter Weather, Winter Storm, Flash Flood

12/10/1992 Summary – Flooding - Wind - Winter Weather, Winter Storm, High Wind, Flash Flood

1/13/1993 Summary – Flash Flooding

3/1/1995 Summary – Flooding - Severe Storm/Thunder Storm – Wind, "FLOOD RAIN WINDS"

3/9/1995 Summary – FLOODS, Winds, Flash Flood, Winter Storm/high Wind

12/10/1996 Summary – Urban/sml Stream Fld, 5.67" of rain at Morgan Hill. Widespread street flooding and Trailer Court that had to evacuate. State Hwy 17 was closed by mudslides. 113,000 people were out of power at some time during the storm.

1/25/1997 Summary – Flash Flood, Arroyo Hondo Cr near San Jose, Saratoga Creek at Saratoga, Guadalupe River at San Jose, Matadero Creek at Palo Alto, and San Francisquito Creek at Stanford University showed moderate increases in streamflow during the warning period. A new round of rain storms brought more flooding problems to the North Bay area. Sonoma County has received 1 to 1 1/2 inches of rain the last three hours and rain rates continued at .3 to .5 per hour the last two hours. Main front is expected in 3 to 4 hours and moderate to heavy rain will occur during this time.

2/3/1998 Summary – Flash Flood, Guadalupe River at Blossom Hill Blvd. Levee Breached along Arroyo Mocha (a dry Creek) and caused damage to roads and property

2/7/1998 Summary – Flash Flood, Ross Creek at Cherry Street. Levee Breached along Arroyo Mocha (a dry Creek) and caused damage to roads and property

2/8/1998 Summary – Flash Flood, Coyote Creek at Edenvale Levee Breached along Arroyo Mocha (a dry Creek) and caused damage to roads and property

2/13/2000 Summary – Flash Flood, Widespread rain 24 hour accumulation of 5+ in. Urban and small stream flooding. Many roads including Hwy 1 and Hwy 116 were closed. A number of trees were downed knocking out power. There were no deaths and only minor injuries. Numerous traffic accidents and flight delays at SFO occurred during the storm.

12/15/2002 Summary – Heavy Rain, December was wettest on record at many locations. 3 primary episodes of precipitation in December, culminating w/ Dec. 13th through the 21st. Wave after wave

of locally heavy rain. Flooding became a serious issue. Urban and small stream flooding w/ mudslides.

10/13/2009 Summary – Flood, EPISODE NARRATIVE: A strong low pressure system made its way through Northern and Central California accompanied by deep tropical moisture and very strong winds. Heavy rain combined with the wind to cause numerous trees, tree limbs and pole/telephone powers to fall. Pacific Gas and Electric reported over 277,000 customers had lost power in the San Francisco and Monterey Bay Areas with a cost of over thirteen million dollars in damages. The record breaking heavy rain also led to flooding and debris flows.

4.6.3 Location and Extent/Probability of Occurrence and Magnitude

ARkStorm Scenario

An extreme flooding scenario, ARkStorm, was modeled by the U.S. Geological Survey and released during a two day summit with stakeholders in Sacramento in January 2011. This model combines prehistoric geologic flood history in California with modern flood mapping and climate-change projections and presents a hypothetical scenario of a severe storm. The hypothetical storm would strike the U.S. West Coast and be similar to the intense California winter storms of 1861 and 1862 that left the central valley of California impassible. The storm is estimated to produce precipitation that in many places exceeds levels only experienced on average once every 500 to 1,000 years.

To define impacts of the ARkStorm, the USGS, in partnership with the California Geological Survey, created the first statewide landslide susceptibility maps for California that are the most detailed landslide susceptibility maps ever created. The project also resulted in the first physics-based coastal storm modeling system for analyzing severe storm impacts (predicting wave height and coastal erosion) under present-day scenarios and under various climate-change and sea-level-rise scenarios. ARkStorm is part of the efforts to create a National Real-Time Flood Mapping initiative to improve flood management nationwide.

Results of this model include evaluation of multiple hazards related to a severe storm event (flood, landslides, wind, etc) for much of California. The report acknowledges that Santa Clara County could be among the most seriously flooded. In the ARkStorm Scenario some wastewater plants in Santa Clara County would be flooded. 10% of customers would lose power initially after the storm. Santa Clara County would experience maximum flooding between 3 and 10 feet for approximately half a day. With potential for impoundment behind levees, there could be an extended recovery time. All of the County's three waste water treatment plants would be flooded. Santa Clara County would experience $40,000,000,000 of property loss from flooding and $59,000,000 of property loss from wind. The ARkStorm Scenario, USGS Open-File Report 2010-1312, is available online (http://pubs.usgs.gov/of/2010/1312/).

Note: The ARkStorm Scenario report was released after the Local Planning Team collaborated to identify and prioritize the hazards for consideration in this plan update. This report may be helpful in revising the hazard prioritizations and informing the risk assessment in future updates to this plan.

FEMA DFIRMs

The Federal Emergency Management Agency developed a Digital Flood Insurance Rate Map (DFIRM) for Santa Clara County, which was adopted in 2009. This mapping is used to implement the County's floodplain management ordinance and participation in the National Flood Insurance Program (NFIP). The Special Flood Hazard Areas mapped on the DFIRM present the flood risk throughout the County. The Santa Clara Valley Water District serves as the County's flood management agency. More information regarding the County's participation in the NFIP and access to floodplain mapping is presented in the Section 7.1, Santa Clara County Capabilities, of this plan. Figure 4-15 presents the FEMA Flood Hazard Areas shown on ABAG's online mapping system.

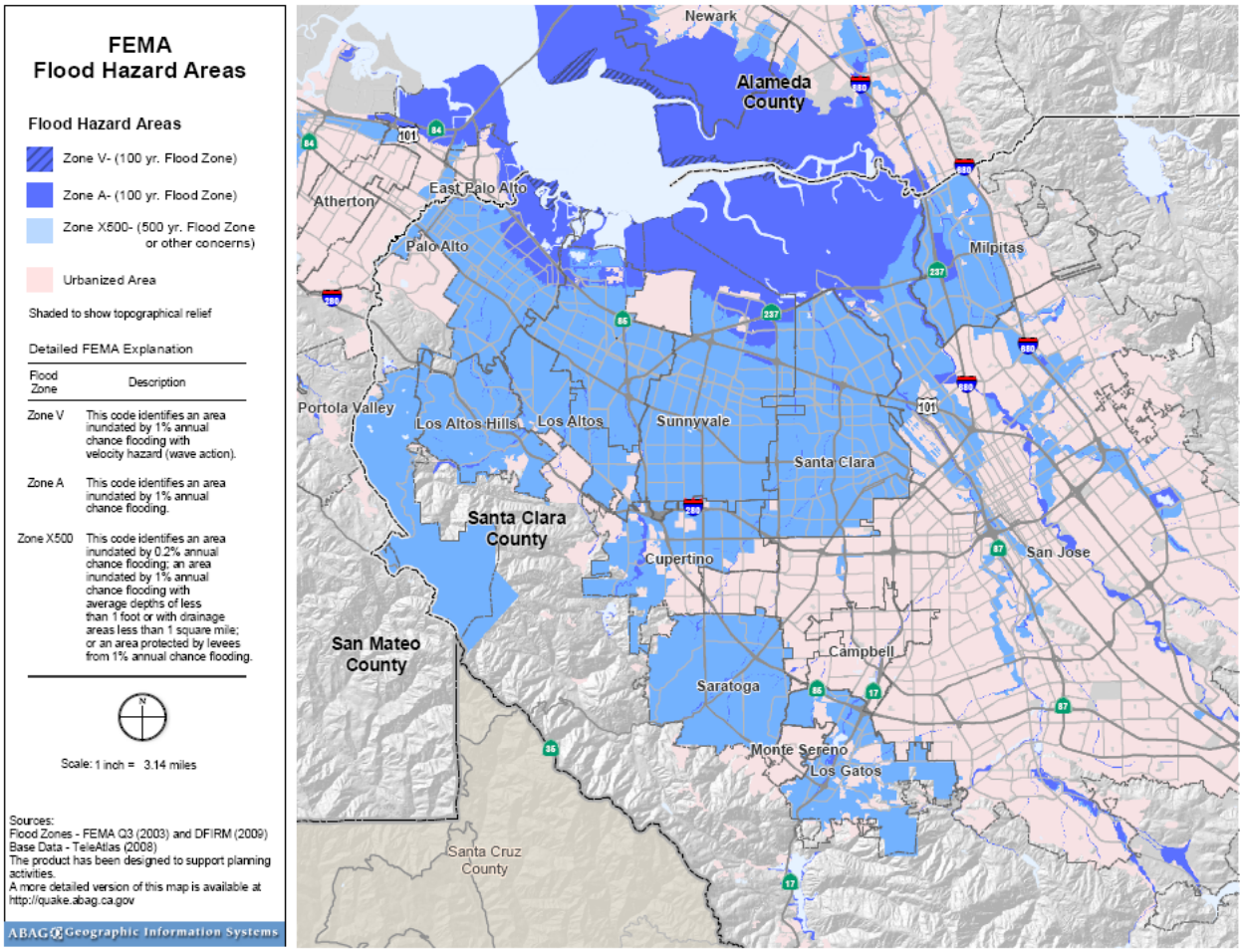


Figure 4-15: FEMA Flood Hazard Areas

Each of the City Annexes (Sections 10 – 22) contains a map of FEMA Flood Hazard Areas for that city.

4.6.4 Climate Change Consideration

Rising sea levels pose a significant threat to coastal areas surrounding San Francisco Bay, including portions of Santa Clara County. Sea level rise can occur through one or more of three processes that include land subsidence, the melting of ice sheets and thermal expansion of water as a result of warming. Sea levels are already rising in San Francisco Bay as is evident in long term tidal gauge records from Fort Point where the rate of rise has been approximately 7.9 inches per century (see Figure 4-16). A growing consensus of scientists believes that sea level rise will continue and the rate of rise will increase. The Intergovernmental Panel on Climate Change (IPCC) suggests that global SLR on the order of 0.2 m (0.66 ft) and 0.6 m (1.97 ft) is possible by 2100[4] with other scientists indicating this rise could be over 3.28 ft (1 m).[5]

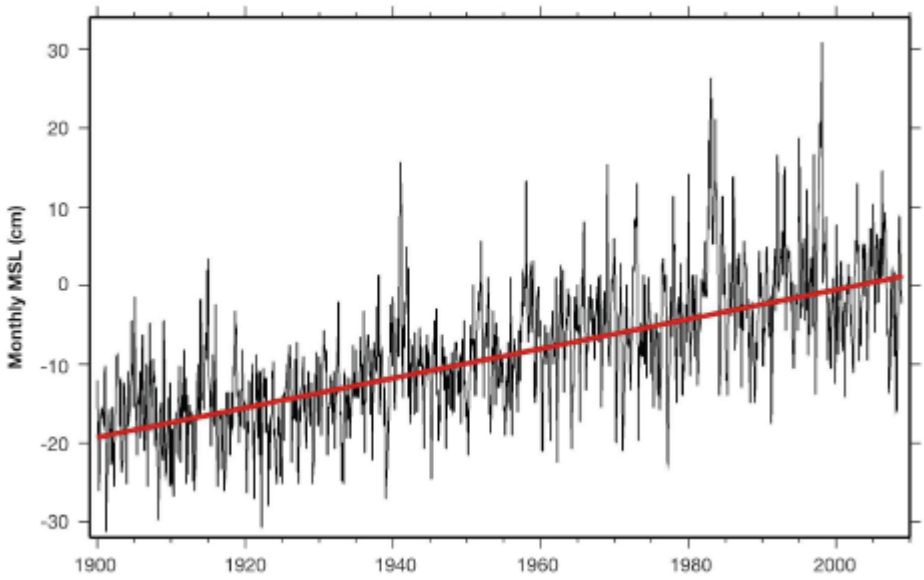


Figure 4-16: Fort Point San Francisco tide gauge record (source: San Francisco Bay Conservation and Development Commission, 2009[6]; Cayan et. Al. 2006)

[4] Fourth Assessment Report: Climate Change 2007: The AR4 Synthesis Report, Geneva: IPCC.
[5] M. Vermeer and S. Rahmstorf. 2009. Global sea level linked to global temperature. Proceedings of the National Academy of Sciences, USA.
[6] San Francisco Bay Conservation and Development Commission, 2009. Living with a Rising Bay: Vulnerability and Adaptation in San Francisco Bay and on its Shoreline.

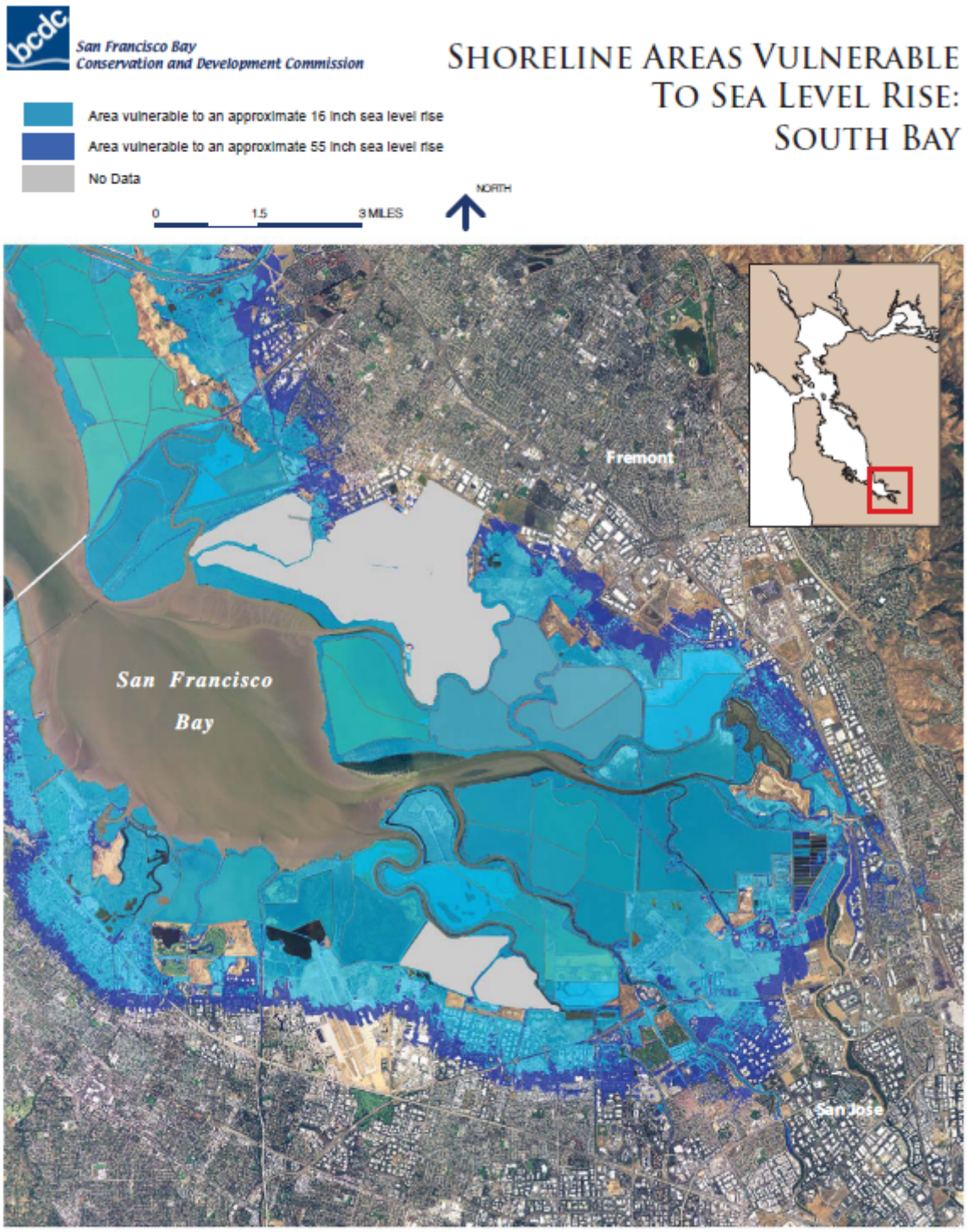


Figure 4-17: Areas near San Francisco Bay vulnerable to a 16 inch and a 55 inch Sea Level Rise (SFBCDC 2009)

Figure 4-17 depicts areas along and near the southern portion of San Francisco Bay that may be vulnerable to sea level rise in 16- and 55-inch sea level rise scenarios.[7] From the figure, it is apparent that a considerable number of buildings and infrastructure may be impacted under either scenario. A study conducted by the Pacific Institute in 2009[8] examined how the 100-year floodplain might expand under various scenarios of sea level rise. Approximately 13,000 people in Santa Clara County are currently vulnerable to a 100-year flood. A sea level rise of 1.0 meter would mean that approximately 24,000 would be within what would become the new 100-year flood plain. That number jumps to 31,000 people with a sea level rise of 1.4 meters. The same study determined that with a 1.0 meter rise in sea level, 180 miles of roadway and approximately 14 miles of highway would be vulnerable to inundation during a 100-year flood. A 1.4 meter rise in sea level would increase the number of vulnerable roadways to 220 and highways to 15. In terms of railways, 8.9 miles would be vulnerable to a 100-year flood in a 1.0 meter sea level rise scenario, while 10 miles would be at risk in a 1.4 meter scenario. The study found that total replacement cost of buildings and contents at risk of a 100-year flood in a 1.0 meter sea level rise scenario is approximately $4.7 billion. A 1.4 meter sea level rise means that $7.8 billion in building contents and values may be at risk.

In addition to issues surrounding inundation, sea level rise also threatens water quality in the region. One study found that increasing the sea level increases the salinity in the Bay.[9] This has the potential to impact wetland processes as well as freshwater supply.

Climate change has the potential to increase flood risk through changes in precipitation patterns. Climate models project that a warming planet could lead to changes in the distribution of precipitation across the country. These models suggest fewer precipitation events overall, but a trend toward an increased frequency of intense precipitation events.[10] These changes may translate into greater storm water run-off into the future, which could exacerbate flooding hazards. While it might not seem intuitive, fewer, but more intense precipitation events might lead to more frequent flash flooding episodes, while longer dry periods between precipitation events might also increase the frequency and severity of drought.

[7] SFBCDC, 2009. N. Knowles, 2008. Potential inundation due to Rising Sea Levels in the San Francisco Bay Region.
[8] M. Heberger, H. Cookley, P. Herrera, The Pacific Institute, May 2009. The Impacts of Sea-Level Rise on The California Coast.
[9] V. Chua, O. Fringer, and S. Monismith, 2009. Influence of Sea Level Rise on Salinity in San Francisco Bay.
[10] Gutowski, W.J., G.C. Hegerl, G.J. Holland, T.R. Knutson, L.O. Mearns, R.J. Stouffer, P.J. Webster, M.F. Wehner, and F.W. Zwiers, 2008: Causes of observed changes in extremes and projections of future changes. In: *Weather and Climate Extremes in a Changing Climate: Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands* [Karl, T.R., G.A. Meehl, C.D. Miller, S.J. Hassol, A.M. Waple, and W.L. Murray (eds.)]. Synthesis and Assessment Product 3.3. U.S. Climate Change Science Program, Washington, DC, pp. 81-116.

4.7 DROUGHT PROFILE

4.7.1 Nature of Hazard

Droughts are short-term or long-term water deficiencies that cause agricultural, environmental, and societal impacts. They can occur in any part of the county and can last for indeterminate periods of time. Meteorological drought is defined as an extended period (generally six months or more) when precipitation is less than 75 percent of normal during that period. Hydrologic drought is characterized by extremely low stream flow levels, and is caused by a prolonged meteorological drought.

Current drought conditions nationwide are tracked by the US Drought Monitor, a partnership between the National Drought Mitigation Center at the University of Nebraska-Lincoln, federal, and state environmental and climatologic organizations. The US Drought Monitor blends a variety of drought indicators to produce a weekly drought condition status map for the nation[11].

Droughts are typically quantified based on indices that consider rainfall, snowpack, temperature, stream flow, groundwater, and/or other factors. One of the most commonly-cited drought measures is the Palmer Drought Severity Index, first documented in a 1965 paper by Wayne Palmer, which uses temperature and precipitation information for a location in a formula to quantify dryness. A Palmer index value of zero indicates normal conditions, with increasingly negative values indicating increasing drought severity. Other drought indices use different methods and formulas to quantify dryness, and may be more appropriate for specific applications. The US Drought Monitor uses a variety of drought indices, including the Palmer index, to produce an overall drought severity classification.

Agricultural drought is the most common, characterized by unusually dry conditions during the growing season, and can have significant economic effects on local agriculture. Extended periods of drought can increase the risk of wildfire occurrences. Wildfire occurrences can lead to an increase of burned woody debris that could increase the potential for landslides or mudflows. Short-term droughts occurring in sync with the growing season may have a significant impact on agricultural productivity, but may have little impact on public drinking water supply. Long-term hydrologic drought can impact public water supplies, forcing local governments to enact water conservation restrictions. Jurisdictions which have invested in water supply and distribution infrastructure tend to be less vulnerable to drought. However, noting that Santa Clara County obtains almost 50% of its public water supply from the ***Sacramento-San Joaquin River Delta*** and, considering the recent restrictions mandated under the Endangered Species Act, Santa Clara has been significantly limited in its ability to obtain water for all uses.

[11] US Drought Monitor available online at: http://www.drought.unl.edu/dm/monitor.html

4.7.2 History of Drought

Based on search results of NCDC and SHELDUS archives, between 1950 and 2010 there was only one (1) instance of drought recorded (1973) in Santa Clara County resulting in significant agricultural damages. Further research with the California Department of Water Resources[12] indicates that drought occurred in the years 1976-1977 and 1987-1992. Recent events indicate drought contributing factors beginning in 2007 and continuing into 2009, when the Governor proclaimed a statewide emergency on February 27, 2009.

February 2009 Summary – The proclamation comes on the heels of the news that much of the state, including San Jose, has experienced the driest spring on record (Spring 2008). It makes way for immediate state actions to deal with the crisis, including providing technical assistance and more state funding for conservation programs… Santa Clara County receives about half of its water through the Sacramento-San Joaquin River Delta, which is already significantly limited this year because of pumping restrictions mandated under the Endangered Species Act. Water deliveries through the Delta have been cut by about 20-30 percent. "As a result of the court-ordered reductions in water supply through Delta, we're already drawing more from our local reservoirs and groundwater aquifer. When you couple the dry year with uncertainties in the Delta, the need to conserve becomes increasingly important," explained Keith Whitman, district's water supply manager[13].

4.7.3 Location and Extent/Probability of Occurrence and Magnitude

As stated in Appendix C of Taming Natural Hazards (2010) the entire Bay Area is equally susceptible to drought.

4.7.4 Climate Change Consideration

Climate change has the potential to make drought events, such as that experienced in 2006 and at various points in the past, more common in the West, including in California. Long-term climate forecast models suggest that a warming planet will lead to changes in precipitation distribution and more frequent and severe drought in some parts of the country, particularly the western U.S. In addition, the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report indicates that it is very likely that hot extremes and heat waves will become more frequent as the Earth warms. This too will have implications for the frequency and severity of future drought occurrence. Extreme heat creates conditions more conducive for evaporation of moisture from the ground, thereby increasing the possibility of drought.

[12] http://www.water.ca.gov/drought/assist/archive.cfm, Historical Drought Archive
[13] http://www.prweb.com/releases/Santa_Clara_Valley_Water/California_drought/prweb1001314.htm, Governor's Drought Proclamation Puts Spotlight on California's Water Challenges

A warming planet could lead to earlier melting of winter snow packs, leaving lower streamflows and drier conditions in the late spring and summer. Snow packs are important in terms of providing water storage and ensuring adequate supply in the summer, when water is most needed. Changing precipitation distribution and intensity have the potential to cause more of the precipitation that does fall to run-off rather than be stored. The result of these processes is an increased potential for more frequent and more severe periods of drought.

4.8 SOLAR STORM PROFILE

4.8.1 Nature of Hazard

The term solar storm is one that encompasses a number of phenomena associated with solar activity; namely; solar flares , coronal mass ejections, high speed solar wind, solar energetic particles[14]. Essentially, the Sun goes through cycles of high and low activity that repeat approximately every 11 years. The number of dark spots on the Sun (sunspots) marks this variation; as the number of sunspots increases, so does solar activity. Sunspots are sources of flares, the most violent events in the solar system. Sunspots, dark areas on the solar surface, contain strong magnetic fields that are constantly shifting. A moderate-sized sunspot is about as large as the Earth. Sunspots form and dissipate over periods of days or weeks. They occur when strong magnetic fields emerge through the solar surface and allow the area to cool slightly, from a background value of 6000 ° C down to about 4200 ° C; this area appears as a dark spot in contrast with the Sun. The rotation of these sunspots can be seen on the solar surface; they take about 27 days to make a complete rotation as seen from Earth. Sunspots remain more or less in place on the Sun. Near the solar equator the surface rotates at a faster rate than near the solar poles.

Groups of sunspots, especially those with complex magnetic field configurations, are often the sites of flares. Over the last 300 years, the average number of sunspots has regularly waxed and waned in an 11-year sunspot cycle. The Sun, like Earth, has its seasons but its “year” equals 11 of ours. This sunspot cycle is a useful way to mark the changes in the Sun. Solar Minimum refers to the several Earth years when the number of sunspots is lowest; Solar Maximum occurs in the years when sunspots are most numerous. During Solar Maximum, activity on the Sun and its effects on our terrestrial environment are high.

In a matter of minutes, a large flare releases a million times more energy than the largest earthquake[15]. While solar activity may have varying effects on the solar system in total, it is those effects on earth that are of concern as a natural hazard. NASA calls this Solar-Terrestrial Effects.

[14] http://www.swpc.noaa.gov/info/FAQ.html; NOAA / Space Weather Prediction Center, SWPC Frequently Asked Questions, 5. Does ALL solar activity impact Earth? Why or why not?
[15] http://www.swpc.noaa.gov/info/SolarEffects.html, NOAA / Space Weather Prediction Center, Solar Effects - Solar Cycles

Electric Power

When magnetic fields move about in the vicinity of a conductor such as a wire, an electric current is induced into the conductor. This happens on a grand scale during geomagnetic storms. Power companies transmit alternating current to their customers via long transmission lines. The nearly direct currents induced in these lines from geomagnetic storms are harmful to electrical transmission equipment. On March 13, 1989, in Montreal, Quebec, 6 million people were without commercial electric power for 9 hours as a result of a huge geomagnetic storm. Some areas in the northeastern U.S. and in Sweden also lost power. By receiving geomagnetic storm alerts and warnings, power companies can minimize damage and power outages.

Pipelines

Rapidly fluctuating geomagnetic fields can induce currents into pipelines. During these times, several problems can arise for pipeline engineers. Flow meters in the pipeline can transmit erroneous flow information, and the corrosion rate of the pipeline is dramatically increased. If engineers unwittingly attempt to balance the current during a geomagnetic storm, corrosion rates may increase even more. Pipeline managers routinely receive alerts and warnings to help them provide an efficient and long-lived system.

Climate

The Sun is the heat engine that drives the circulation of our atmosphere. Although it has long been assumed to be a constant source of energy, recent measurements of this solar constant have shown that the base output of the Sun can have temporary decreases of up to one-half percent. Atmospheric scientists say that this variation is significant and that it can modify climate over time. Plant growth has been shown to vary over the 11-year sunspot and 22-year magnetic cycles of the Sun, as evidenced in tree-ring records.

While the solar cycle has been nearly regular during the last 300 years, there was a period of 70 years during the 17th and 18th centuries when very few sunspots were seen. This drop in sunspot number coincided with the timing of the Little Ice Age in Europe, implying a Sun-climate connection. Recently, a more direct link between climate and solar variability has been speculated. Stratospheric winds near the equator blow in different directions, depending on the time in the solar cycle. Studies are under way to determine how this wind reversal affects global circulation patterns and weather. During proton events, many more energetic particles reach the Earth's middle atmosphere. There they cause molecular ionization, creating chemicals that destroy atmospheric ozone and allow increased amounts of harmful solar ultraviolet radiation to reach the surface of the Earth. A solar proton event in 1982 resulted in a temporary 70% decrease in ozone densities.

Geomagnetic Influence on People and Animals

There is a growing body of evidence indicating that changes in the geomagnetic field affect biological systems. Studies indicate that physically stressed human biological systems may respond to fluctuations in the geomagnetic field. Interest and concern in this subject have led the Union of Radio Science International to create a new commission entitled Electromagnetics in Biology and Medicine.

Possibly the most closely studied of the variable biological effects of the Sun has been the degradation of homing pigeons' navigational abilities during geomagnetic storms. Pigeons and other migratory animals, such as dolphins and whales, have internal biological compasses composed of the mineral magnetite wrapped in bundles of nerve cells. While this probably is not their primarily method of navigation, there have been many pigeon race smashes during a geomagnetic storm. A smash is a term used when only a small percentage of birds return home from a release site. Because these losses have occurred during geomagnetic storms, pigeon handlers have learned to ask for geomagnetic alerts and warnings as an aid to scheduling races.

Our Future

The list of consequences grows in proportion to our dependence on burgeoning technological systems. The subtleties of the interactions between the Sun and the Earth, and between solar particles and delicate instruments have become factors that affect our well being. Thus there will be continued and intensified need for space environment services to address health, safety, and commercial needs. The Space Weather Predictions Center (SWPC) Forecast Center is jointly operated by NOAA and the U.S. Air Force and is the national and world warning center for disturbances that can affect people and equipment working in the space environment. SWPC works with many national and international partners who contribute data and observations; we also share our data and products with them. We are pleased to support efforts worldwide to inform users of space weather.

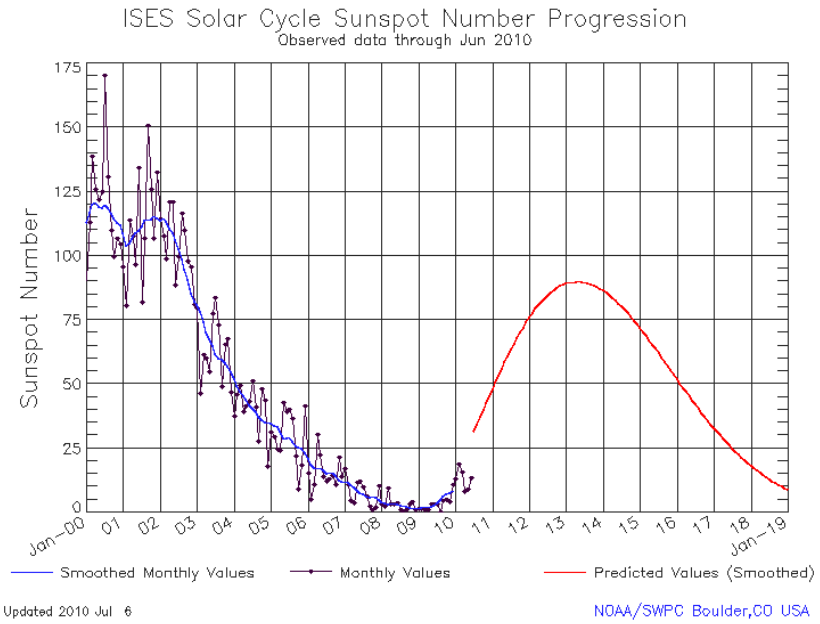
Better understanding and better forecasts are keys to providing better services. SWPC conducts research in solar-terrestrial physics, develops techniques for forecasting solar and geophysical disturbances, and provides real-time monitoring and forecasting of solar and geophysical events.

4.8.2 History of Solar Storms

No information for historical occurrences of solar storm activity affecting Santa Clara County was available at the time this plan was prepared.

4.8.3 Location and Extent/Probability of Occurrence and Magnitude

The entire county is equally susceptible to experiencing impacts from solar storms. Sunspots are an indicator of solar storm activity. The graph below indicates an increase of sunspots into 2013[16].



May 8, 2009 -- The Solar Cycle 24 Prediction Panel has reached a consensus decision on the prediction of the next solar cycle (Cycle 24). First, the panel has agreed that solar minimum occurred in December, 2008. This still qualifies as a prediction since the smoothed sunspot number is only valid through September, 2008. The panel has decided that the next solar cycle will be below average in intensity, with a maximum sunspot number of 90. Given the predicted date of solar minimum and the predicted maximum intensity, solar maximum is now expected to occur in May, 2013. Note, this is a consensus opinion, not a unanimous decision. A supermajority of the panel did agree to this prediction.

[16] http://www.swpc.noaa.gov/SolarCycle/, NOAA/Space Weather Prediction Center, Solar Cycle 24 Prediction Update released May 8, 2009

While sun spot activity is accepted as an indicator, there are other solar activity indices that are utilized to predict the likelihood of solar-terrestrial effects. Evaluation of these indices may better inform the risk assessment to solar storm for future updates to this plan.

4.9 DAM FAILURE PROFILE

4.9.1 Nature of Hazard

There are more than 80,000 dams in the United States, according to the 2007 update to the National Inventory of Dams. Approximately one third of these pose a "high" or "significant" hazard to life and property if failure occurs.

Dam failure can occur with little warning. Intense storms may produce a flood in a few hours or even minutes for upstream locations. Flash floods occur within six hours of the beginning of heavy rainfall, and dam failure may occur within hours of the first signs of breaching.
Other failures and breeches can take much longer to occur, from days to weeks, as a result of debris jams or the accumulation of melting snow. – *copied from*
http://www.fema.gov/hazard/damfailure/index.shtm

A "dam" is an artificial barrier that has the ability to impound water, wastewater, or any liquid-borne material for the purpose of storage or control of water (different types of dams). Dams can fail for one or a combination of the following reasons:

- Overtopping caused by floods that exceed the capacity of the dam.
- Deliberate acts of sabotage.
- Structural failure of materials used in dam construction.
- Movement and/or failure of the foundation supporting the dam.
- Settlement and cracking of concrete or embankment dams.
- Piping and internal erosion of soil in embankment dams.
- Inadequate maintenance and upkeep.

-*Copied from* http://www.fema.gov/hazard/damfailure/why.shtm

4.9.2 History of Dam Failure

There is no historical record of dam failure in Santa Clara County. In the 1960s, San Jose water company lost the ability to release water in Lake Williams after an earthquake. The dam is sound, but they lost the ability to regulate the water flow. A landslide occurred in conjunction with this event.

4.9.3 Location and Extent/Probability of Occurrence and Magnitude

Appendix C of *Taming Natural Hazards* (2010) describes a minimal risk to the Bay Area for dam failure due to safety protocols by the State Division of Safety of Dams.

The reservoirs within the Santa Clara County are:

- Anderson Dam and Reservoir (SCVWD)
- Calero Dam and Reservoir (SCVWD)
- Chesbro Dam and Reservoir (SCVWD)
- Coyote Dam and Reservoir (SCVWD)
- Guadalupe Dam and Reservoir (SCVWD)
- Lexington Reservoir and Lenihan Dam (SCVWD)
- Stevens Creek Dam and Reservoir (SCVWD)
- Uvas Dam and Reservoir (SCVWD)
- Vasona Dam and Reservoir (SCVWD)
- Almaden Dam and Reservoir (SCVWD)
- Pacheco Reservoir (Pacheco Water Conservation District)
- Lake Elsman
- Lake Ranch
- Lake William
- Cherry Flat Reservoir (City of San Jose)
- Calaveras Reservoir (San Francisco PUC)

In the event of an unlikely dam failure, inundation maps have been developed to aid in evacuation planning. Mapping specific to an unlikely inundation from the Anderson Dam is available on the SCVWD website (*http://www.scvwd.com/Services/Reservoirs.aspx*). Additionally, ABAG has provided a comprehensive map of potential dam failure inundation areas throughout the county shown here as Figure 4-18.

On November 10, 2010, the county's emergency managers participated in a Sudden Failure Assessment workshop with the Santa Clara Valley Water District regarding preparedness and response actions in the event of a dam failure. The shared tools, maps, and contact lists allow for increased preparedness and better response throughout the county. Documentation of this collaboration may be found in County Attachment 9: HIRA Support.

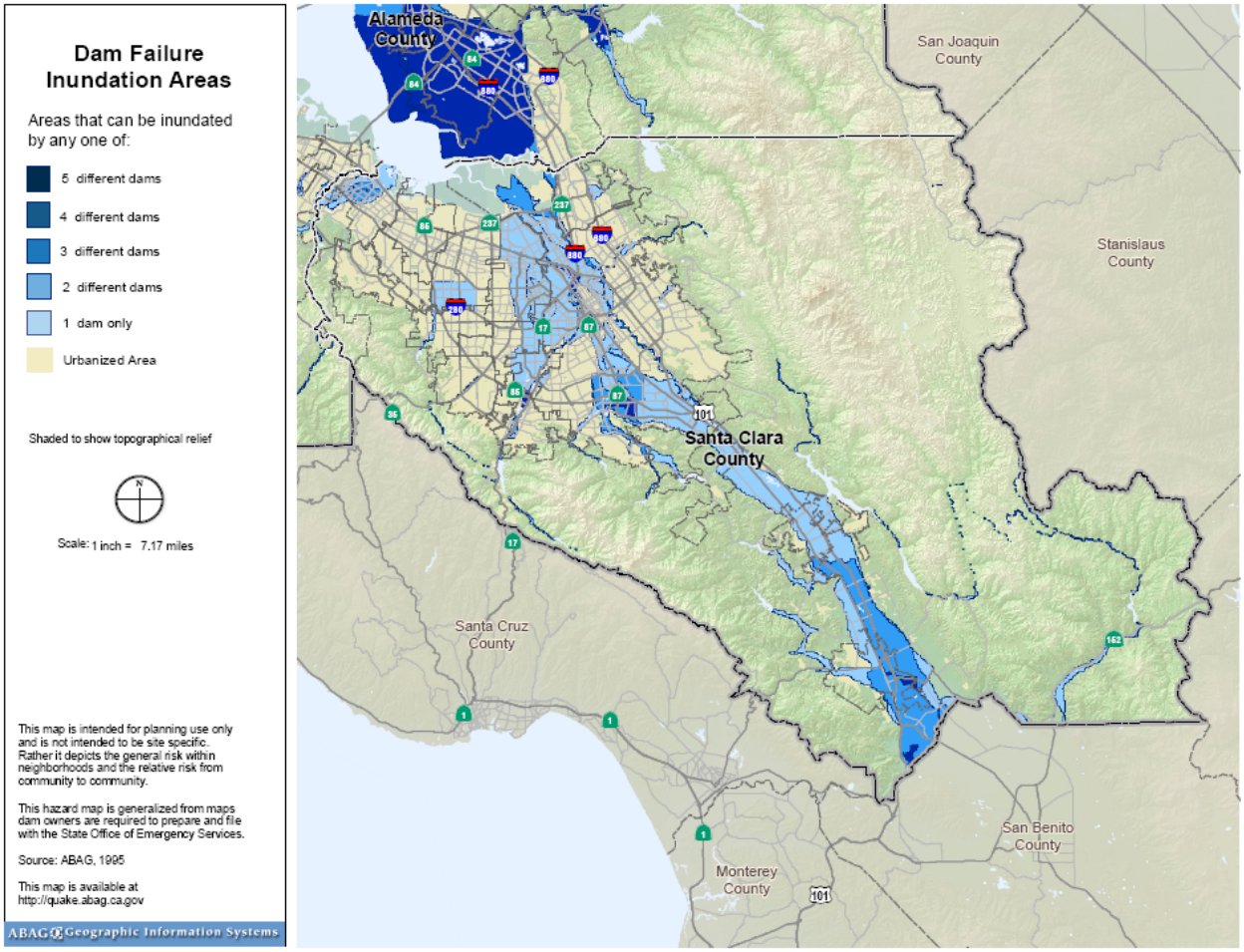


Figure 4-18: Potential Dam Failure Inundation Areas

Each of the City Annexes contains a map of Dam Failure Inundation Areas for that city if applicable.

4.10 DISEASE OUTBREAK PROFILE

4.10.1 Nature of Hazard

Disease and outbreak in the context of this report includes the incidence or occurrence of disease such that a public health state of emergency is warranted or declared. The emergency situation may be the result of various identified diseases or potentially new and unidentified threats. Known diseases could potentially include (but may not be limited to) pandemic influenza, anthrax, botulism, plague, smallpox, rubella and many others. For a complete list of Nationally Notifiable Infectious Conditions see http://www.cdc.gov/ncphi/disss/nndss/phs/infdis.htm.

The prevention of disease and outbreak historically has incorporated the many disciplines of public health. Where prevention has given way to outbreak, an emergency declaration will "kick-in" specific event support from all levels of government and potentially special trained first-responders such as a Community Emergency Response Team (CERT).

In the United States of America public health (in general) operates under a framework of inter-connected federal and state health agencies and at the local level - health departments – in which this system is designed to coordinate public health measures – as opposed to curing the individual for a specific instance of health. Public health can be defined as "the science and art of preventing disease, prolonging life and promoting health through the organized efforts and informed choices of society, organizations, public and private, communities and individuals.[17]" At the ***federal level***, the Centers for Disease Control (CDC) and Prevention is the arm of the Department of Health and Human Services (HHS) whose mission is to collaborate to create the expertise, information, and tools that people and communities need to protect their health – through health promotion, prevention of disease, injury and disability, and preparedness for new health threats.

Organizationally, the CDC includes multiple offices, research centers and strategic partnerships designed to perform its mission – to include the following: [18]

- monitor health,
- detect and investigate health problems,
- conduct research to enhance prevention,
- develop and advocate sound public health policies,
- implement prevention strategies,
- promote healthy behaviors,
- foster safe and healthful environments,
- provide leadership and training.

At the ***state level***, the California Department of Public Health (CDPH) is "dedicated to optimizing the health and well-being of the people in California." The CDPH operates under a similar set of core values and activities as the federal HHS-CDC. Notably, the CDPH includes partnering with communities to identify and solve health problems and respond to public health emergencies as one of its essential services. At the ***local level***, the Santa Clara County Public Health Department constitutes the front-line entity in the public health hierarchal system.

Santa Clara County has a very active Health Department which has prepared an extensive library of resources available in the event of a public health emergency; see http://www.sccgov.org/portal/site/phd. During a major emergency with a public health or medical component, the local public health agency will be just one of the agencies involved in the response to

[17] C.E.A. Winslow, "The Untilled Fields of Public Health," Science, n.s. 51 (1920), p. 23
[18] CDC's Mission and Vision, http://www.cdc.gov/about/organization/mission.htm

the event, and therefore will be working under the National Incident Management System (NIMS) and the Incident Command System (ICS)[19].

4.10.2 History of Disease Outbreak

There is a wide range of potential diseases that could be included in this section. This planning effort included the review of recent and readily available information.

The methodology used to report on the history of disease and outbreak includes searching the Santa Clara Health Department for current and recent alerts, news and highlights. The reasoning behind this methodology includes the notion that if the item exists in such headlines at the County, then these are likely items of importance. Secondary method includes categorizing events listed on 08/10/2010 on the CDC website titled "Recent Outbreaks and Incidents" and noting the types of outbreaks discussed in this section.

4.10.2.1 2009 Pandemic H1N1 influenza

Pandemic H1N1 is a new flu virus that has been spreading throughout the world since the Spring of 2009. The word pandemic does not tell us how mild or serious the illness may be, just that there is a worldwide outbreak of a new flu virus that spreads easily from person-to-person. Since it is a new flu virus, people have little or no immunity (protection) against it.

The pandemic H1N1 flu virus was first called the "swine flu" because laboratory testing showed that many genes in this virus were like flu viruses that normally are found in pigs. More research showed that the H1N1 virus is very different – it has two genes from flu viruses found in pigs, as well as avian (bird) and human genes.

Novel H1N1 influenza A, now known as 2009 Pandemic H1N1 influenza, was initially made reportable in April 2009. States report weekly to CDC either 1) laboratory-confirmed influenza hospitalizations and deaths or 2) pneumonia and influenza syndrome-based cases of hospitalization and death resulting from all types or subtypes of influenza. Based on this system of reporting, the Local Planning Team has assembled the following information:

[19] CERC Planning Elements - Crisis, Emergency & Risk Communication, Santa Clara County Public Health Department

Table 4-7: Historical Records of 2009 Pandemic H1N1 Influenza in Santa Clara County[20]

Provisional Number of Confirmed/Probable 2009 H1N1 Influenza Severe Cases (ICU and/or Fatal), ICU Cases and Deaths in California, by Local Health Jurisdiction, reported April 23, 2009 -July 31, 2010			
Jurisdiction	Severe Cases[a]	ICU cases[b]	Deaths[c]
CALIFORNIA	2100	2005	592
Santa Clara	91	87	21

a Includes: (1) fatal cases not admitted to the ICU, (2) fatal cases admitted to the ICU, and (3) non-fatal cases admitted to the ICU
b Includes the following individuals: (1) non-fatal ICU cases, (2) fatal ICU cases
c Not all fatal cases were admitted to the ICU

Table 4-8: US Laboratory Confirmed Influenza-Associated Hospitalizations and Deaths
August 30 2009 to April 3, 2010
Posted April 9, 2010, 11:00 AM ET
Data reported to CDC by April 6, 2010, 12:00 AM ET[21]

Cases Defined by	Hospitalizations	Deaths
Influenza Laboratory-Tests**	**41,821**	**2,117**

**States report weekly to CDC either 1) laboratory-confirmed influenza hospitalizations and deaths or 2) pneumonia and influenza syndrome-based cases of hospitalization and death resulting from all types or subtypes of influenza. Although only the laboratory confirmed cases are included in this report, CDC continues to analyze data both from laboratory confirmed and syndromic hospitalizations and deaths.

Although the reporting time periods in the two tables above differ, the relative magnitude of deaths can be understood. It could be said that roughly 20% of deaths occurred in California and roughly 10% of deaths occurred in Santa Clara County.

4.10.2.2 Whooping Cough

The California Department of Public Health has declared an epidemic of Whooping Cough (Pertussis) in California. Whooping cough is a bacterial infection that can cause severe coughing fits that make it difficult to breathe. Each year hundreds of babies are hospitalized for whooping cough and some die.

[20] H1N1 Flu - Data Tables, CA Department of Public Health (data accessed on 08/10/2010), http://www.cdph.ca.gov/data/statistics/Pages/H1N1FluDataTables.aspx
[21] 2009 H1N1 Flu U.S. Situation Update (May 28, 2010, 1:15 PM ET), Centers for Disease Control and Prevention, http://www.cdc.gov/h1n1flu/updates/us/#totalcases

4.10.2.3 Salmonella

Salmonellosis is an infection with bacteria called Salmonella. Most persons infected with Salmonella develop diarrhea, fever, and abdominal cramps 12 to 72 hours after infection. The illness usually lasts four to seven days, and most persons recover without treatment. However, in some persons the diarrhea may be so severe that the patient needs to be hospitalized. In these patients, the Salmonella infection may spread from the intestines to the blood stream, and then to other body sites and can cause death unless the person is treated promptly with antibiotics. The elderly, infants, and those with impaired immune systems are more likely to have a severe illness. Salmonella live in the intestinal tracts of humans and other animals, including birds. Salmonella are usually transmitted to humans by eating foods contaminated with animal feces. Contaminated foods usually look and smell normal. Contaminated foods are often of animal origin, such as beef, poultry, milk, or eggs, but all foods, including vegetables may become contaminated. Many raw foods of animal origin are frequently contaminated, but fortunately, thorough cooking kills Salmonella. Food may also become contaminated by the unwashed hands of an infected food handler, who forgot to wash his or her hands with soap after using the bathroom.

Salmonella may also be found in the feces of some pets, especially those with diarrhea, and people can become infected if they do not wash their hands after contact with these feces. Reptiles are particularly likely to harbor Salmonella and people should always wash their hands immediately after handling a reptile, even if the reptile is healthy. Adults should also be careful that children wash their hands after handling a reptile. There is no vaccine to prevent Salmonellosis. Since foods of animal origin may be contaminated with Salmonella, people should not eat raw or undercooked eggs, poultry, or meat. Raw eggs may be unrecognized in some foods such as homemade hollandaise sauce, Caesar and other homemade salad dressings, tiramisu, homemade ice cream, homemade mayonnaise, cookie dough, and frostings. Poultry and meat, including hamburgers, should be well-cooked, not pink in the middle. Persons also should not consume raw or unpasteurized milk or other dairy products. Produce should be thoroughly washed before consuming[22].

The following document includes fairly comprehensive findings for Salmonella (2001-2008) – see Epidemiologic Summary of Salmonellosis in California, 2001 - 2008

4.10.2.4 E. coli

Shiga toxin-producing Escherichia coli (STEC) are important enteric bacterial pathogens in the United States (US), causing an estimated 110,000 infections, 3300 hospitalizations, and 91 deaths each year. These diarrhea-causing E. coli are named for the potent cytotoxins (Shiga toxins 1 and 2) they produce. Among the many STEC serotypes, E. coli O157:H7 is the most frequently reported.

[22] Salmonellosis, California Department of Public Health – Diseases & Conditions (http://www.cdph.ca.gov/HealthInfo/discond/Pages/Salmonellosis.aspx)

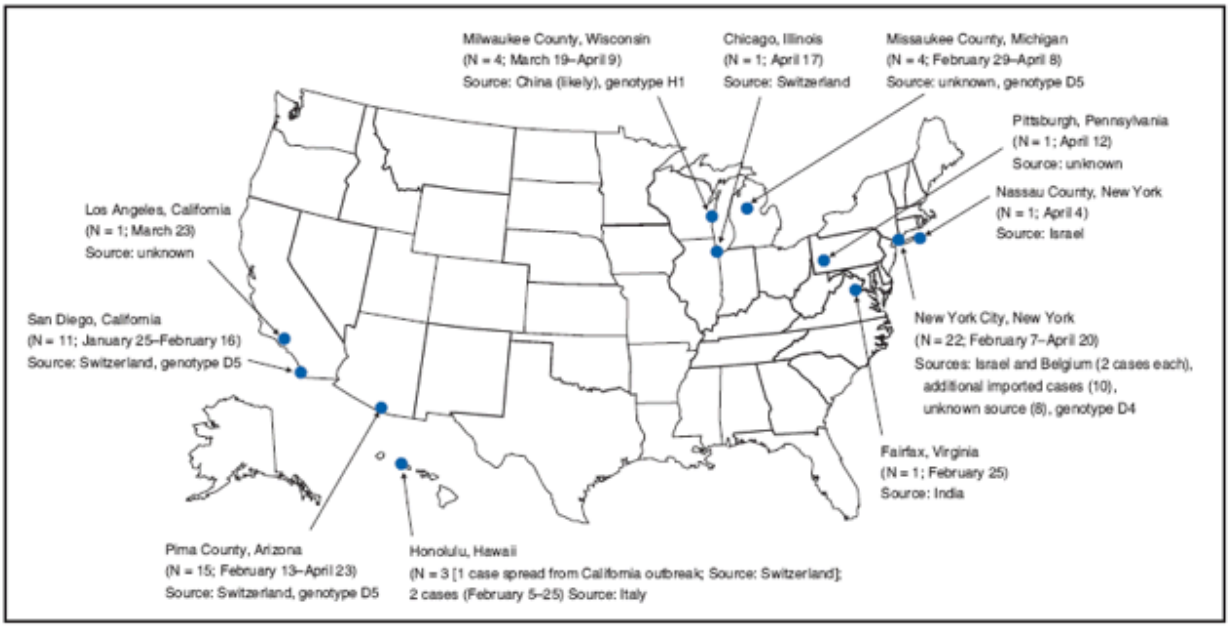
Handling or consuming food contaminated by infected animals, especially cattle, are the leading sources of STEC infections. Direct exposure to infected persons or infected animals and their environments can also result in infection.

The following document includes fairly comprehensive findings for Salmonella (2001-2008) – see http://www.cdph.ca.gov/data/statistics/Documents/stec-episummary.pdf (Epidemiologic Summary of Shiga toxin-producing Escherichia coli (STEC)-related infections and illnesses in California, 2001 - 2008)

4.10.2.5 Measles

Measles, a highly contagious acute viral disease, can result in serious complications and death. As a result of a successful U.S. vaccination program, measles elimination (i.e., interruption of endemic measles transmission) was declared in the United States in 2000. The number of reported measles cases has declined from 763,094 in 1958 to fewer than 150 cases reported per year since 1997. During 2000--2007, a total of 29--116 measles cases (mean: 62, median: 56) were reported annually. However, during January 1--April 25, 2008, a total of 64 confirmed measles cases were

FIGURE. Number of reported measles cases* (N = 64) — United States, January 1–April 25, 2008



*Number of preliminary confirmed cases reported to CDC as of April 25, 2008.

preliminarily reported to CDC, the most reported by this date for any year since 2001. Of the 64 cases, 54 were associated with importation of measles from other countries into the United States, and 63 of the 64 patients were unvaccinated or had unknown or undocumented vaccination status. This report describes the 64 cases and provides guidance for preventing measles transmission and controlling outbreaks through vaccination, infection control, and rapid public health response.

Because these cases resulted from importations and occurred almost exclusively in unvaccinated persons, the findings underscore the ongoing risk for measles among unvaccinated persons and the importance of maintaining high levels of vaccination[23].

4.10.2.6 Avian Flu

There are many different subtypes of type A influenza viruses. These subtypes differ because of changes in certain proteins on the surface of the influenza A virus (hemagglutinin [HA] and neuraminidase [NA] proteins). There are 16 known HA subtypes and 9 known NA subtypes of influenza A viruses. Many different combinations of HA and NA proteins are possible. Each combination represents a different subtype. All known subtypes of influenza A viruses can be found in birds.

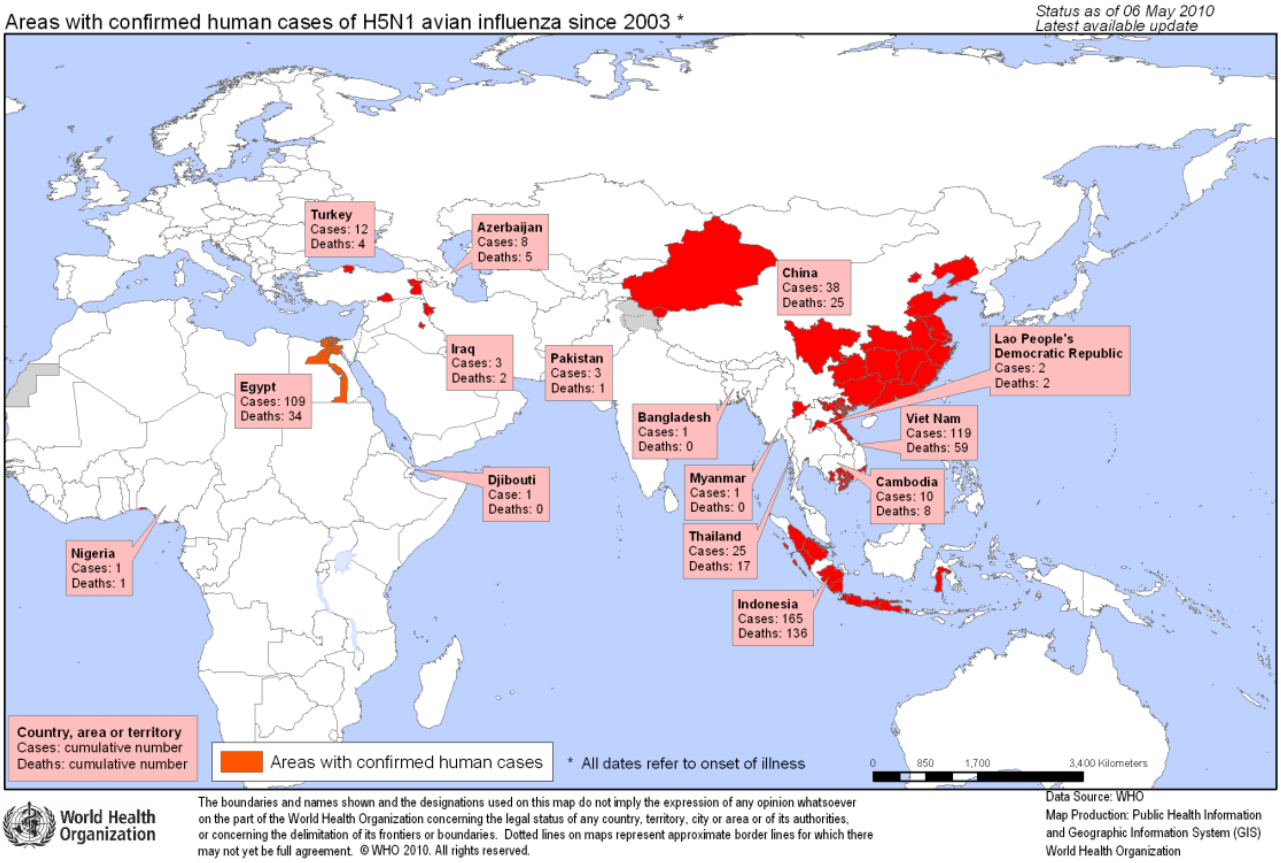
Usually, "avian influenza virus" refers to influenza A viruses found chiefly in birds, but infections with these viruses can occur in humans. The risk from avian influenza is generally low to most people, because the viruses do not usually infect humans. However, confirmed cases of human infection from several subtypes of avian influenza infection have been reported since 1997. Most cases of avian influenza infection in humans have resulted from contact with infected poultry (e.g., domesticated chicken, ducks, and turkeys) or surfaces contaminated with secretion/excretions from infected birds. The spread of avian influenza viruses from one ill person to another has been reported very rarely, and has been limited, inefficient and unsustained.

"Human influenza virus" usually refers to those subtypes that spread widely among humans. There are only three known A subtypes of influenza viruses (H1N1, H1N2, and H3N2) currently circulating among humans. It is likely that some genetic parts of current human influenza A viruses came from birds originally. Influenza A viruses are constantly changing, and they might adapt over time to infect and spread among humans.

During an outbreak of avian influenza among poultry, there is a possible risk to people who have contact with infected birds or surfaces that have been contaminated with secretions or excretions from infected birds.

Symptoms of avian influenza in humans have ranged from typical human influenza-like symptoms (e.g., fever, cough, sore throat, and muscle aches) to eye infections, pneumonia, severe respiratory diseases (such as acute respiratory distress), and other severe and life-threatening complications. The symptoms of avian influenza may depend on which virus caused the infection[24].

[23] Measles --- United States, January 1--April 25, 2008, Morbidity and Mortality Weekly Report (MMWR), May 1, 2008 / 57 (Early Release);1-4 http://www.cdc.gov/mmwr/preview/mmwrhtml/mm57e501a1.htm
[24] Key Facts About Avian Influenza (Bird Flu) and Avian Influenza A (H5N1) Virus - Human infection with avian influenza viruses, Centers for Disease Control and Prevention, last modified May 07, 2007 (http://www.cdc.gov/flu/avian/gen-info/facts.htm)



A search of the World Health Organization (WHO) Global Health Observatory Map Gallery reveals that there have been no cases of human borne H5N1 avian influenza since 2003[25]. Similarly, a search of the WAHID Interface data and mapping archives confirms no incidents in the US.

4.10.3 Location and Extent/Probability of Occurrence and Magnitude

Santa Clara County's entire geographic area is susceptible to disease outbreak.

4.11 FREEZE PROFILE

4.11.1 Nature of Hazard

The definition of extreme cold temperature varies according to the normal climate of a region. In areas unaccustomed to winter weather, near freezing temperatures are considered "extreme cold." Based on the NCDC CLIMAPS database, portions of Santa Clara County have experienced freeze as early as mid-October and as late as the end of May, with a mean freeze period for most of the County at approximately 270 days per year; days in which susceptibility to freeze exists based on the historical record. Excessive cold may accompany winter storms, be left in their wake, or can occur without storm activity. In Santa Clara County, particularly during the agricultural growing season, crops can be subject to extensive damage due to freezes. Notably, and of specific concern in

[25] http://gamapserver.who.int/mapLibrary/Files/Maps/Global_H5N1inHumanCUMULATIVE_FIMS_20100506.png

California, is the fact that freezing conditions kill trees and other vegetation that can become fuel for subsequent wildfire seasons. This issue has been especially problematic for the Bay Area's eucalyptus trees[26].

Winter weather may include heavy snows, damaging ice and extreme cold:

- A heavy snow is generally defined as having more than 8 inches of accumulation in less than 24 hours.
- Ice storms result from the accumulation of freezing rain, which is rain that becomes super-cooled and freezes upon impact with cold surfaces. Freezing rain most commonly occurs in a narrow band within a winter storm that is also producing heavy amounts of snow and sleet in other locations.

Injuries and deaths related to heavy snow usually occur as a result of vehicle accidents. Casualties also occur due to overexertion while shoveling snow. Even minimal amounts of snow fall can cause considerable risk to residents of Santa Clara County.

Ice can become a problem if the temperature at the surface is at or below freezing and a layer of the atmosphere above the surface is warm enough for precipitation to fall as rain rather than snow. The greatest threat from ice storms is to community lifelines such as utility and transportation systems. The ice coats power and communications lines, trees, highways, bridges and other surfaces. Ice-weighted wires, antennae, and structures holding them can break and collapse. Downed trees and limbs can also damage lines and block transportation routes.

Significant icing events hinder the delivery of emergency services and endanger the responders. If extreme cold conditions are combined with low/no snow cover, the ground's frost level can create problems for underground infrastructure as well. When utilities are affected and heaters do not work, water and sewer pipes can freeze and even rupture. Finally, extensive damage to forests can affect timber resources.

Extreme cold can lead to hypothermia and frostbite, which are both serious medical conditions. House fires and carbon monoxide poisoning are also possible as people use supplemental heating devices (wood, kerosene, etc. for heat, and fuel burning lanterns or candles for emergency lighting). Heavy snow can bring a community to a standstill by obstructing and slowing transportation, knocking down trees and utility lines, and causing structural collapse in buildings not designed to withstand the weight of the snow. Until the snow can be removed, airports and roadways are impacted, even closed completely, stopping the flow of supplies and disrupting emergency and medical services.

[26] ABAG 2010, Appendix C – Natural Hazard Risk Assessment, Page 56

4.11.2 History of Freeze

Based on search results of NCDC and SHELDUS archives, between 1950 and 2010 there were 26 instances recorded in which various meteorological conditions of cold weather were recorded. One event on record was declared by FEMA (894-DR-CA) due to freezing conditions of 1990.

Table 4-9: Historical Records of Freeze (Freezing/Winter Weather) in Santa Clara County

Date	Injuries / Fatalities	Type	Non-Ag Damages	Ag Damages	Source of Estimate
4/22/1961	0 / 0	FROST, WIND, LIGHTNING	$109.27	$109,239.93	SHELDUS
1/20/1962	0.86 / 0.12	WINTER STORM	$59,770.44		SHELDUS
3/2/1962	0.02 / 0.03	Wind, rain, snow, glaze, and hail	$597.73		SHELDUS
3/12/1967	0 / 0	SNOW, WIND, RAIN	$5,603.31		SHELDUS
12/12/1967	0 / 0.03	Wind, rain, snow, and cold	$56,033.08	$56,033.08	SHELDUS
1/29/1968	0 / 0	rain and snow	$8,996.64		SHELDUS
2/20/1969	0.07 / 0.57	WIND, RAIN, SNOW	$9,629,458.46	$962,945.86	SHELDUS
4/27/1970	0 / 0	FREEZE	$-	$63,648.31	SHELDUS
5/31/1972	/	Freeze and Severe Weather			
1/27/1981	0 / 0	Winter Storm	$2,462.11		SHELDUS
2/5/1989	0 / 0	RECORD COLD	$-	$222,223.41	SHELDUS
12/20/1990	0 / 0.05	Cold Wave	$142,309.62	$14,230,961.69	SHELDUS
2/5/1992	0.22 / 0.05	Winter Storm	$-		
2/9/1992	0 / 0	Winter Storm	$1,365.54		SHELDUS
2/11/1992	0 / 0	Winter Storm, Flash Flood	$17,783.76		SHELDUS
2/14/1992	0 / 0	Winter Storm, Flash Flood	$13,903.66		SHELDUS
12/6/1992	0.13 / 0	Winter Storm	$2,389.69		SHELDUS
12/10/1992	0 / 0	Winter Storm, High Wind, Flash Flood	$2,012.37		SHELDUS
12/11/1993	0 / 0	Winter Storm	$5,123.14		SHELDUS
12/4/1994	/	Winter Storm			
1/23/1994	0 / 0	HEAVY SNOW	$2,674.89		SHELDUS
2/16/1994	0 / 0	WINTER STORM	$1,851.84		SHELDUS

Date	Injuries / Fatalities	Type	Non-Ag Damages	Ag Damages	Source of Estimate
12/9/1995	15 / 1	"WINTER STORM HIGH WINDS"	$8,432,414.20	$702,701.18	SHELDUS
1/6/2007	0 / 0	"Frost/Freeze"	$-	$2,537,595.94	SHELDUS
12/17/2008	0 / 0	"Frost/Freeze"	$4,000.00		SHELDUS
NOTE:	Damages reported as SHELDUS adjusted to 2008 values				

The following paragraphs summarize the historic events. Information in this section has been obtained and compiled from County documents, committee and public input, and federal and state declared disaster information.

01/06/2007 – Freezing temperatures over the period caused approximately $14 million in damages due to crops. Artichoke damages alone were approximated at $7 million, $3 million in cut flowers and another $3 million in citrus. Lows fell to around 20 degrees several nights, at stations only 10 or 15 miles from the ocean. Record cold wave settled upon the San Francisco and Monterey Bay Areas from January 6th through January 19th. Numerous record lows were experienced and agricultural damage totaled over $1 Billion State-Wide. Counties in the San Francisco and Monterey Bay areas reported damage in excess of $20 million.

12/09/1995 – Widespread winds over 40 mph many report 60 to 80 mph. Max Wind 135 mph from PG&E in San Francisco Area before it blew away. Major Damage in the San Francisco Bay Area where $15 million was reported to the Arboretum and still under estimated damage to the magnificent trees in the Golden Gate Park which was closed for nearly three weeks. Power outages to around 1.5 million people resulted from this storm and some power was out for more than a week causing great financial damage and personnel hardship particularly in the mountainous areas. The wind strength and area coverage was labeled as the worst in the San Francisco Area since 1962-63. Two to five inches of rain fell over with a max of 11.3 inches reported at Kentfield in Marin County a good part of the area with some flash flooding but mainly small stream and local flooding occurred. Two dozen roads closed due to flooding and downed trees in Sonoma County Many reports of houses and other building damaged by falling trees and broken glass due to wind driven debris. One hundred sixty-nine schools closed in the area. Fourteen inches of rain in a 36-hour period over the Russian River Basin. From some of the paths of damage across the San Francisco area it could be determined that a wet down burst mechanism may have contributed to the wind damage.

12/04/1994 – 15 to 18 inches of new snow in the mountains above 3000 feet. 1.5 to 3.5 inches of rainfall.

No other events include a narrative – No other events include a narrative however, it is important to note that based on research, the freeze of spring 1972 is well-known to the agricultural industry. Much has been written that compares more recent events to the 1972 event.

4.11.3 Location and Extent/Probability of Occurrence and Magnitude

Santa Clara County's entire geographic area is susceptible to freezing.

4.12 WIND PROFILE

4.12.1 Nature of Hazard

Wind is associated with multiple natural hazards. In some hazards, wind is the primary cause of damage, while in others; wind plays a contributory or auxiliary role. Damaging wind is primarily associated with hurricanes, tornadoes, downbursts, severe thunderstorms and winter storms. Conditions and damages are exacerbated when strong winds occur during winter storms because ice will collect on trees and above-ground utility system appurtenances. Wind plays a contributory role in wildfire generation and propagation (e.g., Santa Ana or Sundowner Winds), and can exacerbate severe droughts. Given the wide range of hazards which may involve wind as a primary or secondary factor, the level to which analysis can be performed for wind hazard will be limited to readily available data.

Typically between late November and early March, a very strong Pacific storm can bring both substantial rainfall, which saturates and weakens soils, and strong wind gusts that can cause trees to fall on power lines. Due to the wide area involved (sometimes hundreds of miles of coast), service can be interrupted for up to several days in some more remote localities, while service is usually restored quickly in urban areas.

In the spring and fall, strong offshore winds periodically develop. These winds are an especially dangerous fire hazard in the fall when vegetation is at its driest, as exemplified historically by the 1923 Berkeley Fire and the 1991 Oakland Firestorm.[27]

Because the hills, mountains, and large bodies of water produce such vast geographic diversity within this region, the San Francisco Bay Area offers a significant variety of microclimates. The areas near the Pacific Ocean are generally characterized by relatively small temperature variations during the year, with cool foggy summers and mild rainy winters. Inland areas, especially those

[27] Copied directly from http://en.wikipedia.org/wiki/San_Francisco_Bay_Area

separated from the ocean by hills or mountains, have hotter summers and colder overnight temperatures during the winter. Few residential areas ever experience snow, but peaks over 2,000 feet (610 m), including Mount St. Helena, Mount Hamilton, Mission Peak, Mount Diablo, and Mount Tamalpais, occasionally receive snow. San Jose at the south end of the Bay averages fewer than 15 inches (380 mm) of rain annually, while Napa at the north end of the Bay averages over 30, and parts of the Santa Cruz Mountains, just a few miles west of San Jose, get over 55. In the summer, inland regions can be over 40 degrees Fahrenheit (22 degrees Celsius) warmer than the coast. This large temperature contrast induces a strong pressure gradient, which results in brisk coastal winds that help keep the coastal climate cool and typically foggy during the summer. Additionally, strong winds are produced through gaps in the coastal ranges such as the Golden Gate, the Carquinez Strait, and the Altamont Pass, the latter the site of extensive wind farms. During the fall and winter seasons, when not stormy, a high pressure area is usually present inland, leading to an offshore flow. While negatively impacting air quality, this also clears fog away from the Pacific shore, and therefore the best weather in San Francisco can usually be found from mid September through mid October.

Winter storms are typically wet and mild in temperature during this time of year, being caused by cold fronts sweeping the eastern Pacific and originating from low pressure systems in the Gulf of Alaska. During November into mid March, winter storms are usually several days in length, wet and cool, with severely damaging storms rare. Occasionally during the summer, spells of warm humid weather will drift over the Bay Area from the Southwest Monsoon or from the residue of Western Pacific hurricanes near Mexico, usually bringing high variable clouds as well, and more rarely, high-based thunderstorms[28].

The occurrence of strong wind likely exists during thunderstorm, lightning and hail and can be distinguished as separate hazards, apart from wind. This plan discusses thunder and lightning storms as a separate hazard however; it is important to note that the historical record may include an overlap of events due to the inherent presence of strong wind in multiple weather phenomena.

4.12.2 History of Wind

Based on search results of NCDC and SHELDUS archives, between 1950 and 2010 there were 31 instances of high wind recorded.

Table 4-10: Historical Records of High Wind in Santa Clara County

Date	Injuries / Fatalities	Damages	Source of Estimate	Damages in 2008 Dollars
8/21/1960	0 / 0	$1,000.00	SHELDUS	$ 7,428.32
10/9/1960	0.02 / 0.03	$86.21	SHELDUS	$ 640.40

[28] Copied directly from http://en.wikipedia.org/wiki/San_Francisco_Bay_Area

Date	Injuries / Fatalities	Damages	Source of Estimate	Damages in 2008 Dollars
10/16/1960	0 / 0	$1,136.36	SHELDUS	$ 8,441.24
3/16/1961	0 / 0	$862.09	SHELDUS	$ 6,403.88
10/7/1961	0 / 0.03	$862.07	SHELDUS	$ 6,403.73
10/28/1961	0 / 0	$113.64	SHELDUS	$ 844.15
9/16/1965	0 / 0	$16,176.47	SHELDUS	$ 112,157.46
1/15/1966	0 / 0.05	$11,477.28	SHELDUS	$ 74,600.45
2/5/1969	0 / 0	$312.50	SHELDUS	$ 1,805.52
1/3/1972	0 / 0	$500.00	SHELDUS	$ 2,599.97
12/22/1982	0.21 / 0.06	$1,041,770.84	SHELDUS	$ 2,305,210.75
12/15/1987	0 / 0.06	$5,555.56	SHELDUS	$ 10,504.98
2/17/1988	0 / 0.03	$8,620.69	SHELDUS	$ 15,728.89
12/14/1988	0 / 0	$50,000.00	SHELDUS	$ 91,227.56
1/29/1993	0 / 0	$10,000.00	SHELDUS	$ 14,857.07
11/13/1993	0 / 0	$62,500.00	SHELDUS	$ 92,856.72
1/2/1996	0 / 0	$166,666.67	SHELDUS	$ 228,069.94
6/16/1998	0 / 0	$1,000.00	SHELDUS	$ 1,316.45
11/29/1998	0 / 0	$163,636.36	SHELDUS	$ 215,418.71
11/24/2001	0 / 0	$700,000.00	SHELDUS	$ 846,514.78
10/19/2004	NA / NA		SHELDUS	$ -
12/7/2004	NA / NA		SHELDUS	$ -
1/7/2005	NA / NA		SHELDUS	$ -

Date	Injuries / Fatalities	Damages	Source of Estimate	Damages in 2008 Dollars
3/6/2006	0 / 0.25	$0.00	SHELDUS	$ -
12/27/2006	0 / 0	$170,000.00	SHELDUS	$ 182,268.49
10/12/2008	0 / 0	$50,000.00	SHELDUS	$ 50,000.00
12/15/2008	0 / 0	$3,000.00	SHELDUS	$ 3,000.00
12/25/2008	0 / 0	$13,500.00	SHELDUS	$ 13,500.00
4/14/2009	NA / NA		SHELDUS	$ -
10/13/2009	NA / NA		SHELDUS	$ -
10/27/2009	NA / NA	$1,000.00	SHELDUS	$ -
NOTE:	2008 adjusted dollars from SHELDUS…			

The following paragraphs summarize the historic events. Information in this section has been obtained and compiled from County documents, committee and public input, and federal and state declared disaster information.

1/29/1993 – Alameda, Amador, and El Dorado Counties CA02-09 Gusts as high as 60-70 mph were reported on the west slopes of the Sierra Nevada, the East Bay hills of the San Francisco Bay area, and the Santa Cruz mountains. Trees and power lines were felled with damage to structures. The city of Oakland reported eighty trees down.

10/19/2004 – A powerful winter storm produced a 73 mph wind gust at the Los Gatos RAWS site in Santa Clara County.

12/7/2004 – Los Gatos RAWS measured an 87mph wind gust at 3:30am.

1/7/2005 – A strong pacific storm brought gusty winds to the Bay Area. A wind gust reached 60 mph in Southeast San Jose, near Yerba Buena Creek.

12/25/2008 –Strong and gusty winds shattered a power pole in San Jose leaving around 900 homes without power for several hours. A strong fast moving low pressure system brought strong southerly winds and mountain snow to the San Francisco Bay area. This holiday wind event toppled trees and left many without power in San Mateo and Santa Clara counties.

4/14/2009 –Windblown trees fell onto roadways and into a home in La Honda. Alpine Road was closed for about eight hours as trees were removed while Redwood Drive was closed for almost 24 hours after a large Douglas Fir tree fell over and into a home. On Highway 84 near the intersection of Redwood Terrace a downed power line sparked a small grass fire. A mainly dry Pacific storm produced damaging wind to the San Francisco and Monterey Bay Areas. Widespread power outages, downed power lines and trees, boats broken loose from their moorings, and even a big-rig forced onto its side were casualties of this powerful system. Over 55,000 customers lost power during this storm.

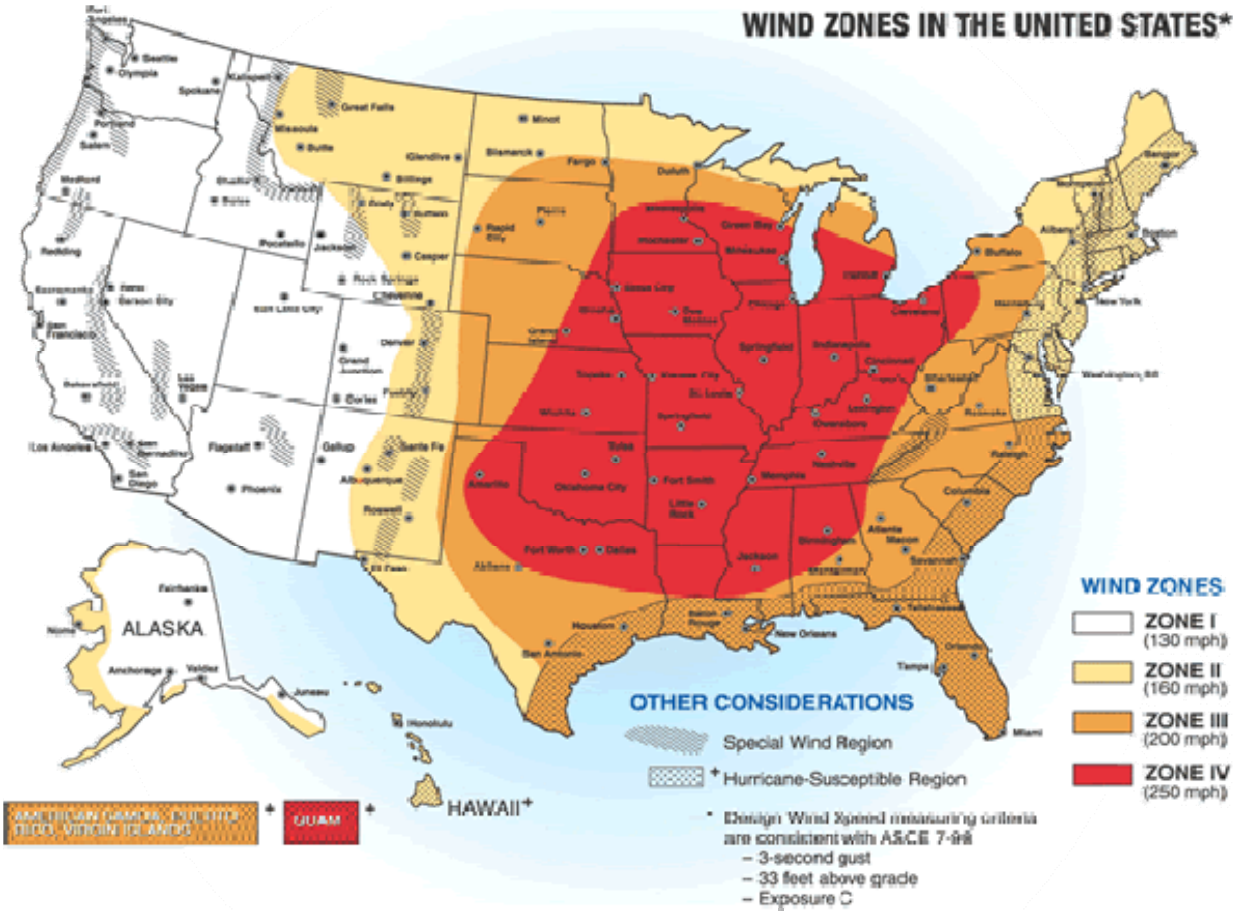
10/13/2009 –Monterey Road between Third and Fourth Streets was submerged due to flooding. Flood waters entered a restaurant on Fourth Street causing damage. Streets were flooded throughout Morgan Hill with water as high as two feet is some locations. The city actually ran out of moveable flooded signs and barriers, unable to mark all flooded locations. Here are some of the locations experiencing flooding: south end of town near the Morgan Hill Post Office on Monterey Road; Fountain Avenue; Llagas Creek Road, Monterey Road north of Morgan Hill, near Cochrane Road; Old Monterey Road from Monterey to Llagas Roads; Butterfield Boulevard at several locations, including at San Pedro and Diana Avenues; Watsonville Road at Monterey Road; Monterey Road at Burnett Avenue; Tennant Avenue; and Wright Avenue from Del Monte to Hale Avenues. Also, a sewage pipe connecting Morgan Hill to the Gilroy sewage treatment plant backed up causing 40,000 gallons of raw sewage to spill into the Ludewig Ranch causing the cancellation of the Harvest Festival in San Martin, an event to raise funds and food for the homeless. A strong low pressure system made its way through Northern and Central California accompanied by deep tropical moisture and very strong winds. Heavy rain combined with the wind to cause numerous trees, tree limbs and pole/telephone powers to fall. Pacific Gas and Electric reported over 277,000 customers had lost

power in the San Francisco and Monterey Bay Areas with a cost of over thirteen million dollars in damages. The record breaking heavy rain also led to flooding and debris flows.

10/27/2009 –At about 11:20 a.m. PDT a 75-ffot eucalyptus tree fell onto a townhouse complex in East San Jose along the 2900 block of Rose Avenue causing substantial damage. A weather disturbance acted upon a lingering warm and moist air mass from a storm which passed through the area a week earlier. Thunderstorms developed over San Francisco and Marin Counties causing minor flooding.

4.12.3 Location and Extent/Probability of Occurrence and Magnitude

According to publication ASCE 7-98 *Standard - Minimum Design Loads For Buildings And Other Structures, 1998*, California is in Zone I of IV developed by ASCE to depict design wind speed measuring criteria. Zone I indicates a design wind speed of 130 mph. At the opposite end of the scale, Zone IV indicates a design wind speed of 250 mph. There are no special wind regions in Santa Clara County.



Santa Clara County's entire geographic area is equally susceptible to high wind events.

4.13 HEAT PROFILE

4.13.1 Nature of Hazard

A heat wave is defined as prolonged periods of excessive heat, often combined with excessive humidity. Extreme heat is defined as temperatures that hover ten degrees or more above the average high temperature for the region and last for several weeks. A heat wave combined with a drought is a very dangerous situation.

The main concern in periods of extreme heat is the potential public health impact, such as heat exhaustion or heat stroke. Individuals of particular concern include those living in residences without air-conditioning, or in areas where electric service is unavailable due to system-wide blackouts. Elderly residents or persons subject to heart disease may be severely affected by the elevated temperature conditions.

Heat kills by pushing the human body beyond its limits. In extreme heat and high humidity, evaporation is slowed and the body must work extra hard to maintain a normal temperature.

Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children, and those who are sick or overweight are more likely to succumb to extreme heat.

Conditions that can induce heat-related illnesses include stagnant atmospheric conditions and poor air quality. Consequently, people living in urban areas may be at greater risk from the effects of a prolonged heat wave than those living in rural areas. Also, asphalt and concrete store heat longer and gradually release heat at night, which can produce higher nighttime temperatures known as the "urban heat island effect."[29]

4.13.2 History of Heat

Based on search results of NCDC and SHELDUS archives, between 1950 and 2010 there were 6 instances of extreme heat recorded.

Table 4-11: Historical Records of Extreme Heat in Santa Clara County

Date	Injuries / Fatalities	Temp	Damages	Source of Estimate	Comments
6/13/1961	0 / 0		$14,705.88	SHELDUS	Damages Adjusted to 2008; $ 109,239.93
7/3/1973	0 / 0		None Reported	SHELDUS	

[29] FEMA>Disasters & Maps>Disasters>Extreme Heat (http://www.fema.gov/hazard/heat/index.shtm)

Date	Injuries / Fatalities	Temp	Damages	Source of Estimate	Comments
8/13/1992	1 / 0		None Reported	SHELDUS	
6/14/2000	11 / 1	108 F	None Reported	SHELDUS	
7/20/2006	0 / 1	100 F +	None Reported	SHELDUS	
5/17/2009	0 / 0	100 F -	$10,000.00	SHELDUS	

The following paragraphs summarize the historic events. Information in this section has been obtained and compiled from County documents, committee and public input, and federal and state declared disaster information.

6/14/2000 – This unusual early summer record breaking heat wave was responsible for 10 deaths in the Bay Area and a large number of heat related injuries. Temperature record of 103 degrees in San Francisco tied the all time record high temperature. Other record highs for the day were Livermore had 107 degrees, Oakland 106 degrees, Santa Rosa 108 degrees High temperature caused over loading of power resources and rolling blackouts were implemented to keep the power system from exceeding capacity so many people lost power for a period during the heat.

7/20/2006– Very hot weather settled upon the Santa Clara Valley - yielding an extended period of high temperatures over 100 degrees and lows in the 70s. Some areas in the Southern Santa Clara Valley reached 115 degrees during the day and fell only to around 80 at night. One death was reported in San Jose.

5/17/2009–An overloaded electric transformer failed in Oakland causing more than 5,000 customers to lose power for about three hours. High pressure aloft centered over Reno, NV along with weak offshore flow at the surface caused temperatures to rise to near 100 degrees in the inland valleys of north-central California. Heat exhausted individuals, blown electric transformers and power outages accompanied the heat.

The following table presents average and record temperatures for Santa Clara County.

Table 4-12: Average and Record Temperatures for Santa Clara County

Month	Avg. High	Avg. Low	Avg. Precip	Rec. High	Rec. Low
January	59.0 °F	42.0 °F	3.03 in	79.0 °F(01/08/1962)	24.0 °F (01/11/1949)
February	63.0 °F	45.0 °F	2.84 in	81.0 °F(02/26/1986)	26.0 °F (02/07/1989)
March	67.0 °F	46.0 °F	2.69 in	87.0 °F(03/11/2005)	30.0 °F (03/03/1966)
April	72.0 °F	48.0 °F	1.02 in	95.0 °F(04/30/1996)	35.0 °F (04/20/1967)
May	77.0 °F	52.0 °F	0.44 in	101.0 °F(05/31/2001)	37.0 °F (05/04/1952)
June	82.0 °F	55.0 °F	0.10 in	109.0 °F(06/14/2000)	42.0 °F (06/02/1966)
July	84.0 °F	58.0 °F	0.06 in	108.0 °F(07/14/1972)	47.0 °F (07/06/1955)

Month	Avg. High	Avg. Low	Avg. Precip	Rec. High	Rec. Low
August	84.0 °F	58.0 °F	0.07 in	105.0 °F(08/01/1993)	47.0 °F (08/22/1973)
September	82.0 °F	57.0 °F	0.23 in	104.0 °F(09/14/1971)	42.0 °F (09/30/1950)
October	76.0 °F	52.0 °F	0.87 in	101.0 °F(10/05/1987)	36.0 °F (10/30/1971)
November	65.0 °F	46.0 °F	1.73 in	85.0 °F(11/02/1967)	21.0 °F (11/16/1976)
December	59.0 °F	41.0 °F	2.00 in	79.0 °F(12/12/1958)	19.0 °F (12/23/1990)

4.13.3 Location and Extent/Probability of Occurrence and Magnitude

Santa Clara County tends to remain cooler than the Central Valley. As shown on the following map, the southern portion of the county has potential for greater impact to extreme heat as it is further from the cooling effects of the San Francisco Bay. Figure 4-19 below shows average extreme high temperatures for July as an example of summer temperature extremes. (Source: NCDC, http://cdo.ncdc.noaa.gov/cgi-bin/climaps/climaps.pl?directive=quick_results&subrnum=&pop=YES)

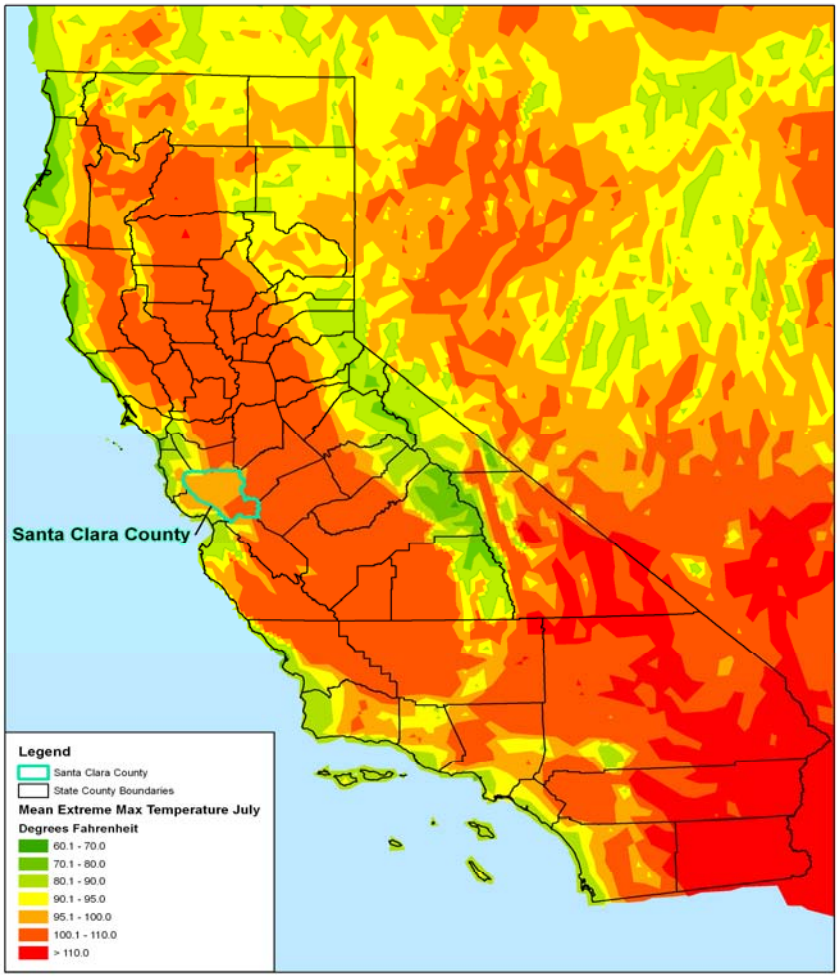


Figure 4-19: Mean Extreme Maximum Temperatures for July

4.13.4 Climate Change Consideration

Average temperatures in the Southwest, including California have increased approximately 1.5°F as compared to a 1960 to 1979 baseline average.[30] Temperatures are projected to rise 4°F to 10°F above this baseline average by the end of the century. In addition to average temperatures rising, periods of excessive heat are expected to become a more common occurrence. The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report indicates that it is very likely that hot extremes and heat waves will become more frequent as the Earth warms. Extreme weather events, including heat waves and droughts, have already become more frequent and intense during the past 40 to 50 years. Increased frequency and severity of heat waves and droughts could lead to an increased occurrence of wildfire as the three hazards are closely related.
In addition to the obvious dangers associated with periods of intense heat, rising temperatures might also lead to a decline in air quality. Increased heat and sunlight can act to produce higher levels of ground-level ozone, resulting in unhealthy air quality, particularly in urban areas.

4.14 AGRICULTURAL PEST PROFILE

4.14.1 Nature of Hazard

Agriculture is a significant component to Santa Clara County's economy and livelihood. It is constantly susceptible to drought, freeze, pests, and other natural phenomena. This profile focuses on the risk to agriculture from pests. The Local Planning Team recognizes that pests may be of risk to other assets in addition to agricultural crops. Some pests have the potential to devastate the natural environment, ecosystems, and infrastructure (i.e. quagga mussels and zebra mussels clogging water conveyance systems). The Local Planning Team may have resources to expand this profile to consider invasive species and expanded risk of pests in future plan updates.

A pest is an organism which is detrimental to humans or to the natural environment. This is often because it causes damage to agriculture through feeding on crops or affecting livestock, such as Mediterranean fruit fly on fruits and vegetables, or Foot and Mouth disease on cattle. An organism can also be a pest when it causes damage to a wild ecosystem or carries disease to human habitats. Examples of these include those organisms which vector human disease, such as rats and fleas that carry the plague disease, mosquitoes that vector malaria, and ticks that carry Lyme disease.

The term "pest" typically means all harmful organisms including weeds, plant pathogenic fungi and viruses. Pesticides are chemicals and other agents (e.g. beneficial micro-organisms) that are used to control or protect other organisms from pests. The related term vermin has much overlap with pest, but generally only includes those creatures that are seen to be vectors of diseases.

[30] Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson, (eds.), Cambridge University Press, 2009. Global Climate Change Impacts in the United States.

It is possible for an animal to be a pest in one setting but beneficial or domesticated in another. For example, European rabbits introduced to Australia caused ecological damage beyond the scale they inflicted in their natural habitat. Many weeds (plant pests) are also seen as useful under certain conditions. For instance, Patterson's curse is often valued as food for honeybees and as a wildflower, even though it can poison livestock.

Important pests include insects, mites, nematodesgastropods (snail and slugs), weeds and plant diseases caused by viruses, bacteria and fungi.

Agricultural Quarantine Programs exist to protect the environment and agricultural food systems. Such programs restrict the introduction of new plants because they may carry injurious insect pests and plant diseases. These programs are considered a "First Line of Defense" in preventing the introduction of invasive species. Much of the quarantine operations of these programs occur behind the scenes where inspections occur on everything from single-celled organisms used for research to exotic animals in zoo's; from flowers, fruits, and vegetables in the market to animal feed at the farm; from the clams and oysters in restaurants to birds and fishes in the pet shop. Regulatory inspections are intended to make sure certain economically significant industries and their resources are not harmed.

California's unique environment is vulnerable to damage by invasive species. Many exotic organisms arrive in California by "hitchhiking" on imported goods. The Division of Agriculture has an important role in protecting California from the introduction and establishment of these non-native species.

Shipments entering California that contain plants and plant products are placed under quarantine and cannot be moved or sold once they arrive at their destination until the local county agricultural office inspects and releases them. Plants, cut flowers, seeds, and fruits that arrive in Santa Clara County via UPS, Fed Ex, Air Freight, and Postal facilities are also inspected. This inspection program helps maintain the quality of the urban and rural environment by limiting the introduction of damaging pests.

Pest exclusion efforts are particularly important in Santa Clara County. Due to high levels of domestic and international trade and travel, urban areas such as Santa Clara County are often "gateways" where invasive pest species first enter California. As such, pest detection and pest eradication are critical components of California's pest exclusion efforts.

Pest detection efforts include the deployment of traps to capture early introductions of invasive pest species. Should detection efforts indicate that an invasive species is present, pest eradication efforts are undertaken to eradicate the pest before it can become permanently established and spread to other areas.

Santa Clara County continues to maintain commercial agricultural production valued at over $260,000,000 per year. Major crops include nursery stock, fruits, vegetables and livestock.

4.14.2 History of Agricultural Pests

Several of the disasters in the Bay Area in the last few decades are related to insect infestations, particularly as they relate to agricultural production. For example, Contra Costa and San Mateo counties were declared disasters in the 1981 Mediterranean fruit fly infestation, and Santa Clara County was a declared disaster in the 1989 Mediterranean fruit fly infestation.

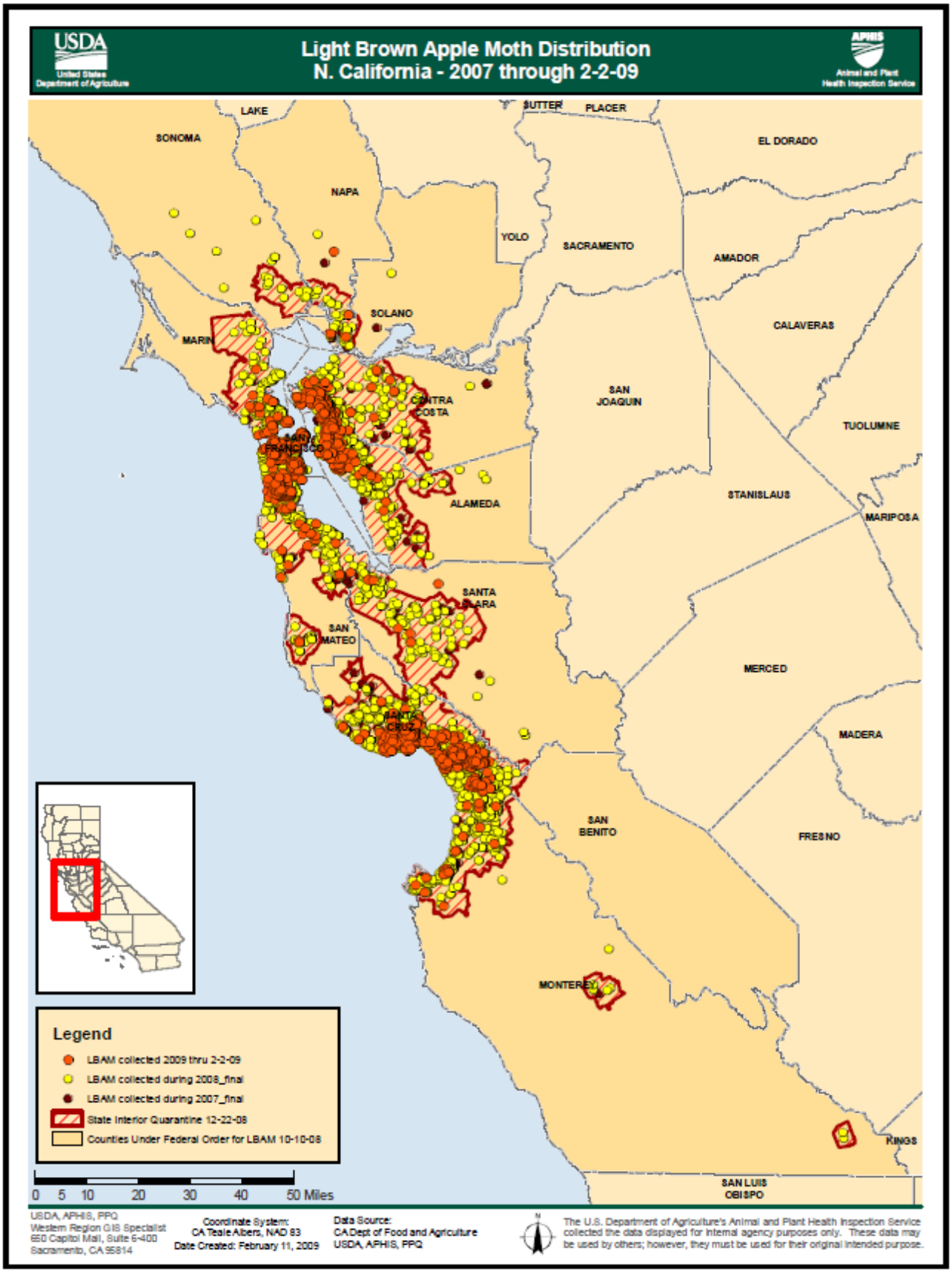
When there is an agricultural emergency, it remains necessary to comply with CEQA. In addition, the State may issue special regulations for local governments. The California Department of Food and Agriculture (CDFA) and the United States Department of Agriculture (USDA) coordinate their emergency response with the Agricultural Commissioner and county health departments. Three strategies are applicable: ENVI c-1, ENVI c-2, and ENVI c-3.

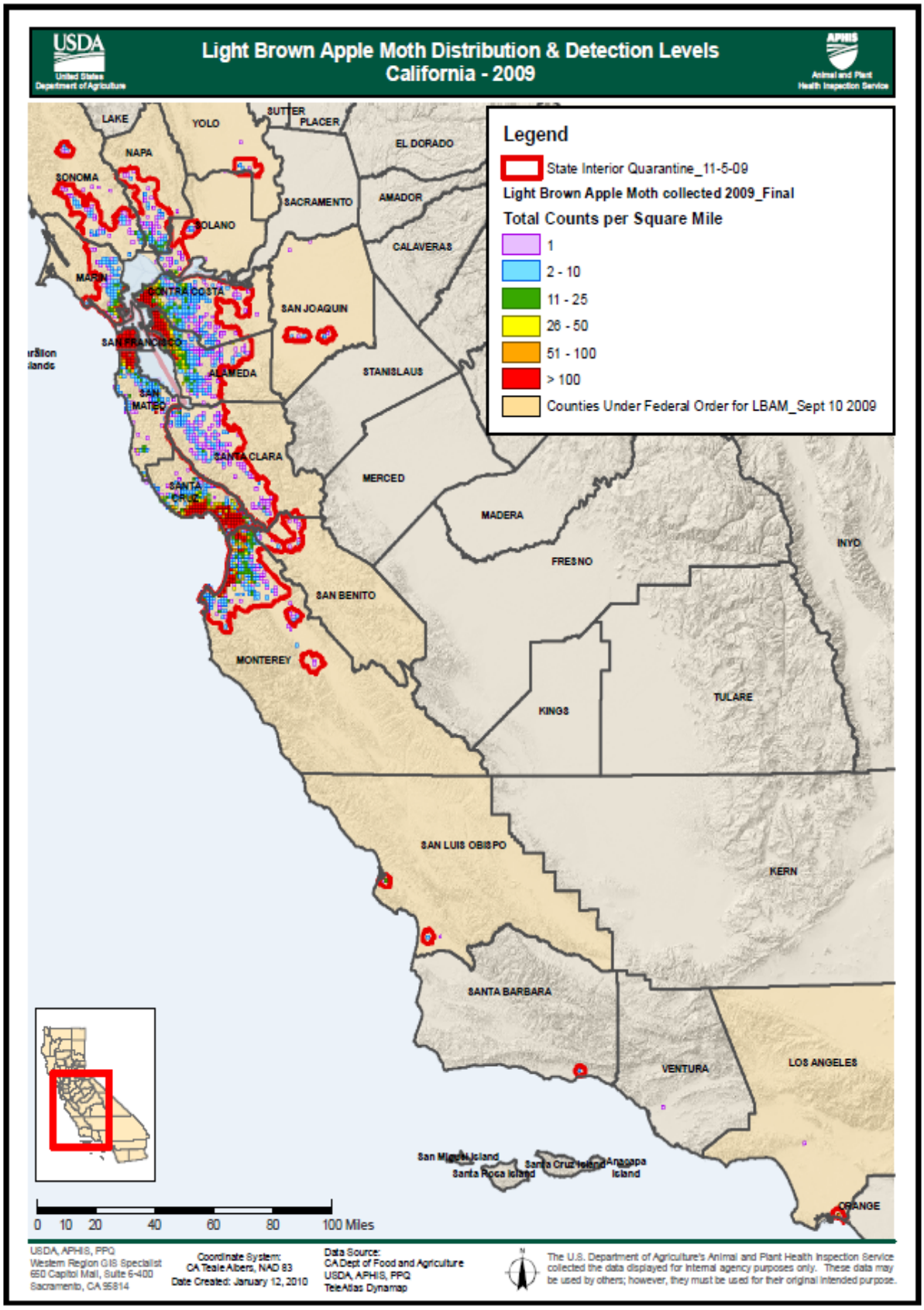
4.14.3 Location and Extent/Probability of Occurrence and Magnitude

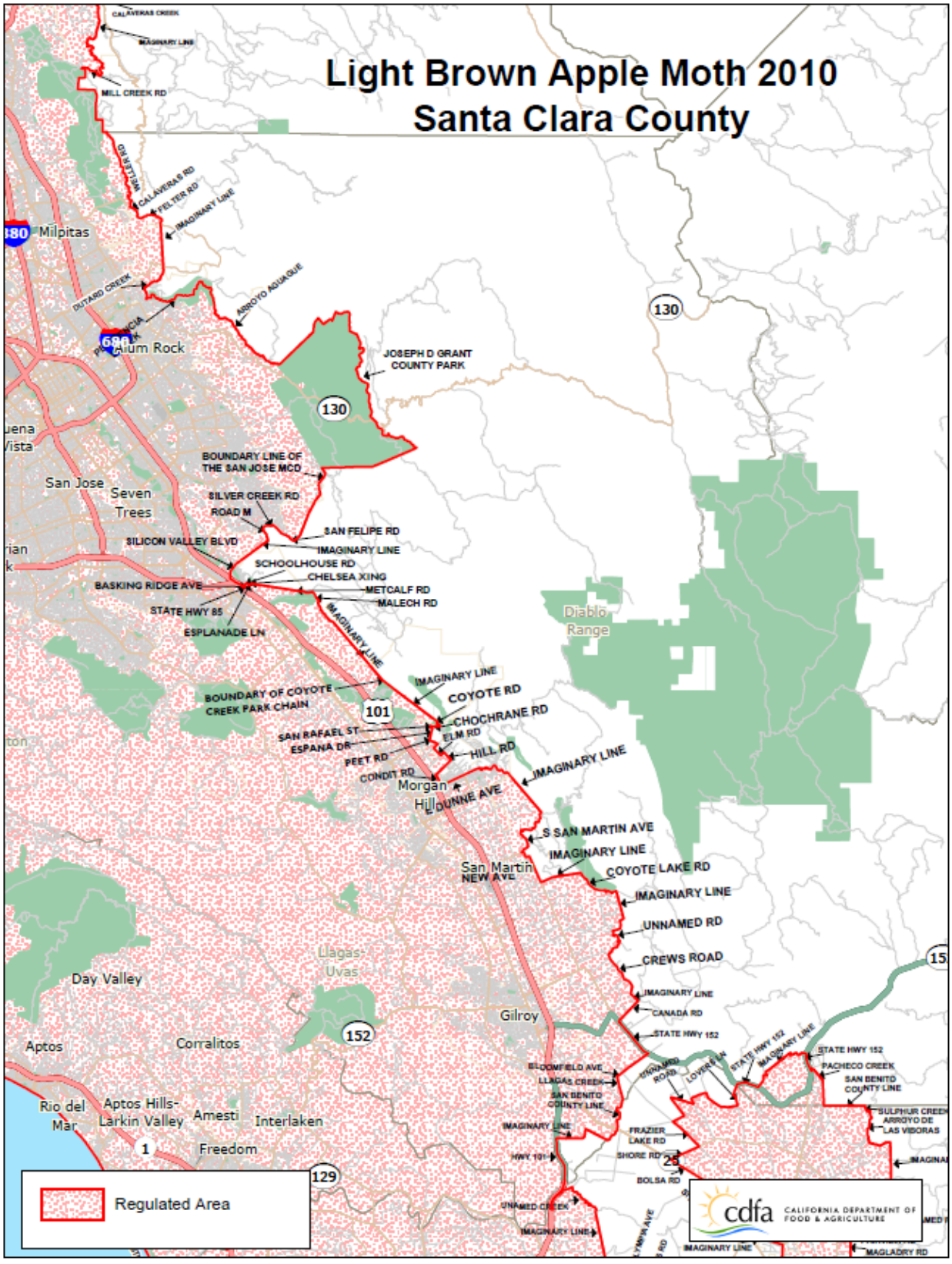
The location of all invasive or pestilent species are not easily mapped due to a lack of data, however some pre-made mapping of species detection and current quarantine program mapping is available from the California Department of Food and Agriculture; see http://www.cdfa.ca.gov/phpps/PE/InteriorExclusion/quarantine.html.

Also, the Santa Clara County Division of Agriculture maintains a GIS data layer relating to agricultural production sites.

The following mapping represents mapping available of species detection and existing quarantines subject to the borders of or within Santa Clara County as of 08/12/2010. It is noted that other quarantines such as Sudden Oak Death (Phytopthora ramorum) apply.


USDA
United States Department of Agriculture
Light Brown Apple Moth Distribution
N. California - 2007 through 2-2-09
APHIS
Animal and Plant Health Inspection Service
LAKE
SONOMA
NAPA
SUTTER
PLACER
EL DORADO
YOLO
SACRAMENTO
AMADOR
SOLANO
MARIN
CALAVERAS
SAN JOAQUIN
CONTRA COSTA
SAN FRANCISCO
TUOLUMNE
ALAMEDA
STANISLAUS
MARIPOSA
SANTA CLARA
SAN MATEO
MERCED
SANTA CRUZ
MADERA
SAN BENITO
FRESNO
MONTEREY
KINGS
SAN LUIS OBISPO
Legend
LBAM collected 2009 thru 2-2-09
LBAM collected during 2008_final
LBAM collected during 2007_final
State Interior Quarantine 12-22-08
Counties Under Federal Order for LBAM 10-10-08
0 5 10 20 30 40 50 Miles
USDA, APHIS, PPQ
Western Region GIS Specialist
650 Capitol Mall, Suite 6-400
Sacramento, CA 95814
Coordinate System:
CA Teale Albers, NAD 83
Date Created: February 11, 2009
Data Source:
CA Dept of Food and Agriculture
USDA, APHIS, PPQ
N
The U.S. Department of Agriculture's Animal and Plant Health Inspection Service collected the data displayed for internal agency purposes only. These data may be used by others; however, they must be used for their original intended purpose.


USDA
United States Department of Agriculture
Light Brown Apple Moth Distribution & Detection Levels
California - 2009
APHIS
Animal and Plant Health Inspection Service
Legend
State Interior Quarantine_11-5-09
Light Brown Apple Moth collected 2009_Final
Total Counts per Square Mile
1
2 - 10
11 - 25
26 - 50
51 - 100
> 100
Counties Under Federal Order for LBAM_Sept 10 2009
LAKE
YOLO
SUTTER
PLACER
EL DORADO
NAPA
SONOMA
SACRAMENTO
AMADOR
SOLANO
CALAVERAS
MARIN
CONTRA COSTA
SAN JOAQUIN
SAN FRANCISCO
ALAMEDA
STANISLAUS
SAN MATEO
SANTA CLARA
MERCED
SANTA CRUZ
MADERA
FRESNO
INYO
SAN BENITO
MONTEREY
KINGS
TULARE
SAN LUIS OBISPO
KERN
SANTA BARBARA
VENTURA
LOS ANGELES
San Miguel Island
Santa Rosa Island
Santa Cruz Island
Anacapa Island
ORANGE
0 10 20 40 60 80 100 Miles
USDA, APHIS, PPQ
Western Region GIS Specialist
650 Capitol Mall, Suite 6-400
Sacramento, CA 95814
Coordinate System:
CA Teale Albers, NAD 83
Date Created: January 12, 2010
Data Source:
CA Dept of Food and Agriculture
USDA, APHIS, PPQ
TeleAtlas Dynamap
The U.S. Department of Agriculture's Animal and Plant Health Inspection Service collected the data displayed for internal agency purposes only. These data may be used by others; however, they must be used for their original intended purpose.


Light Brown Apple Moth 2010
Santa Clara County
Milpitas
Alum Rock
San Jose
Seven Trees
Diablo Range
Morgan Hill
San Martin
Gilroy
Day Valley
Llagas-Uvas
Aptos
Corralitos
Rio del Mar
Aptos Hills-Larkin Valley
Amesti
Interlaken
Freedom
JOSEPH D GRANT COUNTY PARK
BOUNDARY LINE OF THE SAN JOSE MCD
SILVER CREEK RD
ROAD M
SAN FELIPE RD
IMAGINARY LINE
SILICON VALLEY BLVD
SCHOOLHOUSE RD
CHELSEA XING
METCALF RD
MALECH RD
BASKING RIDGE AVE
STATE HWY 85
ESPLANADE LN
BOUNDARY OF COYOTE CREEK PARK CHAIN
COYOTE RD
CHOCHRANE RD
ELM RD
HILL RD
SAN RAFAEL ST
ESPANA DR
PEET RD
CONDIT RD
DUNNE AVE
S SAN MARTIN AVE
NEW AVE
COYOTE LAKE RD
UNNAMED RD
CREWS ROAD
CANADA RD
STATE HWY 152
PACHECO CREEK
SAN BENITO COUNTY LINE
BLOOMFIELD AVE
LLAGAS CREEK
FRAZIER LAKE RD
SHORE RD
BOLSA RD
HWY 101
MAGLADRY RD
Regulated Area
cdfa CALIFORNIA DEPARTMENT OF FOOD & AGRICULTURE

Additional Resources:

Pests of Agriculture, Floriculture, and Turf at University of CA, Statewide Integrated Pest Management Program*:* http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html
CA Department of Agriculture – Pest Detection & Emergency Projects Branch (PD/EP) – http://www.cdfa.ca.gov/phpps/PDEP/

The primary responsibilities of the Pest Detection/Emergency Projects Branch (PD/EP) are the early detection and prompt eradication of serious agricultural pests from California. This is accomplished through the operation of a statewide detection trapping program, special detection surveys, and the maintenance of emergency projects response teams. The Branch administers the statewide detection trapping program through trapping contracts with 46 county departments of agriculture. State personnel conduct trapping in Orange, San Francisco, Santa Barbara, Ventura, Riverside, Santa Clara, Marin, Mendocino, Yolo, and Yuba Counties. Functionally, Branch activities may be divided into the following four components: Managerial, Operations Center, Pest Detection, and Emergency Projects.

The primary objectives of the statewide pest detection system are to find insect pests before they infest one square mile and plant diseases before they exceed one-half of a square mile. Insects targeted for detection by the statewide network of traps include exotic fruit flies (particularly species of Bactrocera, Dacus, Ceratitis, and Anastrepha), Japanese beetle, light brown apple moth, khapra beetle, gypsy moth, European corn borer, and European pine shoot moth[31].

4.15 THUNDER AND LIGHTNING STORM PROFILE

4.15.1 Nature of Hazard

All thunderstorms are dangerous. Every thunderstorm produces lightning. In the United States, an average of 300 people are injured and 80 people are killed each year by lightning. Although most lightning victims survive, people struck by lightning often report a variety of long-term, debilitating symptoms. Other associated dangers of thunderstorms include tornadoes, strong winds, hail, and flash flooding. Flash flooding is responsible for more fatalities, more than 140 annually, than any other thunderstorm-associated hazard.

Dry thunderstorms, which do not produce rain that reaches the ground, are most prevalent in the western United States. Falling raindrops evaporate, but lightning can still reach the ground and can start wildfires.

[31] CA Department of Agriculture – Pest Detection/Emergency Projects Branch (PD/EP), About PDEP, http://www.cdfa.ca.gov/phpps/PDEP/

Characteristics of Thunder and Lightning storms include:

Thunder

- They may occur singly, in clusters, or in lines.
- Some of the most severe occur when a single thunderstorm affects one location for an extended time.
- Thunderstorms typically produce heavy rain for a brief period, anywhere from 3 0 minutes to an hour.
- Warm, humid conditions are highly favorable for thunderstorm development.
- About 10 percent of thunderstorms are classified as severe—one that produces hail at least three-quarters of an inch in diameter, has winds of 58 miles per hour or higher, or produces a tornado.

Lightning

- Lightning's unpredictability increases the risk to individuals and property.
- Lightning often strikes outside of heavy rain and may occur as far as 10 miles away from any rainfall.
- "Heat lightning" is actually lightning from a thunderstorm too far away for thunder to be heard. However, the storm may be moving in your direction!
- Most lightning deaths and injuries occur when people are caught outdoors in the summer months during the afternoon and evening.
- Your chances of being struck by lightning are estimated to be 1 in 600,000, but could be reduced even further by following safety precautions.
- Lightning strike victims carry no electrical charge and should be attended to immediately.[32]

Buildings must be designed to withstand both external and internal wind pressures on the structural framing and exterior elements. The level to which these structures are designed, as expected, directly correlates with its ability to resist damages due to high winds. The community's building code dictates to what design wind speed a structure must be designed to.

The type of building construction will have a significant impact on potential damages from high wind events. A summary of basic building types, listed in order of decreasing vulnerability (from most to least vulnerable), is provided below.

Manufactured: This building type includes manufactured buildings that are produced in large numbers of identical or smaller units. These structures typically include light metal structures or mobile homes.

[32] FEMA>Disasters & Maps>Types of Disasters>Thunderstorm, http://www.fema.gov/hazard/thunderstorm/index.shtm#2

Non–Engineered Wood: Wood buildings that have not been specifically engineered during design. These structures may include single and multi-family residences, some one or two story apartment units, and small commercial buildings.

Non-Engineered Masonry: Masonry buildings that have not been specifically engineered during design. These structures may include single and multi-family residences, some one or two story apartment units, and some small commercial buildings.

Lightly Engineered: Structures of this type may combine masonry, light steel framing, open-web steel joists, wood framing, and wood rafters. Some portions of these buildings have been engineered attention while others have not. Examples of these structures include motels, commercial, and light industrial buildings.

Fully Engineered: These buildings typically have been designed for a specific location and have been fully engineered during design. Examples include high-rise office buildings, hotels, hospitals, and most public buildings.

Other building related factors include height, shape, and the integrity of the building envelope. Taller buildings and those with complex shapes and complicated roofs are subject to higher wind pressures than those with simple configurations. The building envelope is composed of exterior building components and cladding elements including doors and windows, exterior siding, roof coverings, and roof sheathing. Any failure or breach of the building envelope can lead to increased pressures on the interior of the structure, further damage to contents and framing, and possible collapse.

4.15.2 History of Thunderstorms

Table 4-13: Historical Records of Strong Storm-Thunder and Lightning in Santa Clara County

Date	Injuries / Fatalities	Damages	Source of Estimate	Adjusted to 2008 Dollars
2/1/1960	0.03 / 0.09	$1,470.59	SHELDUS	$10,924.01
2/7/1960	0.06 / 0.06	$10,427.09	SHELDUS	$77,455.72
9/9/1960	0 / 0	$14.71	SHELDUS	$109.27
4/22/1961	0 / 0	$14,720.59	SHELDUS	$109,349.20
8/11/1961	0 / 0	$948.28	SHELDUS	$7,044.13
2/7/1962	0.26 / 0.35	$86,206.90	SHELDUS	$597,704.36
3/2/1962	0.02 / 0.03	$86.21	SHELDUS	$597.73
9/12/1963	0 / 0	$125.00	SHELDUS	$866.67
10/11/1963	0 / 0	$29.42	SHELDUS	$203.98
7/16/1965	0 / 0	$86.21	SHELDUS	$597.73

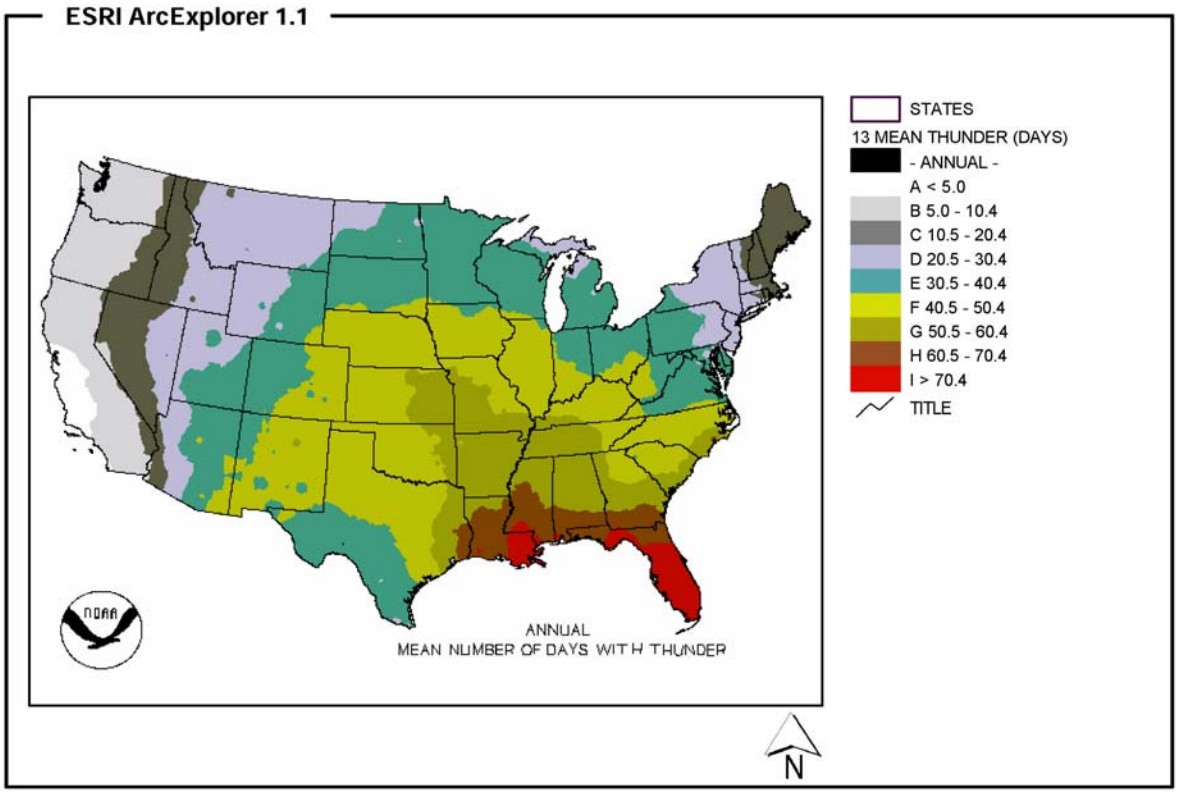
Date	Injuries / Fatalities	Damages	Source of Estimate	Adjusted to 2008 Dollars
8/10/1965	0.03 / 0	$9,482.76	SHELDUS	$65,747.49
8/16/1965	0 / 0	$172.42	SHELDUS	$1,195.46
11/14/1965	0 / 0.02	$8,620.69	SHELDUS	$59,770.44
11/23/1965	0 / 0.18	$1,315.79	SHELDUS	$9,122.86
12/28/1965	0 / 0	$862.07	SHELDUS	$5,977.05
1/20/1967	0.07 / 0.02	$8,706.90	SHELDUS	$56,593.43
3/12/1967	0 / 0	$862.07	SHELDUS	$5,603.31
12/12/1967	0 / 0.03	$17,241.38	SHELDUS	$112,066.16
1/29/1968	0 / 0	$1,470.59	SHELDUS	$8,996.64
1/18/1969	0.17 / 0.78	$870,689.66	SHELDUS	$5,030,561.94
2/20/1969	0.07 / 0.57	$1,833,333.34	SHELDUS	$10,592,404.32
1/8/1970	0 / 0	$10,416.70	SHELDUS	$57,018.45
1/16/1973	0 / 0	$86,206.90	SHELDUS	$426,935.92
1/9/1980	0 / 0	$2,083.34	SHELDUS	$5,416.62
1/3/1982	154 / 5.1	$7,143,571.00	SHELDUS	$15,807,158.35
1/25/1983	0.27 / 0.15	$388,461.53	SHELDUS	$841,663.85
2/26/1983	0.08 / 0	$10,520.84	SHELDUS	$22,795.08
3/1/1995	0 / 0	$11,241,379.31	SHELDUS	$15,798,661.09
5/13/1995	0 / 0	$5,000.00	SHELDUS	$7,027.01
2/7/1998	0 / 0	0	SHELDUS	$-
NOTE:	2008 adjusted dollars from SHELDUS…			

5/13/1995 – In Morgan Hill, CA, a barn, horse stall, and two eight inch diameter trees were blown down by winds related to thunderstorm. Eyewitness described as a tornado where “clouds reached to the ground". No indication of circulation was apparent. Winds estimated 50 to 60 KTS.

2/7/1998 – 3/4 inch hail reported by County OES from law enforcement personnel.

4.15.3 Location and Extent/Probability of Occurrence and Magnitude

According to the NCDC CLIMAPS data, Santa Clara County experiences thunder (and lightning) on average less than five (5) days annually.



Additional Resources:

At this time, the only lightning data contained within Storm Data are lightning events that result in fatality, injury and/or property and crop damage. These events are reported to the NWS for inclusion into the Storm Events Database. If information on lightning strikes that do not result in this criteria is needed, it can be obtained from Vaisala here: http://thunderstorm.vaisala.com/

Vaisala owns and operates the National Lightning Detection Network (NLDN) that provides accurate lightning data information across the USA. Vaisala's STRIKEnet provides lightning verification reports for a specific location and time from the world's most comprehensive lightning database, Vaisala's National Lightning Detection Network (NLDN) and Environment Canada's Canadian Lightning Detection Network (CLDN).

STRIKEnet reports sell for $95; additional days are available for $25/day. A standard report includes:

- Cover letter summary
- Street-detail map showing the area of study
- Street-detail lightning location map
- Confidence ellipse map for lightning strikes
- Data tables

4.16 SILTATION – BAY AREA PROFILE

4.16.1 Nature of Hazard

Siltation may be described as the effect created as suspended matter from the water column settles to the stream bottom. It is a man-made problem that started during the Gold Rush. According to experts on the bay ecosystem, between 1850 and 1914, about 2.4 billion cubic yards of sediment from hydraulic mining and hillside stream erosion flowed into the estuarine system encompassing San Francisco Bay and the Sacramento- San Joaquin River Delta. Between 1914 and 1965, an additional 450 million cubic yards of sediment from mining in the Sierra reached the bay. Dams and other projects have, over the years, decreased the flushing action of water flowing into the bay[33].

San Francisco Bay is the largest estuary on the west coast of the North and South American continents. When the California Gold Rush began in 1849, the open waters and bordering wetlands of the Bay covered 787 square miles, and this magnificent natural harbor teemed with wildlife. But the Bay was shallow; two-thirds of it less than 12 feet deep. The unfortunate result was that as the new State of California began to grow, the Bay began to shrink. Shallow tidal areas were diked off from the open Bay to create salt ponds, farmland, and duck hunting clubs. Municipalities used the Bay for garbage dumps. Siltation from hydraulic gold mining in the Sierra foothills washed into the Bay and filled wetlands. Numerous land reclamation operations were undertaken to create dry real estate where Bay waters once flowed.

By the middle of the 20th century, the Bay's open waters had been reduced to 548 square miles and nearly a third of the Bay, 239 square miles, was gone. In 1959, the US Army Corps of Engineers published a report which concluded that it was economically feasible to reclaim another 325 square miles, 60 percent of the remaining Bay, by 2020. The Bay Area public rejected the notion that the Bay should be allowed to become little more than a wide river. Working together, in 1965, Bay Area citizens convinced the California Legislature to establish a new state agency, the San Francisco Bay Conservation and Development Commission (BCDC), and to empower the agency to regulate new development in the Bay and along its shoreline so that any future fill placed in the Bay would be largely limited to water-oriented uses that could not be accommodated on existing land.

BCDC has been highly effective in achieving this public policy goal. By limiting the use and size of new landfills and requiring mitigation in the form of wetland creation, BCDC has reversed the shrinkage of the Bay; it is now nearly 19 square miles larger than it was in 1965. With BCDC's support, 26,000 acres of privately-owned salt ponds have been purchased by the public to improve their habitat value and convert some of the ponds to intertidal wetlands, resulting in a further expansion of the Bay[34].

[33] Bay Area's marinas are buried in silt / Dredging slowed by costs, tighter rules, SFGate.com, - Peter Fimrite, Chronicle Staff Writer, Thursday, July 5, 2001 - http://www.fohg.org/pdf/MudHarbors.pdf
[34] A Sea Level Rise Strategy for the San Francisco Bay Region - Revised September 2008, San Francisco Bay Conservation and Development Commission

4.16.2 History of Siltation

Alviso

The community of Alviso in Santa Clara County has dropped 13 feet over the last 100 years due to siltation caused by development in an area susceptible to flooding. The hard paving prevented water absorption in the ground while the increased groundwater pumping caused subsidence. Salt ponds, development, and the resulting siltation have filled in the shoreline and blocked many waterways drastically impacting Alviso. To aid flood control, the course of the Guadalupe River has been straightened and channelized. (http://www.hmdb.org/marker.asp?marker=24414)

The region is currently working towards restoring the wetlands in the South Bay. More information on these efforts can be found at:
http://baynature.org/articles/oct-dec-2004/south-bay-challenge/a-tall-order

Palo Alto

What was formerly the Palo Alto Yacht Harbor is now a silted-in mud flat and reed filled marsh. More information about Palo Alto's shoreline with the bay can be found at:
http://baytrail.abag.ca.gov/vtour/map3/access/Btpalto/Btpalto.htm

4.16.3 Location and Extent/Probability of Occurrence and Magnitude

The northern portion of Santa Clara County (Palo Alto and Alviso communities) with San Francisco Bay waterfront areas are challenged with siltation. The San Francisco Bay Conservation and Development Commission (BCDC) has prepared illustrative maps showing that a one-meter rise in the level of the Bay could flood over 200 square miles of land and development around the Bay. Using financial support from Caltrans and the California Energy Commission, the Pacific Institute is working in partnership with BCDC to determine the value of the development threatened with inundation. Initial estimates indicate that over $100 billion worth of public and private development could be at risk[35].

[35] A Sea Level Rise Strategy for the San Francisco Bay Region - Revised September 2008, San Francisco Bay Conservation and Development Commission

4.17 TORNADO PROFILE

4.17.1 Nature of Hazard

Tornadoes are nature's most violent storms. Spawned from powerful thunderstorms, tornadoes can cause fatalities and devastate a neighborhood in seconds. A tornado appears as a rotating, funnel-shaped cloud that extends from a thunderstorm to the ground with whirling winds that can reach 300 miles per hour. Damage paths can be in excess of one mile wide and 50 miles long. Every state is at some risk from this hazard.

Some tornadoes are clearly visible, while rain or nearby low-hanging clouds obscure others. For example, according to the NCDC storm description of an event that occurred on May 13, 1995, eyewitness described what they thought was a tornado where "clouds reached to the ground". However, no indication of circulation was apparent in the estimated 50 to 60 knot winds that blew down a barn, horse stall, and two eight inch diameter trees in Morgan Hill. While this event was ultimately not a tornado because it lacked rotational characteristics, the point holds true that tornadoes can develop so rapidly that little, if any, advance warning is possible.

Before a tornado hits, the wind may die down and the air may become very still. A cloud of debris can mark the location of a tornado even if a funnel is not visible. Tornadoes generally occur near the trailing edge of a thunderstorm. It is not uncommon to see clear, sunlit skies behind a tornado.

The following are facts about tornadoes:

- They may strike quickly, with little or no warning.
- They may appear nearly transparent until dust and debris are picked up or a cloud forms in the funnel.
- The average tornado moves Southwest to Northeast, but tornadoes have been known to move in any direction.
- The average forward speed of a tornado is 30 MPH, but may vary from stationary to 70 MPH.
- Tornadoes can accompany tropical storms and hurricanes as they move onto land.
- Waterspouts are tornadoes that form over water.
- Tornadoes are most frequently reported east of the Rocky Mountains during spring and summer months.
- Peak tornado season in the southern states is March through May; in the northern states, it is late spring through early summer.
- Tornadoes are most likely to occur between 3 p.m. and 9 p.m., but can occur at any time.

4.17.2 History of Tornados

Based on search results of NCDC and SHELDUS archives, between 1950 and 2010 there were 6 instances of tornados recorded.

Table 4-14: Historical Records of Tornado in Santa Clara County

Date	Magnitude	Injuries / Fatalities	Damages	Source of Estimate	Adjusted to 2008
1/11/1951	F2	0 / 0	$2,500,000.00	NCDC	N/A
12/8/1997	F0	0 / 0	$ 20,000.00	SHELDUS	$26,666.67
2/6/1998	F0	0 / 0	$ 100,000.00	SHELDUS	$131,644.77
5/5/1998	F2	1 / 0	$ 3,800,000.00	SHELDUS	$5,002,501.25
5/5/1998	F1	1 / 0	$ 300,000.00	SHELDUS	$394,934.31
4/14/2007	F0	0 / 0	$ 1,000.00	SHELDUS	$1,040.00
NOTE:		2008 adjusted dollars from SHELDUS…			

12/8/1997– weak tornado damaged some trailers in a trailer park. Minor damage to a few trailers.

2/6/1998– Very weak tornado touched down at Lockheed Martine plant in sunny vale with some minor damage.

5/5/1998– Funnel cloud passed over El Camino Real in Mountain View CA A Tornado touched down in the Chevy Chase residential area of Sunnyvale, CA near Hwy 85. The storm survey assessed

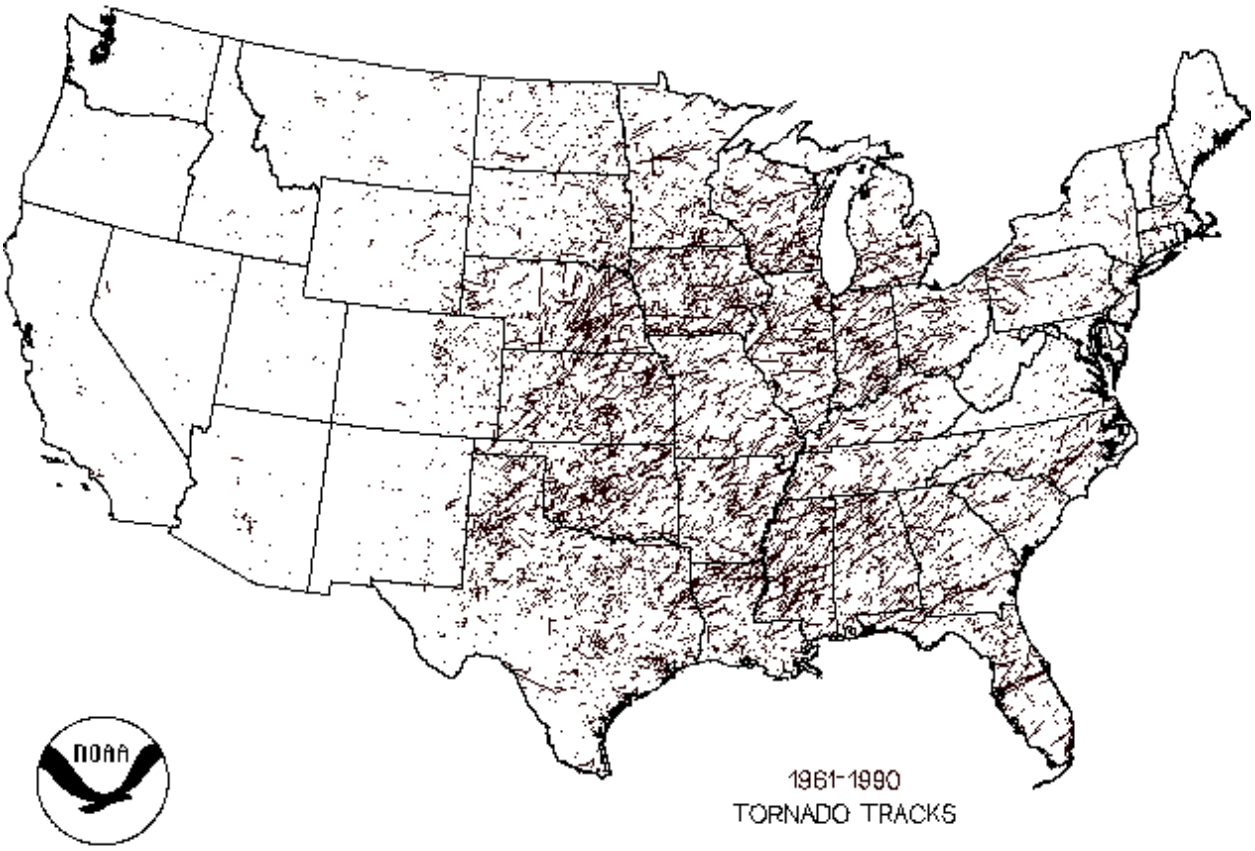
the Damage to 15 homes and a large church as a minimal F2. One woman was injured when struck by flying debris. The storm was well documented on a video shot by a person from their backyard. The storm appears to be rotating anti-cyclonically from this video. This storm apparently developed from thunderstorms that developed in the lee of the Santa Cruz Mountains over the Santa Clara Valley.

5/5/1998– A tornado briefly touched down in Los Altos CA on Alicia Way and continued to the Los Altos High School. A woman Tennis Coach at the high school was picked up and hurled around 20 feet and sustained injuries. A Tornado touched down in the Chevy Chase residential area of Sunnyvale, CA near Hwy 85. The storm survey assessed the damage to 15 homes and a large church as a minimal F2. One woman was injured when struck by flying debris. The storm was well documented on a video shot by a person from their backyard. The storm appears to be rotating anti-cyclonically from this video. This storm apparently developed from thunderstorms that developed in the lee of the Santa Cruz Mountains over the Santa Clara Valley.

4/14/2007– A small tornado spun up near Gavilan College in Santa Clara County - about 2 miles southwest of Gilroy. The tornado touched down briefly and damaged an awning on a temporary trailer and tore apart a large tree - including several two-foot wide limbs ripped off at the trunk. A small EF0 tornado touched down near Gilroy in Santa Clara County - specifically near the intersection of Santa Theresa and Mesa Roads, right next to Gavilan College.

4.17.3 Location and Extent/Probability of Occurrence and Magnitude

The entire geographic area of Santa Clara County is equally susceptible to the occurrence of tornados. The map below, while only covering the 29-year period 1961 to 1990, shows the historical and observed incidences of tornadoes across the lower 48 states. Notably, while tornadoes can and do occur west of the Rocky Mountain range, it is plain to see that the frequency is much less.



4.18 HAZARDOUS MATERIALS PROFILE

4.18.1 Nature of Hazard

Hazardous materials can and are often sub-divided into household and non-household categories. As efforts at all levels of government to clean-up and/or prevent contamination of the environment from chemical or hazardous materials release have progressed, a key concern becomes the cumulative effect of household use chemicals and hazardous materials being dumped or poured onto the ground or into our nations waterways from old, unwanted or unused chemicals in the home. Subsequently, various local environmental/disposal programs have developed offering disposal options for household waste.

Nearly every household uses products containing hazardous materials or chemicals. Although the risk of a chemical accident is slight, knowing how to handle these products and how to react during an emergency can reduce the risk of injury. There are many hazardous materials throughout the home and it becomes each individual's responsibility to current and future generations to check the

label and take the necessary steps to ensure that the product is being used, stored, and disposed of according to manufacturer's directions and/or according to regulations.

Just because chemicals are found everywhere does not necessarily mean that they are a contaminant. Many chemicals are used to our societal and public health benefit. For example, they purify drinking water, increase crop production, and simplify household chores. However, chemicals also can be hazardous to humans or the environment if used or released improperly. Hazards can occur during production, storage, transportation, use, or disposal. Communities can be at risk if a chemical is used unsafely or released in harmful amounts into the environment.

Hazardous materials in various forms can cause death, serious injury, long-lasting health effects, and damage to buildings, homes, and other property. Many products containing hazardous chemicals are used and stored in homes routinely. These products are also shipped daily on the nation's highways, railroads, waterways, and pipelines. Chemical manufacturers are one source of hazardous materials, but there are many others, including service stations, hospitals, and hazardous materials waste sites. Varying quantities of hazardous materials are manufactured, used, or stored at an estimated 4.5 million facilities in the United States, from major industrial plants to local dry cleaning establishments or gardening supply stores.

Hazardous materials come in the form of explosives, flammable and combustible substances, poisons, and radioactive materials. These substances are most often released as a result of transportation accidents or because of chemical accidents in plants[36].

In addition to chemical or hazardous materials release, the threat of biological toxins release is a growing concern in our modern world. Such threats are likely to be the result of political or social unrest and less due as the result of a natural hazard. FEMA has defined such threats in a manner that actually includes biological, chemical/hazardous chemical release along with other items to include the following:

- Explosions
- Biological Threats (identified by the hazard ranking)
- Chemical Threats (identified by the hazard ranking)
- Nuclear Blast
- Radiological Dispersion Device (RDD)

4.18.2 History of Hazardous Materials Incidents

Based on search results of the RIMS database maintained by the California Emergency Management Agency (Cal-EMA) archives[37], there were 250 records returned – see County Attachment 10: Spill

[36] FEMA>Disasters & Maps>Types of Disasters , http://www.fema.gov/hazard/hazmat/index.shtm
[37] RIMS Spill Drill Reports, (http://www.oes.ca.gov/Operational/MALHaz.NSF/WebDrill?OpenView) – Search for "Santa Clara" on 07/26/2010.

Report. Although 250 records may appear to indicate that 250 instances of Hazardous Materials-Chemical Release occurred, there were 78 records that are classified as an update to a previous entry. A review of records indicate that some original entries plus the update exist as distinct and separate entries, however; other update entries do not appear to have a corresponding "original" entry. In addition, not all records indicate an actual spill that may have resulted in regulatory containment and/or clean-up. In some cases, the update denotes that while a notification indicated the possibility of a hazardous materials spill, upon inspection by the appropriate authority (e.g., County Health Department) the original notification was deemed invalid or not an actual hazardous materials spill.

Each RIMS record offers the on-line user the ability to access the individual "SPILL Report" or "Cal EMA-Update"; see County Attachment 10: Spill Report. The Local Planning Team notes that each individual report includes the event location, sometimes including street address and a nearby cross street; however, the data is not in a format that is readily able to be mapped without considerable effort. Regarding the type of effort potentially required, the data would have to change from the web-based format to a spreadsheet or database format. Additionally, street intersections or physical street address, at minimum, would need to be separated into distinguishable columns. Street intersections or physical street address could potentially be used to geo-locate points for mapping purposes. However, it is important to note that street intersections or physical street address alone may not accurately reflect the location of the record or in some cases, street address is not available. The following includes actual information extracted from records in Santa Clara County:

- ***2045 Lafeyette Street***
- ***On Felter Road, 1/2 mile east of Kahler Court, closest city is Milpitas***
- ***On Eastbound 152, east of El Toro Ranch, Landmark - "Big Cut"***
- ***1/2 mile west of the intersection of Hicks Rd and Almeden Rd***

Cal-EMA was contacted to discover if the RIMS database records have already been mapped as Geographic Information Systems (GIS) data and for access to the same. Cal-EMA noted that they do not have GIS data available and suggested that such data may exist at the local level.

Regarding the historical record of biological agent or toxin release (or) the potential thereof - the protocols defined in the earlier section Disease and Outbreak, the Center for Disease Control (CDC) works within the national framework of the Department of Homeland Security to coordinate national emergency preparedness. This National Response Framework (NRF) is a guide to how the Nation conducts all-hazards response. It is built upon scalable, flexible, and adaptable coordinating structures to align key roles and responsibilities across the nation, linking all levels of government, nongovernmental organizations, and the private sector. It is intended to capture specific authorities and best practices for managing incidents that range from the serious but purely local, to large-scale terrorist attacks or catastrophic natural disasters[38]. Due to the sensitive nature of all terroristic-type attacks, there are minimal resources by which to obtain data on the historical incidence of such events.

[38] National Response Framework, Department of Homeland Security - January 2008, Page i; Online resource (http://www.fema.gov/pdf/emergency/nrf/nrf-core.pdf)

4.18.3 Location and Extent/Probability of Occurrence and Magnitude

Hazardous material spills are of greatest concern along railroad tracks and major highways.
Landslide and Debris Flow

4.19 LANDSLIDE AND DEBRIS FLOW

4.19.1 Nature of Hazard

Landslides occur in all US states and territories. In a landslide, masses of rock, earth, or debris move down a slope. Landslides may be small or large, slow or rapid. They are activated by:

- storms
- earthquakes (covered specifically and separately in the earthquake profile)
- volcanic eruptions
- fires
- alternate freezing or thawing
- and steepening of slopes by erosion or human modification

Debris and mud flows are rivers of rock, earth, and other debris saturated with water. They develop when water rapidly accumulates in the ground, during heavy rainfall or rapid snowmelt, changing the earth into a flowing river of mud or "slurry." They can flow rapidly, striking with little or no warning at avalanche speeds. They also can travel several miles from their source, growing in size as they pick up trees, boulders, cars, and other materials.

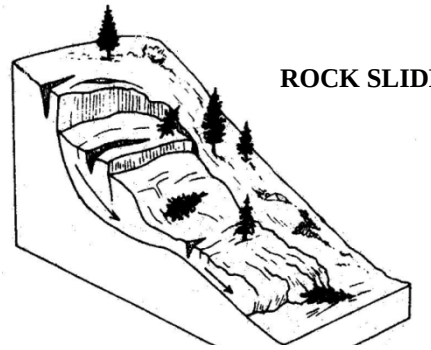
Landslide problems can be caused by land mismanagement, particularly in mountain, canyon, and coastal regions. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides. Land use zoning, professional inspections, and proper design can minimize many landslide, mudflow, and debris flow problems[39].

In the State of California, the California Geological Survey (CGS) has produced numerous maps that show landslide features and delineate potential slope-stability problem areas since the 1960's. The CGS classifies landslides with a two-part designation based on Varnes (1978) and Cruden and Varnes (1996). The designation captures both the type of material that failed and the type of movement that the failed material exhibited. In short, the CGS has classified and mapped the occurrence of landslide to great detail, detail greater than can be reproduced in this identification without degrading the integrity of the scientific distinctions provided in other works. However, noting the volume of research on the subject by the CGS we respectfully borrow limited detail here.

[39] FEMA>Disasters & Maps>Types of Disasters>Landslide (http://www.fema.gov/hazard/landslide/index.shtm)

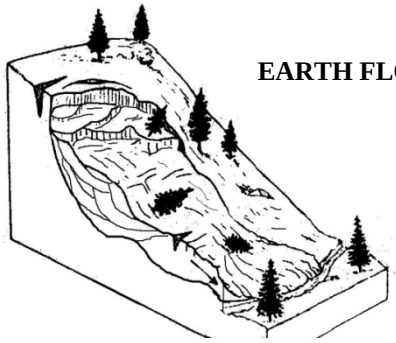
Landslide movements are interpreted from the geomorphic expression of the landslide deposit and source area, and are categorized as falls, topples, spreads, slides, or flows. Falls are masses of soil or rock that dislodge from steep slopes and free-fall, bounce, or roll downslope. Topples move by the forward pivoting of a mass around an axis below the displaced mass. Lateral spreads, commonly induced by liquefaction of material in an earthquake, move by horizontal extension and shear or tensile fractures. Slides displace masses of material along one or more discrete planes. In rotational sliding the slide plane is curved and the mass rotates backwards around an axis parallel to the slope; in translational sliding the failure surface is more or less planar and the mass moves parallel to the ground surface. Flows mobilize as a deforming, viscous mass without a discrete failure plane. More than one form of movement may occur during a failure, in which case the movement is classified as complex if movements occur sequentially and composite if they do not.

In addition to the text above the following diagrams also help define the myriad yet show the most common types of landslide common in California; for a detailed description of the images below refer to California Geologic Survey - Types of Landslides:



ROCK SLIDE

Diagram by J. Appleby, R. Kilbourne, and T. Spittler after Varnes, 1978



EARTH FLOW

Diagram by J. Appleby, R. Kilbourne, and C. Wills after Varnes, 1978

DEBRIS SLIDE

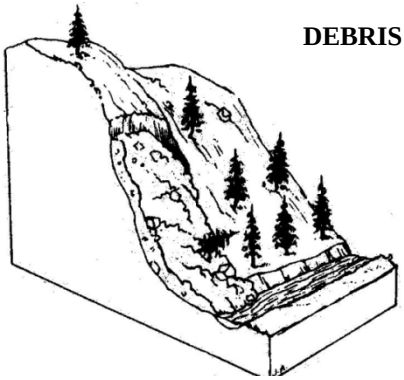


Diagram by J. Appleby, R. Kilbourne, and C. Wills after Varnes, 1978

DEBRIS FLOW

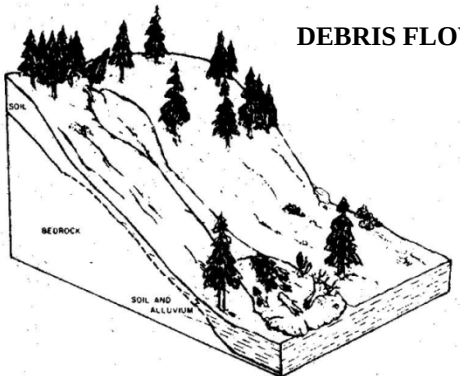


Diagram by J. Appleby and R. Kilbourne, CGS

ROCK FALL

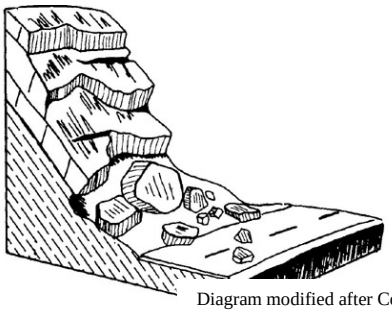


Diagram modified after Colorado Geological Survey

4.19.2 History of Landslide and Debris Flow

The landslide or debris flows on record in Santa Clara are the result of precipitous events that saturate the ground. Based on the search results of NCDC and SHELDUS archives, between 1950 and 2010 there is one (1) event having three (3) separate entries recorded in which Landslide & Debris Flow is specifically mentioned in the event narrative. However, damages from the last entry appear to be caused by wind and have not been included. The two (2) entries are included in the table below.

Table 4-15: Historical Records of Landslide & Debris Flow in Santa Clara County

Date	Injuries / Fatalities	Damages	Source of Estimate	Comments
10/13/2009	0 / 0	$150,000.00	NCDC	Property damage
10/13/2009	0 / 0	$250,000.00	NCDC	Property damage

10/13/2009 (1 of 3 entries) – Morgan Hill - Monterey Road between Third and Fourth Streets was submerged due to flooding. Flood waters entered a restaurant on Fourth Street causing damage. Streets were flooded throughout Morgan Hill with water as high as two feet is some locations. The city actually ran out of moveable flooded signs and barriers, unable to mark all flooded locations. Here are some of the locations experiencing flooding: south end of town near the Morgan Hill Post Office on Monterey Road; Fountain Avenue; Llagas Creek Road, Monterey Road north of Morgan

Hill, near Cochrane Road; Old Monterey Road from Monterey to Llagas Roads; Butterfield Boulevard at several locations, including at San Pedro and Diana Avenues; Watsonville Road at Monterey Road; Monterey Road at Burnett Avenue; Tennant Avenue; and Wright Avenue from Del Monte to Hale Avenues. Also, a sewage pipe connecting Morgan Hill to the Gilroy sewage treatment plant backed up causing 40,000 gallons of raw sewage to spill into the Ludewig Ranch causing the cancellation of the Harvest Festival in San Martin, an event to raise funds and food for the homeless. A strong low pressure system made its way through Northern and Central California accompanied by deep tropical moisture and very strong winds. Heavy rain combined with the wind to cause numerous trees, tree limbs and pole/telephone powers to fall. Pacific Gas and Electric reported over 277,000 customers had lost power in the San Francisco and Monterey Bay Areas with a cost of over thirteen million dollars in damages. The record breaking heavy rain also led to flooding and debris flows.

10/13/2009 (2 of 3 entries) – 1 Mile South of Morgan Hill - Eight families were evacuated from the Bisceglia Avenue apartment complex in Morgan Hill due to flooding. More than a foot of standing water was in the recently renovated four ground floor apartments. The three foot high wall, built to stave off flood water, was unsuccessful. A strong low pressure system made its way through Northern and Central California accompanied by deep tropical moisture and very strong winds. Heavy rain combined with the wind to cause numerous trees, tree limbs and pole/telephone powers to fall. Pacific Gas and Electric reported over 277,000 customers had lost power in the San Francisco and Monterey Bay Areas with a cost of over thirteen million dollars in damages. The record breaking heavy rain also led to flooding and debris flows.

4.19.3 Location and Extent/Probability of Occurrence and Magnitude

Susceptibility to landslide or debris flows varies based on the terrain and geological character of the area. The California Geological Survey produces four principal types of maps to convey landslide risk:
(1) inventories of existing landslides,
(2) landslide hazard—expressed as landslide susceptibility or landslide potential maps,
(3) landslide risk maps, and
(4) landslide zone maps.

1. Landslide-inventory maps, the most basic landslide maps, portray the location of prior failure. Because one clue to the location of future landsliding is the distribution of past movement, maps that show existing landslides are helpful in predicting the hazard. Inventory maps do not necessarily distinguish fresh movements, but in any one year some of the mapped slides—or more frequently, portions of them—may become active. A landslide inventory reveals the extent of past movement and thus the probable locus of some future activity within those landslides, but it does not indicate the likelihood of failure for the much larger area between mapped landslides. For this, hazard, risk or zone maps are required.

2. Landslide-hazard maps describe an unstable condition arising from the presence or likely future occurrence of slope failure. There are two general types of landslide-hazard maps, each of which provides a different level of information and detail:

a. Landslide-susceptibility maps describe the relative likelihood of future landsliding based solely on the intrinsic properties of a locale or site. Prior failure (from a landslide inventory), rock or soil strength, and steepness of slope are the three site factors that most determine susceptibility.

b. Landslide-potential maps describe the likelihood of landsliding (susceptibility) jointly with the occurrence of a triggering event (opportunity). Potential commonly is based on the three factors determining susceptibility plus an estimate or measure of the probability (likelihood of occurrence) of a triggering event such as earthquake or excessive rainfall.

3. Landslide-risk maps describe landslide potential jointly with the expected losses to life and property if a failure was to occur. The potential for landslide damage to a road system, for example, can be evaluated by considering the exposure of the roads to different levels of landslide hazard and the vulnerability of the roads to consequent damage. Similarly, the risk of excessive sedimentation in streams and other ecological damage can be evaluated by considering the landslide hazard jointly with the properties of streams and their sensitivity.

4. Landslide-zone maps depict areas with a higher probability of landsliding, within which specific actions are mandated by California law prior to any development. These maps typically are binary in nature (a given site is either in or out of the zone) and are designed for use as planning tools by non-geoscientists. Zone maps may be derived from landslide potential or susceptibility, but some have been based simply on slope gradient or landslide-inventory maps.

4.20 OTHER HAZARDS

The hazards discussed in this section received a minimal ranking score by the Local Planning Team. Therefore, a brief discussion acknowledging the potential for occurrence is included, but further analysis has not been completed for this plan update.

4.20.1 Land Subsidence

Land subsidence occurs when large amounts of ground water have been withdrawn from certain types of rocks, such as fine-grained sediments. The rock compacts because the water is partly responsible for holding the ground up. When the water is withdrawn the rocks collapse. Land subsidence is most often caused by human activities, mainly from the removal of subsurface water. Compaction of soils in some aquifer systems can accompany excessive ground-water pumping and it is by far the single largest cause of subsidence. Excessive pumping of such aquifer systems has resulted in permanent subsidence and related ground failures. In some systems, when large amounts of water are pumped, the subsoil compacts, thus reducing in size and number the open pore spaces in the soil the previously held water. This can result in a permanent reduction in the total storage capacity of the aquifer system. – *copied from* [*http://ga.water.usgs.gov/edu/earthgwlandsubside.html*](http://ga.water.usgs.gov/edu/earthgwlandsubside.html).

Land subsidence is a settling of the Earth's surface due to the compaction of subsurface materials. Historically, Santa Clara County has experienced as much as 13 feet of subsidence caused by excessive pumping of groundwater.

County voters approved the creation of the Santa Clara Valley Water District in the early 1930's partially to protect groundwater resources and minimize land subsidence. Subsidence is costly, as it can lead to flooding that damages properties and infrastructure, and saltwater intrusion that degrades groundwater quality.

The water district reduces the demand on groundwater and minimizes subsidence through the conjunctive use of surface water and groundwater. A major component of the district's conjunctive use program is recharging the groundwater basin to replenish the groundwater that is withdrawn.

The water district also actively monitors for land subsidence through benchmark surveying, groundwater elevation monitoring, and data from compaction wells. The district surveys hundreds of benchmarks each year to determine if there has been any change in the land surface elevation. The district also monitors groundwater levels to ensure that the amount of groundwater being pumped will not cause further subsidence. Finally, the district collects data from two compaction wells, which are 1,000 foot deep wells designed to measure any changes in the land surface resulting from groundwater extraction. – *copied from* *http://www.scvwd.com/Services/LandSubsidence.aspx*

4.20.2 Expansive Soils

Expansive soils shrink or swell as the moisture content decreases or increases. Structures built on these soils may experience shifting, cracking, and breaking damage as soils shrink and subside or expand. – *copied from* *http://landslides.usgs.gov/learning/glossary.php#e*.

4.20.3 Hailstorm

The most severe hail storms often occur in the central plains states, as hail may grow to baseball or softball size in this region due to strong thunderstorm updraft potential caused by complex atmospheric dynamics. In contrast, penny or quarter-sized hail is more common in other parts of the United States (Schaefer et al., 2003). Based on the size of the hailstones, hail fall can damage or destroy agriculture fields, automobiles, roofing and siding on houses, and cause injury to livestock or people.

Severe hail events (i.e. hail greater than 0.75 inches in diameter) are common during the spring and summer months when the development of thunderstorms is active. The cost of hail fall is well known to the insurance industry, as property damage claims are often filed after severe hail events. Hail damage during the 1990's has been calculated at approximately $1.2 billion per year for both property and crop loss (Changnon, 1999b), and is comparable to the annual damages caused by

tornadoes (Kunkel et al., 1999) and (NCAR, 2001). Hail fall events sometimes cause widespread destruction, resulting in claims of several hundred million dollars or more. In May 1995, $1.1 billion in damages across the Dallas-Fort Worth metroplex was caused by hail (Changnon, 1999b), and in early April 2003, severe thunderstorms and large hail caused over $1.6 billion in damages over the southern plains and lower Mississippi Valley. NOAA's environmental observation systems such as the (WSR-88D) NEXRAD Doppler radar network are very important to help forecasters determine and warn the public where hail fall may occur. Similar to the tornado warnings that NOAA provides, a few minutes of warning is valuable time that helps people to protect valuable property and seek sufficient shelter. – *copied from http://www.economics.noaa.gov/?goal=weather&file=events/hail*.

4.20.4 Tsunami

A tsunami is a sea wave of local or distant origin that results from large-scale seafloor displacements associated with large earthquakes, major submarine slides, or exploding volcanic islands. – *copied from http://earthquake.usgs.gov/learn/glossary/?term=tsunami*.

4.20.5 Volcano

Volcanoes are mountains but they are very different from other mountains. They are not formed by folding and crumpling but by uplift and erosion. Instead, volcanoes are built by the accumulation of their own eruptive products--lava, bombs (crusted over ash flows, and tephra (airborne ash and dust). A volcano is most commonly a conical hill or mountain built around a vent that connects with reservoirs of molten rock below the surface of the Earth. The term volcano also refers to the opening or vent through which the molten rock and associated gases are expelled. – *copied from http://pubs.usgs.gov/gip/volc/text.html*.

4.21 ADDITIONAL HAZARD RESEARCH RESOURCES

- All data from the **NCDC Storm Event Database** is derived from data from the following sources: All Weather Events from 1993-1995, as entered into Storm Data (except 6/93-7/93 which is missing) (No Latitude/Longitude), All Weather Events from 1996-Current, as entered into Storm Data (Includes Latitude/Longitude), Plus additional data from the Storm Prediction Center (Includes Tornadoes 1950-1992, Thunderstorm Winds 1955-1992, and Hail 1955-1992) – http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storms
- All data from **SHELDUS** (Spatial Hazard Events and Losses Database for the United States) is derived from the following source- http://webra.cas.sc.edu/hvri/products/sheldus2.aspx
- Flooding history of Sunnyvale East and West Channels (http://www.valleywater.org/services/sunnyvaleeastandwesthistory.aspx)
- Emergency Underground Water Storage and Equipment Replacement City of Palo Alto (http://www.smartvoter.org/2007/11/06/ca/scl/meas/N/)
- CA Emergency Levee Repair Sites - http://www.water.ca.gov/levees/sites/images/overall_map_110_sites.pdf
- DeltaImpactFactors[1].pdf at *http://www.scvwd.com/Services/Delta.aspx*.
- **Earthquakes (In General)**
  http://www.smate.wwu.edu/teched/geology/geohaz-Index.html
  http://earthquake.usgs.gov/hazards/apps/
  USGS – Earthquake Hazards Program - Custom Mapping and Analysis Tools
  2009 Earthquake Probability Mapping (http://geohazards.usgs.gov/eqprob/2009/index.php)
- **Ground Shaking**
  http://www.smate.wwu.edu/teched/geology/eq-CA-Loma1.html
  http://www.smate.wwu.edu/teched/geology/eq-CA-Loma2.html
- **Liquefaction Related:**
  http://walrus.wr.usgs.gov/geotech/soil/
  The Loma Prieta, California, Earthquake of October 17, 1989--Liquefaction
  SOIL LIQUEFACTION IN THE EAST BAY DURING THE EARTHQUAKE
  By Robert E. Kayen, U.S. Geological Survey;
  James K. Mitchell, Virginia Polytechnic Institute and State University;
  Raymond B. Seed, University of California, Berkeley; and
  Shin'ya Nishio, Shimizu Corp.
  http://earthquake.usgs.gov/people/tomholzer/papers/Holzer_Oakland_LPI.pdf
  Liquefaction Hazard Mapping with LPI in the Greater Oakland, California, Area
  By Thomas L. Holzer,a… M.EERI, Michael J. Bennett,a… Thomas E. Noce,a…
  Amy C. Padovani,b… and John C. Tinsley IIIa…
  http://pubs.usgs.gov/of/2008/1270/
  Liquefaction Hazard Maps for Three Earthquake Scenarios for the Communities of San Jose, Campbell, Cupertino, Los Altos, Los Gatos, Milpitas, Mountain View, Palo Alto, Santa Clara, Saratoga, and Sunnyvale, Northern Santa Clara County, California
  By Thomas L. Holzer, Thomas E. Noce, and Michael J. Bennett 2008

http://earthquake.usgs.gov/regional/nca/qmap/
Northern Santa Clara Valley
http://earthquake.usgs.gov/regional/nca/cpt/
Cone Penetration Testing (CPT) Data

- **Landslide/Mudflow**
  http://pubs.usgs.gov/of/1997/of97-745/of97-745c.html
  Open-File Report 97-745C
  SAN FRANCISCO BAY REGION LANDSLIDE FOLIO PART C -
  SUMMARY DISTRIBUTION OF SLIDES AND EARTH FLOWS IN THE SAN FRANCISCO BAY REGION, CALIFORNIA
  By: C.M. Wentworth, S.E. Graham, R.J. Pike, G.S. Beukelman, D.W. Ramsey, and A.D. Barron
  NOTE - This part was updated on Feb. 17, 1998
  Revision 1 - 17Feb98
- **NOAA Weather Related:**
  http://www.economics.noaa.gov/
  The Economics and Social Benefits of NOAA Data and Products
- **Chemical Release:**
  http://www.scvwd.com/services/FuelLeaksAndSolvents.aspx
  Fuel Leaks and Solvents

SECTION 5 COUNTY VULNERABILITY ASSESSMENT

5.1 CRITICAL FACILITIES

Santa Clara County OES identified 136 critical facilities and provided this list to ABAG in participation with the regional planning process. The County intends to revise this list, through consolidation and coordination with multiple departments for future updates of this plan. This list of critical facilities presents the buildings and structures that are the County's primary concern for ensuring resiliency and therefore applying hazard mitigation strategies.

Table 5-1: Santa Clara County Critical Facilities

Description/Name of Facility	Address	City	Own?
GSA COMMUNICATIONS WAREHOUSE REPEATER	6680 PACHECO PASS HYWY.	GILROY	yes
SSA CHILD PROTECTIVE SERVICES	7350 S. ROSANNA ST.	GILROY	yes
GILROY FAMILY COMMUNITY CENTER /CHILD CENTER	290 IOOF AVE.	GILROY	yes
Public Health	1215 First Street	Gilroy	yes
GSA COMMUNICATIONS MT. MADONNA PK-REPEATER	0 HECKER PASS HWY.	GILROY	yes
LEXINGTON RESERVOIR	0 HWY 17 & ALMA BRIDGE RD.	LOS GATOS	yes
LOS GATOS MUNICIPAL COURT	14205 CAPRI DR.	LOS GATOS	yes
ELMWD REHAB CNTR	701 S. ABEL ST.	MILPITAS	yes
PUBLIC HEALTH	16450 MONTEREY RD.	MORGAN HILL	no
GSA COMMUNICATIONS-REPEATER	0 LAKEVIEW DR./HOLIDAY LAKES.	MORGAN HILL	yes
Superior Court - Morgan Hill Court House	301 Diana Avenue	Morgan Hill	yes
JAMES RANCH	19050 MALAGUERRA AVE.	MORGAN HILL	yes
HOLDEN RANCH COMPLEX	19050 MALAGUERRA AVE.	MORGAN HILL	yes
SOCIAL SERVICES / PUBLIC HEALTH OFFICES	100 MOFFETT BLVD.	MT. VIEW	no
PROBATION-WORK FURLOUGH CENTER	590 E. MIDDLEFIELD ROAD	MT. VIEW	yes
COMM. ASSOC. MENTALLY RETARDED	3864 MIDDLEFIELD RD.	PALO ALTO	yes
PALO ALTO AIRPORT	1901 EMBARCADERO RD.	PALO ALTO	yes
NORTH COUNTY MENTAL HEALTH	231 GRANT ST.	PALO ALTO	yes
NORTH COUNTY OFFICE, Superior Court	270 GRANT ST.	PALO ALTO	yes
GSA COMMUNICATIONS-REPEATER	1720 MONTEBELLO RD.	PALO ALTO	yes
Sheriffs Modular Holding Cells - San Martin	12427 MONTEREY ROAD	San Martin	yes
CCOB-EAST WING	70 W. HEDDING ST.	SAN JOSE	yes
CCOB-WEST WING	70 W. HEDDING ST.	SAN JOSE	yes
HALL OF JUSTICE-EAST WING	190 W. HEDDING ST.	SAN JOSE	yes
MAIN JAIL SOUTH - DOC	180 W. HEDDING ST.	SAN JOSE	yes

Description/Name of Facility	Address	City	Own?
HALL OF JUSTICE-WEST WING	200 W. HEDDING ST.	SAN JOSE	yes
PUBLIC DEFENDER OFFICE	120 W. MISSION ST.	SAN JOSE	no
CIVIC CENTER INSTITUTE/PROBATION	816 N. FIRST ST.	SAN JOSE	yes
MAIN JAIL NORTH - DOC	150 W. HEDDING ST.	SAN JOSE	yes
OLD COURT HOUSE	161 N. FIRST ST.	SAN JOSE	yes
REPEATER STATION/TA TRANSIT/PUB DEF	4 N. SECOND ST.	SAN JOSE	no
SOCIAL SERVICES/PUBLIC GUARDIAN/MENTAL HEALTH STOR	1236 N. FIFTH ST.	SAN JOSE	no
SSA NTR-IOLA WILLIAMS CTR	2072 LUCRETIA AVE.	SAN JOSE	yes
DOWNTOWN SUPERIOR COURT	191 N. FIRST ST.	SAN JOSE	yes
CRIMINAL COURTS ANNEX	115 TERRAINE ST.	SAN JOSE	no
Superior Court Administration	111 W. ST. JOHN ST. #770	SAN JOSE	no
Office of Public Defender	701 North First St	San Jose	no
Mental Health	1075 E. SANTA CLARA ST.	SAN JOSE	no
Office/Court	99 Notre Dame Ave.	San Jose	no
GSA-GARAGE	90 W. YOUNGER ST.	SAN JOSE	yes
SHERIFF DEPARTMENT	55 W. YOUNGER ST.	SAN JOSE	yes
DOC - Day reporting Center	460 East Brokaw Road	San Jose	no
WOMENS RESIDENTIAL CENTER (NEW)	2090 EVANS LANE	SAN JOSE	yes
GSA COMMUNICATIONS-MAIN BLDG	2700 CAROL DR.	SAN JOSE	yes
GSA COMMUNICATIONS-SERVICE BLDG.	2700 CAROL DR.	SAN JOSE	yes
Carol Drive - Communications - Antenna Tower	2700 Carol Drive	San Jose	yes
FAMILY COURT FACILITY	170 PARK CENTER PLAZA.	SAN JOSE	no
1875-77 Senter Road Facility - Office	1875 Senter Road, CA,	San Jose	no
HEALTH-DRUG ABUSE	1675 BURDETTE DR.	SAN JOSE	no
Probation Drug and Alcohol	255 W. Julian Street	San Jose	yes
ADMIN SSA	333 W. JULIAN	SAN JOSE	no
DEPT OF FAMILY & CHILDENS SERVICES	373 W. JULIAN	SAN JOSE	no
EVT1, East VHC WIC Modular	1993 MCKEE RD.	SAN JOSE	yes
EVT 2 - East Valley Clinic Modular	1993 McKee Road	San Jose	yes
SSA-NTR / EASTSIDE NUTRITION CENTER	1755 ALUM ROCK AVE.	SAN JOSE	yes
GSA COMMUNICATIONS-REPEATER	CLAITOR WAY.	SAN JOSE	no
SCVHHS - Mental Health	687 N. KING ROAD.	SAN JOSE	no
METHADONE CLINIC ALEXIAN	2101 ALEXIAN DRIVE	SAN JOSE	yes
PUBLIC HEALTH	720 EMPEY WY.	SAN JOSE	no
VALLEY MEDICAL CENTER-VIP HOUSE	2215 FRUITDALE AVE.	SAN JOSE	yes
SSA-NTR / WILLOWS SR. NUTRITION CENTER	2175 LINCOLN AVE.	SAN JOSE	yes
SCVHHS-MENTAL HEALTH	828 S. BASCOM AVE. Suite 100 & 200	SAN JOSE	no
SSA-NTR / AACI SR. NUTRITION PROGRAM	2400 MOORPARK AVE. ST. 300	SAN JOSE	yes
VMC-HEALTH MAINT. (BUTLER BLDG)	2408 CLOVE DR.	SAN JOSE	yes
SSA MONROE HOUSE - CHILD VISITATION	2232 & 2248 N. First Street	SAN JOSE	no
SCVHHS-Alcohol & Drug	1885 THE ALAMEDA, STE. 211 &212	SAN JOSE	no

Description/Name of Facility	Address	City	Own?
Warehouse	2408 CLOVE DR.	SAN JOSE	yes
ROADS AND AIRPORTS ADMINISTRATION	101 SKYPORT DRIVE	SAN JOSE	yes
ESA,HCD/SOLID WASTE MGMT,CEO Affor. Hsg...	1735 N. FIRST ST. #245, 250, 265, 275, 290	SAN JOSE	no
PROBATION-ADULT	2600 N. FIRST ST.	SAN JOSE	no
OSEC/ESA Risk Management	1735 N. FIRST ST. # 245, 250, 265, 275, 301	SAN JOSE	no
PROBATION -LABORATORY/STORAGE	2610 N. FIRST ST.	SAN JOSE	no
OFFICE OF ESA INSURANCE DIVISION	1735 N. FIRST STREET SUITE 108	SAN JOSE	no
GSA PROPERTY MANAGEMENT	701 MILLER STREET	SAN JOSE	no
County Center at Charcot, 2310 N. First Street	2310 N. First Street (Building #1)	San Jose	yes
County Center at Charcot, 2314 N. First Street	2314 N. First Street (Building #2)	San Jose	yes
GSA COMMUNICATIONS-COPERNICUS PK REPEATER	0 BAYOU ROAD.	SAN JOSE	yes
ROADS & AVIATION SERVICE BLDG	11305 DEL PUERTO RD.	SAN JOSE	yes
GSA COMMUNICATIONS-OPERATIONS SITE	4510 CADWALLADER AVE.	SAN JOSE	no
SHERIFF OFFICE	12 NORTH WHITE RD SUITE 3	SAN JOSE	no
WRIGHT RANCH COMPLEX	298 W. BERNAL RD.	SAN JOSE	yes
GSA COMMUNICATIONS- MT. CHUAL REPEATER	0 MT. CHUAL.	SAN JOSE	no
GSA COMMUNICATIONS- COYOTE PEAK REPEATER	0 COYOTE PEAK, BERNAL RD.	SAN JOSE	yes
GSA COMMUNICATIONS- MT. RODANI REPEATER	0 BOHLMAN RD./MT RODANI RD.	SAN JOSE	no
WRIGHT CENTER EMERGENCY GENERATOR	298 W. BERNAL	SAN JOSE	yes
ROADS OPERATIONS	11030 DOYLE RD.	SAN JOSE	yes
ROADS OPERATIONS-ADMINISTRATION	1505 SCHALLENBERGER RD.	SAN JOSE	yes
Service Center Complex	1555 Berger Drive	San Jose	yes
COUNTY SERVICE CENTER-BUILDING #1	1553 BERGER DR.	SAN JOSE	yes
COUNTY SERVICE CENTER-BUILDING #2	1555 BERGER DR.	SAN JOSE	yes
COUNTY SERVICE CENTER-BUILDING #3	1555 BERGER DR.	SAN JOSE	yes
COUNTY SERVICE CENTER-LOAD CELL/TEST BUILDING #4	1555 BERGER DR.	SAN JOSE	yes
ROADS OPERATIONS-DIVISION MODULAR	1505 SCHALLENBERGER RD.	SAN JOSE	yes
HEALTH DEPT.-LAB	2220 MOORPARK AVE.	SAN JOSE	yes
VMC OT THER, XRAY & HEALTH TOBACCO	2400 MOORPARK AVE.	SAN JOSE	no
PUBLIC HEALTH	3003 MOORPARK AVE.	SAN JOSE	no
VALLEY MEDICAL CENTER COMPLEX	751 S. BASCOM AVE.	SAN JOSE	yes
AVIATION REID HILLVIEW AIRPORT	2500 CUNNINGHAM AVE.	SAN JOSE	yes
SOUTH COUNTY ANIMAL SHELTER	12370 MURPHY AVE.	SAN MARTIN	yes
ROADS & AIRPORTS - WAREHOUSE	13600 MURPHY AVENUE	SAN MARTIN	yes
ROADS & AIRPORTS - STORAGE	13600 MURPHY AVENUE	SAN MARTIN	yes
ROADS & AIRPORTS-SOUTH YARD - OLD BUS TERMINAL	13600 MURPHY AVE.	SAN MARTIN	yes

Description/Name of Facility	Address	City	Own?
ROADS & AVIATION OPERATIONS-SAN MARTIN AIRPORT	12300 MURPHY AVE.	SAN MARTIN	yes
SOUTH COUNTY COURT COMPLEX	12425 MONTEREY RD.	SAN MARTIN	yes
ROADS & AIRPORTS - VEHICLE MAINTENANCE	13600 MURPHY AVENUE	SAN MARTIN	yes
ROADS & AIRPORTS - FUEL ISLAND / CONTROL BLDG	13600 MURPHY AVENUE	SAN MARTIN	yes
SOUTH COUNTY COURT MODULARS	12425 Monterey Road	San Martin	yes
SHERIFF MODULAR	12431 Monterey Road	San Martin	yes
SANTA CLARA-SUPERIOR COURT	1095 HOMESTEAD RD.	SANTA CLARA	yes
GSA COMMUNICATIONS REPEATER	0 BOHLMAN RD./MT RODANI RD.	SARATOGA	yes
SHERIFF-WEST SIDE SUBSTATION	14376 SARATOGA AVE.	SARATOGA	no
SSA-NTR / DODEXHO CATERER CTR.	1375 GENEVA DR.	SUNNYVALE	yes
SUNNYVALE MUNICIPAL COURT	605 W. EL CAMINO REAL.	SUNNYVALE	yes
COLUMBIA NEIGHBORHOOD HEALTH CENTER	785 MORSE AVENUE	SUNNYVALE	no
SSA-NTR SVALE NUTR. CTR / METHODIST CHURCH	535 OLD SAN FRANCISCO RD.	SUNNYVALE	yes
OFFICE OF WELFARE TO WORK SERVICES	420 South Pastoria Ave	SUNNYVALE	no
Fire Station #14	12355 El Monte Rd	Los Altos Hills	
Fire Station #2	21000 Seven Springs Pkwy	Cupertino	
Fire Station #7	22620 Stevens Creek Blvd	Cupertino	
FIRE STATION #15	10 ALMOND AVE	Los Altos	
Fire Station #9	19800 Cox Av	Saratoga	
Fire Station #12	18300 OLD MONTEREY	Morgan Hill	
COUNTY FIRE - 3 MODULAR BLDGS	18300 OLD MONTEREY	Morgan Hill	
COUNTY FIRE - 4 STORAGE BINS	18300 OLD MONTEREY	Morgan Hill	
Fire Station #13	2100 E. Dunne Av	Morgan Hill	
FIRE STA/HOSE/TWR	16565 SHANNON ROAD	Los Gatos	
FIRE STATION #6	16565 SHANNON ROAD	Los Gatos	
FIRE STATION #5	14850 WINCHESTER BLVD.	Los Gatos	
FIRE STATION #3	306 UNIVERSITY AVENUE	Los Gatos	
COUNTY FIRE - Administrative Headquarters	14700 Winchester Blvd.	Los Gatos	
Fire Station #8	18870 Saratoga/Los Gatos Rd	Los Gatos	
Fire Station #4	21452 Madrone Dr	Redwood Estates	
Fire Station #10	484 W Sunnyoaks Ave	Campbell	
COUNTY FIRE - Classroom Bldg.	485 W. Sunnyoaks Ave	Campbell	
COUNTY FIRE - Training Tower	485 W. Sunnyoaks Ave	Campbell	
Fire Station #11	123 Union Ave	Campbell	
Fire Station #1	20215 Stevens Creek Blvd	Cupertino	
Fire Station #16	765 Fremont Ave	Los Altos	

Description/Name of Facility	Address	City	Own?
SSA - Benefits Call Center	1877 Senter Road	SAN JOSE	
SSA - Application Assistance Center	1919 Senter Road	SAN JOSE	
SSA - Calworks, CWES, DFCS	379 Tomkins Ct	Gilroy	
SSA - General Assistance	1888 Senter Road	SAN JOSE	
SSA - Calworks Employment Services	1879 Senter Road	SAN JOSE	
PARKS - VASONA ADMINISTRATION / IC	298 Garden Hill Dr.	LOS GATOS	
PARKS - HELLYER CENTRAL YARD SHOP / ALT IC	985 Hellyer Ave.	SAN JOSE	

This list of critical facilities and available information for them is maintained digitally in an excel spreadsheet (*SantaClaraCounty_Exposure_Analysis.xls*) by Santa Clara County OES. A complete printing of the critical facilities data is included in County Attachment 11: Santa Clara County Exposure Analysis.

5.2 EXPOSURE ANALYSIS

Exposure analyses are used to quantify assets which are "exposed" to risk as opposed to quantifying estimated losses. Santa Clara County did not have available building replacement values for the identified critical facilities at the time this plan was prepared. Therefore, this section includes an exposure analysis for the profiled hazards. Future plan updates may be able to incorporate building replacement values and present estimated losses based on likelihood of event occurrence.
Overlay analyses (using GIS) were conducted for the mappable hazards such as wildfire, flood, and the earthquake related hazards. These analyses compare the location of the critical facilities with the mapped hazard area (i.e. floodplains, wildfire threat zones, shaking potential areas, etc.) and result in a listing of which facilities are at most risk to which hazard. Not all hazards are mappable and some hazards, such as drought, are equally likely throughout the entire County. For these hazards, a general exposure summary is presented in Section 5.2.1 followed by exposure analyses for the mappable hazards in Section 5.2.2.

5.2.1 General Exposure

ABAG's website (**http://quake.abag.ca.gov/mitigation/landuse/**) presents the results of the regional exposure analysis through a searchable online database. Users can view the summaries of land use and infrastructure exposed to the mappable hazards. This section presents the general summary of land use and infrastructure in the unincorporated areas of Santa Clara County. These should be considered at risk to the hazards of equal likelihood throughout the entire County geography (i.e. drought, extreme heat, thunderstorm, etc).

JURISDICTION: Santa Clara County Uninc.
COUNTY: Santa Clara
HAZARD: Land Use
BASIS: Existing Land Use, 2005 using 2009 hazard mapping

	Total Acres
TOTAL RESIDENTIAL LAND [excluding mixed use]:	22,262
1 unit/1-5 acre lot (Rural Residential)	12,654
1-3 units/acre	3,320
3-8 units/acre	5,739
>8 units/acre	502
Mobile Home Parks	48
TOTAL MIXED RESIDENTIAL/COMMERCIAL:	14
Within a Land Area	0
Within a Building	0
Mixture of Above or Unknown	14
TOTAL MIXED COMMERCIAL/INDUSTRIAL:	33
TOTAL INDUSTRIAL [excluding mixed]:	1,191
Light Industrial	72
Heavy Industrial	654
Salvage/Recyling, Mixture or Unknown	175
Food Processing, Warehousing	289
TOTAL MAJOR INFRASTRUCTURE:	7,980
Roads, Highway and Related Facilities	7,625
Rail Stations, Yards and Related Facilities	76
Airports	121
Ports	0
Power Facilities	16
Municipal Wastewater Facilities	53
Municipal Water Supply Facilities	5
Communication Facilities	83
Infrastructure--Other, Unknown	0
TOTAL MILITARY:	1,259
Military Residential	0
Military Hospital	0
Military Communications	0
Military Airport or Port	0
General Military	89
Open Military Lands	0
Closed Military Facilities	1,170
	4,878

TOTAL COMMERCIAL/SERVICES [excluding mixed]:	
Subtotal-Commercial:	926
Retail/Wholesale	268
Research/Office	370
Comm. Outdoor Recreation	248
Other, Mixture or Unknown	40
Subtotal-Education:	3,672
Educational Offices and Day Care	0
Elementary/Secondary	1,003
Colleges/Universities	2,362
Stadium Facilities	56
University Housing	249
Day Care Facilities	2
Subtotal-Hospitals and Health Care	103
Trauma Center Hospitals	57
Community or Local Hospitals	21
Surgery Centers	0
State Prisons	0
State Mental Health Facilities	0
Clinics and Long-Term Care	25
Subtotal-Public Institutions:	177
Convention Centers	0
Sports Stadiums	0
Churches/Synagogues/Other	132
City Halls/County Administration	0
Local Jails	3
Local Police/Fire/Emergency	28
Other-Comm. Centers/Libraries	15
TOTAL URBAN OPEN:	10,080
Golf Courses	1,487
Racetracks	0
Campgrounds and Other	720
Cemeteries	186
Parks	4,554
Vacant--Cleared for Redevelopment	3
Vacant--Undeveloped	2,699
Mixed Urban Open, Including Parks	430
TOTAL AGRICULTURE:	24,547
Cropland and Pasture	8,620
Orchards/Groves/Vineyards	14,653

Greenhouses	1,249
Confined Feeding	0
Farmsteads and Inactive	25
TOTAL RANGELAND:	273,576
Herbaceous Range	204,473
Shrub and Brush	69,054
Mixed Range	49
TOTAL WETLANDS [Based on USGS Mapping]:	981
Forested	1
Non-Forested	15
Salt Evaporators	842
Wetlands--Unknown	123
TOTAL FOREST LAND:	247,514
Deciduous	59,269
Evergreen	92,251
Mixed Forest	95,994
TOTAL SPARSELY VEGETATED:	1,513
Beaches	0
Other Sand	0
Bare Rock	270
Mines/Quarries	1,166
Transitional--Landfills	30
Transitional--Other	0
Transitional--Mixture	48
Mixed Sparsely Vegetated	0
	=========
	Total Acres
TOTAL URBAN LAND:	47,696
TOTAL NON-URBAN LAND:	548,131
GRAND TOTAL:	595,826

Source: Association of Bay Area Governments, 2009.

Note: Because of independent rounding, subcategories may not add to totals

JURISDICTION: Santa Clara County Uninc.
COUNTY: Santa Clara
HAZARD: Land Use
BASIS: Existing Infrastructure, 2009

	Total Miles
ROADS:	1,739
Interstate Highway	47
Primary US/State Highway	78
Secondary State/Co Highway	215
Local Road	1,274
Misc Ramp/Road	125
TRANSIT:	10
Altamont Commuter Express (ACE)	0
Amtrak	0
Bay Area Rapid Transit (BART)	0
Caltrain	9
San Francisco Muni Metro	0
Santa Clara VTA	2
RAIL:	23
All Railroads	23
PIPELINES:	378
Pipelines Under Roads	378

Source: Association of Bay Area Governments, 2009.
Miles of pipeline is an approximation based on miles of road within water service area boundaries and does not include major auqeducts.
Miles of pipeline is miles of water pipelines. Miles of sewer pipelines should be approximately the same.

Note: Because of independent rounding, subcategories may not add to totals.

5.2.2 Critical Facilities Exposure by Hazard

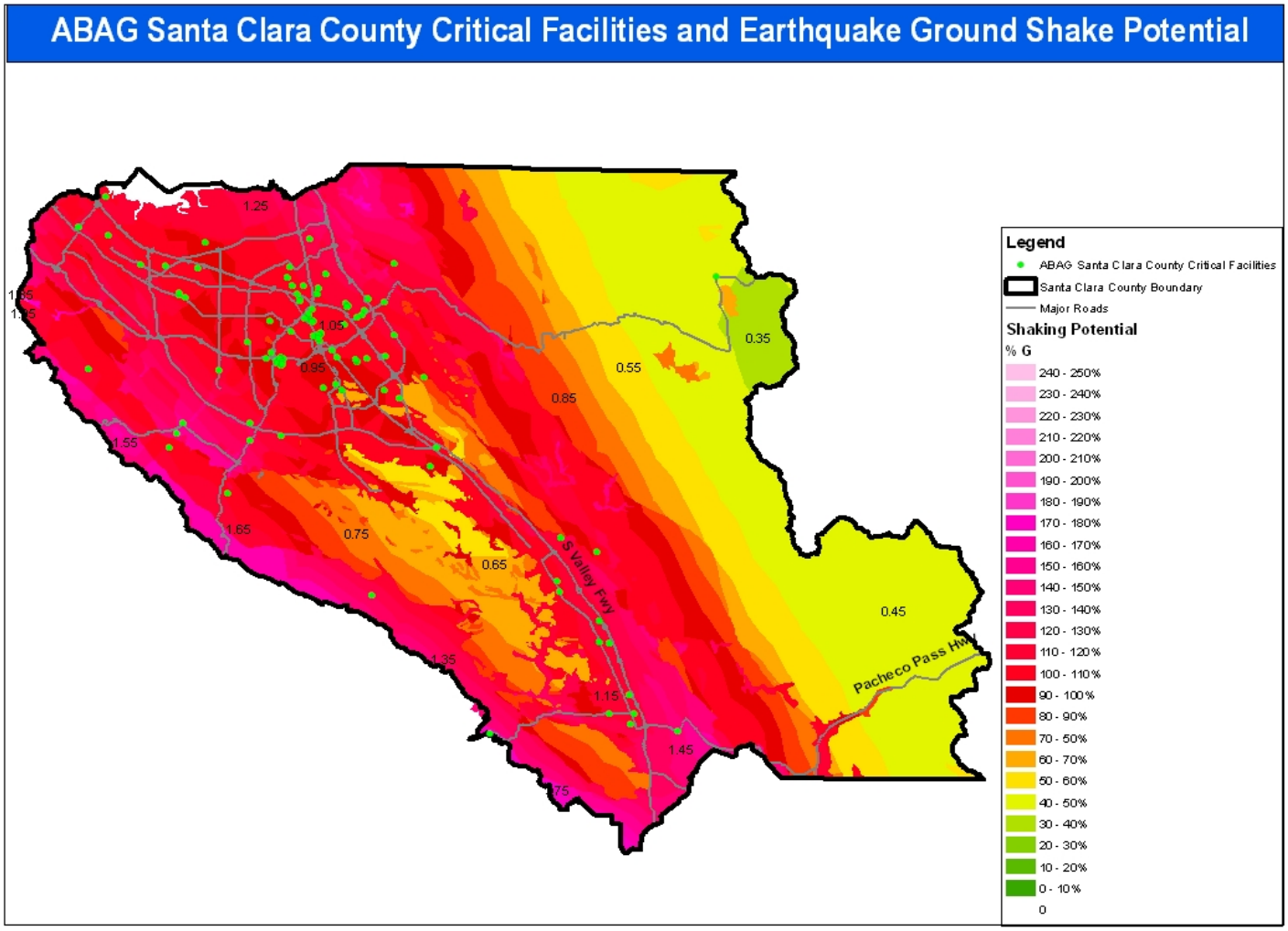
ABAG's website (**http://quake.abag.ca.gov/mitigation/cf2010/**) presents the results of the regional facilities exposure analysis through a searchable online database. Users can view the summaries of how many facilities are exposed to the mappable hazards by category: health care facilities, schools, critical facilities, and bridges/interchanges. This section identifies which of the County's critical

facilities are located in the mapped hazard areas. These facilities are the County's focus for improving resiliency and implementing mitigation strategies.

The complete results from ABAG's exposure analysis are available digitally in an excel spreadsheet from Santa Clara County OES. A complete printing of these results is included in County Attachment 11: Santa Clara County Exposure Analysis.

5.2.2.1 Earthquake Related Hazards

Ground Shaking



Source: California Department of Conservation

Table 5-2: Critical Facilities within areas of Potential Shaking

Critical Facility	Peak Acceleration (%G)	Perceived Shaking	Potential Damage	Instrume-ntal Intensity	Bldg Insured Value	Contents Insured Value
GSA COMMUNICATIONS MT. MADONNA PK-REPEATER	175	Extreme	Very Heavy	X+		
SHERIFF-WEST SIDE	155	Extreme	Very Heavy	X+		

Critical Facility	Peak Acceleration (%G)	Perceived Shaking	Potential Damage	Instrume-ntal Intensity	Bldg Insured Value	Contents Insured Value
SUBSTATION						
GSA COMMUNICATIONS WAREHOUSE REPEATER	145	Extreme	Very Heavy	X+		
GSA COMMUNICATIONS-MT. CHUAL REPEATER	135	Extreme	Very Heavy	X+		
GSA COMMUNICATIONS REPEATER	135	Extreme	Very Heavy	X+		
PARKS - VASONA ADMINISTRATION / IC	135	Extreme	Very Heavy	X+		
NORTH COUNTY MENTAL HEALTH	125	Extreme	Very Heavy	X+		
NORTH COUNTY OFFICE, Superior Court	125	Extreme	Very Heavy	X+		
ELMWD REHAB CNTR	125	Extreme	Very Heavy	X+		
JAMES RANCH	115	Violent	Heavy	IX		
SOCIAL SERVICES / PUBLIC HEALTH OFFICES	115	Violent	Heavy	IX		
SHERIFF OFFICE	115	Violent	Heavy	IX		
Sheriffs Modular Holding Cells - San Martin	115	Violent	Heavy	IX		
SOUTH COUNTY COURT COMPLEX	115	Violent	Heavy	IX		
SOUTH COUNTY COURT MODULARS	115	Violent	Heavy	IX		
SHERIFF MODULAR	115	Violent	Heavy	IX		
ROADS & AIRPORTS - WAREHOUSE	115	Violent	Heavy	IX		
ROADS & AIRPORTS - STORAGE	115	Violent	Heavy	IX		
ROADS & AIRPORTS-SOUTH YARD - OLD BUS TERMINAL	115	Violent	Heavy	IX		
ROADS & AIRPORTS - VEHICLE MAINTENANCE	115	Violent	Heavy	IX		

Critical Facility	Peak Acceleration (%G)	Perceived Shaking	Potential Damage	Instrume-ntal Intensity	Bldg Insured Value	Contents Insured Value
ROADS & AIRPORTS - FUEL ISLAND / CONTROL BLDG	115	Violent	Heavy	IX		
SOUTH COUNTY ANIMAL SHELTER	115	Violent	Heavy	IX		
ROADS & AVIATION OPERATIONS-SAN MARTIN AIRPORT	115	Violent	Heavy	IX		
HOLDEN RANCH COMPLEX	115	Violent	Heavy	IX		
SCVHHS - Mental Health	115	Violent	Heavy	IX		
AVIATION REID HILLVIEW AIRPORT	115	Violent	Heavy	IX		
SSA GENERAL ASSISTANCE OFFICE	115	Violent	Heavy	IX		
METHADONE CLINIC ALEXIAN	115	Violent	Heavy	IX		
CalWorks, Employment Connection	115	Violent	Heavy	IX		
SOCIAL SERVICES-EAST VALLEY	115	Violent	Heavy	IX		
SSA GAIN OFFICE	115	Violent	Heavy	IX		
SSA NUESTRA CASA RESOURCE CTR	115	Violent	Heavy	IX		
GSA COMMUNICATIONS-REPEATER	115	Violent	Heavy	IX		
LOS GATOS MUNICIPAL COURT	115	Violent	Heavy	IX		
COMM. ASSOC. MENTALLY RETARDED	115	Violent	Heavy	IX		
GSA COMMUNICATIONS-REPEATER	115	Violent	Heavy	IX		
PALO ALTO AIRPORT	115	Violent	Heavy	IX		
SSA JOB TRAINING PARTNERSHIP CTR	115	Violent	Heavy	IX		
SSA JOB TRAINING PARTNERSHIP CTR	115	Violent	Heavy	IX		
ROADS OPERATIONS-	115	Violent	Heavy	IX		

Critical Facility	Peak Acceleration (%G)	Perceived Shaking	Potential Damage	Instrume-ntal Intensity	Bldg Insured Value	Contents Insured Value
ADMINISTRATION						
ROADS OPERATIONS-DIVISION MODULAR	115	Violent	Heavy	IX		
GILROY FAMILY COMMUNITY CENTER /CHILD CENTER	115	Violent	Heavy	IX		
Public Health	115	Violent	Heavy	IX		
SSA CHILD PROTECTIVE SERVICES	115	Violent	Heavy	IX		
SSA - Calworks, CWES, DFCS	115	Violent	Heavy	IX		
SSA DO / WEST VALLEY	105	Violent	Heavy	IX		
SOCIAL SERVICES SPEDY PROGRAM	105	Violent	Heavy	IX		
HEALTH DEPT.-LAB	105	Violent	Heavy	IX		
PUBLIC HEALTH	105	Violent	Heavy	IX		
SSA-NTR / AACI SR. NUTRITION PROGRAM	105	Violent	Heavy	IX		
VMC-HEALTH MAINT. (BUTLER BLDG)	105	Violent	Heavy	IX		
Warehouse	105	Violent	Heavy	IX		
VMC OT THER, XRAY & HEALTH TOBACCO	105	Violent	Heavy	IX		
VALLEY MEDICAL CENTER COMPLEX	105	Violent	Heavy	IX		
COLUMBIA NEIGHBORHOOD HEALTH CENTER	105	Violent	Heavy	IX		
CIVIC CENTER INSTITUTE/PROBATIO N	105	Violent	Heavy	IX		
OLD COURT HOUSE	105	Violent	Heavy	IX		
DOWNTOWN SUPERIOR COURT	105	Violent	Heavy	IX		
Superior Court Administration	105	Violent	Heavy	IX		
Service Center Complex	105	Violent	Heavy	IX		
COUNTY SERVICE	105	Violent	Heavy	IX		

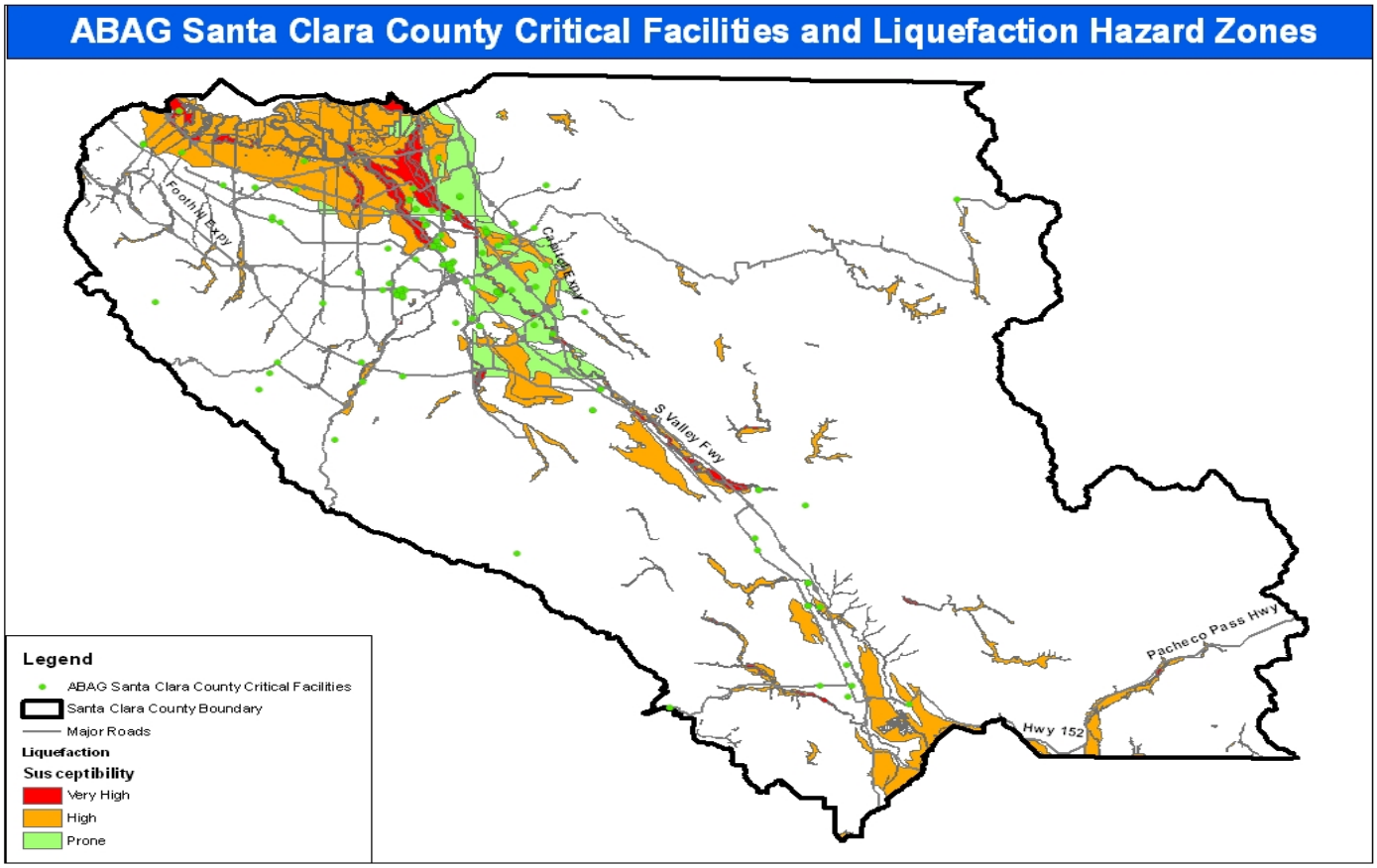
Critical Facility	Peak Acceleration (%G)	Perceived Shaking	Potential Damage	Instrume-ntal Intensity	Bldg Insured Value	Contents Insured Value
CENTER-BUILDING #1						
COUNTY SERVICE CENTER-BUILDING #2	105	Violent	Heavy	IX		
COUNTY SERVICE CENTER-BUILDING #3	105	Violent	Heavy	IX		
COUNTY SERVICE CENTER-LOAD CELL/TEST BUILDING #4	105	Violent	Heavy	IX		
MAIN JAIL NORTH - DOC	105	Violent	Heavy	IX		
PUBLIC DEFENDER OFFICE	105	Violent	Heavy	IX		
CCOB-EAST WING	105	Violent	Heavy	IX		
CCOB-WEST WING	105	Violent	Heavy	IX		
GSA-GARAGE	105	Violent	Heavy	IX		
SCVHHS-Alcohol & Drug	105	Violent	Heavy	IX		
DEPT OF FAMILY & CHILDENS SERVICES	105	Violent	Heavy	IX		
VALLEY MEDICAL CENTER-VIP HOUSE	105	Violent	Heavy	IX		
SCVHHS-MENTAL HEALTH	105	Violent	Heavy	IX		
EVT1, East VHC WIC Modular	105	Violent	Heavy	IX		
EVT 2 - East Valley Clinic Modular	105	Violent	Heavy	IX		
HEALTH-DRUG ABUSE	105	Violent	Heavy	IX		
REPEATER STATION/TA TRANSIT/PUB DEF	105	Violent	Heavy	IX		
GSA COMMUNICATIONS-COPERNICUS PK REPEATER	105	Violent	Heavy	IX		
SOCIAL SERVICES OFFICES	105	Violent	Heavy	IX		
PROBATION-WORK FURLOUGH CENTER	105	Violent	Heavy	IX		

Critical Facility	Peak Acceleration (%G)	Perceived Shaking	Potential Damage	Instrume-ntal Intensity	Bldg Insured Value	Contents Insured Value
GSA COMMUNICATIONS-COYOTE PEAK REPEATER	105	Violent	Heavy	IX		
GSA COMMUNICATIONS-REPEATER	105	Violent	Heavy	IX		
GSA COMMUNICATIONS-MT. RODANI REPEATER	105	Violent	Heavy	IX		
ESA ,HCD/SOLID WASTE MGMT,CEO Affor. Hsg...	105	Violent	Heavy	IX		
OSEC/ESA Risk Management	105	Violent	Heavy	IX		
ROADS AND AIRPORTS ADMINISTRATION	105	Violent	Heavy	IX		
OFFICE OF ESA INSURANCE DIVISION	105	Violent	Heavy	IX		
Office of Public Defender	105	Violent	Heavy	IX		
GSA PROPERTY MANAGEMENT	105	Violent	Heavy	IX		
SOCIAL SERVICES/PUBLIC GUARDIAN/MENTAL HEALTH STOR	105	Violent	Heavy	IX		
Probation Drug and Alcohol	105	Violent	Heavy	IX		
SHERIFF DEPARTMENT	105	Violent	Heavy	IX		
SSA/FAMILY COURT/COUNTY COUNSEL	105	Violent	Heavy	IX		
FAMILY COURT FACILITY	105	Violent	Heavy	IX		
ADMIN SSA	105	Violent	Heavy	IX		
DOC - Day reporting Center	105	Violent	Heavy	IX		
County Center at Charcot, 2310 N. First	105	Violent	Heavy	IX		

Critical Facility	Peak Acceleration (%G)	Perceived Shaking	Potential Damage	Instrume-ntal Intensity	Bldg Insured Value	Contents Insured Value
Street						
County Center at Charcot, 2314 N. First Street	105	Violent	Heavy	IX		
SSA-NTR / EASTSIDE NUTRITION CENTER	105	Violent	Heavy	IX		
SSA NTR-IOLA WILLIAMS CTR	105	Violent	Heavy	IX		
Mental Health	105	Violent	Heavy	IX		
CRIMINAL COURTS ANNEX	105	Violent	Heavy	IX		
Office/Court	105	Violent	Heavy	IX		
HALL OF JUSTICE-EAST WING	105	Violent	Heavy	IX		
MAIN JAIL SOUTH - DOC	105	Violent	Heavy	IX		
HALL OF JUSTICE-WEST WING	105	Violent	Heavy	IX		
1875-77 Senter Road Facility - Office	105	Violent	Heavy	IX		
LEXINGTON RESERVOIR	105	Violent	Heavy	IX		
SUNNYVALE MUNICIPAL COURT	105	Violent	Heavy	IX		
OFFICE OF WELFARE TO WORK SERVICES	105	Violent	Heavy	IX		
SSA-NTR SVALE NUTR. CTR / METHODIST CHURCH	105	Violent	Heavy	IX		
DEPARTMENT OF FAMILY AND CHILDREN SERVICES	105	Violent	Heavy	IX		
ROADS OPERATIONS	105	Violent	Heavy	IX		
Superior Court - Morgan Hill Court House	105	Violent	Heavy	IX		
PROBATION - LABORATORY/STORAGE	105	Violent	Heavy	IX		
PROBATION-ADULT	105	Violent	Heavy	IX		
Wharehouse	105	Violent	Heavy	IX		
PUBLIC HEALTH	105	Violent	Heavy	IX		

Critical Facility	Peak Acceleration (%G)	Perceived Shaking	Potential Damage	Instrume-ntal Intensity	Bldg Insured Value	Contents Insured Value
PARKS - HELLYER CENTRAL YARD SHOP / ALT IC	105	Violent	Heavy	IX		
SSA - General Assistance	105	Violent	Heavy	IX		
SSA - Benefits Call Center	105	Violent	Heavy	IX		
SSA - Calworks Employment Services	105	Violent	Heavy	IX		
SSA-NTR / DODEXHO CATERER CTR.	95	Violent	Heavy	IX		
PUBLIC HEALTH	95	Violent	Heavy	IX		
SSA-NTR / WILLOWS SR. NUTRITION CENTER	95	Violent	Heavy	IX		
WOMENS RESIDENTIAL CENTER (NEW)	95	Violent	Heavy	IX		
SANTA CLARA-SUPERIOR COURT	95	Violent	Heavy	IX		
SSA MONROE HOUSE - CHILD VISITATION	95	Violent	Heavy	IX		
WRIGHT RANCH COMPLEX	95	Violent	Heavy	IX		
WRIGHT CENTER EMERGENCY GENERATOR	95	Violent	Heavy	IX		
SSA - Application Assistance Center	95	Violent	Heavy	IX		
GSA COMMUNICATIONS-OPERATIONS SITE	85	Violent	Heavy	IX		
GSA COMMUNICATIONS-MAIN BLDG	65	Violent	Heavy	IX		
GSA COMMUNICATIONS-SERVICE BLDG.	65	Violent	Heavy	IX		
Carol Drive - Communications - Antenna Tower	65	Violent	Heavy	IX		
ROADS & AVIATION SERVICE BLDG	45	Severe	Moderate/Heavy	VIII		

Earthquake Induced Liquefaction



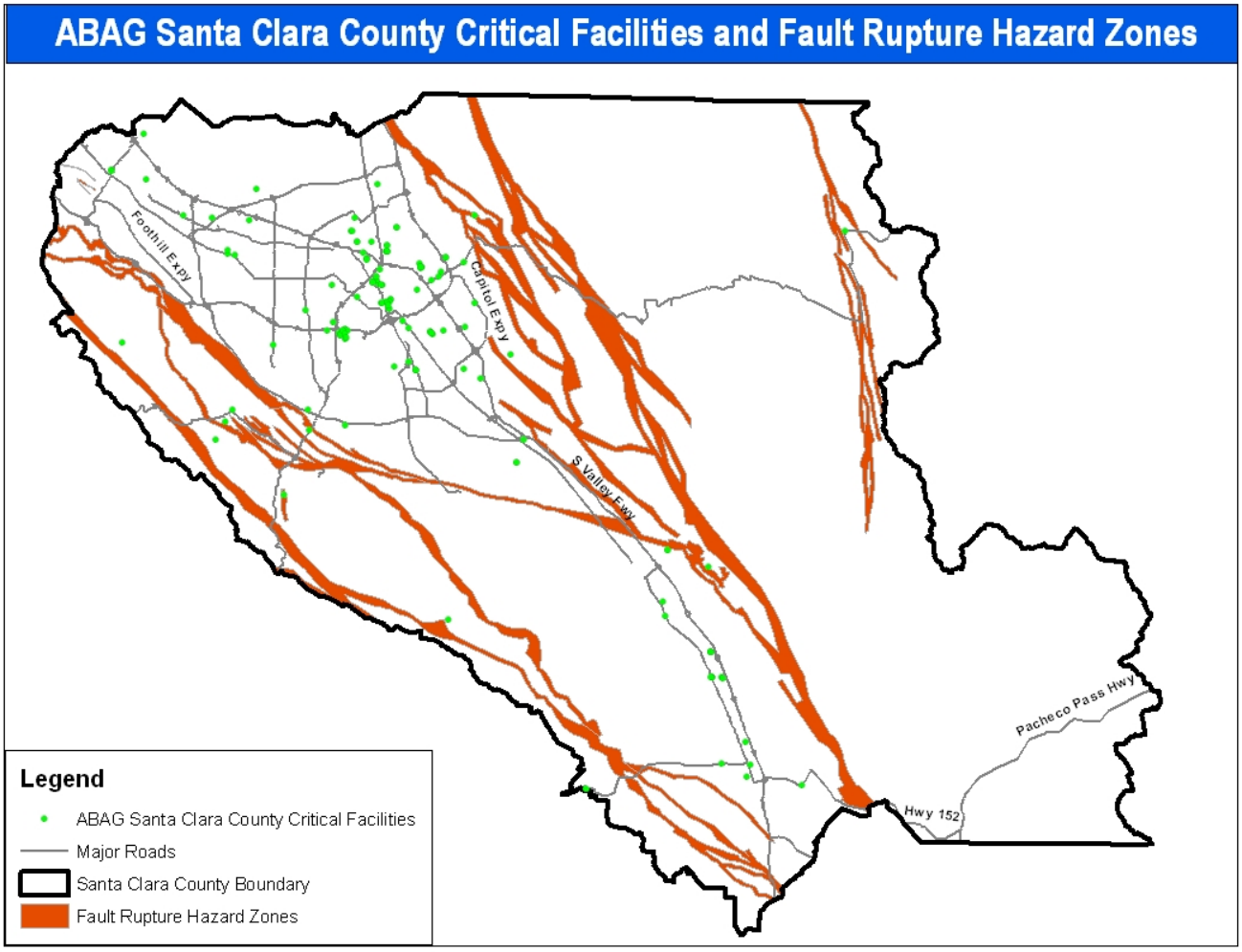
Source: Santa Clara Planning Office

Table 5-3: Critical Facilities within Liquefaction Susceptibility Hazard Zone

Critical Facility	Liquefaction Hazard Zone	Bldg Insured Value	Contents Insured Value
Palo Alto Airport	Very High		
SSA-NTR/DODEXHO Caterer CTR.	High		
Columbia Neighborhood Health Center	High		
South County Animal Shelter	High		
Roads and Aviation Operations-San Martin Airport	High		
Comm. Assoc. Mentally Retarded	High		
Health-Drug Abuse	Prone		
GSA Communications-Copernicus PK Repeater	Prone		
SCVHHS-Mental Health	Prone		

Critical Facility	Liquefaction Hazard Zone	Bldg Insured Value	Contents Insured Value
Aviation Reid Hill View Airport	Prone		
SSA General Assistance Office	Prone		
Methadone Clinic Alexian	Prone		
DOC-Day reporting Center	Prone		
County Center at Charcot, 2310 N First St	Prone		
County Center at Charcot 2314 N First St	Prone		
Cal/Works, Employment Connection	Prone		
Social Services-East Valley	Prone		
SSA Gain Office	Prone		
SSA Nuestra Casa Resource CTR	Prone		
SSA-NTR/Eastside Nutrition Center	Prone		
SSA NTR-IOLA Williams CTR	Prone		
Mental Health	Prone		
1875-77 Senter Road Facility-Office	Prone		
SSA Job Training Partnership CTR	Prone		
SSA Job Training Partnership CTR	Prone		
Probation-Laboratory/Storage	Prone		
Probation-Adult	Prone		
Warehouse	Prone		
Roads Operations-Administration	Prone		
Roads Operations-Division Modular	Prone		
ELMWD Rehab CNTR	Prone		
SSA-Application Assistance Center	Prone		
Parks-Hellyer Central Yard Shop/ALT IC	Prone		
SSA-General Assistance	Prone		
SSA-Benefits Call Center	Prone		
SSA-Calworkds Employment Services	Prone		

Surface Rupture

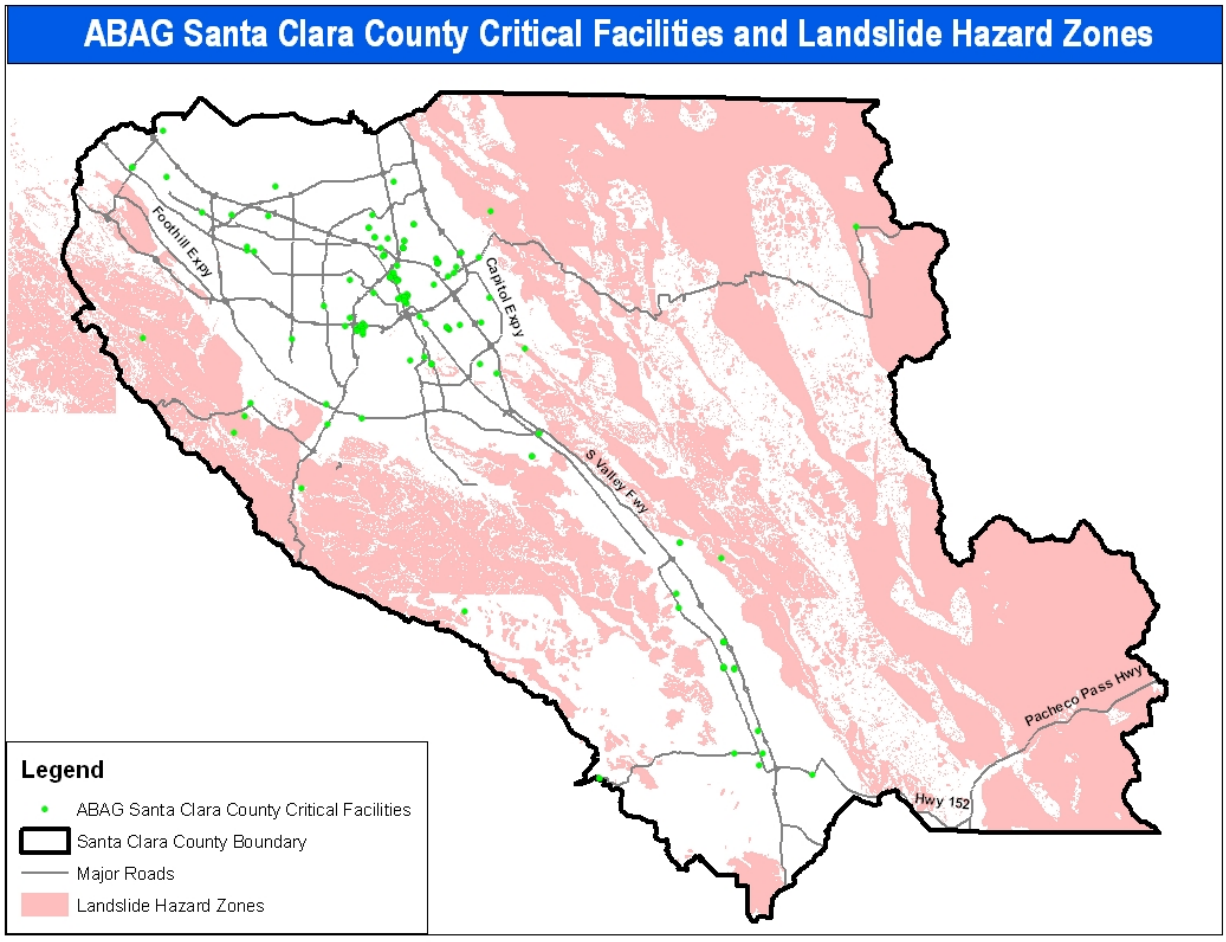


Source: California Geological Survey, State of CA Department of Conservation

Table 5-4: Critical Facilities within Fault Rupture Hazard Zones

Critical Facility	Within Fault Rupture Hazard Zone	Bldg Insured Value	Contents Insured Value
Lexington Reservoir	Yes		
GSA Communications-Repeater	Yes		

Earthquake Induced Landslides



Source: Santa Clara County Planning Office, CA State Department of Conservation

Table 5-5: Critical Facilities within Landslide Hazard Zones

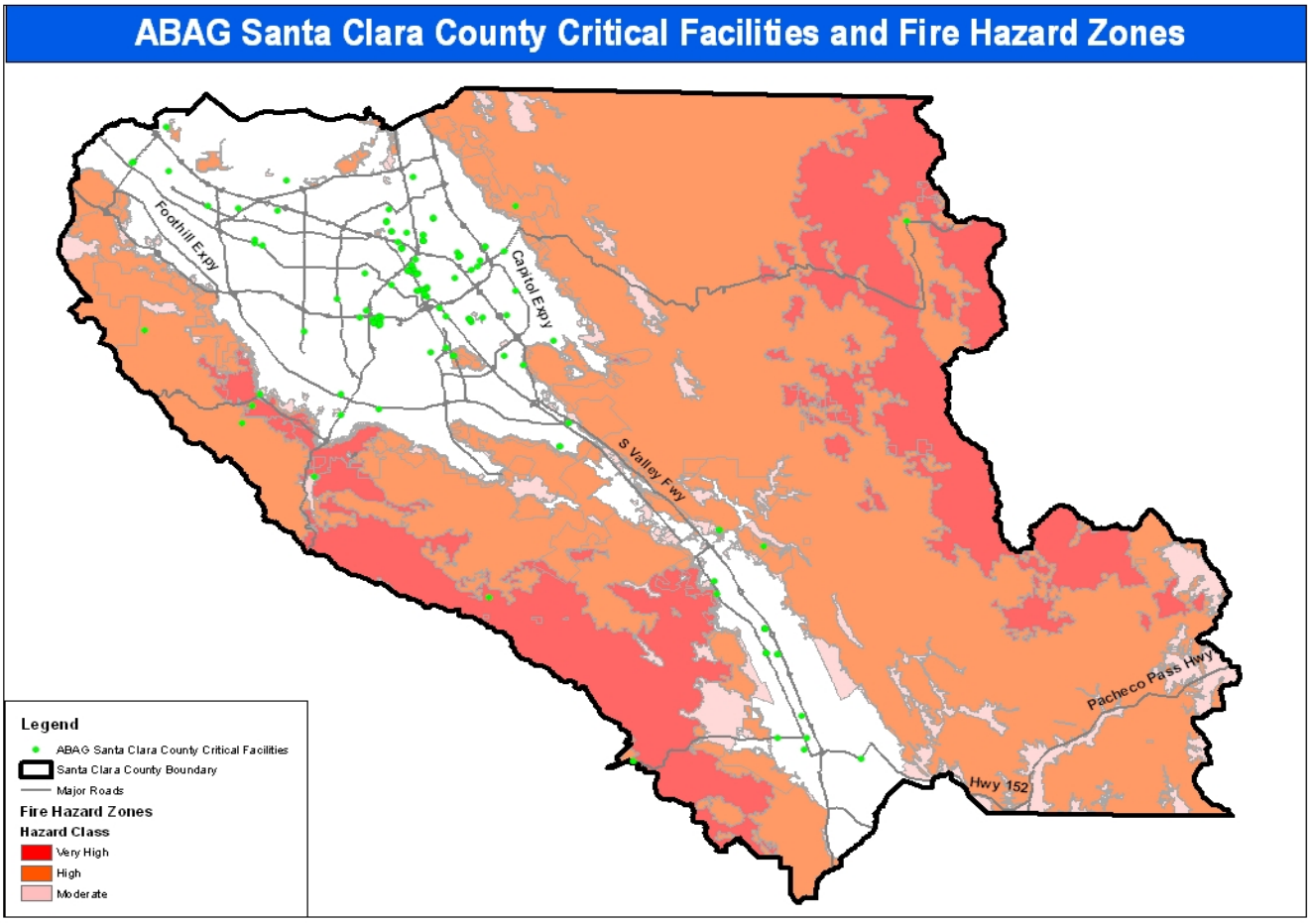
Critical Facility	Within Landslide Hazard Zone	Bldg Insured Value	Contents Insured Value
GSA Communications Operations Site	Yes		
GSA Communications Repeater	Yes		
GSA Communications Mt. Rodani Repeater	Yes		
Lexington Reservoir	Yes		
GSA Communications Repeater	Yes		
GSA Communications Main Bldg	Yes		

Critical Facility	Within Landslide Hazard Zone	Bldg Insured Value	Contents Insured Value
GSA Communications Service Bldg	Yes		
Carol Drive Communications Antenna Tower	Yes		
Roads and Aviation Service Bldg	Yes		

5.2.2.2 Infrastructure Failure

The County of Santa Clara does not have any additional concerns or vulnerabilities regarding the hazard of infrastructure failure as presented in Section 4.

5.2.2.3 Wildfire



Source: CA Department of Forestry and Fire Protection

Table 5-6: Critical Facilities within Fire Hazard Zones

Critical Facility	Fire Hazard Zone	Bldg Insured Value	Contents Insured Value
GSA Communications-Mt. Chual Repeater	Very High		
Lexington Reservoir	Very High		
GSA Communications-Mt. Madonna PK-Repeater	Very High		
GSA Communications Repeater	Very High		
Roads and Aviation Service Bldg	High		
James Ranch	High		
Holden Ranch Complex	High		
GSA Communications Repeater	High		
GSA Communications-Mt. Rodani Repeater	High		
GSA Communications Repeater	High		
GSA Communications-Main Building	High		
GSA Communications-Service Bldg	High		
Carol Drive-Communications-Antenna Tower	High		
Sheriff-West Side Substation	High		
GSA Communications Repeater	High		
Public Health	Moderate		
Parks- Vasona Administration/IC	Moderate		

According to ABAG's exposure analysis, 56 identified critical facilities are within a Wildland Urban Interface area.

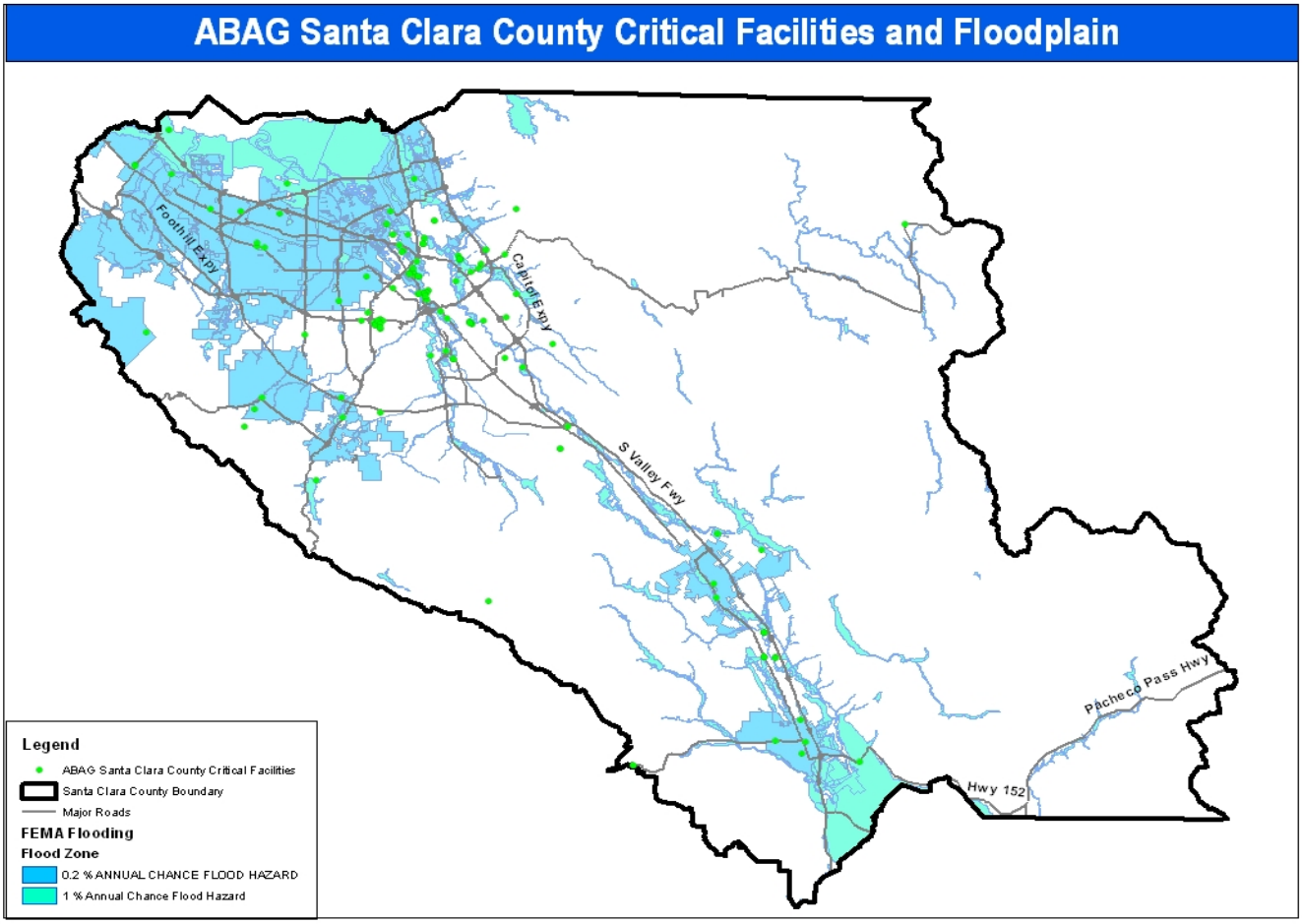
Table 5-7: Critical Facilities within a Wildland Urban Interface Area

Description/Name of Facility	City	WUI
MAIN JAIL NORTH - DOC	SAN JOSE	1
CCOB-EAST WING	SAN JOSE	1
CCOB-WEST WING	SAN JOSE	1
GSA-GARAGE	SAN JOSE	1
ESA ,HCD/SOLID WASTE MGMT,CEO Affor. Hsg...	SAN JOSE	1
OSEC/ESA Risk Management	SAN JOSE	1
SHERIFF DEPARTMENT	SAN JOSE	1
HALL OF JUSTICE-EAST WING	SAN JOSE	1
MAIN JAIL SOUTH - DOC	SAN JOSE	1
HALL OF JUSTICE-WEST WING	SAN JOSE	1
ROADS & AIRPORTS - WAREHOUSE	SAN MARTIN	1
ROADS & AIRPORTS - STORAGE	SAN MARTIN	1

Description/Name of Facility	City	WUI
ROADS & AIRPORTS-SOUTH YARD - OLD BUS TERMINAL	SAN MARTIN	1
ROADS & AIRPORTS - VEHICLE MAINTENANCE	SAN MARTIN	1
ROADS & AIRPORTS - FUEL ISLAND / CONTROL BLDG	SAN MARTIN	1
SOUTH COUNTY ANIMAL SHELTER	SAN MARTIN	1
ROADS & AVIATION OPERATIONS-SAN MARTIN AIRPORT	SAN MARTIN	1
SSA CHILD PROTECTIVE SERVICES	GILROY	1
SSA - Calworks, CWES, DFCS	Gilroy	1
Service Center Complex	San Jose	1
COUNTY SERVICE CENTER-BUILDING #1	SAN JOSE	1
COUNTY SERVICE CENTER-BUILDING #2	SAN JOSE	1
COUNTY SERVICE CENTER-BUILDING #3	SAN JOSE	1
COUNTY SERVICE CENTER-LOAD CELL/TEST BUILDING #4	SAN JOSE	1
PUBLIC DEFENDER OFFICE	SAN JOSE	1
Sheriffs Modular Holding Cells - San Martin	San Martin	1
SOUTH COUNTY COURT COMPLEX	SAN MARTIN	1
SOUTH COUNTY COURT MODULARS	San Martin	1
SHERIFF MODULAR	San Martin	1
GSA COMMUNICATIONS- COYOTE PEAK REPEATER	SAN JOSE	1
ROADS AND AIRPORTS ADMINISTRATION	SAN JOSE	1
WOMENS RESIDENTIAL CENTER (NEW)	SAN JOSE	1
GSA COMMUNICATIONS-MAIN BLDG	SAN JOSE	1
GSA COMMUNICATIONS-SERVICE BLDG.	SAN JOSE	1
Carol Drive - Communications - Antenna Tower	San Jose	1
WRIGHT RANCH COMPLEX	SAN JOSE	1
WRIGHT CENTER EMERGENCY GENERATOR	SAN JOSE	1
PALO ALTO AIRPORT	PALO ALTO	1
Superior Court - Morgan Hill Court House	Morgan Hill	1
ROADS OPERATIONS-ADMINISTRATION	SAN JOSE	1
ROADS OPERATIONS-DIVISION MODULAR	SAN JOSE	1
Public Health	Gilroy	1
PUBLIC HEALTH	MORGAN HILL	1
GSA COMMUNICATIONS WAREHOUSE REPEATER	GILROY	1
SSA-NTR / WILLOWS SR. NUTRITION CENTER	SAN JOSE	1
GSA COMMUNICATIONS-COPERNICUS PK REPEATER	SAN JOSE	1
GSA COMMUNICATIONS-REPEATER	MORGAN HILL	1
GSA COMMUNICATIONS- MT. RODANI REPEATER	SAN JOSE	1
SSA NTR-IOLA WILLIAMS CTR	SAN JOSE	1
1875-77 Senter Road Facility - Office	San Jose	1

Description/Name of Facility	City	WUI
GSA COMMUNICATIONS-OPERATIONS SITE	SAN JOSE	1
GSA COMMUNICATIONS REPEATER	SARATOGA	1
SHERIFF-WEST SIDE SUBSTATION	SARATOGA	1
SSA - Application Assistance Center	SAN JOSE	1
PARKS - HELLYER CENTRAL YARD SHOP / ALT IC	SAN JOSE	1
PARKS - VASONA ADMINISTRATION / IC	LOS GATOS	1

5.2.2.4 Flooding



Source: FEMA- Santa Clara County DFIRM, 2009.

Table 5-8: Critical Facilities within the Special Flood Hazard Area

Critical Facility	Flood Zone (% Annual Chance)	Bldg Insured Value	Contents Insured Value
EVT1, East VHC WIC Modular	1%		
EVT2, East Valley Clinic Modular	1%		
Repeater Station/TA Transit/Pub Def	1%		
ESA, HCD/Solid Waste MGMT, CEO Affor Housing	1%		
OSEC/ESA Risk Management	1%		
Roads and Airports Administration	1%		
Aviation Reid Hill View Airport	1%		
SSA Nuestra Casa Resource CTR	1%		
Mental Health	1%		
Probation-Laboratory/Storage	1%		
Elmwd Rehab CNTR	1%		
Social Services-East Valley	1%		
SSA Gain Office	1%		
SSA-NTR/DODEXHO Caterer CTR	1%		
James Ranch	1%		
Holden Ranch Complex	1%		
Palo Alto Airport	1%		
SSA-General Assistance	1%		
GSA Communications Warehouse Repeater	1%		
Columbia Neighborhood Health Center	.2%		
Public Defender Office	.2%		
CCOB-East Wing	.2%		
CCOB-West Wing	.2%		
GSA-Garage	.2%		
North County Mental Health	.2%		
North County Office, Superior Court	.2%		
Social Services/Public Health Offices	.2%		
Social Services Offices	.2%		
Probation-Work Furlough Center	.2%		
GSA Communications-Repeater	.2%		
Office of ESA Insurance Division	.2%		
Office of Public Defender	.2%		
GSA Property Management	.2%		

Critical Facility	Flood Zone (% Annual Chance)	Bldg Insured Value	Contents Insured Value
Sheriff Department	.2%		
Santa Clara Superior Court	.2%		
SSA/Family Court/County Counsel	.2%		
Family Court Facility	.2%		
Admin SSA	.2%		
Office/Court	.2%		
GSA Communications-Repeater	.2%		
Sunnyvale Municipal Court	.2%		
Office of Welfare to Work Services	.2%		
SSA-NTR SVALE NUTR. CTR/Methodist Church	.2%		
Los Gatos Municipal Court	.2%		
GSA Communications Repeater	.2%		
Comm. Assoc. Mentally Retarded	.2%		
Sheriff-West Side Substation	.2%		
Superior Court-Morgan Hill Court House	.2%		
Probation-Adult	.2%		
Warehouse	.2%		
Gilroy Family Community Center/Child Center	.2%		
Public Health	.2%		
SSA Child Protective Services	.2%		
Public Health	.2%		
SSA-Calworks, CWES, DFCS	.2%		
Parks-Vasona Administration/IC	.2%		

Sea Level Rise

Only two of the identified facilities are expected to be impacted by Sea Level Rise. These are the Palo Alto Airport and SSA-NTR/DODEXHO Caterer Ctr. in Sunnyvale.

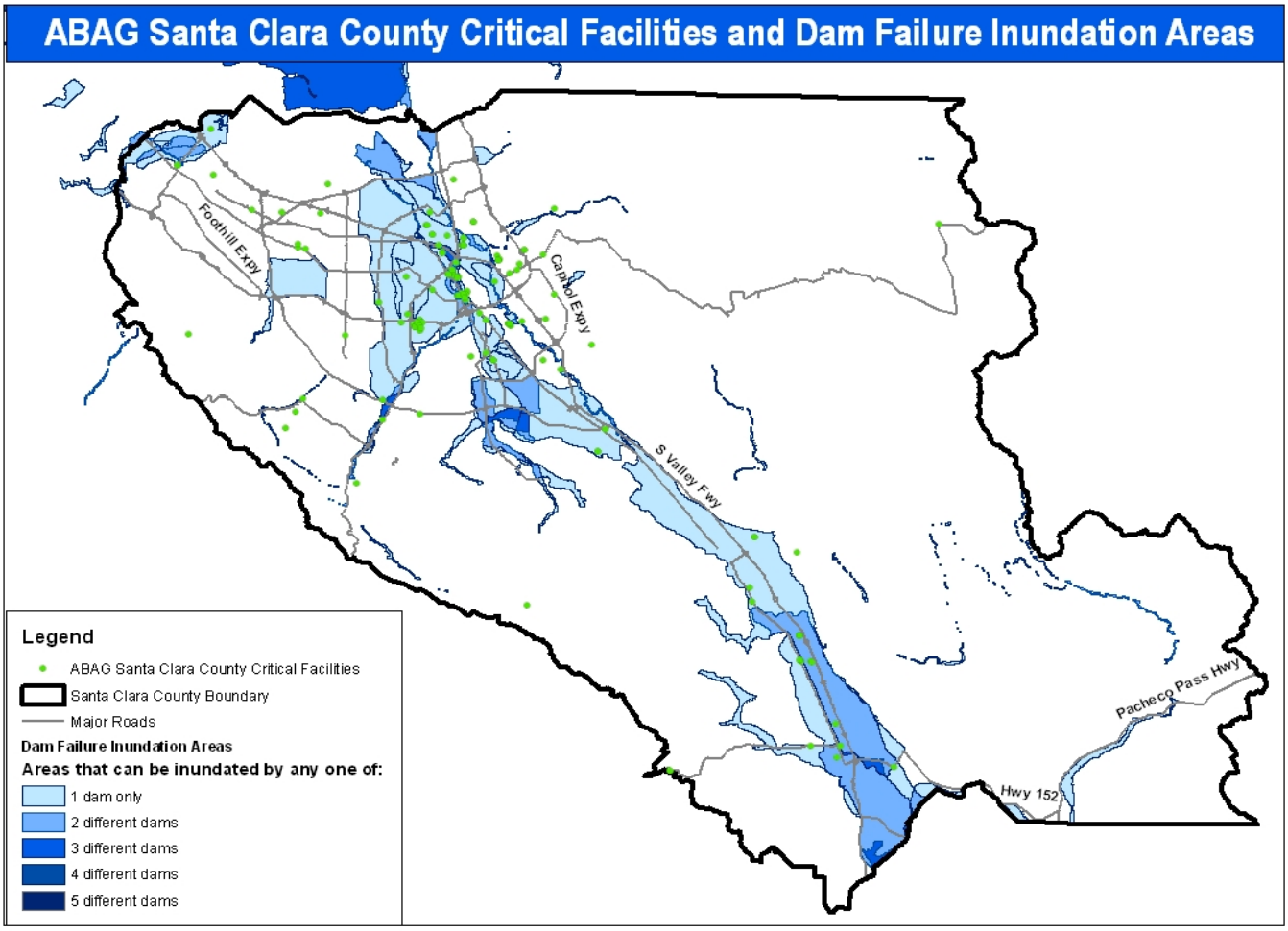
5.2.2.5 Drought

All populations, facilities, and assets are equally at risk to impact from drought. The County of Santa Clara does not have any additional concerns regarding the hazard of drought as presented in Section 4.

5.2.2.6 Solar Storm

All populations, facilities, and assets are equally at risk to impact from solar storm events. The County of Santa Clara does not have any additional concerns regarding the hazard of solar storm as presented in Section 4.

5.2.2.7 Dam Failure



Source: ABAG, 1995. Dam data from California State Office of Emergency Services.

Table 5-9: Critical Facilities within Dam Failure Inundation Areas

Critical Facility	Dam Failure Inundation Area (# of dams)	Bldg Insured Value	Contents Insured Value
MAIN JAIL NORTH - DOC	3		
CCOB-EAST WING	3		
CCOB-WEST WING	3		
GSA-GARAGE	3		
ESA ,HCD/SOLID WASTE MGMT,CEO Affor. Hsg...	3		
OSEC/ESA Risk Management	3		
OFFICE OF ESA INSURANCE DIVISION	3		
SOCIAL SERVICES/PUBLIC GUARDIAN/MENTAL HEALTH STOR	3		
SHERIFF DEPARTMENT	3		
ADMIN SSA	3		
HALL OF JUSTICE-EAST WING	3		
MAIN JAIL SOUTH - DOC	3		
HALL OF JUSTICE-WEST WING	3		
DEPT OF FAMILY & CHILDENS SERVICES	2		
ROADS & AIRPORTS - WAREHOUSE	2		
ROADS & AIRPORTS - STORAGE	2		
ROADS & AIRPORTS-SOUTH YARD - OLD BUS TERMINAL	2		
ROADS & AIRPORTS - VEHICLE MAINTENANCE	2		
ROADS & AIRPORTS - FUEL ISLAND / CONTROL BLDG	2		
SOUTH COUNTY ANIMAL SHELTER	2		
ROADS & AVIATION OPERATIONS-SAN MARTIN AIRPORT	2		

Critical Facility	Dam Failure Inundation Area (# of dams)	Bldg Insured Value	Contents Insured Value
GILROY FAMILY COMMUNITY CENTER /CHILD CENTER	2		
SSA CHILD PROTECTIVE SERVICES	2		
SSA - Calworks, CWES, DFCS	2		
SSA DO / WEST VALLEY	1		
SOCIAL SERVICES SPEDY PROGRAM	1		
HEALTH DEPT.-LAB	1		
PUBLIC HEALTH	1		
SSA-NTR / AACI SR. NUTRITION PROGRAM	1		
VMC-HEALTH MAINT. (BUTLER BLDG)	1		
Warehouse	1		
VMC OT THER, XRAY & HEALTH TOBACCO	1		
VALLEY MEDICAL CENTER COMPLEX	1		
JAMES RANCH	1		
Service Center Complex	1		
COUNTY SERVICE CENTER-BUILDING #1	1		
COUNTY SERVICE CENTER-BUILDING #2	1		
COUNTY SERVICE CENTER-BUILDING #3	1		
COUNTY SERVICE CENTER-LOAD CELL/TEST BUILDING #4	1		
PUBLIC DEFENDER OFFICE	1		
PUBLIC HEALTH	1		
SCVHHS-Alcohol & Drug	1		
VALLEY MEDICAL CENTER-VIP	1		

Critical Facility	Dam Failure Inundation Area (# of dams)	Bldg Insured Value	Contents Insured Value
HOUSE			
SCVHHS-MENTAL HEALTH	1		
Sheriffs Modular Holding Cells - San Martin	1		
SOUTH COUNTY COURT COMPLEX	1		
SOUTH COUNTY COURT MODULARS	1		
SHERIFF MODULAR	1		
SOCIAL SERVICES OFFICES	1		
HOLDEN RANCH COMPLEX	1		
GSA COMMUNICATIONS- COYOTE PEAK REPEATER	1		
ROADS AND AIRPORTS ADMINISTRATION	1		
Office of Public Defender	1		
GSA PROPERTY MANAGEMENT	1		
Probation Drug and Alcohol	1		
WOMENS RESIDENTIAL CENTER (NEW)	1		
SANTA CLARA-SUPERIOR COURT	1		
SSA/FAMILY COURT/COUNTY COUNSEL	1		
FAMILY COURT FACILITY	1		
DOC - Day reporting Center	1		
County Center at Charcot, 2310 N. First Street	1		
County Center at Charcot, 2314 N. First Street	1		
Mental Health	1		
CRIMINAL COURTS ANNEX	1		
Office/Court	1		

Critical Facility	Dam Failure Inundation Area (# of dams)	Bldg Insured Value	Contents Insured Value
GSA COMMUNICATIONS-MAIN BLDG	1		
GSA COMMUNICATIONS-SERVICE BLDG.	1		
Carol Drive - Communications - Antenna Tower	1		
LOS GATOS MUNICIPAL COURT	1		
SSA MONROE HOUSE - CHILD VISITATION	1		
WRIGHT RANCH COMPLEX	1		
WRIGHT CENTER EMERGENCY GENERATOR	1		
PALO ALTO AIRPORT	1		
Superior Court - Morgan Hill Court House	1		
PROBATION -LABORATORY/STORAGE	1		
PROBATION-ADULT	1		
Warehouse	1		
ROADS OPERATIONS-ADMINISTRATION	1		
ROADS OPERATIONS-DIVISION MODULAR	1		
Public Health	1		
PUBLIC HEALTH	1		
GSA COMMUNICATIONS WAREHOUSE REPEATER	1		

5.2.2.8 Disease Outbreak

All populations, facilities, and assets are equally at risk to impact from disease outbreak. The County of Santa Clara does not have any additional concerns regarding the hazard of disease outbreak as presented in Section 4.

5.2.2.9 Freeze

All populations, facilities, and assets are equally at risk to impact from freeze occurrences. The County of Santa Clara does not have any additional concerns regarding the hazard of freeze as presented in Section 4.

5.2.2.10 Wind

All populations, facilities, and assets are equally at risk to impact from high winds. The County of Santa Clara does not have any additional concerns regarding the hazard of wind as presented in Section 4.

5.2.2.11 Heat

All populations, facilities, and assets are equally at risk to impact from extreme heat events. The County of Santa Clara does not have any unique concerns regarding the hazard of heat as presented in Section 4.

5.2.2.12 Agricultural Pest

The County of Santa Clara does not have any additional concerns regarding the hazard of agricultural pests as presented in Section 4.

5.2.2.13 Thunder and Lightning

All populations, facilities, and assets are equally at risk to impact from thunder and lightning events. The County of Santa Clara does not have any additional concerns regarding the hazard of thunder and lightning as presented in Section 4.

5.2.2.14 Siltation – Bay Area

The County of Santa Clara does not have any additional concerns regarding the hazard of siltation as presented in Section 4.

5.2.2.15 Tornado

All populations, facilities, and assets are equally at risk to impact from tornado occurrences. The The County of Santa Clara does not have any additional concerns regarding the hazard of tornado as presented in Section 4.

5.2.2.16 Hazardous Materials

The County of Santa Clara does not have any additional concerns regarding hazardous materials spills as presented in Section 4.

5.2.2.17 Landslide and Debris Flow

The County of Santa Clara does not have any additional concerns regarding the hazard of landslide and debris flow as presented in Section 4.

5.2.2.18 Other Hazards

The County of Santa Clara does not have any additional concerns regarding the hazards of land subsidence, expansive soils, hailstorms, tsunami, and volcano as presented in Section 4.

SECTION 6 COUNTY CAPABILITY ASSESSMENT

6.1 OVERVIEW

The County has chosen to enhance capabilities in public education (OES Website), public notification (AlertSCC), and in effective communications during an incident (WebEOC) as three critical ways to mitigate loss and improve successful response during disasters. The County is in the process of developing a new OES website intended to enhance public awareness of and preparation for disasters. An informed and prepared community is one of the most effective methods of mitigation. AlertSCC is a county-wide notification system capable of using multiple communication modes to send critical messages to selected groups of people in the county. These messages have the potential to dramatically reduce losses of life, property, and public services. WebEOC is a popular software automation of information collection, display, and flow during disasters. It is usable from any web-connected computer (with a browser) and, therefore, enables distributed EOC operations which have the potential to mitigate the adverse effects of loss of centralized EOC operations.

While not identified as a specific mitigation project, the development and support of the Santa Clara CADRE organization has extensive value as a mitigation effort. It is focused primarily of preparation of local businesses and organizations (non-government, faith-based, etc) and integration of their capabilities and resources during disaster response. A key element of this effort is the annual conference, supported entirely by grant funding. American Red Cross and United Way are key leadership organizations in developing CADRE and its programs.

6.2 STAFF AND ORGANIZATIONAL CAPABILITY

6.2.1 Departmental Responsibilities

With a clear hazard mitigation strategy, as outlined in this Local Hazard Mitigation Plan, the County's departments are able to implement their ongoing policies and programs with consideration of the identified hazard risks. In addition, these departments become aware of priority mitigation actions and can offer resources (financial or staffing) to assist with the implementation of those actions.

Santa Clara County operates several departments with capabilities for implementing hazard mitigation strategies. These departments and their roles and responsibilities are summarized in the following table.

Table 6-1: Key Departments in Santa Clara County

Key Departments in Santa Clara County
Departments
• Census 2010 (County Program) Office of the County Executive – Census 2010 Program The Office of the County Executive has formed the Census 2010 Partnership Network with the City of San Jose and Valley Transportation Authority. Working in conjunction with the Federal Census Bureau, the Partnership Network promotes participation in the upcoming census to ensure that every one living in Santa Clara County is accurately counted. The goal is to educate residents, dispel fears and misconceptions, and encourage residents to mail back their census forms. An accurate count is critical for community funding and representation. Census Day is April 1, 2010. Be Counted, Santa Clara County! • Code Enforcement Code Enforcement is a division within the Department Of Planning and Development, an umbrella division that covers code violations for Zoning, Building, Fire Marshal, and Land Development Engineering Divisions. • County 9-1-1 Communications The Mission of County Communications is to provide high quality, cost effective emergency communications services to the public and the public safety community through coordinated emergency 9-1-1 telephone answering and dispatching services and the design, implementation and maintenance of modern communications systems. • Office of Development Services Development Services Office ensures buildings are safe and code compliant through professional plan checking, building inspection and investigation of substandard structures. • Emergency Medical Services The Santa Clara County EMS Agency is charged with the oversight and regulation of the delivery of emergency medical services within the County. The EMS Agency is responsible for developing and coordinating an integrated emergency medical care delivery system, which is composed of education agencies, hospitals and specialty care facilities. Responsibilities include system planning, training program approval, provider and hospital designation, the establishment of appropriate medical, operations, and quality standards, monitoring and facilitating compliance, and the certification, authorization, and accreditation of personnel. The EMS Agency is also responsible for disaster medical-health planning and response. This includes multiple patient management, emergency public health operations, and medical-health mutual aid coordination. • Office of Emergency Services The Office of Emergency Services is responsible for coordinating organized planning efforts with County departments, local cities and special districts to mitigate against, prepare for, respond to, and recover from disasters. The division is responsible for maintaining the County/Operational Area Emergency Operations Centers in a continual state of readiness. Emergency Services also designs,

Key Departments in Santa Clara County

conducts, and evaluates periodic emergency staff training and simulated disaster preparedness and response exercises. The Office of Emergency Services is General Fund-supported.

- **Department of Environmental Health**

The Environmental Resources Agency's Department of Environmental Health protects the health of the community through the enforcement of environmental standards, and through education of residents and businesses. The Consumer Protection Division monitors and protects a variety of basic human needs, including safe food, water, and sewage disposal. The Hazardous Materials Compliance Division regulates the disposal and storage of hazardous materials both above and below ground. The Vector Control District detects and minimizes vector-borne diseases, abates mosquitoes, and assists the public in resolving problems with rodents, wildlife, and insects of medical significance.

- **Facilities and Fleet**

The Facilities and Fleet Department is responsible for the design, construction, maintenance, purchase/sale, and leases of County buildings and property. Provides vehicles to all County agencies and departments on a reimbursable basis.

- **Fire Department**

The Santa Clara County Fire Department is a California Fire Protection District serving Santa Clara County and the communities of Campbell, Cupertino, Los Altos, Los Altos Hills, Los Gatos, Monte Sereno, Morgan Hill and Saratoga. The Operations Division is comprised of four sections: Fire Suppression, Fire Investigation, Emergency Medical Services (EMS), and Hazardous Materials Response (Hazmat). Operations is also responsible for Rescues, and the Special Operations Task Force. More detail available on http://www.sccfd.org/

- **Fire Marshal's Office**

The County Fire Marshal's Office provides fire prevention services throughout the unincorporated areas of the County and for County Facilities, including land development review, construction plan review and inspection, annual inspections of selected occupancies, code enforcement, and hazardous vegetation/debris abatement.

- **Geographic Information Services (County Program)**

Santa Clara County Geographic Information Services works together with other governmental agencies in a sustained effort to provide enhanced access to high quality geographic information in pursuit of better public service.

- **Information Services Department**
- **Measure B Transportation Improvement Program (County Program)**

The Measure B Transportation Improvement program serves as a liaison to the Board of Supervisors to ensure that the financial grants made to the implementing agencies (Valley Transit Authority and County Roads and Airports Department) for acquisition and construction of public transportation facilities are appropriately and responsibly administered.

- **Department of Planning and Development**

The Mission of the Department of Planning and Development is to protect Santa Clara County's

Key Departments in Santa Clara County

natural resources; to ensure quality and sustainable community development and to protect the public health, safety and welfare of our constituents through the application and enforcement of County of Santa Clara's Ordinance Code and land use policies.

- **Office of Planning**

The Planning Office is a division of the Department of Planning and Development. Their primary function is to plan and regulate land use and development within the unincorporated portions of Santa Clara County. They inform property owners, land development specialists, real estate professionals and others of the County's land use and development policies and procedures. They review and process various permit applications such as grading, subdivision, design review and building site approval. They provide support to the Planning Commission and the Board of Supervisors on a variety of land use and development matters. Other responsibilities include policy analysis, GIS services, research and technical assistance relating to land use, housing, environmental protection, historic preservation and demographics.

- **Public Health Department**

The Santa Clara Valley Health & Hospital System (SCVH&HS)'s Public Health Department serves all people of Santa Clara County by protecting health; preventing disease, injury, premature death, and disability; promoting healthy lifestyles, behaviors, and environments; providing high quality, cost-effective medical care to all persons - regardless of ability to pay; and responding to disasters, disease outbreaks and epidemics.

- **Roads & Airports Department**

The mission of the Roads and Airports Department is to preserve, operate, and enhance the County's expressways, unincorporated roads, and three general aviation airports in a safe, timely and cost-effective manner to meet the needs of the traveling public.

- **Santa Clara Valley Health & Hospital System**

The Santa Clara Valley Health and Hospital System promotes a healthy community through a planned, integrated health care delivery system which offers prevention, education and treatment programs to all residents of Santa Clara County, regardless of ability to pay.

- **Office of the Sheriff**

The Santa Clara County Sheriff's Office Preserves the peace, enforces civil orders, makes arrests, investigates public offenses and prevents unlawful disturbances.

- **Social Services and Valley Transit Authority (VTA)**

The County Social Services Agency and the Outreach part of VTA (by agreement with the county) help address mitigation through knowledge of where populations reside with Access of Functional Needs and have the ability to reach them for services or transportation.

6.2.2 Technical Capability

For a successful mitigation program, it is necessary to have a diverse breadth of staff and technical capabilities. Planners, engineers, building inspectors, emergency managers, floodplain managers, people familiar with Geographic Information Systems (GIS), and grant writers are all essential to implementing mitigation actions. The following table summarizes the staffing capabilities available within Santa Clara County.

Table 6-2: Technical Capability Matrix

Technical Capability Matrix							
Land Use Planners	*Civil or Building Engineers*	*Emergency manager*	*Floodplain manager*	*Staff knowledgeable about hazards*	*GIS staff*	*Grant writers*	
Planning and Development, Planning,	Code Enforcement, Development Services, Facilities and Fleet	Emergency Services	Planning and Development, Planning, Code Enforcement	Emergency Services	Geographic Information Systems (County Program)	NONE	

6.2.3 Fiscal Capability

Some of the most relevant departments were examined for their gross expenditures. The values in the table below came from the Santa Clara County Fiscal Year 2010 Final Budget.

Table 6-3: Fiscal Capability Summary

Information Services Department:	*$53,685,726*
County Communications:	*$17,452,254*
Facilities Department:	*$149,797,745*
Fleet Department:	*$20,490,653*
Risk Management Department:	*$69,125,767*
Sheriff's Department:	*$124,737,526*
Santa Clara Valley Health & Hospital System:	*$1,775,747,110*
Public Health Department:	*$72,829,308*
Department of Planning and Development:	*$14,090,431*
Agriculture and Environmental Management:	*$9,708,533*
Roads Department:	*$38,778,660*
Airports Department:	*$3,206,052*
Santa Clara County Fire Department:	*$80,738,600*

6.3 POLICY AND PROGRAM CAPABILITY

The County of Santa Clara has several plans and ordinances in place which provide ample opportunities for implementing the hazard mitigation strategy outlined in this plan. These include the following. Where appropriate a point of contact is identified.

Table 6-4: Available Plans and Ordinances

Capital Improvements Plan	*tbd*
Comprehensive Land Use Plan	*Planning and Development*
Economic Development Plan	*County Executive*
Emergency Operations Plan	*Office of Emergency Services*
Floodplain Management Plan	*Santa Clara Valley Water District*
Hazardous Materials Plan	*County Fire*
Historic Preservation Plan	*Planning and Development*
Open Space Plan	*Planning and Development*
Post-Disaster Redev. Plan	*tbd*
Rad. Response Plan	*tbd*
Storm H_2O Management Plan	*tbd*
General Plan	*Planning and Development*
Flood Damage Prevention Ordinance	*tbd*
Zoning Ordinance	*Planning and Development*
Subdivision Ordinance	*Planning and Development*
Post-disaster Red/Rec. Ordinance	*tbd*
Building Code	*Planning and Development*
Fire Code	*Planning and Development*
National Flood Insurance Program	*tbd*
NFIP Community Rating System	*tbd*

6.3.1 Summary of Relevant Plans

The plans summarized in this section directly facilitate or encourage hazard mitigation. The plans are briefly described as a whole, followed by an overview of relevant sections relating to hazard mitigation.

6.3.1.1 Emergency Operations Plan

The Santa Clara County Operational Area Emergency Operations Plan (EOP) is an all hazards document describing the County's emergency operations organization, compliance with relevant legal statutes, other guidelines, and critical components of the Emergency Response System. This system is activated during extraordinary emergency situations associated with large-scale disasters affecting Santa Clara County and/or the Santa Clara County Operational Area.

The EOP provides a flexible platform for planning and response to all hazards and emergencies. It is applicable to a wide variety of anticipated emergencies including earthquake, wildland/urban interface fires, extreme weather, floods, landslides, terrorism, public health emergencies, technological and resource emergencies, and hazardous materials incidents.

The EOP establishes policies and assigns responsibilities to ensure the effective coordination and support of emergency operations within the County. It provides information on the Operational Area's emergency management structure and how the emergency management team is activated. The roles of field response teams, the emergency operations center, and individual county departments are highlighted in this document.

The four emergency management phases listed below provide the structure to categorize governmental actions.

Preparedness- Preparedness activities, taken in advance of an emergency, help develop operational capabilities, enact protective measures, and enhance effective responses to disasters. These actions can include emergency/disaster planning, training, exercises and public education. The County Office of Emergency Services (OES) has a dedicated full-time Training and Exercise Coordinator to ensure County employees are aware of the EOP and are trained to the levels required by State and Federal guidelines. To promote public awareness and education, the OES makes emergency preparedness information available on the County's website. Citizen preparedness activities include Community Emergency Response Team (CERT) programs. Shelter operations should also be considered during the preparedness phase to accommodate the population who may be forced to evacuate.

Response- County and local governments, volunteer agencies, and segments of the private sector are responsible for initial response operations in an emergency. The County has access to several alert and warning systems that can be used after the event occurs to provide agencies and the public with up to date information. These systems include the Emergency Alert System, National Warning and Alert System, NOAA Weather Radio, California Warning and Alert System, Emergency Digital Information System, Operational Area Satellite Information System, and the California Integrated Seismic Network. The EOC also has a large role in responding to a disaster, providing communication systems for government agencies and volunteer responders with a coordination point during an emergency.

Recovery- There are two phases of recovery, short-term and long-term. Short-term recovery operations will begin during the response phase of emergency. The major objectives of short-term recovery operations include debris removal and clean-up and restoration of essential utility services. Long-term recovery includes hazard mitigation activities, restoration and reconstruction of public facilities, and disaster response cost recovery.

Mitigation- Hazard mitigation activities that may occur after a disaster may include zoning variance improvements, building code changes, plan reviews, seismic safety elements, and other land use planning techniques.

6.3.1.2 General Plan

Safety Element

Development

The county seeks to limit the range of land uses allowed in hazardous areas in order to reduce the exposure of people and buildings to high risk. The policies listed in the Safety Element are intended to discourage development which may place occupants and visitors in unreasonable or avoidable high risk situations. The policies are also intended to minimize the potential for undue financial burden on the County, city governments, and other public agencies by avoiding development which is likely to incur unusually high public service or disaster relief costs.

Hazardous Waste and Materials

The County developed Hazardous Waste Management Plans (CHWMPs) to promote the evaluation of local hazardous waste management issues and needs and to make policy and program recommendations to better protect public health, safety, and the environment while maintaining economic viability. All of the cities in Santa Clara County joined the County in developing a CHWMP in order to create a comprehensive and coordinated countywide approach to hazardous waste management planning. Of particular significance to countywide land use planning is the state requirement that the CHWMP describe the process by which the County and cities will assess current and future hazardous waste facility needs and plan for adequate facility sites. The CHWMP lists criteria to identify the most appropriate locations for hazardous waste facilities in regards to public and environmental safety.

Santa Clara County's Uniform Fire Code, Uniform Building Code, and Hazardous Materials Storage Ordinance all include regulations pertaining to the safe use and storage of hazardous materials and the construction of structures which contain hazardous materials. The policies in the General Plan and the Santa Clara County Land Use Map strive to separate, either geographically or structurally, hazardous activities from other uses. Current regulations bar hazardous material use or storage within a certain distance of such services as day care facilities and restaurants. County and city planning agencies can minimize public safety risks by ensuring that hazardous materials are properly used and stored by using local land use and development regulations.

Emergency Preparedness

Santa Clara County established the Office of Emergency Services (OES) in the 1950's with the responsibility for coordinating all public and private support agencies in the event of a natural or human-caused disaster. These agencies include law enforcement, fire and rescue, health, public works, transportation, welfare, and communications countywide. The OES has also prepared a County Emergency Plan, an "all hazards" plan structured to identify the range and degrees of probable emergency situations, the full range of emergency services which may be needed under a multitude of scenarios, and the timing and coordination of emergency service delivery. The overriding goal of the plan is to identify and organize all County and city service agencies so that they may be applied effectively where and when they are needed.

The General Plan links emergency preparedness and land use by outlining land use policies that can be established to reduce the threat of disasters. Land use policies can require the population to be lower in areas prone to landslides, floods, or wildfires. They can also call for building standards that address earthquake safety concerns. These policies can also direct government agencies in carrying out community and agency education programs, altering citizens and staff as to what to do in the event of an emergency. "Threat Summaries", which include maps of critical risk areas and areas designated as containing significant amounts of hazardous materials in each of the cities, should be considered by planners when site and construction standards are being determined.

Natural Hazards

The major types of natural hazards that are addressed in the Safety Element are geologic and seismic hazards, fire hazards, and flood hazards. Geologic and seismic hazards include landslides, rockslides, mudslides, expansive clays, peat and other highly organic soils, Bay mud and saturated soils, soil creep, and uncontrolled solid waste disposal sites. Fire hazards are more likely to occur in the mountainous areas of Santa Clara County. Flood hazards include stormwater flooding, tidal flooding along the Bay due to levee failures, and inundation due to dam failure. The amount of urban development in flood prone areas over the last 20-30 years has dramatically increased the estimates of potential property damage from major flooding and has also increased the amount of impervious surfaces, which increases the amount of stormwater runoff.

Public policies can be used to protect public safety and property in Santa Clara County. Primary examples include building codes intended to increase the ability of structures to withstand earthquakes, flood control projects, and public safety agencies' capability to respond adequately to hazards when they occur.

There are also various countywide strategies for reducing the threat of natural hazards to life and property that are listed in the General Plan. One strategy is to inventory hazards and monitor changing conditions so that there is adequate documentation of natural hazards areas, such as flood plains, landslide areas, fault traces, and high fire hazard areas, and so that planners are able to

determine the appropriate densities and placement of structures, particularly schools, landfills, and hazardous materials storage facilities, in these areas.

Another strategy is to minimize the resident population within a high hazard area and to limit the expansion of Urban Service Areas so they do not cross into undeveloped areas of significant hazards. Areas of significant natural hazards, especially areas of high or extreme fire hazard, can instead be designated in the County's General Plan as Resource Conservation Areas with low development densities. Areas of persistent flooding and areas of potential inundation from dam failure can be designated for agricultural land uses or other suitable open space use.

A third strategy requires designing, locating, and regulating development to avoid or withstand potential hazards. Development which does occur in areas subject to natural hazards must be designed, constructed, and maintained to reduce the effects of hazards to occupants as well as to the community. For example, stringent engineering standards should be applied to dwellings in areas of soil instability. Also, mandatory sprinkler systems, fire retardant materials, and vegetation clearances around structures should be used when designing new development in extreme fire hazard areas.

Land Use regulations in rural unincorporated areas are stringent. In rural unincorporated areas affected by the highest potential hazards, such as floodways, active landslides, fault traces, and airport safety zones, no new habitable structures shall be allowed. In areas of lesser hazards, there shall be no major structures for involuntary occupancy, such as schools, hospitals, correctional facilities, or convalescent centers. Critical structures and infrastructure vital to public health, safety, and general welfare, structures proposed for both involuntary and voluntary occupancy, as well as clustered development projects, are all not permitted to be built in areas subject to significant impacts from geologic or seismic hazards. Adequate access and water supplies for fire safety should be required for new development in rural unincorporated areas. For communities in areas of high or extreme fire hazards that have developed under development densities greater than generally allowed under current General Plan policies, water systems with hydrants should be provided.

The County would also like to reduce the magnitude of hazards. For example, flood control projects include deepening waterways and straightening channels to increase the capacity of local drainage systems, building levees along the baylands to protect low-lying lands adjacent to the Bay, and reinforcing dams to protect against earthquakes and flood waters. In rural areas, fire protection agencies and districts should utilize controlled burns and other forms of vegetation management to reduce the buildup of vegetative matter and the potential fire hazard within the area.

A final strategy the County documents in the General Plan is to provide public information regarding natural hazards through information publications, emergency preparedness events, involvement of local media, and the system of public education. Any known hazard information should be reported as part of every real estate transaction in accordance with state law.

Aviation

There are five airports in Santa Clara County: San Jose International Airport, Moffett Naval Air Station, and three civilian airports, Palo Alto, Reid-Hillview in San Jose, and South County Airport in San Martin. General strategies for airport safety in Santa Clara County include limiting population densities and land uses within designated airport safety zones and regulating structures and objects in this zone that could be hazardous or distracting to air navigation.

Land Use Element

Santa Clara County will continue to grow in population and employment through the 1990s. Most of the county's future growth should be accommodated within existing urban areas, rather than by expanding into non-urban areas. One strategy to promote urban development within existing urban areas is to endorse compact urban and mixed use development patterns. To make more efficient use of the existing supply of lands in urbanized areas, Urban Growth Boundaries could be established. Long term urban growth boundaries delineate areas intended for future urbanization from those not intended for urban uses. These boundaries can be instrumental in addressing the types and locations of natural hazard areas as well as preventing the urbanization of these areas. Urban Service Areas are another technique used to control the location of future urban expansion. They include only those areas that are suitable for urban development, which includes areas that are relatively free from risks associated with natural hazards. Hazard areas with the following characteristics will be considered unsuited for urban development:

- Flood potential, including areas designated as floodways, tidal zones, coastal high hazard areas, and federal flood insurance rate zones (FIRMs) by the National Flood Insurance Program
- Seismic and geologic hazards
- Areas of soil creep, saturated soils, and areas where the water table is 3 feet or less below the surface
- Areas generally above 15% slope

The vast majority of lands in County jurisdiction outside cities are hillside lands with slopes varying between approximately 10-75%. The Diablo Range and its eastern foothills flank the Santa Clara Valley on the east, and the Santa Cruz Mountains and foothills flank the valley lands on the western side of the County. Within these areas, development through subdivision and through single-site approvals has occurred over time under evolving land use controls. Each development is evaluated with regard to the particular geologic and seismic hazards that may exist, fire hazards, slope constraints and access issues, and septic system suitability, among other development issues. Building Site Approval and grading permit s are also necessary prerequisites of safe and properly-designed land development in rural hillside areas.

Special Areas Plans that address issues or areas of concern to multiple jurisdictions, such as areas that have geologic and seismic conditions which create difficulties in defining allowable building

sites, can be prepared for rural unincorporated areas that may benefit from more detailed planning, policies, and implementation measures.

Housing Element

The housing codes of Santa Clara County and the cities within the County are designed to ensure that existing dwelling units are maintained in a safe and healthy condition. Code enforcement programs should continue to be used to correct immediate housing hazards and should also be coordinated with other neighborhood improvement efforts so as to address the problems of each area comprehensively. Incentives for code compliance, such as tax incentives and low interest loans or grants, should be offered in an effort to encourage owners to rehabilitate their property instead of opting for demolition.

6.3.1.3 Floodplain Management Plan

In an effort to reduce the risk of loss of life, health, and property due to periodic flood inundation, Santa Clara County has developed a floodplain management plan. The plan is designed to minimize the expenditure of public money for flood control projects, the need for rescue and relief efforts, business interruptions, damage to public facilities and utilities, and future blighted areas caused by flood damage. The floodplain management plan also ensures that potential buyers are notified that property is in an area of special flood hazard and that those who occupy property in those areas are held responsible for their actions.

To reduce flood losses, the plan includes methods and provisions to control the alteration of natural floodplains, stream channels, and protective barriers; to control filling, grading, dredging and other development that can increase flood damage; to regulate the construction of flood barriers which can divert flood waters or increase flood hazards in other areas; and to require that uses vulnerable to floods be protected against flood damage at the time of their construction. One of the provisions of this plan is that a development permit must be obtained before any construction or development begins and that certain construction standards such as; anchoring, building with flood resistant materials, and elevating and floodproofing, are required within an area of special flood hazard. The plan also enforces that new and replacement water and sanitary sewage systems should be designed to minimize flood water infiltration and discharge into flood waters. Standards are also included for subdivisions, manufactured homes, and recreational vehicles. Special consideration and construction standards for mudslide and erosion prone areas are also listed in this document. Since floodways are extremely hazardous, no new development is permitted to be constructed in these areas unless certification by a professional engineer or architect is provided demonstrating that the development will not increase base flood elevations. This ordinance also has special regulations for new development within a coastal high hazard area. These regulations ensure that new construction is located on the landward side of the reach of mean high tide, the space below the lowest floor is free of obstructions or constructed with breakaway walls and is not used for human habitation, there is no manmade alteration of sand dunes, and that fill is not used as structural support of a building.

6.3.1.4 Capital Improvement Plan

Santa Clara County's Capital Improvement Plan includes various projects that have been planned or completed to help mitigate potential hazards and to promote disaster and emergency preparedness. These projects are grouped under the following category headings: Finance and Government Operations, Public Safety and Justice, Health and Hospital, and Housing, Land Use, Environment and Transportation.

Finance and Government Operations

To help prevent damages that could occur in the event of an earthquake, seismic upgrades were completed on county courthouses in Palo Alto, Los Gatos, Santa Clara, and the Hall of Justice West in San Jose. A seismic evaluation has been proposed for a county critical facility on Berger Drive in San Jose, in which the Registrar of Voters and the ISD server room that provides much of the computer services for County operations are both located.

"Communications Hill", the County's communications facility located in San Jose, is another county critical facility that is planned to be upgraded to ensure its safety and reliability in the future. An upgrade to the fire protection water system at this facility was already completed. A plan to install a waterless fire suppression system at this facility and another communications facility in the county in an effort to reduce the damage to data servers and voice systems is being considered; however, the plan has not been funded in the FY 2010 budget. The County has also included a plan to construct a new access road to the communication facility. The County believes if the existing road were to become impassable, the impact could be significant: emergency dispatchers could not report for duty to relieve other dispatchers from their shift; technicians may not be able to reach critical equipment in need of repair; emergency communications vans could not be deployed if needed for coordination of resources at the scene of a major incident; and emergency service vehicles could not respond to fire, medical, or law enforcement emergencies at the facility. Despite being listed in the County's CIP, this project is unfunded. Plans to construct a new fence around the perimeter of the facility to ensure its security are included in the CIP. This project was funded and was expected to begin in February 2009.

The Santa Clara County Planar Solid Oxide Fuel Cell project involves the design and installation of a stationary power generation system to be located in San Jose. The county requires this system to deliver a reliable electrical energy supply for use at the 911 call center. The fuel cell system was installed and began operations in 2008.

The Fleet Facility Consolidation project entails the purchase and reconstruction of a building in San Jose to be used as a Fleet maintenance facility as well as a disaster logistics supports facility. This facility supports the County's plan to be prepared in the event of a disaster and is fully funded and is expected to be completed in 2010.

Plans to construct a water line that would supply water for firefighting capability to the Sheriff's firing range, the Mariposa Lodge, and House on the Hill complex in San Jose are also listed in the County's CIP. The project would help to ensure that this complex would be protected in the event of a fire. The design of the water system began in 2008.

Public Safety and Justice

The Sheriff's Office at 55 West Younger Avenue in San Jose is served by a single set of conduits and wiring to AT&T's network infrastructure. According to the County's CIP, damage to the wiring or conduit would severely affect operation of the County's Office of Emergency Services, Emergency Operations Center, and Sheriff's Department communication outside of the facility. In order to ensure there is no interruption in communication, a project to survey the current infrastructure and to design new conduit paths for data and telecommunications lines has been proposed, but is not funded in the FY 2010 Capital Budget.

A project designed to provide the Elmwood Correctional Facility with an emergency water supply has been funded and is in the design stages. A redundant water supply is necessary in the event of an earthquake or other emergency that disrupts the main water supply. Fire safety enhancements and various security upgrade projects have also been approved for this facility.

A project designed to upgrade the firefighting capability and fire protection water capacity at the Muriel Wright Center in San Jose is nearing completion. This project will help protect the center in the event of a fire.

Health and Hospital

The Valley Medical Center Seismic Safety Project is a study being conducted that assesses how to make substantial changes to the Valley Medical Center facilities so that it complies with state legislation, mandating the mitigation of seismic risk liability for hospitals on the following timeline: by 2013/15, buildings are to remain standing and occupants able to exit safely after a seismic event, and by 2030, buildings are to remain operational and capable of providing acute-care medical services to the public after a seismic event. The study portion of this project has been funded.

Housing, Land Use, Environment, and Transportation

Various road and bridge projects are funded and have either been completed or are taking place throughout Santa Clara County. These projects ensure safety for vehicles and pedestrians and help to reduce the risk of traffic accidents. In addition, a culvert maintenance project was funded to fix damages on the San Tomas Expressway box culvert. Culvert maintenance can help prevent flooding and flood damages.

To help prevent damage from an earthquake, a seismic retrofit project of the Central Expressway Overcrossing in Santa Clara was completed in 2009. The retrofit will help the overcrossing to withstand a maximum credible earthquake of Richter magnitude 6.5.

6.3.2 Summary of Relevant Ordinances

Santa Clara County identified several ordinances and policies currently utilized for hazard mitigation in the matrix of regional mitigation strategies prepared by ABAG as part of the 2010 plan update. Below is a summary of these key ordinances and policies.

A8-26: Civil Protection and Emergency Services: This ordinance establishes the Santa Clara County Emergency Organization, County of Santa Clara Disaster Council, and County of Santa Clara Office of Emergency Services, and also defines the coordination and direction of these organizations. Section A8-26 of this ordinance indicates the powers and duties of the Emergency Services Manager.

Building Codes: The building code of Santa Clara County is the 2010 California Building Code, which is based on Volumes I and II of the 2009 International Building Code.

CSC Geologic Ordinance Section C12-600: This chapter establishes minimum requirements for the geologic evaluation of land based on proposed land uses. It further establishes procedures to enforce these requirements, including regulations for the development of land which is on or adjacent to known potentially hazardous areas, or which has the potential to create or increase the risk of geologic hazard.

6.3.3 National Flood Insurance Program

For decades, the national response to flood disasters was simply to provide disaster relief to flood victims. Funded by citizen tax dollars, this approach failed to reduce losses and didn't provide a way to cover the damage costs of all flood victims. To compound the problem, the public generally couldn't buy flood coverage from insurance companies, because private insurance companies consider floods too costly to insure. In the face of mounting flood losses and escalating costs of disaster relief to U.S. taxpayers, Congress established the National Flood Insurance Program (NFIP). The goals of the program are to reduce future flood damage through floodplain management, and to provide people with flood insurance. Community participation in the NFIP is voluntary.

The County of Santa Clara has participated in the National Flood Insurance Program since 1978. All residents of the County are eligible to purchase federal flood insurance. The County continues to maintain full compliance with the NFIP.

6.3.3.1 Community Rating System (CRS)

The CRS is a voluntary part of the National Flood Insurance Program that seeks to coordinate all flood-related activities, reduce flood losses, facilitate accurate insurance rating, and promote public awareness of flood insurance by creating incentives for a community to go beyond minimum floodplain management requirements. The incentives are in the form of insurance premium discounts. CRS ratings are on a 10-point scale (from 10 to 1, with 1 being the best rating), with residents of the community who live within FEMA's Special Flood Hazard Areas (SFHA) receiving a 5% reduction in flood insurance rates for every Class improvement in the community's CRS rating. Santa Clara County joined the Community Rating System in 2004 but as of October 2010 has a "rescinded" status. The county's class 10 rating results in no discounts for flood insurance premiums. All insurance rates are based on where the structure is located in FEMA's Flood Insurance Rate Maps (FIRMs). The most recent Digital FIRMs were adopted by the City on May 18, 2009.

6.3.3.2 Repetitive Loss Properties

The Federal Emergency Management Agency (FEMA) insures properties against flooding losses in the Bay Area through the National Flood Insurance Program.

As part of the process to reduce or eliminate repetitive flooding to structures across the United States, FEMA has developed an official Repetitive Loss Strategy. The purpose behind the national strategy is to identify, catalog, and propose mitigation measures to reduce flood losses to the relatively few number of structures that absorb the majority of the premium dollars from the national flood insurance fund.

A *repetitive loss property* is defined by FEMA as "a property for which two or more National Flood Insurance Program losses of at least $1,000 each have been paid within any 10-year period since 1978."

The County of Santa Clara has ten repetitive flood loss properties. The following is a table summarizing repetitive losses in the County. These properties are all residences in San Martin. At the time of this plan update, the County had no plans for mitigating flood loss to these properties.

City and County	Total Payments ($)	Average Payment ($)	Losses	Properties	Properties (as of 2004)
Santa Clara County (unincorporated)	341,585.74	12,651.32	27	10	8

Source: http://quake.abag.ca.gov/mitigation/floodloss/

6.3.4 Political Capability

The County administration supports the implementation of hazard mitigation in the following ways:

- Utilization of grant sources towards hazard mitigation.
- Joint planning with all local cities and ABAG (Association of Bay Area Governments).
- Encouraging information sharing across sectors – public and private.

Anticipated challenges include project funding and maintaining the interest, momentum and consensus of multiple local jurisdictions simultaneously during a period of reduced local government resources. Furthermore, the County faces the challenge of motivating the private sector to share critical infrastructure information pro-actively so that we can identify and mitigate single points of failure and common points of failure.

Table 6-5: Capability Self-Assessment

Capability Self-Assessment					
	Planning and Regulatory Capability	*Administrative and Technical Capability*	*Fiscal Capability*	*Political Capability*	*Overall Capability*
	medium	high	low	medium	medium

6.3.5 Resource List

Documents used in the assembly of this Capability Assessment include: County website, Santa Clara County Fiscal Year 2010 Final Budget, Emergency Operations Plan, General Plan, Floodplain Management Plan, Capital Improvements Plan, ABAG mitigation Strategies List.

SECTION 7 COUNTY MITIGATION STRATEGY

7.1 MITIGATION PROGRESS

7.1.1 Accomplishments to Date and Current Projects

Santa Clara County Facilities and Fleet has identified seismic retrofit priorities and is seeking FEMA PDM funding for four courthouse retrofit projects. This same organization is also implementing an emergency generator program funded by the General Fund.

The Santa Clara County Emergency Manager's Association is sponsoring an evacuation mapping project spearheaded by south county. It will include:

1. Fire: evacuation routes and staging areas (Cal Fire); (SCVWD is providing pilot GIS support).
2. Flood: 1% annual chance flood boundaries, evacuation map and staging areas
3. Levee Failure: 200 year event
4. Dam Inundation

This project supports several of the identified mitigation actions presented in this section (action #s: 11, 19, 29, 23, 24, 28, 27, and 34). It includes fuel pipelines, natural gas pipelines, water pipelines, sewer pipelines, evacuation routes, dam inundation, WUI, levee, flood hotspots, maintenance plan/procedures, WebEOC, public information.

In addition, Section 6.2.1.4, which summarizes the County's Capital Improvement Plan, highlights several projects that have been completed or are currently funded to help reduce future damage from hazards. Future updates of this plan will use this section to report on progress of the Mitigation Actions listed in Section 7.3.

7.1.2 Wildfire

There are several Community Wildfire Protection Plans within Santa Clara County. These include Croy Fire Area CWPP, East Foothills CWPP and Lexington Hills CWPP. More details are available on http://www.sccfiresafe.org/. At the time of this plan update there were no Firewise communities in Santa Clara County.

7.2 MITIGATION PRIORITIES/OBJECTIVES

In preparation of the 2005 plan, the County helped ABAG in the development and review of the comprehensive regional list of mitigation strategies. Similarly, the County participated in the revision of the regional strategies for development of this annex. Appendix G of Taming Natural Hazards presents a summary list of mitigation strategies with regional priorities and the hazards mitigated. The County ranked those strategies in a spreadsheet provided by ABAG using the following scale:

Existing Program
Existing Program, Underfunded
Very High – Unofficial Program – Becomes Official on Plan Adoption, No Funding Needed
High – Actively Looking for Funding
Moderate
Under Study
Not Applicable, Not Appropriate, or Not Cost Effective
Not Yet Considered

Results of this ranking may be viewed online at http://www.abag.ca.gov/bayarea/eqmaps/mitigation/strategy.html. A summary of these rankings is presented in County Attachment 12: County Strategies 2010.

The countywide Local Planning Team reviewed the priorities as ranked by the participating Santa Clara County jurisdictions to determine the operational area priorities. Based on the hazard profiles and vulnerability assessments, the Local Planning Team identified five priority mitigation categories to focus on for the next five years. These priorities were determined during Local Planning Team milestone meeting #2 and further defined during the Mitigation Action Week workshops. This section includes a discussion of each priority and concludes with concrete mitigation objectives which will guide the County's implementation of mitigation actions through the life of this plan.

7.2.1 Unreinforced Masonry (URM) / Soft-Story Buildings Priority

The 1994 Northridge earthquake left Santa Clara County with the visual image of whole apartment buildings collapsed onto the cars parked on the ground floor. As a result of these earthquakes, many buildings over a wide area suffered significant damage. A high percentage of the collapsed or destroyed buildings in both the Marina District and in Northridge shared a common feature - they fit the definition of a "soft-story building." A soft-story building is a multi-story structure in which the ground floor has wide doors; large unobstructed show windows and other large openings in place of shear walls that could provide needed stability, including parking spaces. A typical soft-story building is a several-story apartment building located over a parking garage or a series of retail businesses. Santa Clara County still has unreinforced masonry (URM) and soft-story structures. URM/soft-story will be the first structures to fail and collapse in an earthquake, posing an unnecessary risk to the residents within.

Return on Investment

There have been significant and frequent changes in building code provisions since the 1994 Northridge earthquake, which indicated clear defects in the 1978 building code revision. URM/Soft-Story only represents the bare minimum Santa Clara County should be addressing based on what they already know from the constantly evolving science of earthquake-resistant structural engineering.

Businesses need to understand that they will have a quicker recovery time and more resilient continuity of operations with retrofitting.

Building owners need to be put on notice and understand that the cost of liability for not acting is greater than the cost of retrofitting URM/soft-story.

As most of the Valley grew in the 50's and 60's, URM was not a major issue. Regardless, due to existing Unreinforced Masonry legislation, all URM must be retrofitted by the year 2016. Santa Clara County can ask the cities if they continue to have URM and what their plan is to address it. The consensus of the URM/Soft-Story Workgroup is to focus on Soft-Story Structures as the more significant vulnerability.

Retrofitting is an investment and requires substantial financial incentives for building owners in order to have a meaningful impact. Reasons to act include: life safety, liability, less demand for post-disaster housing, community resiliency and economic recovery.

7.2.2 Wildland Urban Interface Priority

The Wildland Urban Interface (WUI) is recognized as one of our most significant threats in Santa Clara County in terms of probability and severity. For example the Croy Fire area west of Morgan Hill, the East Foothills area east of San Jose, and the Lexington Hills area south of the Lexington Reservoir have been identified as high-threat areas with specific Community Wildfire Protection Plans (CWPP) to address them. In addition, per the California Fire Alliance "Communities at Risk List", the 14 communities of Cupertino, East Foothills, Gilroy, Lexington Hills, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Morgan Hill, Palo Alto, San Jose, San Martin, Saratoga and Stanford are at high risk of damage from wildfire. These are high-risk communities identified within the wildland-urban interface, the area where homes and wildlands intermix. Some of these communities are more savvy to the WUI threat than others. In addition to the life safety concerns, there is liability for those communities that do not have a plan to address the wildfire threat. Santa Clara County has not been consistently addressing the WUI threat as a county-wide entity with macro-level strategies, coordinating and replicating best practices throughout.

7.2.3 Information Sharing Priority

Critical infrastructure service providers have a significant impact on the public's daily lives and most operate their systems with this understanding. The County government has an obligation to provide for the well-being of its citizens and needs to be provided with information required to do this. Currently, information relating to infrastructure is not consistently shared between infrastructure providers, or between these providers and all public agencies responsible for citizen well-being. As a result, the County government is not proactively being advised of single points of potential infrastructure failure or common modes of potential infrastructure failure and, as such, cannot be an effective partner in assisting with mitigation efforts.

An example of where the potential benefits of cross-infrastructure data sharing can be beneficial is with knowing and assessing the implications of the existence of large distribution lines of two major utilities unknowingly sharing the same corridor in Santa Clara County. If these were known, it may engender actions to decrease the effects of potential failures.

It is recognized and understood that infrastructure owners already maintain their own safety and mitigation plans; however, all systems can and do fail. When they fail, how will this information be conveyed to the County government? The timely transmission of failure information can have a direct bearing on the effectiveness of emergency response. For security and propriety reasons, the private sector has a legitimate concern with sharing critical resource and infrastructure information. The Local Planning Team believes engaging infrastructure providers in a cooperative partnership will develop a responsible middle ground to share the most critical information with those stakeholders that have a need to know. The current way of doing business is to reactively respond to a disaster event or infrastructure failure situation after they occur (i.e., South County Phone Outage, San Bruno Natural Gas explosion, etc.), host a "lessons learned" forum, and then increase readiness for the type of event that just happened. Santa Clara County needs to prepare for the next disaster that will happen, and they can do that by engaging in partnerships with infrastructure providers, proactively and responsibly sharing information across sectors, discovering vulnerabilities and mitigating those vulnerabilities. Until there is sharing of information about critical infrastructure across sectors, it is impossible to begin learning what is not known and start the processes which may discover common points of failure.

7.2.4 Flood Priority

Floods are recognized as one of the most significant threats in Santa Clara County in terms of probability and severity. Per the Guadalupe River Park Conservancy, the Guadalupe River frequently floods San Jose's downtown and Alviso community, with severe flooding in 1862, 1895, 1911, 1955, 1958, 1963, 1969, 1982, 1986 and 1995. In March 1995, severe flooding occurred when the Guadalupe River and Los Gatos Creek combined to produce the highest flow in 50 years. In the most extensive flooding of the City's core in four decades, streets turned into rivers, forcing residents from their homes and driving office workers from high-rise buildings. Approximately 300 homes and businesses were flooded by four separate breakouts along the river, with damage estimates of up to $10 million. Communities of Morgan Hill in South County have also seen substantial localized flooding in recent years.

Cities have been addressing the local flood threat within their own capacity and resources for decades. For example, the City of Santa Clara operates and maintains 21 pump systems within its jurisdiction to eliminate storm drain water from city streets. Should those systems fail, the risk of localized flooding substantially increases. This localized flooding could be minor, moderate, or major, and could threaten property, infrastructure and/or people. Pump systems like those found in the City of Santa Clara are aging and need substantial upgrades to effectively continue mitigating the recurring flood threat throughout the County. More specifically, the pumps, outlets, inlets, power

generators and other associated components are at risk of failure. Also, infrastructure corrections that have been identified over time need to be implemented.

The SCVWD, the Santa Clara County Flood Management Agency, has a comprehensive flood management program for Santa Clara County. Since the 1980s over $1 billion dollars have been invested with over 93,000 homes removed from the flood plain. The district maintains 800 miles of creeks and 52 miles of levees, however, over 50 creeks in the County are subject to severe flooding.

7.2.5 Dam Failure Priority

Some communities will be in immediate danger in the event of a sudden catastrophic dam failure. The preliminary findings of the Anderson Dam seismic stability prove that the County's dam infrastructure is vulnerable to earthquakes. Lower water restrictions on operating capacity and long-term infrastructure improvements will help mitigate but never completely eliminate the possibility of a catastrophic dam failure at Anderson Dam or any of the other major dams in the County and the County should plan for the potential need of immediate public warning accordingly. Although a catastrophic dam failure is not one of the more likely disaster scenarios, it is commonly accepted amongst local emergency management that the sudden failure of Anderson Dam, for example, is probably the worst-case scenario in Santa Clara County and also Monterey County.

The Public Warning Gap

AlertSCC can be a very effective public warning tool to get customized messages out to large numbers of registered individuals efficiently when communications infrastructure is operational. However, the same earthquake scenario that is most likely to trigger a catastrophic dam failure is the same scenario that is most likely to trigger widespread failure in communications infrastructure. Communications failure can be in the form of compromised physical integrity of structures and systems and/or limited bandwidth from the sudden surge of post-earthquake communications service demand from the public. AlertSCC may be rendered partially or totally ineffective after post-earthquake wide-spread communications infrastructure failure. It should be noted, however, that the AlertSCC system uses a variety of communication modes, including text messages and SMS messaging. These communications channels have often been operational even when communication over voice channels is compromised.

The Emergency Alert System (EAS) can be a very effective public warning tool for people that happen to be consuming the media at that particular point in time. This leaves thousands (if not tens of thousands) of people that are not consuming the media at that point in time in immediate danger and with no immediate public warning in the event of a catastrophic dam failure. EAS will be particularly ineffective during the night hours while most people are asleep and not consuming the media.

Field responder vehicle Public Address (PA) equipment can have some positive impact with at least several hours advance warning. However, this equipment will not be beneficial during hazards that occur suddenly without warning, like dam failure.

Finally, we know there will be a lag time in activating any of these systems. For example, the best AlertSCC operator is going to need at least 15 minutes execution time to initiate a public warning. This still does not factor in the time needed for the warning to finally reach all endangered communities within the inundation zone.

AlertSCC and EAS are tools in the public warning toolbox. As summarized above, these tools have their inherent limitations. Their application can be ideal in certain situations. Over-reliance on these tools can be disastrous in other situations – more specifically, the catastrophic earthquake scenario that incapacitates communications infrastructure. An even worse example is the catastrophic earthquake scenario that strikes during the night hours while most people are asleep and inaccessible to EAS.

A siren system targeted specifically for catastrophic dam failure would provide a complete public warning system in Santa Clara County as summarized below:

- Emergency Alert System (EAS) – Highly effective for broad county-wide audience during daytime hours when the public is consuming the media. - EXISTING
- AlertSCC – Highly effective for broad county-wide or targeted audience during any time of day or night when communications infrastructure is intact and bandwidth is available. – EXISTING
- Field Responder Vehicle PA Equipment – Some effectiveness with several hours advance warning. - EXISTING
- Catastrophic Dam Failure Siren System – Highly effective at **all hours of the day and night** for those downstream communities of the dam inundation area within immediate danger, **independent** of the county-wide communications infrastructure. – NOT EXISTING

Activation

Activation procedures might consist of remote electronic activation, on-site manual activation and water flow-based automatic activation. The Water District would be closely involved in development of the water level triggers.

This system can be built as wireless, independent of the communications grid. An existing microwave radio system already provides wireless control points and connects every Public Safety Answering Point (PSAP). This is a very hardened system that provides the backbone to control such a siren system. A dispatcher could fire off other jurisdictions radios from a console.

Public Education

A massive public education campaign with appropriate signage would be required to effectively accustom local communities on appropriate actions in response to activation of the siren system. In general, the "appropriate action" depends on the threat posed to a community. Other communities of the nation may be more concerned about immediate public warning for tornados or hazardous materials facilities. In this case, the only appropriate action to teach local Santa Clara County communities in response to a catastrophic dam failure is to **go to higher ground.**

Political Support

A catastrophic dam failure siren warning system is a significant proposal that would need buy-in from local City Councils early in the process. The County would have to successfully answer the legitimate question "Why do we need siren systems?" in light of existing warning systems. This might be a hard sell in that the tendency to go high-tech is very strong. Yet, the County knows from experience that efficiency does not equal resiliency. Although AlertSCC and EAS may appear to be the more efficient and cost-effective solutions, for the reasons outlined above, they are not the most resilient solutions and they are not stand-alone solutions. The County needs a catastrophic dam failure siren warning system on a parallel track to provide for a complete public warning solution. The County would like both efficient with high-tech warning systems and resilient with siren warning systems. The County believes waiting for the first catastrophic dam failure will be too late.

7.2.6 Mitigation Objectives

- Collaborate as a County and create a county-wide Community Wildfire Protection Plan (CWPP).
- Reduce number of URM/soft-story buildings through demolition or seismic retrofitting.
- Implement a combination of financial incentives and regulated mandates in order to mitigate the clear and present danger of Soft Story Structures pervading Santa Clara County.
- Engage infrastructure providers in a cooperative partnership with County government to develop a responsible middle ground sharing the most critical infrastructure information with those stakeholders that have a need to know.
- Collaborate as a County and verify or create the plan for replacing and/or upgrading localized flooding pump systems, including the generation of alternate power to operate these systems.
- Establish a siren system targeted specifically for catastrophic dam failure to provide a complete public warning system in Santa Clara County.

7.3 MITIGATION ACTIONS

The following actions were identified to accomplish the above stated mitigation objectives relating to the five priorities.

7.3.1 Unreinforced Masonry (URM) / Soft-Story Structures Mitigation Actions

1. Launch a public education campaign to target single-family soft story structures.
2. Consider County Ordinance to require retrofitting of multi-family soft story structures. Consistent with the ABAG definition, "multi-family" buildings consist of three or more families.
3. Address liability concerns and obtain full access to SJSU CDM soft story inventory.
4. Support City of San Jose initiative to develop Soft-Story Mitigation Program via UASI funding. Program will entail public education materials, engineering standards and financial incentives.
5. Create zoning ordinance incentives: density/intensity bonuses, transfer of development rights, reduction in development standards, relief from non-conforming provisions and restriction on new occupancy of a URM or potentially hazardous building.
6. Create financial incentives and remove disincentives such as:
    - **a.** Waive or reduce building/improvement permit fees for seismic retrofits on non-strengthened residences and unreinforced masonry structures.
    - **b.** Apply a portion of property transfer transactions to seismic upgrades during the sale of property. Qualifying upgrades could include foundation repair or replacement, mudsill repair or replacement, wall bracing in basements, foundation-to-mudsill bolting, shear wall installation, water heater anchoring, and securing of chimneys.
    - **c.** Waivers of zoning and parking requirements,
    - **d.** Loans with easier qualifying requirements or below-market interest rates,
    - **e.** Grants to cover part of the design/construction costs using redevelopment or housing funds,
    - **f.** Special assessment districts that generate funding sources for participants
    - **g.** Local tax credits
    - **h.** Leveraging of grant programs
    - **i.** Discounts or credits on homeowners' insurance premiums and lower deductibles.
    - **j.** Elimination of property taxes on the value of retrofit improvements.
    - **k.** Bonuses given by employers for employees who retrofit their homes.
    - **l.** Discounts on building materials.
    - **m.** Reduced gas and electric utility charges.
    - **n.** The following URL from the Northern California Chapter of the Earthquake Engineering Research Institute indicates specifically which cities have applied these financial incentives for future reference: http://www.eerinc.org/?page_id=236**.**
    - **o.** Per EERI Northern California Chapter, even small incentives appear to send a clear message to building owners that governments value efforts to reduce earthquake risk. The positive public relations generated by offers of incentives have offset opposition to retrofitting proposals. Larger incentives clearly produce more meaningful retrofit results and have changed market conditions and increased numbers of buildings being retrofitted.
7. Implement time limits on retrofitting mandates and incentives. This has proven to be effective.
8. Create a "Disaster-Resilient Business" recognition program, similar to the successful County "Green Business" recognition program.

9. Customize a strategy for each target group: business, CBO's, residents, low-income

Note: Use California Seismic Safety Commission as a resource and subject matter expert.

7.3.2 Wildland Urban Interface Mitigation Actions

Primary Mitigation Actions

10. County-Wide CWPP - Create an integrated county-wide CWPP and get it online. Communities have very different needs and these would have to be addressed. Market and promote collaboration of agencies in WUI areas with signs, etc… CWPP would need approval from Board of Supervisors, CalFire and the local fire agency. There is a strong feeling that active involvement from the county-wide stakeholders would make a huge difference.
    a. Create defensible space programs on a county-wide basis.
    b. Organize and mobilize the volunteer workforce for wildfire mitigation projects.
11. Public Education - Implement a county-wide public education campaign. Adapt strategies to address each of the target audiences: those who are unaware, those in denial, those who have accepted the risk, those who recognize the problem and want to help and those who are actively contributing.
12. Homeowners Resources - Address the needs of individual homeowners. For example, the City of Big Bear obtained a grant to replace roofs. Project expenses could be matched for homeowners. Free clearing and chipping could be provided for low-income families.
13. Tactical Database - Prepare tactical information database and accurate maps ready for Incident Commanders to access when necessary. Refer to the "Los Padres model. Develop an evacuation plan for isolated communities. Evacuation routes serve the tri-role of evacuation, response and fire lines. We need to bring it all together with appropriate stakeholders (CalTrans, CHP, etc…) (Example CHP closes Highway 17 @Madrone Drive due to Wildfire. If 17 traffic goes Into Redwood Estates it's a narrow maze. If 17 traffic goes to Old Santa Cruz Highway they have 2 ways out. Does CHP know this? Sheriff's Office? Signage could be critical. Need Focused Tactical Planning for problem areas).
14. County-Wide Task Force - Establish a county-wide Wildfire Mitigation Task Force to study the problem and coordinate efforts. Get critical stakeholders involved early in the process. A core body and extended body could be used to make efficient use of time.

Supplemental Mitigation Actions

15. Establish a cohesive funding strategy to offset PDM funds. Verify if there is precedence elsewhere in the nation of a local council having oversight of funding priorities. For example, CalFire receives mitigation money for brush clearing and access improvement projects from grants provided by timber companies and the SCVWD, but is it supporting a long-term strategic vision? Current funding sources for wildfire mitigation and the Santa Clara County FireSafe Council include the USDI Bureau of Land Management, USDA

Forest Service, US Fish and Wildlife Service, DHS, PG&E, Santa Clara County Fire Department, the County of Santa Clara, Santa Clara Valley Water District, Los Altos Hills County Fire District, San Jose Water Company, State Farm Insurance, S.P. McClenahan Co., and many others for a total of more than 50 donors.

16. Consider "road improvement" as potential mitigation project to be scoped for evacuation and emergency response access. Engage with County Roads & Airports and CalTRANS. Refer to UCSB very scientific model of ingress/egress routes. Also connect this with the Tactical Database using GIS to identify communities that cannot be evacuated in time. Prioritize life safety. (Chuck Weber contacted Tom Cova and got permission to reprint and use his Paper on Community Egress. He is at the University of Utah now: Thomas J Cova [cova@geog.utah.edu]. At UCSB Church and Cova worked together using Mission Canyon in Santa Barbara as a Model for evacuation planning using GIS.)
17. Research and evaluate best practices. The Lexington Hills model built relationships with private property owners. Association of Bay Area Governments (ABAG) has resources available for reference. San Bernardino County and San Diego County have had frequent practice and collaboration within this area.
18. Address "open space" with a county-wide strategy. For example, we need to address our 5 – 10 year plan for fire breaks in these areas. Integrate the LHMP with the Open Space District. The life safety risk has substantially elevated now that mid-peninsula is doing more recreation. (Meetings with Mid Pen within our community included requests to allow emergency egress across open space. Old roads are overgrown and can do double duty as access and firebreaks. Mid Pen's short answer was No.)

7.3.3 Information-Sharing Mitigation Actions

Primary Mitigation Action Plan

19. Create a Santa Clara County Infrastructure Council as an institutional receptacle for matters pertaining to infrastructure data-sharing efforts.
    - **a.** Approach infrastructure providers and ask them to become partners in this council.
    - **b.** Create an agenda in cooperation with council partners. Anticipated agenda items are:
        i. Recognize the legitimate concerns of the private sector in sharing critical infrastructure information, and address those concerns with reasonable measures (PCII, need-to-know, encryption, etc…)
        ii. Initially focus on water and/or power providers to build success and momentum.
    - **c.** Host Council meetings and meet on a quarterly basis.
    - **d.** Host an annual infrastructure review and discuss existing and developing vulnerabilities.
    - **e.** Develop a common architecture interface for data to be shared between members. Request utilities provide agreed-upon information in digital, dynamic format and

create a commonality of layers. Use WebEOC infrastructure for mitigation and emergency response efforts.

f. Consider inviting local high-tech companies to join the council.

Supplemental Mitigation Actions

g. Invite Santa Clara County FireSafe Council to join and give them access to information through WebEOC that they need. For example, they can't build a fuel break without authorization due to property boundaries. Good GIS information can facilitate this process. Well-mapped evacuation routes should be available to stakeholder agencies and the public. "Blue hydrants" could be mapped for the local fire departments.

20. Research success stories nation-wide via LLIS and other forums of cross-sector information-sharing with regards to critical infrastructure.

21. Evaluate opportunities to implement local regulation to encourage maximum cross-sector collaboration.

22. Coordinate with the private sector on prioritization of critical facilities before and during restoration of utility services.

7.3.4 Flood Mitigation Actions

23. Survey the cities to verify their plan for replacing and/or upgrading localized flooding pump systems and generating alternate power. Based on results, scope potential project to upgrade systems county-wide.

24. Build a GIS layer of localized flooding "hot spots" throughout the County.

25. Scope potential projects to make localized flooding hot spots deeper and bigger.

26. Scope potential projects to mitigate existing at-risk levee bridges.

27. Scope potential vegetation removal projects to expedite the flow of water away from communities and into water outlets.

28. Verify with the Water District their plans for managing the risks of the oldest levees in County.

7.3.5 Catastrophic Dam Failure Mitigation Actions

Primary Mitigation Actions

29. Conduct an in-depth county-wide vulnerability analysis of catastrophic dam failure with limitations of existing public warning systems (AlertSCC, EAS, etc…) in the absence of a siren warning system. This might be a logical next step if it is determined that more hard facts are needed of what is at stake before a siren warning system can be realistically pursued.

30. Conduct an in-depth county-wide feasibility study to verify if a siren warning system is something that dam owners, local communities and elected officials can realistically rally

behind. This might be a logical next step if there is any doubt on the feasibility of this project building up sufficient political support over the long-term.

31. Implementation of siren warning system, with marketing and public education campaigns, for the greatest potential dam threat – Anderson Dam.

32. Implementation of siren warning system, with marketing and public education campaigns, for top 10% most threatening dams in the County (as determined by the Water District).

33. Implementation of siren warning system, with marketing and public education campaigns, for all dams in the County.

Supplemental Mitigation Actions

34. Use GIS to evaluate catastrophic dam failure scenarios.

35. Collaborate with the Water District on installation of a dam video surveillance system.

Note: Roll out of the siren system could be prioritized based on the potential threat of each dam.

Note: The effectiveness of the sound of these siren systems should be tested and validated.

Note: A siren system that might articulate language upon activation (Ex: "FLOOD", "DAM FAILURE", etc…) should be considered.

36. Register all Public Safety Answering Points (PSAPs) in County within AlertSCC.

37. Invest in multi-band radios for the water companies to allow them to call out when the flood is coming.

38. Explore the existing SVRIA (Silicon Valley Radio Interoperability Authority) JPA as a mechanism to sustain and maintain the County Multi-Jurisdiction Mitigation Program and/or Catastrophic Dam Failure Siren Warning System.

39. Evaluate the cost/benefit of providing NOAA weather radios to downstream residences of the dam inundation area.

40. Evaluate "Domino Dam Effect" for potential mitigation.

7.3.6 Mitigation Action Prioritization

The Local Planning Team reviewed the STAPLE/E criteria on the following page to evaluate these identified actions and assign a priority ranking for implementation. During the 4th milestone meeting, the Local Planning Team developed initial implementation approaches for the high priority projects.

Methodologies

The Local Planning Team agreed it would be ideal to review each identified action and assign a score for each STAPLE/E criteria (Social, Technical, Administrative, Political, Legal, Economic, Environmental) using the following scale and add the scores to rank the projects.

STAPLE/E Scoring Scale
0 = Poor (negative impacts)
1 = Fair (neutral or no impacts)
2 = Good (positive impacts)
3 = Excellent (very favorable impacts)

However, time during the third milestone meeting did not permit the Local Planning Team to complete this detailed process. Therefore, each representative at the milestone meeting was given 15 votes to identify priority mitigation actions based on review of the STAPLE/E criteria. The Local Planning Team may use the STAPLE/E Scoring Scale for future prioritization efforts. The votes were tallied to identify the highest priority mitigation actions. These results are presented in the table below.

Table 7-1: Mitigation Action Priority Ranking Results

Note, the Action #s in ***Bold Italics*** have been suggested by Local Planning Team members as projects that may be eligible for FEMA mitigation grant funding.

Action #	Identified Action Description	Votes	Implementation Approach
4	Support City of San Jose initiative to develop Soft-Story Mitigation Program via UASI funding. Program will entail public education materials, engineering standards and financial incentives.	17	San Jose is no longer funding this program.
11	Public Education - Implement a county-wide public education campaign.	17	1. Develop a uniform message 2. Identify target audiences 3. Identify responsible parties 4. Outline timing 5. Identify funding 6. Establish partners/leverage (emphasis on wildland urban interface areas)
19	Create a Santa Clara County Infrastructure Council as an institutional receptacle for matters pertaining to infrastructure data-sharing efforts. (see sub-tasks)	17	1. Member organzations 2. Charter - clarify & Define purpose 3. Representatives (This is especially important following the San Bruno incident.) SCC EMA could lead this project by taking it to the Emergency Planning Council. These infrastructure duties most likely fall within the EPC Charter. Utilities are represented on the EPC. (Fire and police entities are getting PG&E maps to their satisfaction since the San Bruno incident.)
6	Create financial incentives and remove disincentives (see list of suggestions)	15	See Number 5; Related to #4, start with NOI for retrofit program. Note: Santa Clara County, jurisdiction and Infrastructure Council could also take this on
29	Conduct an in-depth county-wide vulnerability analysis of catastrophic dam failure with limitations of existing public warning systems (AlertSCC, EAS, etc…) in the absence of a siren warning system.	15	**Dewberry completed a Dam Hazard Assessment report as a direct result of this prioritized action. The report was delivered to County OES in November 2011.**
23	Survey the cities to verify their plan for replacing and/or upgrading localized flooding pump systems and generating alternate power. Based on results, scope	14	1. Gather existing water infrastructure inventories 2. develop "gaps" definitions to define survey 3. develop survey and

Action #	Identified Action Description	Votes	Implementation Approach
	potential project to upgrade systems county-wide.		targeted stakeholders 4. Determine lead for survey (Council?) (Need to coordinate with SCVWD. Issues include the localized flood pump systems, power, make sure generators are not below BFE, water customers need drinking water.) Santa Clara City and San Jose are concerned that water is pumped up and over levees into the Guadalupe River. Streets are lower than the levee. If the power goes down, residents are at risk if the pumps are not operating. Gilroy and Morgan Hill do not have this risk, only risk to cities that touch the bay. The problem will be exacerbated by sea level rise.
10	Create an integrated county-wide CWPP and get it online.	13	County Fire applied for grant funding for a west valley CWPP, but has not yet been successful. The CWPP is integrated into the planning process for south county.
24	Build a GIS layer of localized flooding "hot spots" throughout the County.	13	Define & ID Hotspots - County EM or Planning GIS to implement
13	Tactical Database - Prepare tactical information database and accurate maps ready for Incident Commanders to access when necessary.	12	Needs further definition
30	Conduct an in-depth county-wide feasibility study to verify if a siren warning system is something that dam owners, local communities and elected officials can realistically rally behind.	12	Follow up to #29.
16	Consider "road improvement" as potential mitigation project to be scoped for evacuation and emergency response access.	10	overlay via GIS with EQ faults overlay DFIRMS with current evacuation plans, drive routes to check for flood or other vulnerabiity; vegetation using wildland urban interface
28	Verify with the Water District their plans for managing the risks of the oldest levees in County.	9	Follow up to #29.
2	Consider County Ordinance to require retrofitting of multi-family soft story structures. Consistent with the ABAG	8	Similar to #4.

Action #	Identified Action Description	Votes	Implementation Approach
	definition, "multi-family" buildings consist of three or more families.		
15	Establish a cohesive funding strategy to offset PDM funds.	8	
27	Scope potential vegetation removal projects to expedite the flow of water away from communities and into water outlets.	8	target high priority waterways; walk/drive channels to evaluation vegetation & seek solution
22	Coordinate with the private sector on prioritization of critical facilities before and during restoration of utility services.	7	Council; reach out and survey private sectior
31	Implementation of siren warning system, with marketing and public education campaigns, for the greatest potential dam threat – Anderson Dam.	7	Follow up to #29.
34	Use GIS to evaluate catastrophic dam failure scenarios.	7	Follow up to #29.
35	Collaborate with the Water District on installation of a dam video surveillance system.	7	1. use results of #29 prioritization to target demo dam innundation area for video survellance 2. seek partnerships 3. seek funds
7	Implement time limits on retrofitting mandates and incentives.	6	Relates to financial incentives, reasonable time frame for implementation and property owner eligibility (time)
33	Implementation of siren warning system, with marketing and public education campaigns, for all dams in the County.	6	Implement #31, then expand to priorty dams per #29 and #35 following lessons learned
9	Customize a strategy for each target group: business, CBO's, residents, low-income	5	relates to #11; #22
14	County-Wide Task Force - Establish a county-wide Wildfire Mitigation Task Force to study the problem and coordinate efforts.	5	1. coordinate with CAL Division of Forestry, local Fire Departments & USFS; BLM 2. determine message 3. charter task force 4. priority actions 5. partnerships 6. funding
18	Address "open space" with a county-wide strategy.	5	1. coordinate with CAL Division of Forestry, local Fire Departments & USFS; BLM ; NRCS, Farm Bureau, etc 2. determine message 3. charter task force 4. priority actions 5. partnerships 6. funding

Action #	Identified Action Description	Votes	Implementation Approach
32	Implementation of siren warning system, with marketing and public education campaigns, for top 10% most threatening dams in the County (as determined by the Water District).	5	Implement #31, then expand to priorty dams per #29 and #35 following lessons learned; Link to #11 public information
	Mitigate pandemic flu disease outbreak	5	Integrate with local/state health pandemic flu planning initiatives
39	Evaluate the cost/benefit of providing NOAA weather radios to downstream residences of the dam inundation area.	5	Compare to reverse 911 and explore feasibility with local phone providers
1	Launch a public education campaign to target single-family soft story structures.	4	Result of action #4
3	Address liability concerns and obtain full access to SJSU CDM soft story inventory.	4	Related to action #4
8	Create a "Disaster-Resilient Business" recognition program, similar to the successful County "Green Business" recognition program.	4	Council addressing infrastructure should own this.
12	Homeowners Resources - Address the needs of individual homeowners.	4	Ready.com, myhazards.calema.gov.ca
20	Research success stories nation-wide via LLIS and other forums of cross-sector information-sharing with regards to critical infrastructure.	4	
21	Evaluate opportunities to implement local regulation to encourage maximum cross-sector collaboration.	4	related to #5 and #6
17	Research and evaluate best practices.	3	Needs further definition. Look at Losses Avoided Studies completed by FEMA. See #20.
38	Explore the existing SVRIA (Silicon Valley Radio Interoperability Authority) JPA as a mechanism to sustain and maintain the County Multi-Jurisdiction Mitigation Program and/or Catastrophic Dam Failure Siren Warning System.	3	Santa Clara OES or mitigation committee maintains mitigation program; interoperability may be mechanism for dam warning system.
5	Create zoning ordinance incentives: density/intensity bonuses, transfer of development rights, reduction in development standards, relief from non-conforming provisions and restriction on new occupancy of a URM or potentially hazardous building.	2	See #6.

Action #	Identified Action Description	Votes	Implementation Approach
25	Scope potential projects to make localized flooding hot spots deeper and bigger.	2	1. survey "hot spots" to determine potential solutions following GIS or H&H analysis (maps) of watershed to determine carrying capacity of "Hot spots"
26	Scope potential projects to mitigate existing at-risk levee bridges.	2	Start with #38 priority levees
36	Register all Public Safety Answering Points (PSAPs) in County within AlertSCC.	2	
37	Invest in multi-band radios for the water companies to allow them to call out when the flood is coming.	2	Determine funding source
40	Evaluate "Domino Dam Effect" for potential mitigation.	2	Follow up to #29.

STAPLE/E Review and Selection Criteria
Social
• Is the proposed action socially acceptable to the jurisdiction and surrounding community? • Are there equity issues involved that would mean that one segment of the jurisdiction and/or community is treated unfairly? • Will the action cause social disruption?
Technical
• Will the proposed action work? • Will it create more problems than it solves? • Does it solve a problem or only a symptom? • Is it the most useful action in light of other jurisdiction goals?
Administrative
• Can the jurisdiction implement the action? • Is there someone to coordinate and lead the effort? • Is there sufficient funding, staff, and technical support available? • Are there ongoing administrative requirements that need to be met?
Political
• Is the action politically acceptable? • Is there public support both to implement and to maintain the project?
Legal
• Is the jurisdiction authorized to implement the proposed action? • Are there legal side effects? Could the activity be construed as a taking? • Will the university be liable for action or lack of action? • Will the activity be challenged?
Economic
• What are the costs and benefits of this action? • Do the benefits exceed the costs? • Are initial, maintenance, and administrative costs taken into account? • Has funding been secured for the proposed action? If not, what are the potential funding sources (public, non-profit, and private)? • How will this action affect the fiscal capability of the jurisdiction? • What burden will this action place on the tax base or local economy? • What are the budget and revenue effects of this activity? • Does the action contribute to other jurisdiction goals? • What benefits will the action provide?
Environmental
• How will the action affect the environment? • Will the action need environmental regulatory approvals? • Will it meet local and state regulatory requirements? • Are endangered or threatened species likely to be affected?

7.4 MITIGATION ACTION IMPLEMENTATION PLANS

For projects that warrant complex tracking, the following implementation plans have been prepared as a tool for the Local Planning Team. These may be updated as often as necessary and used to report on mitigation progress for future plan updates.

Project Description: (11) Public Education - Implement a county-wide public education campaign. Adapt strategies to address each of the target audiences: those who are unaware, those in denial, those who have accepted the risk, those who recognize the problem and want to help and those who are actively contributing.
Potential Funding Sources: County Staff Time, HMGP or PDM
Responsible Department: *to be determined*
Target Completion Date: *to be determined*
Implementation Approach / Status Report: 1. Develop consistent messaging. 2. Outline targeted audiences and dissemination strategy. 3. Identify responsible parties for maintaining messaging. 4. Establish partners and identify synergies with other organizations.

Project Description: (19) Create a ***Santa Clara County Infrastructure Council*** as an institutional receptacle for matters pertaining to infrastructure data-sharing efforts.

- **a.** Approach infrastructure providers and ask them to become partners in this council.
- **b.** Create an agenda in cooperation with council partners. Anticipated agenda items are:
    - i. Recognize the legitimate concerns of the private sector in sharing critical infrastructure information, and address those concerns with reasonable measures (PCII, need-to-know, encryption, etc…)
    - ii. Initially focus on water and/or power providers to build success and momentum.
- **c.** Host Council meetings and meet on a quarterly basis.
- **d.** Host an annual infrastructure review and discuss existing and developing vulnerabilities.
- **e.** Develop a common architecture interface for data to be shared between members. Request utilities provide agreed-upon information in digital, dynamic format and create a commonality of layers. Use WebEOC infrastructure for mitigation and emergency response efforts.
- **f.** Consider inviting local high-tech companies to join the council.
- **g.** Invite Santa Clara County FireSafe Council to join and give them access to information through WebEOC that they need. For example, they can't build a fuel break without authorization due to property boundaries. Good GIS information can facilitate this process. Well-mapped evacuation routes should be available to stakeholder agencies and the public. "Blue hydrants" could be mapped for the local fire departments.

Potential Funding Sources: County Staff Time

Responsible Department: *to be determined*

Target Completion Date: *to be determined*

Implementation Approach / Status Report:

1. Member organzations
2. Charter - clarify & Define purpose
3. Representatives

SCC EMA could lead this project by taking it to the Emergency Planning Council. These infrastructure duties most likely fall within the EPC Charter. Utilities are represented on the EPC. (Fire and police entities are getting PG&E maps to their satisfaction since the San Bruno incident.)

Project Description: (6) Create financial incentives and remove disincentives such as:

- **a.** Waive or reduce building/improvement permit fees for seismic retrofits on non-strengthened residences and unreinforced masonry structures.
- **b.** Apply a portion of property transfer transactions to seismic upgrades during the sale of property. Qualifying upgrades could include foundation repair or replacement, mudsill repair or replacement, wall bracing in basements, foundation-to-mudsill bolting, shear wall installation, water heater anchoring, and securing of chimneys.
- **c.** Waivers of zoning and parking requirements,
- **d.** Loans with easier qualifying requirements or below-market interest rates,
- **e.** Grants to cover part of the design/construction costs using redevelopment or housing funds,
- **f.** Special assessment districts that generate funding sources for participants
- **g.** Local tax credits
- **h.** Leveraging of grant programs
- **i.** Discounts or credits on homeowners' insurance premiums and lower deductibles.
- **j.** Elimination of property taxes on the value of retrofit improvements.
- **k.** Bonuses given by employers for employees who retrofit their homes.
- **l.** Discounts on building materials.
- **m.** Reduced gas and electric utility charges.
- **n.** The following URL from the Northern California Chapter of the Earthquake Engineering Research Institute indicates specifically which cities have applied these financial incentives for future reference: http://www.eerinc.org/?page_id=236**.**
- **o.** Per EERI Northern California Chapter, even small incentives appear to send a clear message to building owners that governments value efforts to reduce earthquake risk. The positive public relations generated by offers of incentives have offset opposition to retrofitting proposals. Larger incentives clearly produce more meaningful retrofit results and have changed market conditions and increased numbers of buildings being retrofitted.

Potential Funding Sources: County Staff Time

Responsible Department: *to be determined*

Target Completion Date: *to be determined*

Implementation Approach / Status Report:

1. Charge Local Planning Team members (individual jurisdictions) with implementing these ideas as appropriate.
2. Request input and progress reports at annual LPT meeting.

See Action #5; Related to #4, start with NOI for retrofit program. Note: Santa Clara County, jurisdiction and Infrastructure Council could also take this on

Project Description: (29) Conduct an in-depth county-wide vulnerability analysis of catastrophic dam failure with limitations of existing public warning systems (AlertSCC, EAS, etc…) in the absence of a siren warning system. This might be a logical next step if it is determined that more hard facts are needed of what is at stake before a siren warning system can be realistically pursued.
Potential Funding Sources: HMGP, PDM
Responsible Department: *to be determined*
Target Completion Date: *to be determined*
Implementation Approach / Status Report: Dewberry completed a Dam Hazard Assessment report as a direct result of this prioritized action. The report was delivered to County OES in November 2011. A meeting to discuss follow up items to this report is scheduled for January 11, 2012 with County OES, SCVWD, and County ISD.

Project Description: (23) Survey the cities to verify their plan for replacing and/or upgrading localized flooding pump systems and generating alternate power. Based on results, scope potential project to upgrade systems county-wide.
Potential Funding Sources: County Staff Time, HMGP, PDM
Responsible Department: *to be determined*
Target Completion Date: *to be determined*
Implementation Approach / Status Report: 1. Gather existing water infrastructure inventories 2. Identify "gaps" 3. Create surveys and identify stakeholders 4. Determine responsible party for disseminating survey, tracking responses, and identifying projects for improvement. Note: coordinate with SCVWD. Issues: localized flood pump systems, power, make sure generators are not below BFE, water customers need drinking water Santa Clara City and San Jose are concerned that water is pumped up and over levees into the Guadalupe River. Streets are lower than the levee. If the power goes down, residents are at risk if the pumps are not operating. Gilroy and Morgan Hill do not have this risk, only risk to cities that touch the bay. The problem will be exacerbated by sea level rise.

Project Description: (10) Create an integrated county-wide CWPP and get it online.
Potential Funding Sources: FY10 Assistance to Firefighters Grant Program Fire Prevention and Safety Grants; HMGP, PDM
Responsible Department: County Fire
Target Completion Date: *to be determined*
Implementation Approach / Status Report: a grant application was submitted in January 2011 for FY10 Assistance to Firefighters Grant Program Fire Prevention and Safety Grants**.** The funds were not awarded to SCC.

Project Description: (24) Build a GIS layer of localized flooding "hot spots" throughout the County.
Potential Funding Sources: County Staff Time, HMGP, PDM **(any grants or potential for funds from SCVWD?)**
Responsible Department: *to be determined*
Target Completion Date: *to be determined*
Implementation Approach / Status Report: 1. Define and identify "hotspots" 2. Engage appropriate county agency to develop GIS mapping.

Project Description: (13) Tactical Database - Prepare tactical information database and accurate maps ready for Incident Commanders to access when necessary.
Potential Funding Sources: *to be determined*
Responsible Department: *to be determined*
Target Completion Date: *to be determined*
Implementation Approach / Status Report: 1. identify information necessary for responders 2. develop required mapping and summary data sheets 3. build into WebEOC for ongoing updates

SECTION 8 COUNTY PLAN MAINTENANCE

8.1 MONITORING, EVALUATING, AND UPDATING THE PLAN

The Local Planning Team noted during milestone meeting #3 that they wish to remain active. The collaborative process through 2010 resulted in many good mitigation project ideas. The LPT would like to continue collaborating among the jurisdictions to implement these ideas and build a more resilient community.

The Santa Clara County Office of Emergency Services (OES) agreed to host annual meetings of the LPT. In order for these meetings to be successful, the LPT agreed it would help to have official "buy in" from each jurisdiction's City Manager, which would in turn establish the LPT as an acknowledged body responsible for implementing mitigation throughout the County.

The OES director has the opportunity to meet with public works directors. The LPT agreed it would be beneficial to add mitigation and discussion of the identified projects in this plan to that agenda on an annual basis.

The strategy specific task forces (as convened during Mitigation Action Week) will continue to meet periodically as necessary to implement the identified strategies.

During the annual LPT meetings, the group will report on progress within their jurisdictions, progress from the strategy specific task forces, and discussions at other relevant forums such as public works directors meetings. Additionally, the group will review the existing plan (actions and priorities) and note specific items that have changed. Summaries of each annual LPT meeting, and other relevant interim meetings, will be logged with OES and stored with the existing plan. These summaries will be used to inform the next official update to this plan. As required by the Disaster Mitigation Act of 2000, OES has agreed to facilitate a complete update to this plan and submittal to Cal EMA/FEMA for approval before the 5 year expiration date.

8.2 INCORPORATION INTO EXISTING PLANNING MECHANISMS

Relevant local planning mechanisms for the County of Santa Clara are identified and summarized in Section 6 County Capability. These will be reviewed on an ongoing basis for identification of synergies in implementing the prioritized mitigation actions noted in Section 7.

Additionally, the County will consider adopting this plan as an addendum to the safety element of the general plan the next time it is revised and updated.

8.3 CONTINUED PUBLIC INVOLVEMENT

The Local Planning Team discussed development of a centralized web site for mitigation information. This website would be designed to inform the public of mitigation progress as well as solicit input regarding risk priorities. The LPT acknowledged that as specific mitigation projects are implemented, the public interest will grow through the local discussions and approval processes for those projects.

OES agreed to present the summaries of the annual LPT meetings to the County Disaster Council on an annual basis. The Disaster Council meetings are noticed and open to the public.

Comments or suggestions for this plan may be submitted to OES at anytime by contacting:

The Santa Clara County Office of Emergency Services, (408) 808-7800 or oes@oes.sccgov.org

SECTION 9 COUNTY ATTACHMENTS

9.1 SUMMARY OF ATTACHMENTS

Attachment 1: Preliminary Meetings
Meeting minutes from each of the meetings summarized in Table 3-1: Preliminary Meetings, are included in this Attachment. These meetings include: the Internal Kick Off Meeting, Santa Clara County Operation Area Meeting, City of Cupertino Individual Jurisdiction Meeting, City of Campbell Individual Jurisdiction Meeting, City of Gilroy Individual Jurisdiction Meeting, Santa Clara County Operation Area Meeting, City of Los Altos Individual Jurisdiction Meeting, ABAG Collaboration Meeting, Emergency Managers Association Meeting, Town of Los Gatos Individual Jurisdiction Meeting, Cisco Meeting, Lockheed Martin Meeting, City of Saratoga Individual Jurisdiction Meeting, Oracle Meeting, Applied Materials Meeting, and Intel Meeting.

Attachment 2: City Invites
Santa Clara County OES invited each of the 15 incorporated cities (via letters to the city managers and operational area emergency managers) to participate on the Local Planning Team (LPT). These invitation letters can be found in this Attachment.

Attachment 3: Local Planning Team Meeting #1
A Power Point presentation, hazard ranking worksheet, risk prioritization tools, meeting minutes/notes, and agenda from the Local Planning Team Meeting #1 are included in this Attachment.

Attachment 4: Local Planning Team Meeting #2
The agenda from Local Planning Team Meeting #2, along with handouts reviewed and discussed at this meeting, can be found in this Attachment. Handouts include topics such as: Repetitive Loss Data, Mitigation Strategy Priorities, Mitigation Goals and Action Ideas, Vulnerability Analysis, and STAPLE/E Criteria.

Attachment 5: Mitigation Action Week Sign In Sheets
Following the LPT Meeting #2, Miguel Grey, County OES, organized several work group meetings to further discuss the identified key topics and develop specific mitigation actions. The sign in sheets from these meetings are located in this Attachment.

Attachment 6: Local Planning Team Meeting #3
The agenda from Local Planning Team Meeting #3, along with the handout reviewed and discussed at this meeting, can be found in this Attachment. The results of the mitigation action prioritization can also be found in this Attachment.

Attachment 7: Survey Outreach Materials
This Attachments includes a copy of the online survey that the LPT released in an effort to solicit public input regarding concerns for hazard risk and to gauge the level of public preparedness for emergencies. Draft materials used to disseminate the survey, such as email and press release text, are also included in this Attachment.

Attachment 8: County Outreach-County Exhibits
Santa Clara County issued a press release and linked the online survey to the County's website as a "Hot Item". The Sherriff's Office emailed the survey link to all of their employees (badge and civilian) and linked to the survey on their webpage as "Featured Information". Copies of these materials can be found in this Attachment.

Attachment 9: HIRA Support
On November 10, 2010, the county's emergency managers participated in a Sudden Failure Assessment workshop with the Santa Clara Valley Water District regarding preparedness and response actions in the event of a dam failure. The shared tools, maps, and contact lists allow for increased preparedness and better response throughout the county. Documentation of this collaboration can be found in this Attachment.

Attachment 10: Spill Report
Based on a search of the RIMS database maintained by California Emergency Management Agency archives, there were 250 records of hazardous materials incidents (as of July 26, 2010). The Spill Report found in this Attachment documents these records.

Attachment 11: Santa Clara County Exposure Analysis
This list includes all information on the County's critical facilities and identifies which of the critical facilities are located in the mapped hazard areas, according to ABAG.

Attachment 12: County Strategies 2010
In preparation of the 2005 plan, the County helped ABAG in the development and review of the comprehensive regional list of mitigation strategies. Similarly, the County participated in the revision of the regional strategies for development of this annex. Appendix G of Taming Natural Hazards presents a summary list of mitigation strategies with regional priorities and the hazards mitigated. The County ranked those strategies in a spreadsheet provided by ABAG. A summary of these rankings can be found in this Attachment.

9.2 ATTACHMENTS
The attachments are available on CD in PDF format.