



Annex to 2010 Association of Bay
Area Governments
Local Hazard Mitigation Plan
Taming Natural Disasters

City of Vacaville

Table of Contents

Table of Contents	2
The Regional Planning Process	3
The Planning Process	3
<i>The Planning Team</i>	3
<i>Process for Updating Plan Sections</i>	4
<i>Preview of Existing Reports, Studies and Plans</i>	5
<i>Public Meetings</i>	5
Hazards Assessment	6
Past Occurrences Of Disasters (natural and human-induced)	7
<i>Historical Earthquakes</i>	7
<i>Historical Fires</i>	8
<i>Historical Flooding</i>	9
<i>Historical Human Disasters</i>	10
Risk Assessment	11
<i>Urban Land Exposure in the City of Vacaville</i>	11
<i>Infrastructure Exposure in the City of Vacaville</i>	12
<i>Exposure of City-Owned Buildings, Critical Healthcare Facilities and Schools in the City of Vacaville</i>	13
<i>Repetitive Loss Properties in the City of Vacaville</i>	15
<i>Other Risks</i>	15
National Flood Insurance Program	15
Mitigation Goals	16
Mitigation Activities and Priorities	16
<i>Evaluation of Mitigation Progress from Previous (2005) Plan</i>	16
<i>Future mitigation Activities and Priorities</i>	16
<i>On-Going Mitigation Strategy Programs</i>	17
The Plan Maintenance and Update Process	19
Exhibit A - Jurisdiction Map	20
Exhibit B - Public Meeting Documentation	21
Exhibit C - Vacaville Mitigation Strategy Spreadsheet	22

Introduction

The City of Vacaville is a moderately-sized city in Solano County, California. The City has a population of 97,305 people, based on a January 2010 estimate¹. This year, the City's budget has been reduced to \$172,550,679 (page 23 City of Vacaville Operating Budget and Capital Improvement program FY2010/2011, adopted June 22, 2010). This is provisional in that the outcome of the State budget process or other impacts to major revenue sources may require future amendments. The City has reduced staff to 529 full time people in the 2010-2011 Budget. A map of the City boundary is included as **Exhibit A** to this annex.

The Regional Planning Process

The City participated in various Association of Bay Area Governments (ABAG) workshops, conferences, and meetings. Two representatives from the City attended ABAG's sub-regional workshops in Fairfield and elsewhere to review the draft mitigation strategies and develop draft priorities. City representatives also attended the Wildfire and Flooding Workshops hosted by ABAG on July 2 and 7, 2009 to finalize the mitigation strategies and priorities specific to those hazards

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, the County has provided written and oral comments on the multi-jurisdictional plan and provided information on facilities that are defined as critical to ABAG.

The Planning Process

The Planning Team

The Vacaville City Manager authorized the formation of a LHMP Team to undertake review and development of the City of Vacaville 2010 Local Hazards Mitigation Plan. Planning Team members were as follows:

Gary Cullen, Deputy Director of Public Works, Maintenance – Co-leader of staff efforts. Mr. Cullen attended ABAG workshops that developed the 5-year update plans; reviewed and assisted in the compilation of the initial information with ABAG and FEMA; assisted in development of the 2010 Strategies Matrix for the City of Vacaville; and coordinated the review by other departments of the Matrix and Plan.

Frank Drayton, Fire Department Division Chief – Co-leader for staff efforts. Mr. Drayton attended ABAG workshops; reviewed and assisted in the compilation of the initial information with ABAG and FEMA; assisted in development of the 2010 Strategies Matrix for

¹ California Department of Finance, E01 City-County Population Estimate January 1, 2010. See www.dof.ca.gov/research/demographic/reports

the City of Vacaville; and coordinated Fire Department review and responses to the Matrix and Plan.

Rod Moresco, Public Works Director – Mr. Moresco provided input on Public Works capabilities and responsiveness; and City facilities impacted by hazards such as rights-of-way, infrastructure, City buildings, and other public facilities. He also provided comments on the 2010 Strategies Matrix.

Brian Preciado, Fire Chief – Mr. Preciado provided input on the City’s Emergency Operations Center (EOC) procedures; Fire Department and emergency Services response times and issues; emergency communications; and disaster preparedness and capabilities. He also provided comments on the 2010 Strategies Matrix.

Maureen Carson, Director of Community Services - provided input on Planning Department involvement, planning capabilities, and General Plan coordination and compatibility. She also provided comments on the 2010 Strategies Matrix.

Jay Salazar, Chief Building Official – Mr. Salazar provided input primarily on Building Code issues and policies regarding the construction/reconstruction of residential and commercial buildings. Mr. Salazar is also in charge of the City’s unreinforced masonry buildings programs.

These participants in the ABAG multi-jurisdictional planning process, as well as City of Vacaville staff assigned by them, helped in the development and review of the comprehensive list of mitigation strategies in the overall multi-jurisdictional plan. The Departments of Community Development, Public Works, Fire, and the City Manager’s office reviewed and decided on mitigation strategy priorities that were best for our situation and placed them into the Strategies Matrix. Key City staff identified mitigation strategies, prioritized those strategies, and reviewed preliminary budgets and potential funding sources for strategies designated as “High” priority for City-owned-and-operated facilities. Mitigation strategies were assigned to the appropriate various City Departments based on responsibilities and involvement. The tentative decision on priority was made based on a variety of criteria, not simply on an economic cost-benefit analysis. These criteria include being technically and administratively feasible, politically acceptable, socially appropriate, legal, economically sound, and not harmful to the environment or our heritage.

City Council will adopt the plan and strategies by resolution once the City receives FEMA approval for the plan. The final strategies (as shown in the attached Table) will become an *Implementation Appendix* to the City’s *Safety Element*, as a part of the comprehensive update to the City’s General Plan.

The City Planning team also prioritized specific mitigation tasks for the next 5 years. This list includes implementation process, funding strategy, and approximate time frame. See **Mitigation Activities and Priorities** section for a list of these strategies.

Process for Updating Plan Sections

The process began with a thorough review of the 2005 Local Hazard Mitigation Plan. This was completed during the City staff’s comprehensive review of the 2010 workshops with ABAG. New FEMA and ABAG data on hazards susceptibility was incorporated as well as an updating of the risk assessments with the new data. The plan included a more complete review of historical hazards and the 2010 planning process. The material was further updated to reflect minor changes in the City’s policies and programs since 2005. There were no separate meetings that specifically addressed the updates from the 2005 LHMP other than those in the following sections.

Preview of Existing Reports, Studies and Plans

The following documents were reviewed and incorporated into this annex in addition to those in the regional plan in Appendix A.

Existing plans, studies, reports, and technical information (Name of plan/document)	Method of incorporation into the jurisdiction annex (Section in annex where this plan was incorporated and how it was used)
City of Vacaville General Plan – Safety Element	Hazards Assessment and priority mitigation actions
Capital Improvements Plan (CIP)	Priority mitigation actions and programs
City of Vacaville Emergency Response Plan	Priority mitigation actions and programs.

Public Meetings

The objective of the public meetings has been to solicit input on Mitigation Strategies and any impacts to the public, but also to educate the public on the process and about the occurrence of natural disasters within our jurisdiction. Also this will provide an opportunity for the public to review the LHMP in detail should they choose and learn about the planned responses their City is prepared for in the event of a natural, or other, disaster.

The City provided its first opportunity for the public to comment on the LHMP mitigation strategies on September 29, 2009, from 5:00 p.m. – 6:00 p.m., at the Ulatis Cultural Center (UCC), Room D. No one from the public attended this meeting, nor were any comments received afterwards.

Staff has also posted the City’s LHMP on its website and invited comments from the public via that method as well. To date, no input from the public has been received during this process, but the web-site has and will remain open for comments until FEMA approval is obtained.

Documentation of the public meetings and the internet posting is provided in **Exhibit B, following**.

Currently, the City is updating its General Plan and has been holding public meetings under that venue which will include the LHMP. The LHMP and its mitigation strategies will be incorporated into the Safety Element of the new General Plan. The timetable for the General Plan Update is set to complete itself by summer of 2012. In the mean time, the City Council will adopt the LHMP as a part of the Safety Element of the existing plan. A further public hearing will be held and incorporated into the City Council Adoption process providing the public an additional opportunity to participate at a regularly scheduled and advertised City Council meeting. The City intends to complete its public process and have Council adopt the final LHMP at a regularly scheduled and noticed meeting in the summer of 2011, within one year of FEMA's approval of the Multi-Jurisdictional LHMP.

Hazards Assessment

The ABAG multi-jurisdictional Local Hazard Mitigation Plan, to which this is an annex, lists nine hazards that impact the Bay Area, five related to earthquakes (faulting, shaking, earthquake-induced landslides, liquefaction, and tsunamis) and four related to weather (flooding, landslides, wildfires, and drought). Maps of these hazards and risks are shown on the ABAG website at <http://quake.abag.ca.gov/mitigation/>.

The City has reviewed and studied the hazards identified in the LHMP and ranked those hazards based on past disasters and expected future impacts. The City's Safety Element as well as input from the City departments was utilized to rank hazards identified by the ABAG umbrella plan. The City's conclusion is that flooding was the most important to our community followed by wildfire, and landslides. These pose the most significant risks for potential property loss and life hazard. Because much of the city is newer construction, earthquakes (including shaking and liquefaction) are considered less of a problem although still of concern.

The past records of recurring flooding, in particular the December 31, 2005 flooding that closed I-80, played a significant role in selecting the hazard of most concern. Over 900 businesses and residences were flooded or damaged by the 2005 flood totaling over \$20 million in damages.

While the City has undertaken a number of general hazard mapping activities since the first Safety Element was prepared by the City, all of these maps are less detailed and are not as current as those shown on the ABAG website at <http://quake.abag.ca.gov/mitigation/>.

Past Occurrences Of Disasters (natural and human-induced)

The City and County has experienced a number of different disasters during its history, including numerous earthquakes, floods, droughts, wildfires, energy shortages, civil disturbances, landslides, and severe storms. In addition to the declared disasters noted in Appendix D, locally significant incidents that have also impacted the City of Vacaville and Solano County in the last several years include:

Occurrences of Hazards Within the Last 5 Years

Only one major hazard has been recorded in the past five years, although the City has been plagued by wildfires every year in the late summer. A description of the major hazard follows:

2005-6 - Dec 31, Vacaville flooding. Department of Water Resources (DWR) declared emergency mobilization. High tides in Delta and continued wet weather expected throughout the State result in federal disaster declaration. Governor declares state of emergency due to threat of major flooding in northern California and San Joaquin Valley.

A Brief History of Hazards in the Vacaville Area

Historical Earthquakes

1838 - June, San Francisco, magnitude 6.8- 7.4

1865 - October 8, Santa Cruz Mountains, magnitude 6.5, Intensity VIII

1868 - October 21, Hayward, magnitude 6.8-7.0, Intensity VI-VII

1892 - April 19, Vacaville, magnitude 6.4, Intensity VIII. Severe damage in Allendale, Dixon, Elmira, Vacaville, and Winters when the Calaveras Fault slipped. \$225,000 property loss and one fatality. At Allendale, between Vacaville and Winters, buildings collapsed or were shifted off foundations: and ground fissures formed, suggesting possible faulting. In Vacaville, many structures demolished including Odd Fellows Hall, Ream & Thomas Grocery, Masonic Hall and residences of Thissell, Gates and Blake. Most brick structures destroyed in Vacaville and many frame buildings damaged with chimneys destroyed. Similar damage reported in Winters (Yolo County). Damage less serious in Dixon, but many school buildings severely damaged and the Baptist Church demolished. Fairfield's Methodist Church suffered severe damage and in Elmira damage was complete. Felt north to Redding, east to Virginia City, Nevada, and south to Salinas and Fresno.

1892 - April 21, Winters, magnitude 6.2-6.4, Intensity VIII . Weakened structures in communities hit by the April 19 earthquake were further damaged. Damage most severe in Winters, where many buildings that withstood the April 19 shock were leveled. Not one building on Main Street was left habitable. At Esparto, every brick chimney fell and wood-frame buildings were wrenched out of shape. Many chimneys collapsed in Sacramento and Woodland. Additional loss was slight in Dixon and Vacaville. It was felt in an area about the same as that of the April 19 shock.

1898 – Damage to older brick buildings on Mare Island. Officer's HQs demolished as result.

1906 - April 18, the Great 1906 San Francisco Earthquake, magnitude 7.8. Ranks as one of the most significant earthquakes recorded in America. Benicia was hardest hit of nearby cities (damages included the Clock Tower at the Arsenal). Suisun also suffered damage and nearly destroyed by fire. Vallejo received some 38,080 refugees. The Vallejo Police

deputized 188 citizens to join forces with the regulars to control any criminal activity. Vacaville Company I of the California Guard went to San Francisco to aid rescue efforts.

1989 - October 17, Loma Prieta Earthquake (Santa Cruz mountains) – magnitude 6.9. This quake ended decades of tranquility in the San Francisco Bay region. It killed 63 persons, injured 3,757, and displaced over 12,000. Over 20,000 homes and businesses damaged and more than 1,100 destroyed. The quake caused \$6 Billion of damage. Reconstruction continues today some two decades later with replacement of Oakland-Bay Bridge. Damage occurred in Solano County in Benicia (Clock Tower and fire station) and Isleton (City Hall Community Center and fire station) as it rolled through Solano County.

Historical Fires

1877 - Vacaville: Fire destroyed half the business district. A second almost burned the town completely.

1888 – Vacaville: A fire burned Chinese District. Second one destroyed most of the business district.

1890 - 3 fires in Vacaville, one burned five buildings because a new water line was being laid and the water system was shut down. About one hundred persons called to Coulter Ranch to fight fires in hills north of Vacaville. A party of fire fighters were surrounded and narrowly escaped. More than three hundred acres were burnt and a large number of trees were destroyed.

1895 - Vacaville formed a fire department and 3 days later the entire north side of Main Street between Dobbins and Main Street Bridge was destroyed by fire. Involved 12 businesses, Bowles Opera House, 58 Chinese dwellings, barns and outbuildings. Damage over \$30,000. Rebuilt with brick.

1900 – First fire alarm system installed in Vacaville. Fire in Chinatown in Vacaville.

1908 - Blue Ridge Mountains fire raged for two weeks.

1909 - Hotel Raleigh, one of the oldest landmarks in Vacaville, destroyed by fire. The steeple of the Presbyterian Church caught fire and top part had to be cut off to save the church.

1912 – Benicia Army Arsenal fire. Fire totally destroyed main store-house of the Army Arsenal just above Army Point. Loss estimated at \$5,000,000. Nobody was injured despite many explosions of powder stores which was heard and felt for miles. Fire reported as one of the fiercest in history of the coast. Huge masses of smoke and the blaze could be seen in San Francisco. Cause of fire believed to have been spontaneous combustion in the packing of some of the ammunition.

1925 - Last remaining building of Maine Prairie destroyed in a fire.

1942 - Fire began in the Crystal Building bowling alley in Vacaville caused damage.

1949 – Grass-fire that started in Mix Canyon burned for seven (7) days.

1958 - Vacaville: Diamond Match Lumberyard burned. Flared again a month later causing more damage. Losses were greatest monetary amount in the history of the town.

1951 - The Japanese Buddhist Temple in Vacaville destroyed by fire.

1953 - Old Vacaville High School gym burned forcing the razing of entire structure.

1954 – Grass-fire with high winds burned 5,888 acres from California Medical Facility to Travis AFB.

1957 - Air tankers first used to help fight a Mt. Vaca fire.

1961 - Black Saturday – Some ninety-five (95) fires reported. Worst was in Allendale area (95,008 acres and 10 homes destroyed). Another burned from Elmira-Travis AFB to Collinsville (40,008 acres). Third fire from Benicia-Cordelia Hills along Highway 40 to the Carquinez Bridge. 3 days later, an arson fire in Miller Canyon burned 2,808 acres along Blue Ridge in 40 hours.

1965 - “Black Thursday” - Fire between Dixon and Peabody-Vanden roads. Second fire caused by power lines falling and igniting dry grass in English Hills burned to freeway. 300-400 fire fighters fought the blaze north of Vacaville (6,588 acres, 13 homes and 45 other buildings

lost). Unknown number of livestock lost. Extensive damage at Travis AFB. Meanwhile the “Kaiser Fire” started in Napa County when power lines fell there. Burned 25,888 acres from Soscol Ridge near Highway 29 to American Canyon Road and 1-88 to the south and into Green Valley to the east.

1981 - Atlas Peak Fire in Napa burned nearly 25,868 acres (5% of the land in the county) and caused an estimated \$36 million in damage and threatened Solano County.

Historical Flooding

1846, '49, '50 and '52 - severe winter & flooding recorded.

1861 - December - January 1862: California's Great Flood. Four weeks of rain caused largest flood in California's recorded history. The entire Sacramento and San Joaquin valleys flooded for 300 miles (480 km), averaging 20 miles (32 km) in width. Inland sea created in Orange County lasted three weeks. Water 4 feet deep, up to 4 miles from the river.

1862 - severe winter & flooding recorded.

1896 - The beginning of a four-year drought in the Vaca Valley area.

1906 - Storm reported highest ever rainfalls in a southeast to northwest direction from Monterey to Ione in Sierra Nevada foothills. 300,000 acres flooded in Sacramento Valley.

1907 and '09 - severe winter & flooding recorded.

1931 - Some flooding in Vacaville.

1940 - Northern California's six day floods, Meridian and Rio Vista flooded eight feet in depth.

Property damage over \$10,000,000. Levees near Colusa dynamited to relieve pressure on the Meridian district. Meridian and Colusa surrounded with water for four days. Rio Vista near the junction of the Sacramento and San Joaquin rivers had more than 50,000 acres of farmland flooded up to ten feet. The river went over its banks in at least nine places between Lindsay slough and Rio Vista. New danger points in Delta area between Rio Vista and San Francisco Bay, where the Sacramento and San Joaquin rivers crests caused water level rises near Antioch and Martinez with some areas there under water.

1955 - Storm affected central Sierra and South Bay. The Eel River on the North Coast saw greatest flow on record to that date while Central Valley rivers saw near record flows. Sstatewide disaster declared, with the storm resulting in 74 deaths and \$200 million in economic losses. Heaviest 24-hour rainfall on December 20th - 15.34 inches in Shasta County.

1955 - severe winter & flooding recorded.

1956 - Flooding all along coastal counties.

1964 - severe winter & flooding recorded.

1983 - Storms cause damage and extensive flooding in Vacaville area.

1986 - Sacramento River & Delta flooded. Rio Vista sustained major damage & got federal aid.

1986 - Northern California and western Nevada floods. Pineapple Express caused unprecedented amounts of rain. The nine-day storm brought half of the average annual rainfall for the year. Record flooding to southern San Francisco Bay area. Extensive flooding in Napa and Russian rivers. Napa recorded their worst flood to date. Calistoga recorded 29 inches (740 mm) of rain in 10 days (thousand-year rainfall event). 24-hour record rain events reported in Central Valley and Sierra (thousand-year rainfall). Record 24-hour rainfall in Central Valley of 17.60 inches (447 mm) at Four Trees in Feather River basin. Sacramento had 10 inches (250 mm) rain in an 11-day period. Sacramento, Yuba, and Feather River levee breaks in Olivehurst and Linda cause disasters forcing thousands of residents to evacuate. On San Joaquin River and in Delta, levee breaks along Mokelumne River caused flooding in Thornton and flood four Delta islands. Lake Tahoe rose 6 inches (150 mm) as a result of high inflow. Resulted in 13 deaths, 50,000 people evacuated, and over \$400 million in property damage. 3000 residents of Linda joined in class action lawsuit Paterno v. State of

California, which went to California Supreme Court in 2004. Court decision said California was liable for millions of dollars in damages due to levee failures.

1987 - Major flooding to the east and southeast of Vacaville halted railroad travel/shipping.

1989 - Drought again!

1995 - severe winter & flooding recorded.

1996-7 - New Year's Day: Northern California flood. Pineapple express hit northern California making December one of wettest on record. Klamath River in worst flood since 1974 permanently changed course in some areas. Record flows in Feather and San Joaquin River basins from rain at elevations up to 11,000 feet (3,400 m), prompting snow melt. Cosumnes River (tributary to San Joaquin River) bore brunt of flooding. Levees fail flooding Olivehurst, Arboga, Wilton, Manteca, and Modesto. Massive landslides in Eldorado National Forest east of Sacramento close Hwy 50. Damages totaled \$35 million. Sierra Nevada Watersheds already saturated when 3 subtropical storms added more than 30 inches (760 mm) of rain. Levee failures (breaks and overtopping) in the Sacramento River Basin result in extensive damages. In San Joaquin River Basin, dozens of levees failed and produced widespread flooding. The Sacramento-San Joaquin River Delta also experienced levee breaks and overtopping. 48 counties were declared disaster areas (all 46 counties in northern California). Over 23,000 homes and businesses, agricultural lands, bridges, roads and flood management infrastructures – valued at about \$2 billion – were damaged. Nine people killed and 120,000 people were evacuated from their homes. 300 square miles (780 km²) were flooded. Yosemite Valley flooded for the first time since 1861-62.

2004 - Upper Jones Tract levee break: federal disaster declaration and \$90 million damages.

2005-6 - Dec 31, Vacaville flooding. Department of Water Resources (DWR) declared emergency mobilization. High tides in Delta and continued wet weather expected throughout the State result in federal disaster declaration. Governor declares state of emergency due to threat of major flooding in northern California and San Joaquin Valley.

Historical Human Disasters

1837 - Smallpox epidemic. Known as the Miramonte epidemic, infected the Patwins of the area. It raged for two years.

1853 - The J. Bragdon (steamer) ran down the Comanche and sank her in Suisun Bay killing ten people.

1864 - The Washoe blew up at Steamboat Slough killing fifty.

1865 - The Yosemite blew up leaving Rio Vista. 140 passengers, many of them Chinese, were killed. (Numerous steamships blew up from overheated boilers-some due to the desire to outrace others steamships.)

1875 - Phylloxera (plant lice) attacked early vineyards beginning in Pleasants Valley and spreading southward. Green Valley was spared. This caused many farmers to develop orchards to replace vineyards and wheat fields. (Dixon and Montezuma Hills areas continued to raise grain and livestock.)

1919 - At Mare Island, when launching the USS California, the first super dreadnought, a cable gave way and the ship went completely across the channel swamping the boats and wiping out the ferry slip but hurting none of the gathered dignitaries.

1922 - No. 1 Magazine at the Benicia Arsenal blew up.

1924 - Hoof and mouth disease hit four counties (Solano, Napa, Contra Costa, Alameda).

1930s - The Great Depression. Chain operations forced fruit companies and local shippers to sell out or quit. Government standards also caused fruit growers to quit-leading to the abandonment and decay of orchards. United Prune Growers with federal aid helped growers' cash flow for a while. "Buckskin disease" decimated cherry orchards.

1932 - **Vacaville Riots** between Agricultural Workers' Industrial League and pruners.

- 1941** - The United States entered World War II. The Japanese Buddhist Temple in Vacaville shot at following the announcement of the attack on Pearl Harbor. (The Japanese-Americans would soon leave for the internment camps.)
- 1942** - Blackout and air raid drills held in the various towns.
- 1944 - Port Chicago ammunition explosion** killed 326 men (including 282 black enlisted men who were the ammunition loaders and injured more than 400 others). Most of the dead and injured were African American recruits, and the continuing unsafe conditions even after the disaster resulted in 58 black servicemen refusing to work, known as the Port Chicago Mutiny, a month later. Civil rights changes resulted. Blast felt throughout North & East Bay areas causing damage in Benicia and Vallejo and blowing out windows in Vacaville. The Charles van Damme steamer was lifted and stuck into the slick.
- 1958** - United States entered the Korean Conflict. Nineteen (19) persons were killed, including Brig. Gen. Robert F. Travis, in a 6-29 bomber accident at Fairfield-Suisun Air Base.
- 1958** - "Operation Chico" a Civil Defense Exercise took place. 1,008 people were moved from Solano County to Chico where they boarded with local families for the weekend. The maneuver was practiced because of the fear that an atomic bomb would be dropped in the county because of its strategic location. It was accessible from both Bay Area bridges and the site of Travis AFB and the PG&E substation.
- 1961** - Direct military aid given to South Viet Nam. Travis Air Force Base a major departure/arrival point. (1965 - 1975) Dead and wounded and later MIAs' bodies shipped there. Vallejo had the first all-metal fallout shelter that was designed by the Office of Civil Defense Mobilization and built at the expense of the U.S. Government. As an experiment a Vallejo family spent sixty (60) hours in a fallout shelter.
- 1988** - The Shell Oil spill entered Suisun Bay at Simmons Island and Ryer Island.
- 1989** - Toxic waste cache discovered at Collinsville.

More information on State and Federally declared disasters in the City of Vacaville or Solano County can be found at <http://quake.abag.ca.gov/mitigation/ThePlan-D-Version-December09.pdf>

Repetitive Loss Properties

The City of Vacaville has on record a total of 14 repetitive loss properties, 4 of which were residential properties. FEMA records a total payout of \$589,897.88 or an average of \$42,133.42 per property. Not that damages from the Dec. 31, 2005 storm were over \$20 million and affected more than 900 properties bring Vacaville to the attention of the statewide news for that event.

Risk Assessment

Urban Land Exposure in the City of Vacaville

The City examined the hazard exposure of urban land based on information in ABAG's website at <http://quake.abag.ca.gov/mitigation/pickdbh2.html>. The "2005 Existing Land Use with 2009 Mapping" file was used for this evaluation (in the previous plan, the file used was "Existing Land Use in 2000"). In general, the hazard exposure of the county is increasing over

time as the amount of urban land increases. (In the last 5 years, 188 acres of land has become urban and added to the 11,703 urban acres in the City.)

- Earthquake faulting – The Great Valley Fault runs to the east of Vacaville. However, this fault is not considered an active fault with significant surface rupture hazard by the California Geological Survey (This is unchanged from the 2005 plan).
- Earthquake shaking – No acres are in the highest two categories of shaking potential. However, many acres are in moderate hazard levels due to the presence of this Great Valley Fault (This is unchanged from the 2005 plan).
- Earthquake-induced landslides – The California Geological Survey has not completed mapping of this hazard in the City of Vacaville. However, the hazard is considered similar to that of rainfall-induced landslides. One location of landslides is on record in Vacaville but appeared to be rain related.
- Earthquake liquefaction – 7,697 acres (as compared to 7,411 acres in 2005) are in areas of moderate, high, or very high liquefaction susceptibility. Because of the low levels of shaking intensity expected in Vacaville, liquefaction is not a serious hazard and the California Geologic Survey has not completed its mapping of this hazard in Vacaville.
- Tsunamis – There is no significant tsunami hazard in the City of Vacaville because the city is inland from the Bay.
- Flooding – 711 acres (increased due to FEMA map changes to 555 acres in 2005) are in the 100-year flood plain, while an additional 2,573 acres (as compared to 1,830 acres in 2005) are in other flood-prone areas. Flooding was determined to be the most critical hazard for the City of Vacaville.
- Landslides – In 2005 the City had 33 acres of land affected by existing landslides. Since then 4 acres have been repaired by developers leaving 29 acres currently considered to have some hazard potential.
- Wildfires – In 2005 the City had 477 acres considered subject to high or very high wildfire threat. Due to development this figure is currently 417 acres. None of the urban land is designated as extreme wildfire threat, but within the City limits 5,008 acres are in the designated wildland-urban interface threat areas. Wildfire was determined to be the second most significant hazard threatening the City.
- Dam Inundation – 142 (as compared to 141 acres in 2005) are subject to dam inundation.
- Drought – all acres are subject to drought.

Infrastructure Exposure in the City of Vacaville

The City also examined the hazard exposure of infrastructure based on the information on ABAG's website at <http://quake.abag.ca.gov/mitigation/pickdbh2.html>. Of the 313 miles of roadway in the City,

- ◆ Earthquake faulting – Per the ABAG website, no active faults run within the city so rupture of a fault is not a direct concern.
- ◆ Earthquake shaking – No miles of roadway are in the highest two categories of shaking potential. All are in the moderate shaking potential areas.

- ◆ Earthquake-induced landslides – the California Geological Survey has not completed mapping of this hazard in the City of Vacaville. No roads are in areas subject to rainfall-induced landslide.
- ◆ Earthquake liquefaction – 211 miles of roadway are in areas of moderate, high, or very high liquefaction susceptibility.
- ◆ Tsunamis – While tsunamis mapping within San Francisco Bay has not been completed, there is no significant hazard in the City of Vacaville.
- ◆ Flooding – 13 miles of roadway are in the 100-year flood plain, while an additional 56 miles are in other flood-prone areas.
- ◆ Landslides – No roads are in areas of existing landslides.
- ◆ Wildfires – While 15 miles of roadway are subject to high, very high, or extreme wildfire threat, 142 miles of roads are in wildland-urban interface threat areas.
- ◆ Dam Inundation – Four miles of roadway is in an area subject to dam inundation.
- ◆ Drought – is not a hazard for roadways.

Exposure of City-Owned Buildings, Critical Healthcare Facilities and Schools in the City of Vacaville

Finally, the City created a list of critical facilities it owns and provided this list to ABAG. ABAG returned the list to the city with the hazard exposure of each facility and summarized it on its website. The City examined the hazard exposure of critical health care facilities, schools, and city-owned buildings based on the information on ABAG's website at <http://quake.abag.ca.gov/mitigation/pickcrit2010.html>. Of the critical facilities in the City,

Exposure (number of facility types)								
Hazard	Healthcare Facilities		Schools		Locally Owned Critical Facilities		Locally owned bridges and interchanges	
	2005	2010	2005	2010	2005	2010	2005	2010
<i>Total Number of Facilities</i>	8	9	23	27	7	100 ¹	34	36
Earthquake Shaking (within moderate shaking category) ²	8	0	23	6	7	15	33	50
Liquefaction Susceptibility (w/n moderate, high, or very high liquefaction susceptibility)	8	9	19	20	6	70	27	32
Liquefaction Hazard (within CGS study zone) ³	-	-	-	-	-	-	-	-
Earthquake-Induced Landslides (within CGS study zone) ⁴	-	-	-	-	-	-	-	-
Earthquake Faulting (within CGS zone) ⁵	-	-	-	-	-	-	-	-
Flooding (within 100 year floodplain)	0	0	2	0	0	3	3	6
Flooding (within 500 year floodplain)	3	6	6	7	0	25	7	6
Landslides (within areas of existing landslides) ⁶	0	0	0	0	0	3	0	0
Wildfires (subject to high, very high, or extreme wildfire threat)	0	0	0	0	0	4	0	0
Wildland-Urban Interface Fire Threat	3	4	15	19	3	47	15	16
Dam Inundation	0	1	0	3	0	1	0	3
Sea Level Rise (exposed to 16in sea level rise) ⁷	-	0	-	0	-	0	-	0
Sea Level Rise (exposed to 55in sea level rise) ⁸	-	0	-	0	-	0	-	0
Tsunamis ⁹ (within inundation area)	-	0	-	0	-	0	-	0
Drought ¹⁰	-	-	-	-	-	-	-	-

¹ Increase in total number of critical facilities is due to better reporting to ABAG

² There are no facilities in the highest shaking potential category.

³ The California Geological Survey has not completed mapping of this hazard in the City of Vacaville.

⁴ The California Geological Survey has not completed mapping of this hazard in the City of Vacaville. However, this is unlikely to be an issue because no city-owned facilities or bridges or interchanges are in existing landslide areas.

⁵ No active faults with a significant surface rupture hazard run within the city so rupture of a fault is not a direct concern.

⁶ There are no critical facilities in areas of “many” or “mostly” landslide.

⁷ Sea level rise data was not available in 2005. This is not a threat to Vacaville as it is inland of the Bay.

⁸ Sea level rise data was not available in 2005. This is not a threat to Vacaville as it is inland of the Bay

⁹ Tsunami evacuation planning maps were not available inside the San Francisco Bay in 2005. This map became available in December 2009. This is not a threat to Vacaville as it is inland of the Bay

¹⁰ Drought will not affect locally owned facilities directly. However, the city does operate a water-supply distribution system.

Repetitive Loss Properties in the City of Vacaville

Currently there are 14 repetitive loss properties listed in FEMA's database. This number increased due to the December 31, 2005 storm. Some of these fall within the new increased special flood hazard zones on the newly modified FEMA FIRM maps. Only two remain outside of a special flood hazard zone at this time. In 2004 there were 6 repetitive flood loss properties in the City, based on the information at <http://quake.abag.ca.gov/mitigation/pickflood.html>. These properties are mostly residential in nature and should benefit somewhat from the already constructed Pleasants Valley Detention Basins. These were completed since the last flooding occurred at these properties. The completion of the Alamo Creek Detention basin in 2011 should greatly reduce threat to the majority of the properties. Current studies are underway for the Brown Street area that will define a project to protect one last identified property.

Other Risks

The City plans to continue to work with ABAG through 2010/2011 to improve the risk assessment information being compiled by ABAG by providing information on unreinforced masonry buildings and soft-story apartments located in the City.

Drought, though a potential problem in the City, is not fully assessed. The City has more than ample supplies of water from the Delta, Putah South Canal, and ground water wells for any currently foreseeable drought. The City will work with ABAG and various water supply agencies on this issue however.

The City plans to work with ABAG to develop specific information about the kind and level of damage to buildings, infrastructure, and critical facilities which might result from any of the hazards previously noted.

National Flood Insurance Program

Vacaville has participated in the National Flood Insurance Program (NFIP) since 1982. The City also participates in the Community Rating System (CRS) and is currently class 8. Every 5 years the City is re-evaluated and is currently in this process. A new class number will be issued, but staff is optimistic it will remain at 8. Because the City participates, residents get a 10% discount on flood insurance if they are within the 100-year flood zone and a 5% discount if they are outside of the 100-year flood zone. The City performs an annual outreach and public education program on flood insurance. The City complies with sections c-2 and c-4 of its NFIP agreement with FEMA.

On May 4, 2009, FEMA Flood Insurance Rate Maps (FIRMs) changed for the City of Vacaville. Four significant new areas were added into the area of special flood hazard. The City made a concerted outreach effort to inform the public in advance of these changes and to educate them on the benefits of the NFIP prior to the residents falling into the new flood zones. The City mailed flyers and conducted well-attended public meetings on the Flood Map changes prior to their

implementation. Feedback from the public has been supportive of the insurance, with questions generally pertaining to reasons for their location in (or out) of a special hazard zone.

The City has a Floodplain Management Ordinance which has been reviewed as a part of the normal NFIP 5-year renewal process. A few minor revisions suggested by FEMA have been adopted by the City Council in July of 2010 for the City to continue to be fully compliant in the program. All new developments are required to perform a flood study and to mitigate increased runoff by 110% of the predevelopment flows within the Alamo Creek Watershed upstream of Peabody Road. In this process, flood hazards are addressed prior to approval of a development. Individual building permits are not individually scrutinized unless they fall within a special flood hazard zone or the City is aware of a specific local flood issue.

Mitigation Goals

The goal of the ABAG MJ-LHMP is to maintain and enhance a disaster-resistant region by reducing the potential for loss of life, property damage, and environmental degradation from natural disasters, while accelerating economic recovery from those disasters. This goal is unchanged from the 2005 plan and continues to be the goal of the City of Vacaville in designing its mitigation program.

Mitigation Activities and Priorities

Evaluation of Mitigation Progress from Previous (2005) Plan

In the winter storms of late December and early January 2006, the City again experienced flooding due to lack of adequate detention basins. Therefore, the construction of these basins and related mitigation activities were listed as their highest specific mitigation priority. The City has currently completed one set of the planned basins (the Pleasants Valley Basins), and has approved grant funding for two more (Alamo Creek Detention Basin and Ulatis Creek Detention Basin). The Alamo Creek Detention Basin is nearing completion of environmental and design phases and is anticipated to start construction in 2011. The Ulatis Creek Basin is undergoing environmental review and will likely see construction in 2013. The City has applied for grant funding of the Laguna Creek Detention Basin and has not yet received a response. The City has been and will continue to actively seek grants for drainage facility improvements since flooding has been identified as the City's greatest priority. The City has installed two additional stream gauge stations (and one added rain gauge) hooked to the City website for evaluation and public notice of stream flood levels. These two are at the Buck Ave bridge over Alamo Creek and the Allison Drive bridge over Ulatis Creek. This brings the total for City stream gauges to 5. Two were installed at the Peabody & Tulare bridges over the Alamo Creek after the 2005 flood and one has been at the Marshall bridge over Alamo Creek for some time.

Future mitigation Activities and Priorities

With flooding the major hazard of concern, the City is actively pursuing grant funding for drainage and detention basin efforts. Detention basins have been identified as the most cost effective means of attenuating the flood hazards. These projects and their relative priority was worked out with a consultant and discussed and approved among the City Department Heads and

the LHMP Committee. The Public Works Department is taking the lead in this effort. These projects correspond with mitigation strategy INFR-d-5. Pending detention facilities are:

- ◆ Alamo Creek Detention Basin – 544 acre-feet. Funded and slated for construction in fall of 2011, or spring 2012. This basin affected the most properties and received grant funding first.
- ◆ Ulatis Creek Detention basin - 500 acre-feet. Partially funded and entering environmental review. Anticipated construction in 2013. This basin affected the second largest group of properties flooded in the Dec. 31, 2005 storm and has received partial grant funding allowing the City to begin the process.
- ◆ Laguna Creek Detention basin – City studies call for a minimum of 460 +/- acre-feet at this location. Currently this basin is unfunded, but it is designated to be a priority project for the City. Application for a predisaster mitigation grant (PDM10) has been submitted. A developer may participate in contributions towards this project as well, but this is not certain at this time. This basin will add further protection to the lower half of the City in conjunction with the Alamo Creek basin. The City has been notified of award of a grant for this basin but the grant is pending completion of this LHMP. The City intends to continue to pursue available grant funding as opportunities arise.
- ◆ Florence Drive Detention Basin – 16 acre-feet. Currently unfunded but in City Capital Improvement Program and is pending available funding. This is a smaller and lower priority basin than Laguna Creek. The street this basin will protect has fewer homes but was significantly impacted in the Dec. 31, 2005 storms. It is possible this may be constructed by 2014-15.
- ◆ Ulatis Creek Floodwall. This is a potential project that is under consideration. Due to a lack of city-owned property at this location, costs are projected to be fairly high. The benefits may need to be reassessed once other flood protection has been achieved.

On-Going Mitigation Strategy Programs

The City has many on-going mitigation programs which help create a more disaster-resistant region. The following list highlights some of those programs identified as *Existing Programs* in the mitigation strategy spreadsheet. Others are on-going programs that are currently underfunded. It is the City's priority to find additional funding to sustain these on-going programs over time.

- Increase efforts to reduce the risk of existing private development in wildland-urban-interface fire threatened neighborhoods or in areas exposed to high wildfire threat by improving vegetation management and engineering design (ECON-e-1);
- Development of interoperable communications for first responders from cities, counties, special districts, state, and federal agencies. (GOVT-c-7) – Underfunded;
- Require that new development provide adequate fire service access (INFR-c-6)
- Maintain and update the City of Vacaville's Standardized Emergency Management System Plan (GOVT-c-12);
- Offer CERT/NERT type training to employees (GOVT-c-3)
- Continue to participate in FEMA's National Flood Insurance Program (GOVT-d-5)

- Continue annual compliance with State of California and federal requirements to assess the vulnerability of dams to damage from earthquakes, seiches, landslides, liquefaction, or security threats (INFR-a-13).
- Continue to review and update designated back-up Emergency Operations Center with redundant communications system (INFR-a-21)
- Continue to work with residents in rural-residential areas to ensure adequate plans are developed for appropriate access and evacuation in wildland-urban-interface fire-threatened communities or in areas exposed to high-to-extreme fire threat. For example, in some areas, additional roads can be created, and in other areas, the communities will need to focus on early warning and evacuation because additional roads are not feasible. (HSNG-g-11)
- Continue to actively implement existing State law that requires cities and counties to maintain lists of the addresses of unreinforced masonry buildings and inform private property owners that they own this type of hazardous structure. (ECON-c-1)
- Continue to comply with all applicable building and fire codes, as well as other regulations (such as state requirements for fault, landslide, and liquefaction investigations in particular mapped areas) when constructing or significantly remodeling government-owned facilities. (GOVT-a-11)
- Continue to develop and distribute culturally appropriate materials related to disaster mitigation and preparedness, such as those on the <http://www.preparenow.org> website. (HSNG-k-16)
- Continue to enforce State-mandated requirements, such as the California Environmental Quality Act, to ensure that mitigation activities for hazards, such as seismic retrofits and vegetation clearance programs for fire threat, are conducted in a way that reduces environmental degradation such as air quality impacts, noise during construction, and loss of sensitive habitats and species, while respecting the community value of historic preservation. (ENVI-a-1)

Incorporation into Existing Planning Mechanisms

The City has a Safety Element in its General Plan that includes a discussion of fire, earthquake, flooding, and landslide hazards. A comprehensive update to the General Plan is underway, with adoption estimated to occur in spring of 2012. Policies in the Safety Element of the Plan will be updated to be consistent with current State laws and will incorporate by reference the City's LHMP. In addition, the City enforces the requirements of the California Environmental Quality Act (CEQA), which, since 1988, requires mitigation for identified natural hazards. The City has used these pre-existing programs as a basis for identifying gaps that may lead to disaster vulnerabilities in order to work on ways to address these risks through mitigation.

The City has a Capital Improvement Plan (CIP) that currently lists most of the ongoing detention basin capital projects referred to in this document. The CIP reflects an active movement towards implementation of these critical facilities. The CIP is reviewed annually and all bridge or facility retrofits are updated into the program annually as funding is secured.

The Plan Maintenance and Update Process

As required by the Disaster Mitigation Act of 2000, the City of Vacaville will update this plan annex at least once every five years, by participating in a multi-agency effort with ABAG and other agencies to continue in the multi-jurisdictional plan.

The Public Works Director will have the responsibility of updating the plan. The Fire Chief will ensure that *monitoring* of this Annex will occur. The plan will be monitored on an on-going basis, however, the major disasters affecting our community, legal changes, notices from ABAG as the lead agency in this process, and other triggers will be used to determine when, and what, revisions are needed.. Finally, the Annex will be a discussion item on the agenda of the meeting of City department heads at least once a year in April. At that meeting, the department heads will focus on *evaluating* the Annex in light of technological and political changes during the past year or other significant events. This group will be responsible for determining if the plan should be updated.

The City of Vacaville is committed to reviewing and updating this plan annex at least once every five years, as required by the Disaster Mitigation Act of 2000. The City Community Development Director and/or the Public Works Director will contact ABAG four years after this plan is approved to verify that ABAG will be undertaking a new plan update process. The City plans to participate in any updates to the multi-jurisdictional plan whenever one may occur. If ABAG is unwilling or unable to act as the lead agency in the multi-jurisdictional effort, other agencies will be contacted, including the County's Office of Emergency Services. Counties should then work together to identify another regional forum for developing a multi-jurisdictional plan.

The public will continue to be involved whenever the plan is updated and as appropriate during the monitoring and evaluation process. Prior to adoption of future updates, the City will provide an opportunity for the public to comment on the updates. The Community Development Director and/or the Public Works Director will ensure that public notice will be posted in accordance with State and/or City policies for such prior to any future meetings. The City will announce the comment period to the public and supply meeting logistics as necessary to facilitate the public process.

Public notice aspect of the City's plan will continue on the City's web site and links to ABAG and FEMA as well as the City's LHMP. The web-site is configured to allow input from visitors to the plan or comments of concerns or strategies. The goal of the public outreach efforts will be to educate the public on the hazards that face their community and of the efforts being taken to mitigate these by the City, the region (ABAG), the State, and the Federal (FEMA) governments in a team effort. The web-site also contains advice in the event of an emergency and the City maintains a reverse 911 program for individual calling of properties threatened by flood waters.

Exhibit A - Jurisdiction Map

Exhibit B - Public Meeting Documentation

Exhibit C - Vacaville Mitigation Strategy Spreadsheet

[Available on CD or at <http://www.abag.ca.gov/bayarea/eqmaps/mitigation/strategy.html>]