CHAPTER 7
PUBLIC HEALTH AND SAFETY

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PURPOSE

The purpose of this chapter is to provide a summary of baseline conditions of the major public health and safety hazards in Napa County. These include three human-made hazards: vehicular accidents, crime, and hazardous materials spills; and three natural hazards: seismically-related hazards, wildland fires, and flooding. In addition, emergency response centers are outlined and County health statistics are reviewed.

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LIST OF ACRONYMS AND ABBREVIATIONS

BDR	Baseline Data Report
Cal ARP	California Accidental Release Prevention Program
Cal/EPA	California Environmental Protection Agency
CCR	California Code of Regulations
CDF	California Department of Forestry and Fire Protection
CDJ	California Department of Justice
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Information System
CESQG	conditionally exempt small quantity generator
CHP	California Highway Patrol
CIWMB	California Integrated Waste Management Board
CUPA	Certified Unified Program Agency
DEM	Department of Environmental Management
DHS	California Department of Health Services
DTSC	Department of Toxic Substance Control
EMD	Emergency Management Division
EOC	Emergency Operations Center
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
G	gravity
GIS	Geographic information system
HMBP	Hazardous Materials Business Plan Program
HUD	U.S. Department of Housing and Urban Development
LOP	Local Oversight Program
LQG	large quantity generator
LUFT	leaking underground fuel tank
LUST	leaking underground storage tank
MTBE	methyl tertiary butyl ether
MTC	Metropolitan Transportation Commission
NEHRP	National Earthquake Loss Reduction Program
NEP	National Earthquake Loss Reduction Program
NFIP	National Flood Insurance Program
NPL	National Priorities List
NVP	Napa Valley Petroleum, Inc.
OEHHA	Office of Environmental Health Hazard Assessment
OES	Office of Emergency Services
PCB	poly-chlorinated biphenyl
PCE	perchloroethylene
PNPL	Proposed National Priorities List
Porter-Cologne	Porter-Cologne Water Quality Control Act
PRC	California Public Resources Code
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SPCC	Spill Prevention, Control and Countermeasure
SQG	small quantity generator
SRA	state responsibility area
SSURGO	Soil Survey Geographic
SWIS	Solid Waste Information System
SWRCB	State Water Resources Control Board
TCE	tetracholorethene
UBC	Uniform Building Code
USBOR	U.S. Bureau of Reclamation
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
UST	Underground Storage Tank
VOC	volatile organic compound

INTRODUCTION

This chapter identifies and provides a discussion of the major public health and safety hazards in Napa County. These include three human-made hazards: vehicular accidents, crime, and hazardous materials spills; and three natural hazards: seismically related hazards, wildland fires, and flooding. In addition, emergency response centers are outlined and County health statistics are reviewed. The following four maps, presented at the end of this chapter, have been generated to accompany this chapter.

- Traffic Accidents Map
- Hazardous Sites Map
- Fire Hazard Severity Map
- Flood Zones Map

PURPOSE

The purpose of this chapter is to provide a summary of baseline conditions of the major public health and safety hazards in Napa County.

POLICY CONSIDERATIONS

This section discusses the federal, state, and local policies that apply to public health and safety issues in Napa County. Note that the discussion contained in this section is general and not an exhaustive description of all possible policies.

FEDERAL POLICIES

HUMAN-MADE HAZARDS

TRAFFIC

The *Safe, Accountable, Flexible, Efficient Transportation Equity Act,* or SAFETEA, was approved by Congress in July 2005 and signed into law by the President in August 2005. This law provides $244 billion in guaranteed funding for federal surface transportation programs for the next five years, an average annual increase of 35% from previous years. This law replaces the Transportation Equity Act for the 21st Century (TEA-21), which expired in September 2003.

HAZARDOUS AND CONTAMINATED SITES

Federal Hazardous Substances Act of 1960

The Federal Hazardous Substances Act requires that certain hazardous household products bear cautionary labeling to alert consumers to the potential hazards that those products present and to inform them of the measures they need to protect themselves from those hazards. The Act gives the U.S. Environmental Protection Agency (EPA) authority to ban by regulation a hazardous substance if it determines that the product is so hazardous that the cautionary labeling required by the Act is inadequate to protect the public.

Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne) created the State Water Resources Control Board (SWRCB) and gave it the ultimate authority over state water rights and water quality policy for California. Porter-Cologne also established nine Regional Water Quality Control Boards (RWQCB) to oversee water quality on a day-to-day basis at the local/regional level. The new state law was so influential that Congressional authors used sections of Porter-Cologne as the basis of the Federal Water Pollution Control Act Amendments of 1972 (commonly known as the Clean Water Act).

Federal Insecticide, Fungicide and Rodenticide Act of 1972

The Federal Insecticide, Fungicide and Rodenticide Act provides federal control of pesticide distribution, sale, and use. Pesticide users also must take exams for certification as applicators of pesticides. All pesticides used in the United States must be registered (licensed) by the EPA. Registration assures that pesticides will be properly labeled.

Hazardous Materials Transportation Act of 1975

The Hazardous Materials Transportation Act, as amended, is the basic statute regulating hazardous materials transportation in the United States. The purpose of the law is to provide adequate protection against the risks to life and property inherent in transporting hazardous materials in interstate commerce. This law gives the U.S. Department of Transportation and other agencies the authority to issue and enforce rules and regulations governing the safe transportation of hazardous materials (Department of Energy 2005). Specific requirements include packaging standards and hazard communication consisting of documentation and identification of packaging and vehicles. Requirements have also been established for the transport of hazardous materials. State agencies are authorized to designate highways for the transport of hazardous materials. In areas where highways have been designated, hazardous materials can only be transported on the designated highways and on roadways that represent the shortest distance between the delivery site and the designated highway. Where highways have not been designated, hazardous materials must be transported on routes that do not go through or near heavily populated areas, places where crowds are assembled, tunnels, narrow streets, or alleys, except where there is no practicable alternative route or where the route is necessary to reach delivery sites, designated rest areas, and repair facilities (Code of Federal Regulations Title 49).

Resource Conservation and Recovery Act of 1976

The Resource Conservation and Recovery Act (RCRA), as updated in 1984 by the Hazardous and Solid Waste Amendments, deals with both hazardous and non-hazardous solid waste. Subtitle C of the RCRA establishes a regulatory framework and approach for managing hazardous waste from generation until ultimate disposal ("cradle to grave"). The two main components of this approach are permitting and tracking. Either the EPA or the states must issue a permit to facilities before they can treat, store, and dispose of hazardous waste. A permit outlines the precautions that must be taken to manage the waste in a manner that adequately protects human health and the environment. Tracking requires each facility handling waste to obtain an identification number. Generators must prepare a uniform manifest document to accompany any transported hazardous waste from the point of generation to the point of final disposal (U.S. Environmental Protection Agency 1997).

According to the RCRA hazardous waste, generators are separated into three groups:

- Large quantity generators (LQGs) are those that generate more than 2,200 pounds (1,000 kilograms) per calendar month (approximately five full 55-gallon drums). Examples of LQGs include pharmaceutical companies and chemical manufacturers.
- Small quantity generators (SQGs) are those that generate between 220 pounds (100 kilograms) and 2,200 pounds (1,000 kilograms) of hazardous waste per calendar month. Examples of SQGs include laboratories, printers, and dry cleaners.
- Conditionally exempt small quantity generators (CESQGs) are those that generate less than 220 pounds (100 kilograms) of hazardous waste per calendar month. Examples of CESQGs include 1-hour photo labs and dental offices.

The most stringent requirements are placed on LQGs. CESQGs are subject to very minimal requirements because CESQGs produce a small amount of hazardous waste and because full regulation would present an economic burden on businesses. About 98% of the nation's hazardous waste is treated or disposed of onsite by generators (U.S. Environmental Protection Agency 1997).

RCRA regulations and permits set forth certain procedures that are designed to protect the environment and surrounding communities when owners and operators of hazardous waste facilities close their sites. In addition, RCRA sets standards for groundwater monitoring, disposal unit maintenance, and security measures that some owners and operators of hazardous waste facilities will need to follow for up to 30 years after the facility closes (known as postclosure care) (U.S. Environmental Protection Agency 1997).

RCRA also regulates underground storage tanks (USTs) that store petroleum or certain chemical products under Subtitle I and medical wastes under Subtitle J. The EPA promulgated final regulations in 1988 with respect to UST construction and monitoring methods. The federal regulations set standards for new UST system design, construction, installation and notification, upgrading of existing UST systems, general operating requirements, release detection, reporting and investigation, corrective action, and out-of-service and closed UST systems. Additionally, the EPA regulations impose financial responsibility requirements on owners or operators of USTs containing petroleum.

Comprehensive Environmental Response, Compensation and Liability Act of 1980

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, deals with cleaning up inactive and abandoned hazardous waste sites, which are also known as Superfund sites. This law created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment.

Title III of the Superfund Amendments and Reauthorization Act, also known as the Emergency Planning and Community Right-to-Know Act, imposes hazardous materials planning requirements to help protect local communities in the event of an accidental release. To implement this act, Congress required each state to appoint a State Emergency Response Commission. The commissions were required to divide their states into Emergency Planning Districts and to name a Local Emergency Planning Committee for each district. Broad representation by firefighters, health officials, government and media representatives, community groups, industrial facilities, and emergency managers ensures that all necessary elements of the planning process are represented.

NATURAL HAZARDS

EARTHQUAKES, SEISMICITY, AND OTHER GEOLOGIC HAZARDS

The Earthquake Hazards Reduction Act

In October 1977, Congress passed the Earthquake Hazards Reduction Act to "reduce the risks to life and property from future earthquakes in the United States through the establishment and maintenance of an effective earthquake hazards reduction program." To accomplish this, the Act established the National Earthquake Hazards Reduction Program (NEHRP). This program was significantly amended in November 1990 by the National Earthquake Hazards Reduction Program Act by refining the description of agency responsibilities, program goals and objectives. The four NEHRP agencies are:

- Federal Emergency Management Agency (FEMA)
- National Institute of Standards and Technology
- National Science Foundation
- U.S. Geological Survey (USGS)

To meet the above goal, NEHRP's mission includes improved understanding, characterization and prediction of hazards and vulnerabilities; improved model building codes and land use practices; risk reduction through post-earthquake investigations and education; development and improvement of design and construction techniques; improved mitigation capacity; and accelerated application of research results. The Act designates FEMA as the lead agency of the program, and assigns several planning, coordinating, and reporting responsibilities.

Example of Low Ground Fire

National Earthquake Loss Reduction Program

The National Earthquake Loss Reduction Program (NEP) was formed as a result of the report "Strategy for National Earthquake Loss Reduction" prepared by the Office of Science and Technology Policy in April 1996. The NEP "aims to focus scarce research and development dollars on the most effective means for saving lives and property and limiting the social disruptions from earthquakes, coordinate federal earthquake mitigation research and development and emergency planning in a number of agencies beyond those in NEHRP to avoid duplication and ensure focus on priority goals, and cooperate with the private sector and with state and local jurisdictions to apply effective mitigation strategies and measures." The NEP does not replace NEHRP, but encompasses a wider range of earthquake hazard reduction activities than those supported by the NEHRP agencies, and provides a framework within which these activities can be more effectively coordinated.

FIRE HAZARD SEVERITY

Wildland fire management policy falls under the jurisdiction of the land management agencies responsible for national forests, parks, wilderness areas and other public lands. There are five federal land management agencies with wildfire management responsibilities:

- U.S. Forest Service (USFS)
- National Park Service
- Bureau of Land Management
- U.S. Fish and Wildlife Service
- Bureau of Indian Affairs

The USFS is an agency of the Department of Agriculture, while the remaining four agencies are within the Department of the Interior. The USFS is recognized as the leader in wildland fire management because of its legislative mandate, experience, resources, and expertise. The policies, and to a certain extent, the practices of the other four agencies closely follow those of the USFS.

National Fire Plan

The National Fire Plan, finalized in August 2001 by the Department of the Interior and Department of Agriculture, outlines a coordinated national 10-year comprehensive strategy for the management of wildland fire, hazardous fuels, and ecosystem restoration and rehabilitation on federal and adjacent state, tribal, and private forest and range lands in the United States. This approach recognizes fire as part of the ecosystem; focuses on hazardous fuels reduction, integrated vegetation management, and firefighting strategies; and allocates and utilizes resources in a cost-effective manner over a long-term basis. An implementation plan of the National Fire Plan, completed in May 2002, designates general responsibilities for federal, state, and local agencies (National Fire Plan 2002).

U.S. Bureau of Reclamation

The U.S. Bureau of Reclamation (USBOR) manages property along Lake Berryessa within Napa County. USBOR has an agreement with the California Department of Forestry and Fire Protection (CDF) that applies to all lands administered by USBOR authorizing CDF to develop and implement appropriate plans for the suppression of wildland fire occurring within the reservoir take-line. This includes activities to reduce fuel, maintain fire roads, and improve wildlife habitat, and is in force until September 2005.

FLOODING

National Flood Insurance Act

The National Flood Insurance Act established the National Flood Insurance Program (NFIP), a federal program administered by FEMA. The NFIP enables property owners in participating communities to purchase insurance as protection against flood losses in exchange for state and community floodplain management regulations that reduce future flood damages. Participation in the NFIP is based on an agreement between communities and the federal government.

National Dam Safety Program Act

The National Dam Safety Program was established in 1972 and is administered by FEMA. The primary purpose of the program is to provide financial assistance to the states for strengthening their dam safety programs.

Dam Safety and Security Act

The Dam Safety and Security Act was enacted to assist states in improving their dam safety programs, support increased technical training for state dam safety engineers and technicians, provide funding for dam safety research, and maintain the National Inventory of Dams.

The Water Resources and Development Act

The Water Resources and Development Act was enacted in 1996 to reduce the risks to life and property from dam failure in the United States through the establishment and maintenance of an effective national dam safety program to bring together the expertise and resources of the federal and non-federal communities in achieving national dam safety hazard reduction.

STATE POLICIES

HUMAN-MADE HAZARDS

TRAFFIC ACCIDENTS

State guidelines generally set the framework for regional and local planning efforts. State law requires the regional and local planning agencies to develop and submit a Regional Transportation Plan (RTP)

every three years to the California Transportation Commission and the California Department of Transportation. The regional planning agency, the Metropolitan Transportation Commission (MTC) in the case of Napa County, has the option of submitting a previous RTP if it is deemed adequate, or submitting a revised version. The RTP is required to contain a policy element, an action element, and a financial element. Local and regional projects must be consistent with the adopted RTP in order to receive state and federal funding.

HAZARDOUS AND CONTAMINATED SITES

Hazardous Waste Control Law of 1972

The Hazardous Waste Control Law established the definition of hazardous waste and the management of hazardous wastes in the state. This law is similar to the RCRA, which incorporated some of its provisions.

Hazardous Substance Account Act of 1981

The Carpenter-Presley-Tanner Hazardous Substances Act or Hazardous Substance Account Act, also known as the California Superfund, establishes a program to provide for response authority and funding for accidental releases of hazardous substances and hazardous waste disposal sites that pose a threat to public health or the environment.

Underground Storage of Hazardous Substance Act of 1983

The California Underground Storage of Hazardous Substance Act, also known as the Sher Bill, governs the construction, maintenance, testing, and use of USTs for the temporary and long-term storage of hazardous substances. This Act establishes design, maintenance, and monitoring standards and procedures for inspection and testing by Certified Unified Program Agencies (CUPAs).

Toxic Injection Well Control Act of 1985

The Toxic Injection Well Control Act prohibits any injection of hazardous waste into the ground that would endanger the use of the particular groundwater that is designated as drinking water.

Business Plan Act (1985)

The California Hazardous Materials Release Response Plans and Inventory Law of 1985, also known as the Business Plan Act, requires preparation of Hazardous Materials Business Plans and disclosure of hazardous material inventories. A Business Plan includes information such as an inventory of hazardous materials handled, storage location of hazardous materials, an emergency response plan, and provisions for employee training in safety and emergency response procedures. The State Office of Emergency Services (OES) has primary regulatory responsibility with delegation of authority to local jurisdictions. Local agencies include the various local fire protection districts and the Solid Waste & Hazardous Materials Division of Emergency Management Division (EMD).

Under certain circumstances, a business must prepare a Risk Management and Prevention Plan to minimize offsite risks associated with acutely hazardous materials. This plan provides additional planning information that covers equipment and system safety, operating procedures, preventive maintenance, upset risk assessments, and safety auditing. Statewide, the Department of Toxic Substance Control (DTSC) has primary regulatory responsibility for management of hazardous materials, with delegation of authority to the local agencies mentioned above.

California Hazardous Waste Control Act of 1986

The California Hazardous Waste Control Act, also known as the Tanner Act (AB 2948), requires the preparation of a County Hazardous Waste Management Plan and the identification of potential areas for the siting of needed future hazardous waste facilities.

Safe Drinking Water and Toxic Enforcement Act of 1986

The Safe Drinking Water and Toxic Enforcement Act, also known as Proposition 65, prohibits the contamination of drinking water with chemicals known to cause cancer or reproductive toxicity. Many hazardous materials are included in this category. This law also requires the publication and annual updates of a list of these chemicals. The California Office of Environmental Health Hazard Assessment (OEHHA) last updated the list in March 4, 2005, and more than 600 chemicals have so far been listed (Office of Environmental Health Hazard Assessment 2005).

Assembly Bill 1809 (1986)

AB 1809 addresses hazardous waste generated by households. AB 1809 requires counties to identify a program for the safe management of household hazardous wastes, which should be separated from the solid waste stream. The law authorizes cities and counties to approve an increase in solid waste collection fees to offset the cost of establishing, publicizing, and maintaining a household hazardous waste inspection program. AB 1809 also requires the California Integrated Waste Management Board to develop a public information program.

Assembly Bill 2185 (1987)

AB 2185, also known as the Waters Bill, incorporated the provisions of Title III of the Superfund Amendments and Reauthorization Act into a state program. This law delegated implementation of emergency planning and community-right-to-know programs to OES, which has in turn authorized local government agencies to implement the program. Local Administering Agencies are required to prepare Area Plans for environmental emergency planning purposes and to identify and maintain resources for disasters and accidental releases.

Aboveground Petroleum Storage Act of 1990

The Aboveground Petroleum Storage Act establishes an inspection program for above ground storage tanks. In general, the Act requires owners or operators of aboveground petroleum storage tanks to file a storage statement and implement measures to prevent spills.

Medical Waste Management Act of 1991

Within the regulatory framework of the Medical Waste Management Act, the Medical Waste Management Program of the California Department of Health Services (DHS) ensures the proper handling and disposal of medical waste throughout California. DHS permits and inspects medical offsite treatment facilities, transfer stations, and medical waste transporters throughout the state. Locally, EMD enforces the provisions of this Act (California Department of Health Services 2002).

Assembly Bill 2707 (1991)

AB 2707 requires cities and counties to prepare a Household Hazardous Waste Element, which would be included in their County Hazardous Waste Management Plan.

Senate Bill 1082 (1993)

SB 1082 required the establishment of a unified hazardous waste and hazardous materials management program. The result was the California Environmental Protection Agency (Cal/EPA) Unified Program, which consolidates, coordinates, and makes consistent the administration, permitting, inspections, enforcement, and fee functions of DTSC, the SWRCB, the RWQCB, OES, and the State Fire Marshal. The Unified Program is implemented at the local government level by the CUPA (California Environmental Protection Agency 2005).

Assembly Bill 2886 of 2000

The bill authorizes the SWRCB to require a person who is submitting a report relating to a program administered by the board, to the board, a regional board, or a local agency, to submit the report in electronic format, as prescribed. This bill created the geotracker data base.

NATURAL HAZARDS

EARTHQUAKES AND SEISMICITY

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to mitigate the hazard of surface faulting to structures for human occupancy. The main purpose of the law is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The law only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards. The Alquist-Priolo Act requires the State Geologist to establish regulatory zones known as "Earthquake Fault Zones" around the surface traces of active faults and to issue appropriate maps. The maps are distributed to all affected cities, counties, and state agencies for their use in planning efforts. Local agencies must regulate most development projects within the zones. Projects include all land divisions and most structures for human occupancy.

Wildland Fire

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act addresses nonsurface fault rupture earthquake hazards, including liquefaction and seismically-induced landslides. Passed by the State Legislature in 1990, this law was codified in the California Public Resources Code as Division 2, Chapter 7.8A, and became operative in April 1991. The Seismic Hazards Mapping Act resulted in a mapping program that is intended to reflect areas that have the potential for liquefaction, landslide, strong earth ground shaking, or other earthquake and geologic hazards.

California Uniform Building Code (UBC)

The State of California provides minimum standards for building design through the California UBC (California Code of Regulations [CCR] Title 24). The California UBC Code is based on the UBC that is used widely throughout the United States (generally adopted on a state-by-state or district-by-district basis), and has been modified for conditions within California. The California UBC includes a seismic zone map to determine applicable seismic standards for proposed structures. Seismic zones range from 0 to 4, with Zone 0 being the least active and Zone 4 the most active. Napa County is located within Zone 4 according to the 2001 California UBC.

California Water Code – Division 3, Dams and Reservoirs

Since 1929, the State of California has supervised dams to prevent failure for the purposes of safeguarding life and protecting property. The legislation was a result of the failure of St Francis Dam in March of 1928. Legislation enacted in 1965 revised the Statutes to include off-stream storage as a result of the failure of Baldwin Reservoir in 1963. The Division of Safety of Dams of the California Department of Water Resources regulates this legislation. Two classifications of dam types are included: (a) dam structures that, are, or will be in the future, 25 feet or more in height from the natural bed of the stream or water course at the downstream at the toe of the barrier, and (b) dams that have an impounding capacity of 50 acre-feet or more (California Department of Water Resources 2004).

An important part of implementing the legislation involves geology and geotechnical engineering in the site selection, design, construction and on-going inspection of the impounding structures for the entirety of their useful life.

FIRE HAZARD SEVERITY

California has enacted statewide laws aimed at reducing wildfire hazards in wildland-urban interface areas. These regulations cover topics such as fire prevention, vegetation management, notification and penalties, fire hazard severity zones, defensible space, setbacks, and exemptions. For the complete text of the Fire Hazard Zoning Field Guide view the Office of the State Fire Marshal's fire safety planning website located at: http://osfm.fire.ca.gov/zoning.html.

California Public Resources Code

State Responsibility Area. The California Pubic Resources Code requires the designation of state responsibility areas (SRAs), which are identified based on cover, beneficial water uses, probable erosion damage, fire risks, and hazards. The financial responsibility of preventing and suppressing wildland fires in the SRA is primarily the responsibility of the state. Fire protection in areas outside the SRA are the responsibilities of local or federal jurisdictions and are referred to as local responsibility areas and federal responsibility areas, respectively. Generally, when development density within a given SRA exceeds one dwelling unit per acre on a regional basis, the land is no longer classified as an SRA and becomes the responsibility of the local jurisdiction.

Defensible Space Requirements. In 1987, SB 1075 was adopted to require the California Board of Forestry to establish minimum fire safety standards that apply to the SRA. Subsequently, Pubic Resources Code Section 4290 required local jurisdictions to implement these fire safe standards. The concept of defensible space is the cornerstone of fire safety regulations. The intent is to reduce the intensity of a wildland fire by reducing the volume and density of fuels (e.g., vegetation that can transmit fire from the natural growth to a building or structure), to provide increased safety for fire equipment and evacuating civilians, and to provide a point of attack or defense from a wildland fire. Defensible space is characterized by the establishment and maintenance of emergency vehicle access, emergency water reserves, street names, building identification, and fuel modification measures. The basic recommendation is to provide a minimum of 100 feet fuel clearance from all structures. To comply with the state's defensible space requirement, the local fire protection agencies require the following, at minimum:

- the clearance of 100 feet of flammable vegetation from around buildings; on steeper parcels, fire safe clearance requirements are determined by the local fire protection agency;
- the removal of branches from within 10 feet of a chimney; and
- the removal of all flammable vegetation from roof tops, including dry leaves and pine needles.

Vegetation Management Program

The CDF has a fuel reduction program called the Vegetation Management Program. Limited funding is available to conduct fuel management activities primarily by burning on parcels or aggregates of parcels of 100 acres or more. The objective of the Vegetation Management Program is to prevent high intensity wildfire through fuel modification. If brush can be kept at the medium fuel load level as described above, then the intensity of fire can be reduced substantially.

California Fire Plan

The California Board of Forestry and the CDF have developed the California Fire Plan in an effort to reduce the overall costs and losses from wildfire in California. According to the California Fire Plan, the primary purpose of wildland fire protection in California is to protect the human health and safety together with the wide range of assets found on California wildlands. These assets include timber; range; recreation; water and watershed; plants; air quality; cultural and historic resources; unique scenic areas; buildings; and wildlife, plants, and ecosystem health (California Fire Plan 2003).

The California Fire Plan defines a standard for measuring the level of fire protection service provided in an area, considers assets at risk, incorporates the cooperative interdependent relationships of wildland fire protection providers, provides for public stakeholder involvement, and creates a fiscal framework for policy analysis. A key product of the California Fire Plan is the development of wildfire safety zones to reduce the risks to residents and firefighters from future large wildfires. The California Fire Plan defines an assessment process for measuring the level of service provided by the fire protection system for wildland fire. This measure can be used to assess the department's ability to provide an equal level of protection to sites with similar land types, as required by Pubic Resources Code Section 4130. This measure is the percentage of fires that are successfully controlled before unacceptable costs are incurred. Knowledge of level of service will help define the risk to wildfire damage faced by public and private assets in the wildlands.

FLOODING

Dam Safety Act

The Dam Safety Act was passed to establish procedures for emergency evacuation and control of populated areas below dams. The Dam Safety Act provides for the development of inundation maps by dam owners, map approval by OES, and development of emergency procedures by local governments to evacuate and control the risk areas.

Emergency regulations to implement the Dam Safety Act became effective on April 2, 2002. These regulations require owners of state jurisdictional dams to file inundation maps and studies, and they include provisions for noncompliance that may include referral of the matter to the Office of the Attorney General.

COUNTY POLICIES

The following policies were excerpted from the Napa County General Plan (last amended July 28, 1992):

HUMAN-MADE HAZARDS

TRAFFIC ACCIDENTS

The Metropolitan Transportation Commission's (MTC) Transportation 2030 Plan for the San Francisco Bay Area (2030 Plan) is a long-range transportation plan for the nine-county San Francisco Bay Area, including San Francisco, Alameda, Contra Costa, San Mateo, Santa Clara, Napa, Solano, Marin, and Sonoma Counties. The 2030 Plan sets priority for funding and implementation of transportation-related projects in the Bay Area. Please also refer to Chapter 11, *Transportation and Circulation*, of the BDR.

State Route 12/29

The Napa County General Plan (adopted in 1983 and amended in May 1991) provides Countywide goals and policies aimed at shaping the long-term transportation conditions in the County. The Circulation Element of the General Plan provides specific goals and policy guidelines related to circulation and land use, state highway routes and County roads, transit and paratransit, air transportation, rail service, navigable waterways, and nonmotorized transportation. Relevant policies from the Napa County General Plan are described below:

Planning Goal 2: Improve the County roadway system, including State Highway Routes, County roads and local streets (under County jurisdiction), to provide satisfactory levels of service, safety, and convenience in person and goods movement, with respect to the Land Use element of the Napa County General Plan. Such improvements should optimize the usefulness of the existing transportation system and be implemented in the most effective manner with respect to maintenance of environmental quality in Napa County.

Policy Guidelines

2b. Consider adding additional capacity to SR 29 between American Canyon Road and the southern end of the Southern Crossing (from four to six lanes). Under this alternative, peak hour capacity of SR 29 would be increased from 3,400 vph to approximately 5,100 vph (peak direction) with associated year 2000 peak hour L.O.S. improvement from "D/E" to "B/C"; increased safety would result from reduced traffic congestion.

2c. Support continuing improvements to develop Soscol Avenue, in the City of Napa, as a major connection between Imola Avenue and Trancas Street. This would improve convenience, safety, and levels of service.

2d. Continue efforts to improve Silverado Trail between Trancas Street and SR 29 in Calistoga as a two lane arterial, consistent with applicable design standards for a two lane highway with a design speed of 45 miles per hour. The 45 miles per hour design speed is a County Transportation Planning Guideline. It should be considered a minimum to affect the greatest safety benefits. In conjunction with these improvements, continue to require highway improvements, such as separate left turn lanes where justified by projected or observed traffic generation at existing or new activity centers along Silverado Trail.

2e. Control the location, functional design, and spacing (relative to other roadways) of new driveways for new and expanding developments along SR 29 (Yountville to Calistoga) and Silverado Trail (north to Trancas Street) to optimize roadway capacity and minimize the interference caused by side vehicular and pedestrian traffic. As discussed in Chapter 2, as the level of the "strip commercial" development increases, along with its associated driveways (mostly unsignalized intersections), roadway capacity decreases. Therefore, the approval of new or expanded developments should continue to be contingent upon a proper analysis of potential impacts relating to the development, especially with respect to driveway location and spacing with respect to other driveways and crossing roadways. Said controls and assessments should not be limited only to SR 29 and Silverado Trail, but should be applicable to other local arterial roadways. It would be appropriate to implement such controls in concert with Policy Guidelines 2a and 2d, and with the Goals and Policies of the Land Use Element.

2f. Implement a program of highway signage to direct drivers to use the Silverado Trail to reach certain destinations, to remove traffic from the sensitive section of SR 29.

2g. In light of the projected increase in the use of existing County highways, continue to perform periodical inspections, preventive maintenance, safety betterments and repairs, to the fullest extent possible with existing and projected financial resources.

Example: current projects included Petrified Forest Road and Silverado Trail. To partially alleviate congestion and improve safety, the section of SR 29 north of Calistoga should be included in the DPW's current safety betterments program.

HAZARDOUS AND CONTAMINATED SITES

General Plan

TRANSPORTATION HAZARDS

Policies for Transportation Hazards

2. State and federal agencies with responsibilities for regulating the transportation of hazardous materials should be requested to review regulations and procedures, in cooperation with the County, to determine means of mitigating the public safety hazard in Napa County.

3. When an emergency occurs in the transportation of hazardous materials, the County Office of Emergency Services should be notified as soon as possible.

4. Industry should be encouraged to utilize underground pipelines, rail, and water transportation of hazardous materials to the greatest extent feasible to take advantage of the greater separation from the general public provided by these modes of transportation.

WATER SUPPLY

Policies for Emergency Water Supplies

c. Construct the well so that it denies entry to any contaminated or undesirable water contained in the water-bearing deposits.

d. Provide minimum distances from a well to possible sources of contamination which are long enough to provide reasonable assurance that subsurface seepage of contaminated water will not reach the well. The following minimum distances (recommended by the California Department of Water Resources 1981) are typical of good practice:

Sewer, watertight septic tank, or private privy	50 feet
Subsurface sewage leaching field	100 feet
Cesspool or sewage pit	150 feet

Barnyards, feedlots, and animal holding areas should be downslope from the well and at least 100 to 200 feet away, depending upon drainage conditions.

Ordinances

Napa County Code regulating hazardous materials and contaminated sites are primarily located in Chapter 16.20 Underground Storage of Hazardous Substances, Chapter 16.24 Corrective Action Plans—Contamination, and Chapter 16.12 Surface Mining and Reclamation.

NATURAL HAZARDS

EARTHQUAKES, SEISMICITY, AND OTHER GEOLOGIC HAZARDS

Chapter 9 of the Napa County General Plan entitled Seismic Hazards covers policies related to earthquakes and seismicity.

Specific Plan Policies

A. Use existing authority of local governments to reduce hazards to life and property.

1. Include when necessary a geologic/seismic evaluation as a part of required Environmental Impact Reports.
2. Require a geologic/seismic report
   a. When warranted by the results of a geologic/seismic evaluation.
   b. For new residential developments, roads or highways proposed to be located on parcels which contain identifiable landsliding or slumps; and
   c. For all proposed structures and facilities open to the public and serving 100 persons or more.
3. Discourage the development of structures such as hospitals, police and fire stations, and buildings open to the public whose occupancy exceeds 100 persons from locating within 1/8 mile of an active fault or the placement of transportation or utility corridors in or across such areas, excepting Oak Hill, unless a geologic/seismic report shows such development or placement is consistent with public safety.
4. Promote the installation of strong-motion accelerographs where appropriate.
5. Encourage the completion of an inventory of existing structures such as schools, etc. and encourage strengthening where needed to improve public safety.
6. Identified active faults incorporated in the County's Seismic Safety Plan Element and the immediate adjacent areas, except Oat Hill, should be restricted to open space uses such as agriculture, parks, trails, or wildlife habitat.
7. Development proposals covered in Policy 2 to be reviewed by the County Department of Public Works prior to issuance of a building permit.
8. Develop a program for on-site inspection of grading work for developments in questionable areas to insure that bedding planes are not undercut, that proper fill material is carefully placed and compacted.
9. Encourage planting of vegetation on unstable slopes to protect structures at lower elevations. Utilize native plants for landscaping in the hills to eliminate the need for supplemental watering which can promote earth movement.

10 Study the development of safety standards for all land within areas subject to inundation downstream from water-retaining structures that might fail as a result of an earthquake.

11. Rezone open space lands subject to extreme geologic hazards and geologically sensitive lands to the Geological Risk Combination District.

B. Promote intergovernmental cooperation directed towards lessening known hazards and defining uncertain hazards.

1. Encourage state and federal governments to require lending institutions to require earthquake insurance on all residential structures as a condition to the granting of a loan on such properties. The insurance could be included with a broad-coverage natural disaster insurance program.
2. Encourage the purchase of National Flood Insurance, which also covers damage from mudflows.
3. Promote a joint program between all local governmental units in Napa County to employ such additional expertise as needed to provide technical information in regard to seismic hazards, to provide technical assistance, and, over time, to prepare detailed geologic hazard maps of the County for planning purposes.
4. Assess the potential hazard from the possible rupture or collapse of above-ground tanks holding large quantities of liquid; whether water, wine or petroleum products.
5. Promote land use, transportation, utility, and flood control policies that would discourage urban development in wetlands and drained wetlands in the southern part of Napa County.
6. Review program proposed in the 1974 California Urban Geology Master Plan for their applicability to Napa County.
7. Develop a geologic mapping program in cooperation with USGS, California Division of Mines and Geology and other federal, state and regional agencies to identify geologic hazards; including fault zones (both active and inactive), landslides, and landslide-prone areas in Napa County.
9. Encourage the state and federal governments to develop dam safety programs including the preparation of contingency plans for urbanized areas in the proximity of existing and future dams.
10. Encourage local governments to develop: a. search and rescue programs, b. emergency communication system, c. emergency services and facilities programs.
11. Encourage implementation of the following procedural recommendations (Joint California Legislative Committee on Seismic Safety 1972).
    a. Property Reports, state law (commencing with Section 38780 of the government Code) now permits local jurisdictions to require sellers of property to obtain a residential property report from the city or county prior to the resale of residences. The purpose of the law is to make certain that purchasers are aware of local regulations and special restrictions pertaining to a residence and parcel prior to consummation of a sale. It is recommended that this local option should be exercised by the County. Local reports should include in addition to other information available city or county information with respect to geologic and seismic conditions.
    b. Local Agency Formation Commission's charge from the state should be reviewed to make certain that adequate attention is given to seismic safety problems.
    c. Federal Grant and Loan Programs such as those of U.S. Housing and Urban Development (HUD) that result in a significant amount of construction should be reviewed with respect to seismic safety as well as other geologic hazards.

12. Consider as a part of the County Zoning Ordinance the development of a geologic hazard combined zone.
13. Consider requiring dynamic analyses of design specifications and plans for proposed buildings.
14. Encourage research and development regarding seismic protection standards for inclusion in County Building Code.

C. Participate in public education programs.

9-40 9. Seismic Safety Element

1. Prepare written materials to inform the general public, developers and home builders of potential seismic problems in Napa County.
2. Encourage schools to teach first aid as a required subject, to prepare students for emergency/hazard situations.

Ordinances

Napa County Codes regulating seismic hazards are primarily located in Title 18 (Zoning) and Title 15 (Building & Construction).

FIRE HAZARD SEVERITY

General Plan Policies

A basic planning and land use approach to wildland fire reduction in Napa County would be the incorporation of the Fire Hazard Severity Scale into planning policies and standards. Standards for density, spacing, setback, access, water supply, building design and construction and vegetation clearance can be specifically geared to the three fire hazard severity classes. The standards can be clearly spelled out and applied on a consistent basis by joint review of the Napa County Fire Department/CDF and planning staffs.

Specific Plan Policies

A. Reduce Wildland Fires

1. Adopt standards to restrict urban development in high wildland fire hazard areas as identified by the Fire Hazard Severity Scale.
2. Develop a prescribed-fuel management program (including prescribed burns) for managing fire hazardous areas; to reduce wildfire hazard, improve watershed capabilities, promote wildlife habitat diversification and improve grazing.
3. Adopt regulations for clearance around structures, minimum road widths, evacuation routes and maximum road grades.
4. Develop stringent site criteria and construction standards for construction in high fire hazard areas and prohibit construction where these criteria are not met.
5. Develop a Countywide fuelbreak program to separate wildland fire hazard areas, provide access for fire suppression equipment and improve safety of firefighters.

Brown Street, City of Napa, 1905

Source: Napa County Flood and Water Conservation District

6. Support a cooperative program to be started between the insurance providers and all agencies involved with the wildfire problem, whereby financial incentives can be gained by homeowners and developers through either tax rebates or reduced insurance costs.
7. Support the state requiring property owners to comply with recommended fire safe standards before any low cost emergency loans are approved to rebuild in hazardous wildfire areas.
8. Recommend changes in existing law to require the Real Estate Commission to notify the proper parties in all real estate transactions of the inherent dangers when moving into a hazardous fire area as part of the full disclosure notification.
9. Support the location of a State Conservation Camp in Napa County and the use of local jail inmates to provide people for fuel breaks and fire suppression.
10. Work with local agencies and 4H to develop a program of fire reduction by animal grazing on a rotating/loan basis.
11. Rezone open space lands subject to high fire risk to the Fire Risk Combination District.

Ordinances

The County has adopted the 2000 Uniform Fire Code and Standards, as published by the International Conference of Building Officials, in County Code Chapter 15.32.010. The Uniform Fire Code establishes standards for fire department access, fire hydrants, automatic sprinkler systems, fire alarm systems, fire and explosion hazards safety, wine caves, hazardous materials storage and use, provisions intended to protect and assist first responders, industrial processes, and many other general and specialized fire-safety elements for new and existing buildings and premises.

Additional fire ordinances can be found in Title 8 Health and Safety, Title 15 Buildings and Construction, and Title 18 Zoning. The Napa County Fire Protection ordinances located in Title 8, Division III Fire Protection establish regulations and guidelines for burning and fireworks, while Chapter 15.32, also known as the California Fire Code with local amendments, provides regulations for building and construction fire safety. Chapter 18.84 of the County Code, the Fire Risk Combination District ordinance, establishes district fire classifications intended to minimize the potential for wildfires and the loss of life and property.

FLOODING

The following policies were excerpted from the Napa County General Plan (last amended July 28, 1992).

FLOODPLAINS

General Plan Policies

1. Location: Floodplains of prime significance for open space planning are found in the American Canyon, Napa River Delta - Carneros, and Napa Valley Planning Areas. Other floodplains are located in the Dry Creek, Berryessa, Pope Valley and Curry - Suisun - Madigan Planning Areas. Further studies are needed to determine flood parameters and potential frequency more precisely.

2. Planning Goals:

   (a) Restrict and regulate urban development in areas of flood risk.

   (b) Protect the vegetation and animal habitats of the waterways and floodplains from encroachment of urban development.

   (c) Protect existing areas of urban development from flooding.

Specific Plan Policies

Conservation Policy:

(a) Restrict and regulate structures in the floodway and floodplain of all unincorporated areas subject to flooding, in the 100 year flood, as identified in HUD Floodway and Floodplain Insurance Rate Maps.

(b) Adopt floodplain zoning in all applicable areas, and investigate the compatibility of zoning areas adjacent to floodplains for recreational uses. Floodplains along streams which feed Lake Berryessa, the Napa River, and the Suisun Marsh are zoned for agricultural uses in the majority.

(c) Continue to encourage provision for flood insurance. The Napa County Flood Control and Water Conservation District and the Napa County Board of Supervisors have obtained federal government approval of Napa County for flood insurance and have agreed, in return, to enact local land use and control measures for areas having special flooding problems. The controls are to be consistent with federal criteria.

(d) Encourage development and implementation of floodplain management safety and flood control programs that protect homes and property, as well as stream side vegetation, and control obstruction of natural floodways. Permanent installations may be excluded from floodplain land. Seasonal flooding of streams, deposits of rock and sediment and bank undercutting make some areas difficult to develop. Occasional high water level in the Lakes floods low lying areas for short durations.

(e) Maintain water courses and vegetation within urban areas as components of an open space system. Develop pedestrian and riding trails if compatible with riparian (stream side) vegetation and wildlife habitat. Develop public access at frequent intervals.

(f) Maintain water courses and vegetation within rural areas as components of an open space system and develop public access or roadside rests at crossroads where compatible with surrounding land uses.

Ordinances

Napa County Code governing flooding is primarily found in Title 16.04 Floodplain Management.

METHODOLOGY

This section presents the methods used to identify and evaluate public health and safety hazards in Napa County. It includes a description of the study area considered and describes the resources consulted for each analysis.

DEFINITION OF STUDY AREA

In the Public Health and Safety section, the entire County is considered as a single geographic unit. Data limitations did not permit division of the County into smaller sub-areas or regions. Some data, such as traffic accident data from the California Highway Patrol (CHP) and crime data from the Napa County Sheriff's Department were collected for the incorporated cities within Napa County as well as unincorporated areas of the County.

TECHNICAL APPROACH

HUMAN-MADE HAZARDS

TRAFFIC ACCIDENTS

The Highway Safety Act of 1966 gave rise to California's Statewide Integrated Traffic Records System. This system processes all reported fatal and injury collisions which occurred on California's state highways and all other roadways, excluding private property. The CHP prepared the 2002 Annual Report of Fatal and Injury Motor Vehicle Traffic Collisions. This report was completed as a result of motor vehicle traffic collision reports received from local police and sheriff jurisdictions and from CHP field offices. Statistics within this report were used to compare traffic accidents in the region. The region is defined by the counties surrounding Napa County, including Sonoma County, Solano County, Yolo County, Marin County, and Lake County.

For the Countywide information, five law enforcement agencies within Napa County were contacted in February, 2003. These included the Napa County Sheriff's Department, Napa Police Department, St. Helena Police Department, Calistoga Police Department, and CHP. Data on the locations of accidents were not available for most enforcement districts. However, the CHP provided a file consisting of accident locations throughout the unincorporated areas of the County. This file required conversion to a format that could be used in a geographic information system (GIS) application. Accidents included in the GIS database are only those that were linkable to the County's existing GIS road coverage. There were many accident reports that supplied location descriptions such as "1/2-mile south of mile post 150 on SR 121." These points were not directly linkable to the GIS, but will be provided in a database format.

CRIME

The main source of data on crime rates in Napa County was the Office of the Attorney General at the California Department of Justice (CDJ). Summary data is available through the website at http://www.ag.ca.gov/cjsc/datatabs.htm. Data are limited to the number of crimes per year, and crimes per 100,000 population in various categories including homicide, rape, robbery, aggravated assault, burglary, motor vehicle theft, larceny, and arson. Crimes occurring in the incorporated cities of St. Helena, Calistoga, Yountville, American Canyon, and Napa are also included in the CDJ data.

Law enforcement agencies within Napa County were also contacted regarding criminal records, response times, and staffing rates. Response times and staffing rates of various law enforcement agencies within Napa County are provided in Chapter 13, Public Facilities and Services, of the BDR. The Napa County Sheriff's Department provided the most comprehensive crime data which included numbers of crimes in various categories for the years 2000 through 2003. The Calistoga Police Department was also able to provide data on crimes within their jurisdiction. Napa Police Department and St. Helena Police Department were unable to provide data with specifics relating to crime numbers and trends. All jurisdictions were unable to provide specific data on crime locations and specifics due to confidentiality.

CONTAMINATED SITES

This section addresses the locations, potential human exposure, magnitude of risk associated with contaminated sites, chemical spills, and polluted groundwater within the County. Existing data was provided by Napa County, and included contaminated site listings from the Calsites and Geotracker databases. The additional databases listed below were searched, and sites were added to the existing list. Information from these databases was converted to GIS format and added to the existing Hazfac GIS database maintained by the County. The federal and state databases searched include:

National Priorities List (NPL). The National Priorities List is maintained by the EPA and lists the most severe hazardous waste sites as identified by Superfund. Sites are put on the NPL after they have been scored using the Hazard Ranking System, as well as having been subjected to public comment. Any site on the NPL is eligible for cleanup using Superfund Trust money. The NPL is primarily an informational resource that identifies sites that may warrant cleanup.

Resource Conservation and Recovery Information System (RCRIS). The RCRIS database is used by the EPA to support its implementation of the RCRA, as amended by the Hazardous and Solid Waste Amendments of 1984. The RCRA requires that generators, transporters, treaters, storers, and disposers of hazardous waste provide information concerning their activities to state environmental agencies. The RCRIS groups hazardous waste generators into three classes based on their production capacity or function. These are:

- Small quantity generator (SQG) – Generate between 220 lbs and 2,200 lbs of hazardous waste in one or more months.
- Large quantity generator (LQG) – Generate 2,200 lbs or more of hazardous waste in one or more months.
- Treatment, Storage, and Disposal Facility – Sites where hazardous waste substances are treated, stored, or disposed.

CalSites. The California DTSC has developed an electronic database with information about sites that are known to be contaminated with hazardous substances, as well as information on uncharacterized properties where further studies may reveal problems. The Site Mitigation and Brownfields Reuse Program Database, also known as CalSites, is used primarily by DTSC staff as an informational tool to evaluate and track activities at properties that may have been affected by the release of hazardous substances. This database displays information in six categories: CalSites Properties, School Property Evaluation Program Properties, Voluntary Cleanup Program Properties, Unconfirmed Properties Referred to Another Local or State Agency, Unconfirmed Properties Needing Further Evaluation, and Properties where a No Further Action Determination has been made. The confirmed sites are generally high priority or high potential risk, and include military facilities, state funded or Responsible Party lead, and NPL sites.

Cortese. The Cortese Hazardous Waste and Substances Sites List is also maintained by the California DTSC. The Cortese List is a planning document used by state and local agencies, as well as developers, to comply with the California Environmental Quality Act requirements in providing information about the location of hazardous material release sites. Other state and local agencies, including the SWRCB, DTSC, California Integrated Waste Management Board (CIWMB), and Cal/EPA, are required to provide additional hazardous material release information for the Cortese List.

GeoTracker. GeoTracker is a database which tracks regulatory information about leaking underground fuel tanks (LUFTs), fuel pipelines, and public drinking water supplies.

Division of Oil, Gas & Thermal Energy. Oil, gas, and thermal energy well locations are acquired from the California Department of Conservation, Division of Oil, Gas & Thermal Energy. The data is in GIS format.

Solid Waste Information System (SWIS). The SWIS database is maintained by the CIWMB, which is part of Cal/EPA. SWIS contains information on solid waste facilities, operations, and disposal sites throughout California. The types of facilities found in this database include landfills, transfer stations, material recovery facilities, composting sites, transformation facilities, waste tire sites, and closed disposal sites. For each facility, the database contains information about location, owner, operator, facility type, regulatory and operational status, authorized waste types, and local enforcement agency. Twenty-seven facilities in Napa County were identified through the SWIS database search (California Integrated Waste Management Board 2004).

NATURAL HAZARDS

EARTHQUAKES, SEISMICITY, AND OTHER GEOLOGIC HAZARDS

The information provided in this section is based primarily on the findings of the geological resources chapter of this BDR. This section provides a discussion of natural hazards associated with earthquakes and geology, as well as background descriptions of the County's physiography, bedrock formations and geologic structures, geology, soil deposits, and seismic and non-seismic hazards. Public health and safety from earthquakes, seismicity, and other geologic hazards was assessed based on this background information.

FIRE HAZARD SEVERITY

A model was developed to assess the fire hazard severity within Napa County. This GIS-based model used digital mapping combined with parameters such as landscape characteristics, historical data, weather, and disturbance levels, to determine the fire hazard for a given area. Adapted from a methodology originally developed by the Colorado State Forest Service and using Model Builder within Arc GIS 9.0, data was collected from CDF, Napa County, and the U.S. Census Bureau. With the assistance of CDF/Napa County Fire, the model was modified to suit conditions within Napa County. The model allows the County to make adjustments from year to year when weather conditions change or additional information becomes available.

In order to assess fire hazard severity, the model analyzed three primary categories that contribute to wildland fires: risk, hazard, and value.

Risk, an estimate of the probability of ignition, was based on historical fire data and collected by the CDF from 1990 to 2003. CDF/Napa County Fire then produced a GIS data layer assessing the probability of ignition, which was included in the model.

Hazard estimates the vegetative and topological features affecting fire intensity and rate of spread. Parameters considered within this category including slope, fuel hazard, and fire frequency regime. Fuel hazard and fire frequency were both determined by CDF/Napa County Fire. Vegetation data from UC Davis' Information Center for the Environment was assessed for fuel hazard potential, while fire frequency was determined using the State of California's Fire and Resource Assessment Program. CDF/Napa County Fire provided GIS layers for inclusion in the model for both parameters. Once GIS layers were established for the hazard parameters, they were weighted according to their importance. For the purposes of this BDR the weightings were slope (15%), fuel hazard (50%), and fire frequency (35%), as seen in the equation below. This equation places the greatest importance on fuel availability followed by the fire frequency regime and lastly by the terrain or slope. This weighting system was determined through coordination with County of Napa planners and CDF/Napa County Fire.

Hazard = (Slope*15%) + (Fuel Hazard*50%) + (Fire Frequency*35%)

Value includes the natural or human-made components of the ecosystem, such as housing density, vineyards, public water supply, and recreational lands, on which a value can be placed. This model places great importance on the estimated value of infrastructure since it is equally weighted with both hazard and risk. Using U.S. Census Bureau GIS information, housing density by census blocks were incorporated into the model. Additionally, vineyards were delineated by the County GIS analysts and also included in the model.

The final step in the analysis is to combine the risk, hazard, and value grids to create a fire hazard severity ranking.

Fire Hazard Severity = Risk + Hazard + Value

The completed model and data used will be given to the County and CDF upon conclusion of the analysis. This allows the County and CDF the option of making adjustments to the equations used and variables included should more data become available in the future. This is possible due to the user friendly interface found in Model Builder which can be saved as a tool and transferred to other GIS professionals.

Fire Threatening Homes

FLOODING

Risk from flooding was assessed by mapping the Federal Emergency Management Agency (FEMA) flood zones for Napa County. The FEMA map for the County was updated in March of 2000 and includes areas of inundation due the 100 and 500 year flood events.

PUBLIC HEALTH

Information regarding general health characteristics in the County were obtained through communication with various persons at the Napa County Department of Health and Human Services Agency. The County Health Officer, Dr. Thomas Charran, provided statistics relating to overall County health as well as comparing Napa County to other counties in California. Additional information was gathered from the County Health Status Profiles published annually by the California Department of Public Health. These reports provide useful Countywide information as well as National Health Standards. The 2004 County Health Status Profile is the most recent, and utilizes information gathered between 2000 and 2002.

REGIONAL PUBLIC HEALTH AND SAFETY IN SURROUNDING COUNTIES

HUMAN-MADE HAZARDS

TRAFFIC

Counties surrounding Napa County include Sonoma County to the west, Lake County to the north, Yolo County to the east, Solano County to the southeast, and Marin County to the southwest. Table 7-1 shows the number of persons killed or injured in traffic accidents in 2002 by county. The table compares the total number of people killed and injured from car and motorcycle accidents. Compared to the five counties, Napa County is below the average in the total numbers of persons killed and injured in all categories except for the number of persons severely injured and motorcyclists killed. Napa County is slightly above average in the number of people severely injured and has the highest rate of deaths from motorcycle accidents.

See the BDR transportation and circulation chapter for more detailed information on traffic collisions.

Table 7-1: Persons Killed or Injured in Traffic Accidents by County – 2002

	Total Killed	Total Injured	Severe Injury	Other Visible Injury	Complaint of Pain	Motorcyclists Killed	Motorcyclists Injured
Napa County	19	1,391	82	433	876	7	76
Sonoma County	49	4,206	195	1,208	2,803	6	152
Solano County	37	3,459	141	888	2,430	3	121
Yolo County	18	1,396	78	462	856	0	39
Marin County	16	1,779	69	502	1,208	3	87
Lake County	24	522	39	209	274	2	24

Source: Business, Transportation and Housing Agency and CHP 2002.

CRIME

Napa County has a population-adjusted reported crime rate of 3,074 per 100,000 people, compared to 3,972 in the state, or 898 cases less per year (Table 7-2). The adjusted reported crime incidents in Napa County are also lower than Solano County (3,018), Yolo County (4,282), and Lake County (4,223). Napa County reported 56 and 304 more cases of crime compared to Sonoma County and Marin County, respectively. Napa County has one of the lowest overall violent crime rates and the lowest property crime rate in the region for burglary and motor vehicle theft.

Table 7-2: Reported Crimes per 100,000 Population per Year for the State and Various Counties (2003)

	Violent Crimes	Homicide	Rape	Robbery	Aggravated Assault	Property Crimes	Burglary	Motor Vehicle Theft	Larceny-Theft	Arson	Total Crimes per 100,000 Population per Year
Statewide	*569*	6.7	27	177	358	*1,340*	670	670	*2,025*	*38*	*3,972*
Napa County	*290*	1.5	30	39	220	*727*	443	284	*2,040*	*17*	*3,074*
Sonoma County	*382*	2.5	36	48	296	*829*	503	326	*1,789*	*18*	*3,018*
Solano County	*535*	4.8	32	155	343	*1,263*	649	614	*2,483*	*47*	*4,328*
Yolo County	*571*	2.7	44	97	428	*1,524*	968	556	*2,089*	*98*	*4,282*
Marin County	*221*	0.0	18	55	148	*894*	508	386	*1,639*	*16*	*2,770*
Lake County	*586*	2	24	56	504	*1,684*	1,363	321	*1,930*	*23*	*4,223*

Note: Data includes incorporated as well as unincorporated areas of Napa County.
Values are rounded.

Source: Office of the Attorney General and CDJ 2004.

HAZARDOUS AND CONTAMINATED SITES

Many human-made substances can be hazardous to human health and safety. Hazardous wastes generated by residents and businesses throughout Northern California contribute to environmental and human health hazards, and have become an increasing public concern in recent years.

Northern California is known for many reasons, two of which are industrial operations and agricultural production. Both of these industries are connected with the use, potential release, and eventually waste of hazardous materials. Since most industry throughout Northern California has been focused throughout the nine Bay Area counties, hazardous wastes and contaminated sites are most concentrated throughout these areas. As populations grew around urban centers in San Joaquin, Sacramento, and Yolo Counties, there were additional opportunities for industry and the use of hazardous materials. These three counties, as well as the nine Bay Area counties, are also known for their agricultural production. Because of these uses (and many others associated with urban environments), there are many locations throughout Northern California that are identified on the hazardous waste and contaminated site databases.

NATURAL HAZARDS

EARTHQUAKES, SEISMICITY AND OTHER GEOLOGIC HAZARDS

PHYSIOGRAPHY, BEDROCK FORMATIONS AND GEOLOGIC STRUCTURE

Based on geology, landscape, and climate, California has been divided into a number of large, distinct regions known as geomorphic provinces. The Coast Range Geomorphic Province, which defines the entire region in and around Napa County, extends about 700 miles from north of Santa Barbara to the Oregon border and about 90 miles from the Pacific Ocean to the Great Valley. Steep, rugged ranges of moderate relief, ongoing mountain building, active faulting, accelerated erosion, and widespread landsliding characterize the province.

The province consists of a series of long, northwest-trending ranges separated by river valleys. The orientation of these ranges and river valleys is controlled by regional tectonics – the deformation and motion of the earth's crust. The physiography has influenced the local climate, the development of soils, and the existence and location of geologic hazards such as landsliding.

The San Francisco Bay Area region is an area of high seismic activity. The San Andreas fault system, forming the boundary between the North American and Pacific crustal plates, is expressed as a series of northwest-trending faults. These faults include, but are not limited to, the Maacama, Healdsburg, and Rodgers Creek faults. Many individual faults of the San Andreas fault system have produced strong earthquakes in the past and are expected to do so in the future.

Faults are seldom single cracks in the earth's crust but typically are braids of breaks that comprise shatter zones which link to form networks of major and minor faults.

FIRE HAZARD SEVERITY

Much of Northern California is considered a high hazard fire environment. The "fire environment" is defined as the "surrounding conditions, influences, and modifying forces that determine wildfire behavior." The region possesses all the ingredients necessary to support large, intense, and uncontrollable wildfires. There are three different classes of wildland fires: surface fire, ground fire, and crown fire. A surface fire is the most common type and burns along the floor of a forest, moving slowly and killing or damaging trees. A ground fire is usually started by lightning and burns on or below the forest floor. Crown fires spread rapidly by wind and move quickly by jumping along the tops of trees.

Fire is a natural part of our environment and the region's landscape has adapted to frequent fires throughout its evolution. As human population increases and people spread farther from city centers, homes are built in more isolated and fire prone areas. Many homes are built in these environments without regard to the potential for or the dangers associated with wildfire. As more people use our wildlands for recreation every year, the potential for wildfire climbs as four out of every five forest fires are human-started. Increased likelihood for wildfire combined with more people and structures in isolated locations lead to the potential for greater loss of life, increased property losses, more damage to natural resources, and more money needed for firefighting.

The CDF's Sonoma-Lake-Napa Unit is responsible for regional fire management and protection within SRAs. This unit is comprised of six counties and spans an area from the Pacific Ocean on the west and San Francisco Bay on the south, to the Sacramento Valley on the east. It is bounded to the north by the Mendocino Unit and the Mendocino National Forest. The Sonoma-Lake-Napa Unit has primary responsibility for nearly 2.6 million acres and works closely with more than 100 volunteer and paid fire departments (California Department of Forestry and Fire Protection 2004).

FLOODING

The region surrounding Napa County experiences a Mediterranean climate with wet winters and dry summers. This climate type is particularly flood prone as the majority of rainfall in any given year falls between the months of November and March. In addition, population and development pressures increase the potential for flooding in the region. Development increases the amount of paved or impervious area such as roofs, driveways, and parking lots, etc., which, in turn, increases runoff volume, runoff peak depth and runoff velocities. The overall effect is that increased development produces more runoff. Increased urban development (both residential and commercial) can place houses and buildings in areas that naturally flood during certain times of the year. With increased runoff, the flooding increases and flood-prone areas are inundated for longer times. With residential or commercial structures now in the places where this flooding occurs, the increased runoff leads to potential citizen health and safety concerns.

Flooding on Third Street, 1997

Source: Napa County Flood and Water Conservation District

COUNTYWIDE PUBLIC HEALTH AND SAFETY HAZARDS

HUMAN-MADE HAZARDS

TRAFFIC ACCIDENTS

Traffic accidents have increased by 30%, or 671 accidents, for the period between 1993 and 2003. However, the total number of traffic-related deaths has remained relatively constant. This may be due in part to safer vehicles, as well as improved enforcement of seatbelt laws. The documented increase in traffic accidents has exceeded the rate of population increase for a similar period. Table 7-3 shows a summary of the traffic accident data for Napa County provided by the CHP.

According to data in the Napa Police Department's 2003 Annual Report, accidents within the City of Napa account for about 60% of all accidents in the County with 1,760 total accidents occurring in the City, of the 2,943 total accidents occurring in the County. However, the likelihood that a motorist will be killed or injured within the City of Napa is far lower than in other areas of the County (see Table 7-4,

Accident along Highway 29

Table 7-3: Summary of Traffic Accident Statistics, Napa County, 1993-2003

Year	Total # of Accidents	Killed Victims	Injured Victims	Party Count	Severe Injury Count	Other Visible Injury Count	Complaint of Pain	Pedestrian Killed Count	Pedestrian Injured Count	Bicyclist Killed Count	Bicyclist Injured Count	Motorcyclist Killed Count	Motorcyclist Injured Count
1993	2272	19	1379	4289	70	442	867	3	29	0	65	0	49
1994	2383	14	1423	4471	61	462	900	1	35	2	74	2	59
1995	2519	16	1545	4754	77	538	930	3	52	0	67	2	80
1996	2456	13	1460	4627	84	494	882	2	43	1	70	1	61
1997	2404	17	1358	4526	95	454	809	1	34	2	65	0	56
1998	2527	14	1312	4831	73	384	855	1	36	1	61	0	39
1999	2632	21	1381	4990	85	430	866	1	42	3	74	4	57
2000	2677	24	1344	5118	69	398	877	2	32	0	61	1	54
2001	2893	16	1398	5481	63	431	904	2	38	0	49	3	76
2002	3082	19	1305	5512	82	433	876	0	46	0	59	7	89
2003	2943	20	1294	5510	76	420	798	1	36	0	47	4	92

Note: Some of the 2002 traffic accident statistics (specifically the number of victims injured and motorcyclists injured) do not match with those provided from the 2002 Annual Report.

Source: CHP 2004

Table 7-4: City of Napa Traffic Accidents, 1999-2003

	1999	2000	2001	2002	2003
Non Collision Accidents	1	2	1	9	14
Vehicle vs. Motorcycle	1	13	11	15	12
Other Vehicle Accidents	21	34	34	12	30
Vehicle vs. Pedestrian	42	41	40	42	34
Vehicle vs. Bike	50	52	36	51	44
Vehicle vs. Fixed Object	119	149	137	138	150
Vehicle vs. Parked Vehicle	279	309	350	364	358
Vehicle vs. Vehicle	1045	1165	1214	1221	1118
Total	*1535*	*1716*	*1852*	*1816*	*1760*
Victims Killed	3	2	6	1	1
Victims Injured	550	553	612	549	496

Source: City of Napa Police Department 2003

which provides a five year comparison of traffic accidents in the City of Napa). In 2003, a total of 20 deaths occurred from motor vehicle-related accidents, only one of which occurred within the City of Napa, equivalent to 0.05%.

The top 20 locations where traffic collisions were reported within Napa County from 2002 to 2004 are listed in Table 7-5 and are graphically represented in Map 7-1. It should be noted that due to the rural nature of much of Napa County, the nearest intersection may be a considerable distance from the location of the collision.

When reviewing collision data, it is important to understand that as general activity at an intersection (traffic volumes, pedestrians, bicycles, etc.) increases, the number of chances for collisions increases. Intersections with higher traffic volumes would be expected to have a proportionally higher number of collisions. Therefore, although an intersection in Table 7-5 may have a high number of collisions, it is not necessarily indicative of a safety concern. Regardless, collision history is helpful when looking at Countywide transportation safety.

Nearly 75% of the collisions occurring within the top 20 general areas for traffic collisions in Napa County occurred along SR 29, including three fatalities. As shown in Table 7-5 and Map 7-1, 13 of the top 20 intersections in Napa County are within the City of Napa. However, the top two intersections with respect to collisions are the intersections of SR 29/SR 121 and SR 29/SR 221. These two intersections represent 122 collisions, 32 injuries, and 1 fatality. The intersection of SR 29/SR 12 represents the intersection with the highest number of injuries, with 20. The intersections of SR 29/SR 121, Solano Avenue/Trower Avenue, and American Canyon Road/Flosden Road each recorded one fatality due to a collision between 2002 and 2004. Again, these top intersections also likely have higher traffic volumes, so the fact that they have more collisions does not necessarily mean that there is more of a safety concern at these intersections than others.

Table 7-5: Top Intersection Traffic Collision Locations Napa County, January 2002 – December 2004

Intersection	Collisions	Fatal	Injury
SR 29/SR 121	64	1	19
SR 29/SR 221	58	0	13
Jefferson Street/Pueblo Street	54	0	18
SR 29/Trancas Street	54	0	19
SR 29/American Canyon Road	53	0	9
SR29/Imola Avenue	51	0	13
SR 29/Redwood Road	48	0	12
Jefferson Street/Trancas Street	45	0	11
SR 29/Rio Del Mar	45	0	14
SR 29/SR 12	43	0	20
Lincoln Avenue/Main Street	40	0	14
SR 29/1st Street	39	0	9
Solano Avenue/Trowler Avenue	38	1	18
Jefferson Street/Lincoln Avenue	37	0	10
SR 29/Trower Avenue	32	0	12
California Boulevard/Lincoln Avenue	30	0	8
Redwood Road/Solano Avenue	29	0	5
Lincoln Avenue/Soscol Avenue	28	0	9
American Canyon Road/Flosden Road	25	1	9
SR 29/South Kelly Road	24	0	14

Source: 2002-2004 SWITRS Data

CRIME

NAPA COUNTY

Crime Statistics from the Office of the Attorney General, at the CDJ are for the entire County, including unincorporated areas as well as incorporated cities. Figure 7-1 shows the trend in crimes per 100,000 population during the period 1993-2003.

The total number of incidents reported for various crimes between 1993 and 2003 is summarized in Table 7-6. Larceny-theft is the most common type of reported crime in the County with 2,670 incidents reported in 2003. Property crimes are the second most common (953 incidents in 2003), followed by violent crimes (380 incidents in 2003), and arson (22 incidents in 2003). Of the two types of property crimes, burglary (581 incidents in 2003) tends to be more prevalent than motor vehicle theft (372 incidents in 2003). Of the four types of violent crimes, aggravated assault (288 incidents in 2003) is the most prevalent, followed by robbery (51 incidents in 2003), rape (39 incidents in 2003), and homicide (2 incidents in 2002).

Table 7-6: Total Number of Reported Crimes per Year in Napa County 1993-2003

Category/Crime	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Violent Crimes	*568*	*589*	*489*	*411*	*385*	*404*	*331*	*322*	*361*	*345*	*380*
Homicide	4	2	2	0	2	1	2	3	1	2	2
Rape	31	41	24	34	30	32	28	37	36	26	39
Robbery	64	80	61	71	48	62	40	46	52	49	51
Aggravated Assault	469	466	402	306	305	309	261	236	272	268	288
Property Crimes	*1,186*	*1,309*	*1,187*	*982*	*1,219*	*1,091*	*767*	*707*	*645*	*911*	*953*
Burglary	882	1,018	826	713	885	833	578	503	482	564	581
Motor Vehicle Theft	304	291	361	269	334	258	189	204	163	347	372
Larceny-Theft	*3,135*	*3,120*	*2,831*	*2,565*	*2,610*	*2,526*	*1,923*	*1,635*	*1,953*	*2,318*	*2,670*
Arson	*90*	*79*	*42*	*27*	*41*	*41*	*37*	*55*	*51*	*22*	*22*
Total Crimes per Year	*4,979*	*5,097*	*4,549*	*3,985*	*4,255*	*4,062*	*3,058*	*2,719*	*3,010*	*3,596*	*4,025*

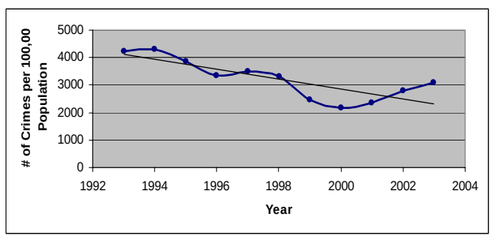
Note: Data includes incorporated as well as unincorporated areas of Napa County.
Source: Office of the Attorney General, CDJ 2004

Between 1993 and 2003, arson experienced the greatest fractional decrease of any of the crime categories, falling by 75% from 90 crimes reported in 1993 to 22 crimes reported in 2003 (Table 7-6). The total number of violent crimes has decreased by approximately 33% from 568 incidents reported in 1993 to 380 incidents in 2003. Aggravated assault has decreased by approximately 39% from 469 to 288 incidents reported. Property crimes have decreased by 20% over the same period from 1,186 to 953 incidents reported. The total number of larceny-theft crimes fell 15% from 3,135 to 2,670 incidents.

Over the same period, the population adjusted crime rate has decreased overall by approximately 27% from 4,230 to 3,074 crimes per 100,000 population. The crime rate reached a low of 2,161 crimes per 100,000 population in 2000 (Table 7-7). The observed decrease in the crime rate is due in large part to a reduction in larceny-theft, which fell by 27% (624 crimes) from 2,664 to 2,040 crimes per 100,000 population.

NAPA COUNTY SHERIFF'S DEPARTMENT

Crime statistics provided by the Napa County Sheriff's Department include the unincorporated areas of Napa County as well as the cities of American Canyon and Yountville which do not have their own police departments (see Table 7-8). Table 7-9 also shows County statistics, including incorporated cities and other jurisdictions provided by the CDJ. Note that data provided by the Napa County Sheriff's Department are not consistent with data published by the CDJ. For example, in 2003, CDJ data indicate that, excluding arson, there were a total of 865 crimes in the Sheriff's Department's jurisdiction, while the Sheriff's Department data indicates that there were 1,167 crimes.



Source: Office of the Attorney General, CDJ 2004

Figure 7-1: Reported Crimes per 100,000 Population in Napa County (1993-2003)

Table 7-7: Reported Crimes per 100,000 Population per Year 1993-2003

Category/Crime	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Violent Crimes	*483*	*495*	*415*	*345*	*318*	*330*	*266*	*256*	*282*	*268*	*290*
Homicide	3.4	1.7	1.7	0.0	1.7	0.8	1.6	2.4	0.8	1.6	1.5
Rape	26	35	20	29	25	26	23	29	28	20	30
Robbery	54	67	52	60	40	51	32	37	41	38	39
Aggravated Assault	399	392	341	257	252	252	210	188	212	208	220
Property Crimes	*1,008*	*1,100*	*1,008*	*825*	*1,006*	*890*	*618*	*562*	*504*	*707*	*727*
Burglary	749	856	701	599	730	679	465	400	376	438	443
Motor Vehicle Theft	258	245	307	226	276	210	152	162	127	269	284
Larceny-Theft	*2,664*	*2,622*	*2,403*	*2,156*	*2,154*	*2,060*	*1,548*	*1,300*	*1,525*	*1,798*	*2,040*
Arson	*77*	*66*	*36*	*23*	*34*	*33*	*30*	*44*	*40*	*17*	*17*
Total Crimes per 100,000 Population per Year	*4,230*	*4,283*	*3,862*	*3,349*	*3,511*	*3,313*	*2,462*	*2,161*	*2,350*	*2,790*	*3,074*

Note: Data includes incorporated as well as unincorporated areas of Napa County; values are rounded.

Source: Office of the Attorney General, CDJ 2004

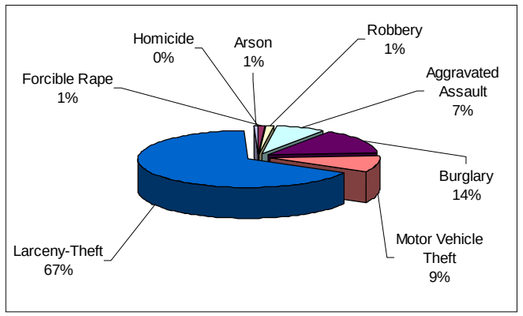


Figure 7-2: Total Number of Reported Crimes in Napa County (2003)

According to the Sheriff's Department, in 2003 there were a total of 1,167 crimes within their jurisdiction, including 635 crimes in unincorporated areas, 467 crimes in American Canyon, and 65 crimes in Yountville (Table 7-8). Larceny was the most common crime type with 516 total offenses, followed by assault and burglary, with 303 and 244 offenses each. Motor vehicle theft, rape, homicide, and robbery were less common with 83, 16, 3, and 2 offenses respectively in 2003.

Since the year 2000, crime rates have increased by 35% from 865 total crimes with the greatest increase occurring in motor vehicle theft (277%) which increased from 22 offenses in 2000 to 83 offenses in 2003. Between 2000 and 2003, larceny, burglary, and assault increased by 55% (from 333 to 516), 27% (from 192 to 244), and 6% (from 287 to 303), respectively. Rape and homicide rates changed only slightly and robbery decreased by 85% (from 12 to 2).

According to CDJ data, crimes in unincorporated areas of Napa County, American Canyon, and Yountville accounted for approximately 14% (507 crimes), 9% (314 crimes), and 1% (50 crimes), respectively, of the total crimes in Napa County in 2002. Table 7-8 shows the number of various crimes included in the FBI Crime Index for unincorporated Napa County in 2002. Figure 7-2 graphically depicts the total number of crimes for the entire County occurring in 2003.

Table 7-8: Crime Statistics for Areas under the Jurisdiction of Napa County Sheriff's Department

	Unincorporated Napa County	American Canyon	Yountville	Total
2003 total crimes	*635*	*467*	*65*	*1,167*
Homicide	3	0	0	3
Rape	14	2	0	16
Robbery	1	1	0	2
Assault	173	109	21	303
Burglary	143	93	8	244
Larceny	288	196	32	516
Motor Vehicle Theft	13	66	4	83
2002 total crimes	*686*	*405*	*78*	*1,169*
Homicide	2	0	0	2
Rape	6	1	0	7
Robbery	6	8	0	14
Assault	186	97	22	305
Burglary	142	88	19	249
Larceny	337	168	34	539
Motor Vehicle Theft	7	43	3	53
2001 total crimes	*572*	*321*	*70*	*963*
Homicide	1	0	0	1
Rape	8	5	0	13
Robbery	2	1	2	5
Assault	177	111	19	307
Burglary	109	75	14	198
Larceny	273	103	33	409
Motor Vehicle Theft	2	26	2	30
2000 total crimes	*541*	*77*	*247*	*865*
Homicide	2	0	0	2
Rape	14	1	2	17
Robbery	2	4	6	12
Assault	181	23	83	287
Burglary	126	16	50	192
Larceny	213	32	88	333
Motor Vehicle Theft	3	1	18	22

Source: Napa County Sheriff's Department 2004.

Data includes unincorporated areas of Napa County as well as the cities of Yountville and American Canyon.

Table 7-9: Reported Crimes in Napa County by Jurisdiction 2003

Jurisdiction	Homicide	Forcible Rape	Robbery	Aggravated Assault	Burglary	Motor Vehicle Theft	Larceny-Theft	Arson	Total
Total	2	39	51	288	581	372	2,670	22	4,025
Sheriff's Department	2	11	2	35	236	82	497	4	869
Unincorporated	2	10	1	24	138	12	277	4	468
American Canyon	0	1	1	8	90	66	191	0	357
Yountville	0	0	0	3	8	4	29	0	44
Calistoga	0	2	0	6	12	13	107	4	144
Napa	0	26	48	232	308	173	1,969	14	2,770
St. Helena	0	0	1	4	25	2	88	0	120
Napa State Hospital	0	0	0	11	0	0	9	0	20
Union Pacific Railroad	0	0	0	0	0	0	0	0	0
CA Highway Patrol	0	0	0	0	0	102	0	0	102

Source: CDJ 2004a

CITY OF NAPA

Crimes in the City of Napa accounted for approximately 69% (2,770 crimes) of the total crimes in Napa County in 2003 (CDJ 2004a). This only includes crimes accounted for by the FBI Crime Index and does not include misdemeanor crimes. Table 7-9 shows the number of various crimes included in the FBI Crime Index for the City of Napa in 2003. There were no reports of homicide in the City of Napa in 2003. According to the Napa Police Department's 2003 Annual Report (City of Napa Police Department 2003), the crime rate in the City of Napa is much lower than it was fifteen years ago. However, several problems identified by the Napa Police Department include homelessness, methamphetamine use, youth gangs, and child abuse.

The homeless population of Napa has seen a three fold increase since 1990. The demographics of this population are also troubling in that paroled felons, sex offenders, and violent offenders have increased and live among the more vulnerable mentally ill and disabled members of the homeless population. Methamphetamine use has increased steadily and is now very prevalent among high school, and even middle school students. As a result of this and a Department-wide effort aimed at drug offenders, drug-related arrests have gone up. Child abuse increased dramatically from only 83 reports in 1988 to 462 reports in 2003. This nearly six fold increase in abuses against the family and children may be the result of laws requiring more people to report suspicions of child abuse as well as increased community education (Napa Police Department 2003).

CALISTOGA

Felony crimes in the City of Calistoga accounted for approximately 4% (144 crimes) of the total crimes in Napa County in 2003. Crime rates in the City of Calistoga reflect that of a small, rural community with recent small increases in more urban type crimes involving gangs and drugs over the last five years. In 2003, there were no reports of homicide or robbery reported in Calistoga. Table 7-9 shows the number of various crimes included in the FBI Crime Index for the City of Calistoga in 2003.

CITY OF ST. HELENA

Crimes in the City of St. Helena accounted for approximately 3% (120 crimes) of the total crimes in Napa County in 2003. Like Calistoga, crime rates in the City of St. Helena are low and the majority of crimes in St. Helena are property crimes, with thefts from parked cars being the most common (City of St. Helena Police Department 2004). In 2003 there were no reports of homicide, forcible rape, or arson in St. Helena. Table 7-9 shows the number of various crimes included in the FBI Crime Index for the City of Calistoga in 2003.

NAPA STATE HOSPITAL

The Napa State Hospital has its own law enforcement jurisdiction within Napa County. Crimes at the Napa State Hospital accounted for approximately 0.5% (20 crimes) of the total crimes in Napa County in 2003. Compared to other jurisdictions, there are a disproportionate number of aggravated assaults that occur at the hospital. At the hospital aggravated assault accounted for 55% of all crimes in 2003, whereas Countywide aggravated assault accounted for only 7% of all crimes.

UNION PACIFIC RAILROAD

The Union Pacific Railroad maintains its own jurisdiction within Napa County. Crime rates on Union Pacific Railroad property are very low. No crimes were reported to the CDJ in 2003.

CALIFORNIA HIGHWAY PATROL

The CHP also maintains its own jurisdiction within Napa County. Most of the crimes reported by the CHP to the CDJ are related to motor vehicle theft. In 2003, there were 102 motor vehicle thefts reported by the CHP in Napa County, accounting for approximately 2% of all crimes in Napa County in 2003.

CONTAMINATED SITES

The database search described in the methods section identified hundreds of sites, each with varying levels of information and detail. Currently, there are no sites in Napa County on the NPL or the Proposed National Priorities List (PNPL). There are twenty-seven sites identified in the Calsites Database (Brownfields), including two Calsites, three sites with no further action required, five Voluntary Cleanup Sites, and seventeen Unconfirmed Properties Referred To Another Agency. The Cortese List includes two sites in Napa County. The Geotracker database contains 322 sites in Napa County where

LUFTs have been identified. There are a total of twenty-six oil and gas wells and twenty-seven facilities in Napa County identified through the SWIS database search.

METHODS FOR CREATING THE HAZARDOUS SITES MAP

The Hazardous Sites Map (see Map 7-2) divides the locations into classifications based on the database (or databases) in which they are found and their file status (open or closed). While most sites are only found in one database, many were found in multiple database systems. The sites found in multiple databases tend to be those that pose a greater risk to public health due to the size of the spill or the nature of the contaminant and site conditions. Open files are those that have not been properly remediated, or where contaminant levels and threats are unknown. Closed files are those that have either been determined to pose no or only minor risk to public health, or which have been remediated to the satisfaction of the lead public agency.

The hazardous sites have been assigned to one of four risk level ratings according to the presumed human health risk level of sites within their classification. The four risk level categories, and the types of sites classified to them are:

- Red – Extreme potential risk to human health
  - Cerclis Superfund sites also listed as unconfirmed brownfields and open leaking underground storage tanks (LUSTs)
  - EPA Superfund sites also listed as brownfields, solid waste facilities and open LUSTs
  - EPA Superfund Sites also listed as open unconfirmed brownfields
  - Open overseen LUST sites
- Orange – High potential risk to human health
  - Open LUSTs
  - Open or closed solid waste disposal sites also listed as open unconfirmed brownfields
  - Open solid waste disposal sites
  - Agricultural USTs also listed as unknown
  - Open vineyard spills
  - Open sites not listed on other databases
- Yellow – Medium potential risk to human health
  - Closed overseen LUST sites
  - Cerclis Superfund sites also listed as closed LUSTs
  - Open winery spills
  - Closed solid waste disposal sites
- White – Low potential risk to human health
  - Closed LUST sites
  - Closed sites not listed on other databases

Map 7-2 does not attempt to rank site risk levels on a site by site basis, but rather by their general classification. This map is a useful tool for future site assessments, as it provides the user with a guide to the types of hazards that may be on or in the vicinity of a site. If it is determined from the map that hazards exist at a particular location, the user is advised to consult the databases referenced in the text of this chapter and in the legend of Map 7-2. Once the nature and status of the site has been researched, a more accurate site assessment should be made.

The following discussion of contaminated sites in Napa County is a general approach to analyzing the human health risk associated with various types of contaminated sites. For many of the sites, the specific contaminant is unknown or undocumented, or the health risks and property status have not been fully assessed. For others, there is greater detail. When assessing the relative risk of a specific site, it is important to consider all of the available information, including site history, the contaminant type and characteristics (persistence, water solubility, etc.), proximity to sensitive receptors, remedial actions taken in the past, and current status.

CONTAMINANT TYPES

There are 650 chemicals covered by the Toxics Release Inventory in the United States. The toxicity and environmental persistence of these chemicals is highly variable, and depends to a large degree on the source, chemical structure, and pollutant loads. The variability in potential contaminants is large, but can generally be divided into categories depending on their source. These include industrial wastes (e.g., chemical industry, poly-chlorinated biphenyl [PCB]), transportation-related pollutants (e.g., oil, solvents, fuels), agriculture related pollutants (e.g., fertilizers, herbicides, pesticides), commercial chemicals (e.g., paints, PVC bottles), and civil waste (e.g., detergents, trash). Chemicals can either be organic or inorganic and either water soluble or non-aqueous phase liquids. Many of the more dangerous chemicals are persistent organic pollutants which are not water soluble and biodegrade relatively slowly. United Nations Environmental Protection has published a list of Persistent Organic Pollutants, many of which are related to agriculture and have been banned in most countries. There are a number of sources of information for chemical characteristics and relative threats to human health of

specific substances. The Agency for Toxic Substances and Disease Registry provides lists and toxicological profiles for 269 priority pollutants, and minimum risk levels for 315 pollutants. The detailed reports can be accessed online at http://atsdr1.atsdr.cdc.gov/toxpro2.html.

PROXIMITY TO SENSITIVE RECEPTORS

Primary exposure pathways for toxic chemicals include ingestion (particularly with drinking water), inhalation (polluted air), and direct exposure to skin.

Napa County lies within the jurisdiction of two RWQCBs: Central Valley RWQCB, based in Sacramento, and the San Francisco Bay RWQCB, based in Oakland. The boundaries for RWQCB jurisdiction are determined using watersheds. Using the supplied hazardous sites maps in the draft report, the areas of Napa County that lie within the Central Valley RWQCB jurisdiction are those areas depicted on these following maps: Central Interior Valleys, Berryessa Area, Pope Valley, and the Livermore Area. The areas of Napa County that lie within the San Francisco Bay RWQCB jurisdiction are those areas depicted on these following maps: Jamieson/American Canyon, Carneros Area, Southern Interior Valleys, Western Mountains, Angwin Area, Eastern Mountains, Napa Valley Floor, and Napa River Marshes.

The Local Oversight Program (LOP) is contracted by the SWRCB to perform oversight of LUST sites. The Napa County LOP directs the assessment and remediation of these contaminated sites from initial leak discovery through the remediation and closure process.

The number of people in Napa County that rely on private wells for drinking water exceeds the number of people served by small public water systems. Not accounting for municipal water supplies, there are 142 small water systems in Napa County, which are defined as water systems with less than 200 service connections. In many areas of the County, private wells are the only source of water for residences and businesses. In more densely populated areas of the County, residents receive water from municipal supplies, but also have wells on their property for irrigation and/or other purposes. Many of these wells were installed before municipal water service was available and prior to any permitting requirements. Obtaining information regarding many of these privately owned historical wells is often difficult.

Contaminated sites that are in close proximity to a well may pose a greater threat to human health than those that are further away. However, the persistence and movement of chemicals after application to a land surface are influenced by local geography, geology and soil properties, climate, land use/land cover, chemical characteristics, and management activities. In addition, local groundwater tables and the direction and rate of groundwater flow have a large effect on the ability of contaminants to move throughout the subsurface. In some cases, a contaminant release may occur near a well, and the well will not be affected. In other cases, however, contaminants from a spill may be detectable in a distant well. There is no general rule of thumb that distinguishes the required distance or time for pollutant dilution, and therefore no easy way to make an accurate assessment of human health risk without a thorough understanding of the site conditions.

Currently, there are no mandatory testing requirements (protective program) in place for private wells. However, if there is suspicion that a drinking water or irrigation well is polluted by a groundwater plume, measures should be taken to determine the source and risk factors involved. Municipal water providers/districts in American Canyon, Napa, Yountville, St. Helena, and Calistoga require backflow prevention devices be installed on wells at properties that are connected to municipal water supplies within the city limits. This is to protect municipal supplies from cross contamination from surface/shallow water.

The City of Napa has identified 1,150 private wells, St. Helena has identified 261 wells, and Calistoga has identified 237 wells within their respective cities (on record). At this time, a count for American Canyon is not available, and Yountville does not have a current count of wells within its city limits. Yountville will be installing their first municipal supply well in the near future. It is estimated there are several hundred additional wells within the cities and County that have not been identified, and new wells are continually installed throughout the County. Napa County has issued 4,145 well permits (not including monitoring wells) since the summer of 1983. Not all wells that are permitted result in an installation, but an estimate of the total number of wells existing in Napa County (including those installed prior to permitting) is approximately twice that number.

Napa County enacted a water well ordinance in 1974, and since that time has maintained paper files for all water wells drilled within the County. Napa County DEM is also the permitting agency for heat pump/AC return flow wells and septic systems, and has paper records of these systems installed in the County.

Napa County has documented 240 public and private water wells. Some of these are used as drinking water sources, while others are solely for irrigation, cooling, or other purposes. Only the addresses of these wells are provided in the database; the precise locations are not referenced.

LUSTs (over 322 documented in Napa County) are the most common source of groundwater pollution. Over time, the tanks may corrode, crack, and develop leaks, causing potentially serious contamination of local groundwater resources. Many LUFTs are associated with existing gas stations or areas where gas stations have been in the past. Volatile organic compounds (VOCs), such as benzene, xylene, toluene, and methyl tertiary butyl ether (MTBE) are the most common contaminants associated with LUSTs. MTBE is of particular concern, and the EPA requires all large drinking water systems, and a representative sample of small systems, to monitor and report the presence of MTBE (reporting began in 2001). Volatilization of contaminants may also occur, creating risk of exposure via the respiratory system.

Pesticides are also a major source of groundwater pollution that frequently contaminate drinking water and irrigation wells. Pesticide properties include both physical and chemical characteristics such as solubility, adsorption, volatility, and the potential for degradation. Pesticide chemicals that dissolve readily in water are highly soluble, thus making them available for transport with the water flow. Such pesticides have a tendency to leach from the soil into to groundwater. However, many pesticides do not leach because they are adsorbed into soil particles or organic matter, even though they may have a relatively high solubility. Highly volatile chemicals are easily lost to the atmosphere and are less likely to

leach into the groundwater, unless they are also highly soluble and collected in water systems. Degradation affects the potential for a pesticide to reach groundwater and the persistence of the pesticide influences the potential for long-term contamination. The longer the compound lasts before it is broken down, the longer it is subject to the forces of leaching. However, many highly persistent pesticides (e.g., chlorinated hydrocarbons) have not been found in groundwater because of their low solubility and strong adsorption to soil particles. On the other hand, some pesticides of low persistence (e.g., aldicarb) have been found in groundwater. Table 7-10 lists the persistency of certain pesticides in soils. Information on other pesticides can be found on pesticide labels or through EPA Fact Sheets and Health Advisories, Material Data Safety Sheets, and company literature. As with all contaminated sites, it is important to have a thorough understanding of site conditions and contaminant characteristics prior to assessing relative risk.

Table 7-10: Pesticide Persistence in Soil

Low Persistence (half-life <30 days)	Moderate Persistence (half-life 30-100 days)	High Persistence (half-life >100 days)
Aldicarb	Aldrin	Bromacil
Captan	Atrazine	Chlordane
Dalapon	Carbaryl	Lindane
Dicamba	Carbofuran	Paraquat
Malathion	Diazinon	Picloram
Methyl Parathion	Endrin	Trifluralin
Oxamyl	Fonofos	
2, 4-D	Glyphosate	
2, 4, 5-T	Heptachlor	
	Linuron	
	Parathion	
	Phorate	
	Simazine	
	Terbacil	
	TCA	

Note: Half-life is the period over which the concentration of a specified chemical or drug takes to fall to half its original concentration.

Soil properties that affect pesticide movement include texture, permeability, and organic matter content. Management practices, or the methods used to apply pesticides, are another factor determining leaching potential. Injection or incorporation into the soil, as in the case of nematicides, makes the pesticide most readily available for leaching. Most of the pesticides that have been detected in groundwater have been incorporated into the soil rather than sprayed onto growing crops. It is important to remember that pesticide and groundwater relationships are site-specific, and even minor changes in the soil-crop-environment-pesticide relationship can change the potential for groundwater contamination.

Landfills and other solid waste disposal facilities can also be sources of groundwater contamination. The database includes 27 such sites in Napa County, including landfills (open and closed) and other solid waste disposal facilities. Specific information on each of these sites is available through SWIS, (maintained by CIWMB). Several of the landfills are included in additional databases as well. The City of Napa Landfill is found on the Comprehensive Environmental Response, Compensation, and Liability Information System Superfund List; the American Canyon, Hidden Glen, and Upper Valley Disposal Service Landfills are found on the CalSites List as voluntary and referred cleanup sites. While most landfills have a protective bottom layer, the layer can become cracked or may be missing altogether, and pollutants (e.g., car battery acid, paint, household cleaners, nutrients, etc.) may leach into the local groundwater.

Dry cleaning operations and historical operation of tanneries have led to soil and groundwater contamination by solvents, including perchloroethylene (PCE), tetrachloroethene (TCE), and chromium. The San Francisco Bay RWQCB is currently the oversight agency for several contaminated sites of this type in Napa County.

UNIFIED PROGRAMS

California's Unified Program is intended to provide relief to businesses complying with the overlapping and sometimes conflicting requirements of formerly independently managed programs. The Unified Program is implemented at the local government level by CUPAs. The Department of Environmental Management (DEM) is the CUPA for Napa County, as well as for all of its incorporated cities. As the CUPA, the DEM administers the following Unified Programs related to hazardous materials:

- Hazardous Materials Release Response Plans and Inventory (Business Plan) Program
- California Accidental Release Prevention Program
- Underground Storage Tank Program
- Hazardous Waste Generator and Hazardous Waste Onsite Treatment Programs
- Above Ground Storage Tank Program (Spill Prevention, Control, and Countermeasure Plans)

Hazardous Materials Release Response Plans and Inventory (Business Plan) Program. Commonly known as the Hazardous Materials Business Plan Program (HMBP). All businesses handling hazardous materials in amounts equal to or greater than 55 gallons for a liquid, 500 pounds for a solid, or 200 cubic feet at standard temperature and pressure of a compressed gas are required to prepare a HMBP. The plan consists of owner/operator information, chemical inventory, an emergency response plan, and maps. The purpose of the program is to make available to the public information on what hazardous materials are being handled at businesses in the community, provide information to emergency responders on what hazardous materials are handled at a facility, and provide training to employees in how to handle a release or threatened release of hazardous materials at a facility. There are currently 1,138 facilities in Napa County subject to the HMBP program.

California Accidental Release Prevention (Cal ARP) Program. Facilities that handle extremely hazardous materials in state or federal planning quantities are regulated under the Cal ARP Program. The purpose of this program is to reduce releases of extremely hazardous materials and decrease the impact of a release. To accomplish this, facilities are required to submit a risk management plan containing the following:

- A facility hazard assessment that identifies the potential effects of an accidental release, a review of the history of accidental releases at the facility, and an evaluation of the worst-case release scenario.
- A release prevention program that includes prescribed maintenance of systems containing extremely hazardous materials, monitoring, and training for operators and maintenance personnel.
- An emergency response program addressing emergency response training for employees and procedures for informing the public and response agencies in the event of a release.

There are currently ten facilities in Napa County subject to the Cal ARP Program, which with the exception of one compressed gas distributor, are all wineries.

Underground Storage Tank Program (UST). The UST program regulates facilities that store hazardous materials in USTs (as defined in Chapter 6.7 of the Health and Safety Code and Title 23 CCR). The purpose of this program is to promote the early detection of releases from USTs and reduce the potential for contamination of groundwater. DEM regulates approximately 49 UST facilities, with a total of 133 USTs identified. They consist mostly of automobile fueling facilities and emergency generators.

Hazardous Waste Generator and Hazardous Waste Onsite Treatment Programs. There are approximately 400 businesses in Napa County that generate hazardous wastes. They consist mainly of CESQGs, which are facilities that generate less than 100 kilograms of hazardous waste per month. The majority of CESQGs are auto repair shops, maintenance yards, dry cleaners, medical facilities, printers, machine shops, and photo processors. The waste is periodically removed from the facility for disposal or recycling. Several larger hazardous waste generators are permitted to treat their waste on-site.

The Napa-Vallejo Waste Management Authority provides a disposal service for hazardous waste at its Household Hazardous Waste Collection Facility at the Devlin Road Transfer Station. The service is offered to households and CESQGs. CESQGs must make an appointment by calling (800) 984-9661.

Above Ground Storage Tank Program Spill Prevention, Control and Countermeasure (SPCC) Plan. Facilities that have above ground petroleum storage tanks with a capacity of 1,320 gallons or multiple storage containers with a cumulative storage capacity of 1,320 gallons are required to prepare a SPCC plan that meets the requirements of the Code of Federal Regulations, Title 40 Section 112. At the time of inspection, DEM will verify that the SPCC plan is in place.

NAPA VALLEY PETROLEUM

Napa Valley Petroleum, Inc. (NVP) is an industrial manufacturer and provider of diesel, gasoline, propane, lubricants, compressed natural gas, and other petroleum related products (Napa Valley Petroleum 2004). NVP provides services to the agricultural, commercial and residential communities of Napa, Sonoma and Solano Counties. NVP operates six fleet fueling and five retail gasoline station locations in Napa Valley and is affiliated with the Commercial Fueling Network, which offers over 3,000 fueling locations across the United States. NVP's bulk fueling services for gasoline and diesel include the design, placement, and filling of bulk storage tanks at residential, agricultural, and commercial locations. NVP propane services include the design, placement, and filling of bulk tanks at residential, agricultural and commercial locations. NVP also offers an aluminum cylinder exchange service. Lubrication services include the proper specification and selection of lubricants for all uses. The nature and size of NVP's business operations are such that the potential for spills of hazardous substances and risk to human health are large. As the largest corporation providing these services within Napa County, NVP's daily operations, as well as potential damage and malfunctioning of the products they provide, present a high potential for hazardous material spill risk to human health.

The Geotracker database contains five records of LUFTs owned by NVP: four NVP owned Exxon gas stations (located at 1153 Main Street in St. Helena, 6795 Washington Street in Yountville, 2008 Redwood Road and 1895 Salvador Avenue in the City of Napa), and NVP's bulk plant (located at 257 S. Kelly Road in American Canyon).

There is also one record (located at 905 Main Street in St. Helena) for NVP in the CalSites database. This location is an unconfirmed brownfield site that was referred by the DTSC to another agency in 1988. An underground tank release of petroleum products occurred at the site.

A complete list of petroleum and chemical products provided by NVP, as well as Material Safety Data Sheets for the most hazardous materials are provided on the NVP website at www.napavalleypetroleum.com.

NATURAL HAZARDS

EARTHQUAKES, SEISMICITY, AND OTHER GEOLOGIC HAZARDS

Information on the physiography, bedrock formations and geologic structure, and soil deposits of Napa County are provided in detail in the geological resources chapter. This section focuses on the seismic and non-seismic (related to geology/soils and not triggered by earthquakes) hazards.

HISTORIC FAULT ACTIVITY

Numerous earthquakes have occurred in the region within historic times. Between 1735 and 2005, 97 earthquakes (Richter Magnitude 5.0 or larger) have occurred within 200 kilometers of the center of Napa County. The five most significant historic earthquakes to affect Napa County are summarized in Table 7-11.

NATURAL HAZARD ASSOCIATED WITH EARTHQUAKES, SEISMICITY, AND OTHER GEOLOGIC HAZARDS:

- Surface Fault Rupture
- Seismically Induced Ground Shaking
- Seismically Induced Ground Failures
- Failure of Levees and Dams
- Ground Subsidence/Settlement
- Landslides and Soil Creep
- Erosion
- Expansive Soils
- Seiche and Tsunamis

Table 7-11: Significant Historic Earthquake Activity – Napa County

EpiCenter	Historic Richter Magnitude	Year	Distance from County Center
37.70 – 122.50	8.3	1906	89 km
37.80 – 122.20	6.8	1836	76 km
37.6 – 122.40	7.0	1838	98 km
38.40 – 122.00	6.4	1892	27 km
37.7 – 122.10	6.8	1868	88 km
38.20 – 122.40	6.2	1898	33 km
38.38 – 122.41	6.8	2000	15 km

Sources: USGS 2001, Idriss 1995, as referenced in the geological resources chapter

A large number of faults have been mapped within Napa County (Graymer et al 2000 and Graymer et al 2004-in press, as referenced in the geological resources chapter) (Map 7-3). Only a small number of these faults have been designated as active by the California Geological Survey. Active and potentially active faults within Napa County are described in the following section.

The locations of the major faults are indicated on the Geologic Maps of Graymer (2002 and 2004, as referenced in the geological resources chapter). Additional geologic maps that were used for this study include recent maps by the California Geological Survey, the Unified Building Code Map of known active faults, and the Department of Transportation's 1996 map of maximum credible earthquake events.

MAJOR ACTIVE FAULTS IN NAPA COUNTY

The three faults designated as active in the County are the West Napa fault, Green Valley fault, and Hunting Creek fault. These faults are briefly described below, but are discussed in detail in Chapter 1, *Geological Resources*. Cordelia fault, considered possibly active, is also described in this section.

West Napa fault. The West Napa fault has been mapped as Holocene-active (California Division of Mines and Geology 2000, as referenced in the geological resources chapter) in the southern part of the map area (south from the Napa Airport to very near the Napa-Solano County boundary). It is not presently designated as active along its northern segment that is shown to terminate in the vicinity of Yountville (Helley and Herd 1977, as referenced in the geological resources chapter), although, recent work (Langenhein and others 2003, as referenced in the geological resources chapter) has shown that the damaging 2000 Yountville earthquake of magnitude 5.2 may have occurred on the northern segment of the West Napa fault.

Napa Valley fault. The Napa Valley fault is a dextral (right lateral) strike-slip fault that forms a part of the larger San Andreas fault system. This fault is generally located along the western side of Napa Valley and extends from Yountville southeast to the vicinity of Napa Junction, although there have been suggestions that the West Napa fault may continue further to the northwest in the bedrock hills to near St. Helena, rather than striking more northerly into the alluvium of Napa Valley. Cumulative lateral displacement on the fault is unknown.

Green Valley fault. The Green Valley fault extends northward four to five miles into the southeast part of Napa County and terminates near the west edge of Wooden Valley. It is an active, right lateral strike-slip fault, which is the easternmost, significant strike-slip fault of the larger San Andreas fault system within the San Francisco Bay area. It is characterized by a seismic creep (slow, gradual movement on a fault not associated with felt earthquakes).

Hunting Creek fault. The Hunting Creek-Berryessa is an active (Holocene) dextral strike-slip fault system associated with the larger San Andreas fault system. The Hunting Creek-Berryessa fault system extends from the vicinity of Wilson Valley south-southeast to the Cedar Roughs area west of Lake Berryessa. In the USGS Fault and Fold Database, the fault zone is divided from north to south into the Wilson, Hunting Creek, and Lake Berryessa sections, based on changes in geomorphic expression of the faults. Slip rates for each segment vary, but it has been argued that the geomorphic expression of the Hunting Creek fault indicated a slip rate of at least 1 mm/yr. It is generally necessary to establish a slip rate of at least 1 mm/yr on a given fault to qualify as sufficiently active by the California Geological Survey and thus zoned according to the provisions of the Alquist-Priolo Fault Zoning Act.

Cordelia fault. The Cordelia fault is roughly parallel to and located a few miles east of the Green Valley fault. It extends toward the County from the south but is presently mapped as terminating a few miles short of the County line. The Cordelia fault is Holocene-active based on a slip rate of 1 mm/yr as determined from fault trenching investigations conducted near the north end of the fault (pers. comm., Borchardt 2005). See also Chapter 1, *Geologic Resources*, of the BDR.

PRIMARY AND SECONDARY EARTHQUAKE HAZARDS

Surface Fault Rupture

Surface rupture occurs when a fault breaks through to the ground surface as a result of an earthquake. The movement is essentially instantaneous (several kilometers per second) and one side of the fault is displaced relative to the other. The sense of movement can be horizontal, vertical or combinations thereof. The amount of the displacement can vary from a few inches or less, to several feet depending on the characteristics of the fault. The length of the rupture can also vary widely, depending on fault characteristics.

Structures built astride a fault that experience the effects of surface fault rupture can be severely damaged or undergo collapse from the nearly instantaneous stress imposed by the fault displacement. Such damage presents high risk for injury and death. Although there is a developing research and application for minimizing the surface rupture effects on structures built across active faults, it is still evolving, relatively expensive compared to standard foundation design, and will not necessarily mitigate all risk of damage. In the majority of cases at this time, the simplest, least expensive, and safest approach is to avoid the active fault trace. This is done by exposing the fault trace(s) at the project location through trenching and detailed logging. As necessary, this is followed by the development of setback recommendations of human-habitation structures to avoid the trace(s).

There is also a slower form of rupture known as fault creep. In addition to its slow rate of movement (as slow as a few millimeters per year), creep movements are not associated with the sudden generation of

ground shaking that results from rapid rupture events. Although lacking great rupture speed and associated ground shaking, creep movements can, nonetheless, cause substantial damage to development over time. Several faults in the Bay Area are known to be associated with creep movements of various types (Yeats et.al 1997, as referenced in the geological resources chapter). The Green Valley fault that extends into the southeast part of Napa County is known to have undergone creep movements (Galehouse 1992, as referenced in the geological resources chapter).

Seismically Induced Ground Shaking

Damage to development from seismic shaking caused by the Bay Region's active faults should be anticipated in Napa County sometime within the next few decades. As described above, there is a 67% chance for a magnitude 6.7 or larger earthquake to occur in the Bay Area by the year 2032. Smaller earthquakes (between magnitudes 6.0 and 6.7), capable of considerable damage depending on proximity to urban areas, have about an 80% chance of occurring in the Bay Area by 2032 (U.S. Geological Survey 2002, as referenced in the geological resources chapter).

The severity of the shaking damage at a particular location within the County depends not only on the magnitude of the earthquake and the distance to its epicenter, but also on other factors including the nature and thickness of the deposits at the location. For example, the Napa Earthquake of 2000 resulted in unusually strong ground accelerations at Napa with attendant damage to structures, while nearer the epicenter at Yountville there was a general lack of damage, even to older buildings. These stronger accelerations and related damage appear to have been contributed to by the apparently much deeper alluvial fill beneath the valley at Napa than at Yountville, which intensified the damage.

Depending on the severity of the shaking, damage of various types could occur, including that caused by liquefaction and other ground failures (described under separate headings below). In general, older, unreinforced masonry buildings and other city buildings constructed before 1930 that have not been seismically retrofitted are most subject to structural failure/collapse.

The largest area where greater shaking damage is anticipated is within the various valleys of the County. Deeper, unconsolidated alluvial deposits occupy these areas, especially the lower part of the Napa Valley, which is underlain by saturated, estuarine deposits, including the very weak compressible Bay Muds. Deep, unconsolidated deposits associated with valleys are subject to higher amplitude, longer duration shaking motions which can cause more damage to improvements than those sited on firmer, shallower deposits.

Seismically Induced Ground Failures

Ground failures due to seismically induced ground shaking are also referred to as "secondary effects." In contrast to primary fault rupture, effects of which are localized along the fault, secondary-shaking effects can extend many miles from the earthquake fault that generated the shaking. Ground failures can result directly from earthquake shaking, or from liquefaction induced by the shaking. The principal ground failures due to shaking include the following:

- landsliding;
- liquefaction;
- ground settlements; and
- lateral spreads, lurching, and ground cracking.

Earthquake Generated Landsliding. Landsliding is one the most common types of failure resulting from earthquake shaking. Landsliding triggered by ground shaking occurs in the same types of hilly or mountainous terrain that is also the source area for non-seismically induced sliding. Ground shaking can reactivate dormant landslides, cause new landslides, and accelerate or aggravate movement on active slides. A number of landslide types can occur as the result of shaking. Rock falls and rock topples probably have a higher incidence during earthquakes than under non-earthquake conditions. A large earthquake occurring when the ground is saturated from winter rains has the potential to trigger a large number of landslides of various dimensions and types of movement (e.g., falls, flows, rotations, translations, etc). Locations of potential landslides and non-seismic generated landslides are discussed later under the subheading "Landslides and Soil Creep."

Liquefaction. Liquefaction is the sudden loss of soil shear strength during strong ground shaking due to increased pore water pressure and decreased effective stress (effective stress - hat portion of the total stress on the soil that is borne by the soil grains). As a result, sufficiently liquefied soils can no longer support structures built on them, or maintain buoyant structures placed beneath them. Liquefied soils on sloping ground may flow in a semi-fluid or plastic state (a lateral spreading) disrupting the original ground surface and damaging improvements in their path.

Liquefaction occurs in areas underlain by loose, saturated, cohesionless (non-clayey) sand, silt, and gravel. Liquefaction prone deposits of this type are geologically young, relatively unconsolidated materials that are most commonly associated with alluviated valleys that have high groundwater levels. Liquefaction potential ranges from high to low depending on various factors, including soil type, soil thickness and groundwater levels. Estuarine areas, and areas comprised of un-engineered, saturated, cohesionless fill are considered to have a generally high to very high liquefaction potential.

Relative to the total area of Napa County, alluviated valleys represent a relatively small percentage (approximately 20% or less). On a Countywide basis, the potential for liquefaction-induced ground failures is relatively low. Because most of the County's improved areas are within these valleys, the potential for liquefaction to occur would have a higher risk of causing damage. Estuarine areas generally present a uniformly higher potential for liquefaction. The largest contiguous area within the County where liquefaction failures could occur is within the loose saturated estuarine deposits along the Napa River, south of the City of Napa. Other smaller areas with ground failure potential are scattered within valley areas throughout the County.

Other Earthquake Ground Failures.
Lateral Spreading: Lateral spreading is a ground failure in which a subsurface layer of soil liquefies, resulting in the overlying soil mass deforming laterally toward a free face. This is a type of landsliding

HAZARDS ASSOCIATED WITH SEISMICALLY INDUCED GROUND FAILURE:

- Landsliding
- Liquefaction
- Ground settlements
- Lateral spreads, lurching, and ground cracking

triggered by shaking. Most of the County is not susceptible to lateral spreading. Limited lateral spreading could occur in alluvial areas adjacent to open stream channels where a bank or terrace face exists.

Lurching: Ground lurching is a short-term ground failure caused by seismic forces exerted on the soil. Ground lurching can occur in areas underlain with soft, weak soils and often results in ground cracking and permanent displacements. The largest known area within the County underlain by soft, weak soils is the lower Napa Valley immediately south of the City of Napa. Weaker soils typical include the Bay Mud.

Seismic Differential Settlement: Differential settlement is the non-uniform densification of loose soils that occurs during strong ground shaking and causes uneven settlement of the ground surface. There are numerous locations in the County where soils of this type are likely to occur, the larger of which are in valley areas. Differential settlement can also occur under non-seismic conditions.

Failure of Levees and Dams

The seismically induced failure of levees, earth fill dams and other embankments can occur due to the direct failure of the embankment itself, or seismic failure of the natural foundation materials beneath the embankment, leading to failure of the overlying embankment structure. Due to generally weak foundation materials believed to be present in the southernmost part of the Napa Valley, the risk of levee failure resulting from seismic shaking could be moderate or higher. This is particularly the case for older levees that may not have been constructed to modern standards. This includes older levees in the Cuttings Wharf area just west of the Napa River.

Landsliding has occurred in this area.

As of October 15, 2004 there were 51 dams in Napa County of various sizes and ages (California Department of Water Resources 2004). Most of these are believed to be earth fill structures. Some of these dams are within the jurisdiction of the California Department of Water Resources. All dam structures that fall within this jurisdiction are those that, a) are, or will be in the future, 25 feet or more in height from the natural bed of the stream or water course at the downstream at the toe of the barrier, or b) have an impounding capacity of 50 acre feet or more (Department of Water Resources 2004, as referenced in the geological resources chapter). These dams are highly regulated during their design and construction phases and are routinely inspected during their impoundment life. As such, these jurisdictional dams should be relatively safe from a seismic hazard standpoint. It is very likely that the largest, oldest and least maintained of the non-jurisdictional dams present the highest risk for seismic failure.

Ground Subsidence/Settlement

Subsidence and settlement are sometimes used interchangeably. Settlement is often used for smaller, site-specific areas and for occurrences that last a relatively short time frame. In contrast, subsidence is often for larger areas that last a longer period of time (e.g., years). Subsidence/settlement can occur differentially, that is one area or location subsides or settles more than another. The results of subsidence/settlement, especially when it occurs differentially, can be damaging.

Ground subsidence/settlement has two basic mechanisms: elastic settlement and consolidation. Elastic settlements occur from structures and other loads that cause deformation of the subsurface soils. Elastic settlement from structures is usually minor and usually occurs during construction or within the first few weeks after construction.

Longer-term ground subsidence requiring months to decades also occurs as a result of the consolidation of natural surficial materials that are compressible. A surficial geologic unit that is known to be prone to subsidence is Bay Mud that underlies parts of the marsh area in the lower parts of the Napa Valley south of the City of Napa. When fill or structure loads are placed on these muds for development, flood control, or other purposes, significant settlement can result. It is expected that fills previously placed on these deposits are likely undergoing consolidation and settlement of the ground surface. Any new fill or structure loads will induce new settlement in addition to any on-going settlement. The time required to complete consolidation of Bay Mud depends on the thickness of the Bay Mud and distance to a drainage layer (underlying sand lenses). The time required to complete settlement can range from a few months to many decades.

Subsidence may result in flooding as ground levels are lowered, including the free board of flood control levees. Subsidence can also cause damage to structures, utilities, and roadways from differential settlement. Foundation and walls can be cracked and the structure tilted out of level. Gravity utilities and storm drains can become inoperable due to differential settlement that causes sag in the lines or slope reversal.

Landslides and Soil Creep

Landsliding is judged to be the most potentially damaging geologic hazard in Napa County. All the major ridge and hill systems within the County have experienced landsliding to varying degrees. Napa County exhibits a wide variation in landslide types. This variation includes the type of movement, size/depth, geometry, degree of activity, rate of movement, and density of landslide development. Based on these variations (generally by type of material and type of movement) landslides are classified and referred to by such names as: slump, earth flow, translational, fall, flow, etc. All landslides do not present the same level of risk to a given project, and different projects may have different levels of acceptable risk from the same landslide. Some bedrock formations and surficial deposits are more prone to landslide failure than others, and some slope types can be more prone to sliding or particular types of sliding than others.

Because of their slower relative rate of movement, most landslide types usually present the risk of property damage. However, some types have a higher probability of causing physical injury or death. These latter slides are characterized by their rapid movement (up to several tens of feet per second) and long travel distance from the point of origin. They are most commonly classified as debris flows and debris avalanches on the landslide maps (also referred to as mud slides or flows). Several, but not all, of the County landslide maps show the potential for, and mapped locations of, slope failures of this type.

Erosion

Erosion is the general process or group of processes whereby materials of the Earths crust are loosened, dissolved, or worn away, and simultaneously moved from one place to another, by natural agencies. These agencies include weathering, solution, corrosion, and transportation, but usually

exclude mass wasting processes such as landsliding and soil creep. More specifically, it is the mechanical destruction of the land and the removal of the resultant materials, such as soil and rock particles, by running water, wind, etc. Erosion can be natural or it can be caused or exacerbated by manmade activities. Exacerbated erosion is referred to herein as accelerated erosion.

Sandy soils on moderate slopes or clayey soils on steep slopes are susceptible to erosion, especially when subjected to concentrated surface water flow. Weathered rock can also be eroded if the concentrated flows are sufficiently high. The potential for erosion is accelerated when established vegetation is disturbed or removed, particularly on hillside areas. On hillside areas the result can be rilling, rutting, and without correction, the eventual development of damaging gully systems. The eroded material may be transported to stream courses and cause water quality issues and other environmental problems.

Along many natural drainage courses on both hillsides and within the valley areas, stream and river flows erode banks. This results in water siltation and also causes the location of the stream or river to meander (lateral migration of the channel). If lateral migration is sufficient it can undermine structures or roadways and cause damage or collapse. These natural processes can be accelerated or initiated by inappropriate or poorly designed/constructed improvements.

The potential for natural and accelerated erosion damage exists at many locations throughout the County. This potential is due to the large total area occupied by hill and ridge systems in the County relative to gently sloping valley areas. The potential for increasing amounts of accelerated erosion exists due to such activities as continued hillside development, including vineyards and other types of land modification.

Locations of erosive soils can be found by referring to the Soil Survey Geographic (SSURGO) database or the equivalent hard copy report by the National Resources Conservation Service (Lambert and Kashiwagi 1978, as referenced in the geological resources chapter). The soil database contains a list of the soil units that have the potential for accelerated erosion. Referral to GIS-based and hard copy maps of landslides and surficial deposits can also assist in identifying erosion prone areas.

Expansive Soils

Certain clay-rich soils can cause considerable damage to structures, streets, and roads as they shrink and swell in response to seasonal changes in their moisture content. Such soils are referred to as expansive. In late summer, expansive soil shrinks and cracks (1 to 3 inches wide in many places) as the soil dries and hardens. In the wet season, swelling of the clay closes the cracks, and the soil then is plastic and weak. The forces exerted during expansion and contraction are sufficient to heave and distort buildings, and to crack shallow foundations and pavements.

Expansive soils exist at a number of locations in Napa County. Expansive soils can occur on both hills and gently sloping valley areas. When expansive soils occur on a hill slope they undergo the slow seasonal down slope movement known as soil creep. This down slope process adds to the potential for these soils to damage developments.

Locations of expansive soils can be found by referring to the SSURGO database or the equivalent hard copy report by the NRCS (Lambert and Kashiwagi 1978, as referenced in the geological resources chapter).

Seiche and Tsunamis

The potential for damage caused by seiches and tsunamis is judged to be low due to lack of bay front exposure within the County. There may be some potential for seiche within large bodies of water within the County, such as reservoirs.

FIRE HAZARD SEVERITY

Napa County has a long and active wildfire history. The County is characterized by narrow valleys surrounded by steep, hilly terrain. With its long, dry summers and rugged topography, Napa County has a high wildland fire potential. In the last several decades the combination of firefighting technology, fire suppression policy, environmental regulations and developmental trends has led to increasing fuel loads, greater occupancy of remote wildlands and greater potential for catastrophic wildfire. In the last thirty years wildfires have burned 232,000 acres of land in or directly adjacent to Napa County; a County of approximately 482,000 acres. The Rumsey fire, which burned 40,000 acres in October of 2004, was the largest of the year. Spread across Yolo and Napa Counties, it cost over $10,000,000 to suppress and caused $1,000,000 in damages.

Wildland Fire

Climate and landscape characteristics are among the most important factors influencing hazard levels. Weather characteristics such as wind, temperature, humidity and fuel moisture content affect the potential for fire. Of these four, wind is the dominant factor in spreading fire since burning embers can easily be carried with the wind to adjacent exposed areas, starting additional fires. While the County has a characteristic southerly wind that originates from the San Francisco Bay (which becomes a factor in fire suppression), during the dry season the County experiences an occasional strong north wind that is recognized as a significant factor in the spread of wildland fires (City of Napa 2004).

Landscape characteristics such as steep slopes also contribute to fire hazard by intensifying the effects of wind and making fire suppression difficult. Vegetation type influences wildfire hazard levels as well. For example, landscapes dominated by chaparral are more flammable than other vegetation types. The combination of highly flammable vegetation, steep inaccessible wildlands, and high levels of recreational use can result in wildfire risk and hazards of major proportions.

A model was developed through coordination with the County and CDF to assess fire hazard severity (see Figure 7-3). This GIS-based model assesses the County to determine areas of potentially high fire hazard from conditions such as historical data, landscape characteristic, and weather. The resulting figure ranks fire hazard severity from low to high within each evaluation area, Map 7-4 presents these results for the Napa Valley Floor. The areas with a higher risk of catastrophic wildland fire are represented in red, while the areas in yellow represent the lowest fire hazard risk. Urban areas where there was no significant source of vegetation to carry the fire were considered zero risk areas and are represented in gray on the map.

Figure 7-3: Fire Hazard Severity Model

Table 7-12 details the number of acres within each fire hazard ranking for evaluation areas. The Napa Valley Floor has the largest amount of high fire hazard acres. Out of 42,364 acres within the area, 16,358 acres (38.6%) are considered high fire hazard. The Eastern Mountains follow close behind with 12,645 acres (15.7%) considered high fire hazard. The Angwin area has the highest percentage of land considered high fire hazard in the County with 41.8%. With 0.72%, Knoxville has the lowest percentage of high fire hazard land within the County. Overall, Napa County has 47,441 acres or 10.5% of high fire hazard area.

Table 7-12: Fire Hazard Severity Ranking per Evaluation Area

Evaluation Area	Total Area (acres)	Low (acres)	Medium (acres)	High (acres)	Percent of High Hazard (%)
Angwin Area	4,006	559	1,771	1,676	41.84%
Berryessa Area	75,252	41,522	30,710	3,019	4.01%
Carneros Area	10,142	2,674	3,882	3,587	35.37%
Central Interior Valleys	30,369	13,727	14,118	2,524	8.31%
Eastern Mountains	80,432	19,572	48,216	12,645	15.72%
Jamieson/American Canyon	12,870	7,162	5,024	685	5.32%
Knoxville Area	61,004	32,072	28,491	441	0.72%
Livermore Ranch Area	12,710	5,527	6,653	530	4.17%
Napa River Marshes	4,099	2,749	1,239	111	2.70%
Napa Valley Floor	42,364	8,702	17,304	16,358	38.61%
Pope Valley	38,103	23,447	12,444	2,211	5.80%
Southern Interior Valleys	29,096	17,721	10,572	803	2.76%
Western Mountains	51,001	33,847	14,302	2,852	5.59%
Napa County	451,448	209,282	194,726	47,441	10.51%

Flooding on Main Street, 1940

Source: Napa County Flood and Water Conservation District

FLOODING

The following is a summary of information provided by the Napa County OES, and available through the County website at www.co.napa.ca.us.

While the Napa River is typically viewed as an attraction in the Napa Valley, it can be treacherously dangerous during the winter. The City of Napa, located where the Napa River flattens into the San Pablo Bay estuary, is the most flood prone populated area in Napa County and the fifth most flood prone community in California in terms of flood damage payments from the FEMA. There are 2,500 properties in the floodplain and over 60 have made more than one flood damage claim to FEMA. Areas subject to flooding in Napa are generally from Trancas Street in the north to Imola Avenue in the south, Coombs Street to the west and Silverado Trail to the east (see Map 7-5).

In order to assess hazards associated with flooding, FEMA flood zones for the 100 and 500 year floods are displayed on Map 7-5. The term 100-year flood is used to define a condition of flooding that has a 1% chance of occurring in any given year. In a statistical view, the rainfall amounts and frequency and other related conditions necessary to create the 100-year flood will occur on the average of once in every 100 years. The 500-year flood will statistically occur only once every 500 years on average. The majority of the flooding within the County occurs within the Napa Valley floor. The City of Napa and those areas surrounding the Napa-Sonoma Marshes are the most heavily affected; although Yountville, St. Helena, American Canyon and Calistoga all have flooding from the 100-year event within their boundaries. Specific areas subject to flooding in Napa are generally from Trancas Street in the north to Imola Avenue in the south, Coombs Street to the west and Silverado Trail to the east.

Between 1862 and 1997, the City of Napa has experienced 27 floods, the largest of which occurred on February 18, 1986 (Wadsworth 1998). In 1986, flooding along the Napa River reached the 50-year frequency level, or a 2% chance of occurrence per year. Twenty inches of rain fell on Atlas Peak in two days. Thirty inches of rain fell over ten days in Calistoga. Throughout Napa County there were three deaths, 27 injuries, 250 destroyed homes, 2,500 damaged residences and over $100 million in damage. Over 5,000 people were evacuated from their homes. There was also an unknown amount of un-reimbursed damaged such as reduced tourism, personal hardships, and delayed public projects.

Between 1961 and 1997, flooding has caused $540 million of property damage in Napa County (Wadsworth 1998). Since 1862, twenty-seven major floods have struck the Napa Valley. Major flood events occurred in 1940, 1942, 1955, 1960, 1963, 1965, 1967, 1973, 1979, 1982, 1983, 1986, 1993, 1995, and 1997.

In January and March of 1995, the City of Napa was flooded by two 10-year frequency floods, which have a 10% chance of occurrence every year and a 65% chance of occurrence every decade. The City of Napa requested $8 million to pay for damage to City property. FEMA also paid individual property owners separately.

During a 100-year flood, more than 325,000 gallons of flood water per second would flow through the City of Napa, or five times the volume of Lake Hennessey, over the span of the flood. More than 3,500 people would be affected and 2 million square feet of business and office space would be inundated.

Flooding from tidal fluctuations in Napa County does not cause significant economic damage and is limited to areas in the lowland sloughs of the southern part of the County.

FLOOD PROGRAMS

An ambitious effort was made by the City to control flood damage after the 1986 flood. Flood damage control became a top priority following the 1995 flood which was nearly as large as the 1987 flood. The City of Napa now participates in programs and conducts activities to reduce flood damages and insurance rates including: participation in the NFIP, elevation of homes with FEMA Hazard Mitigation Grant Funds, design of the Napa River/Napa Creek Flood Reduction Project, creation of an Emergency Plan, construction of drainage system improvement projects and monitoring rainfall and stream level

gages to provide additional flood preparation time. The City has the "Citizen's Guide to Flooding and Flood Recovery" available and provides free sandbags and sand on the first Saturday of November through March.

In 1996, the Community Coalition, a group consisting of the Friends of the Napa River, Napa Valley Economic Development Corporation, Napa County Flood Control District and the U.S. Army Corps of Engineers invited residents, businesses, local government, and numerous resource agencies, together and established goals of 100-year flood protection, an environmentally restored, "living" Napa River, enhanced opportunities for economic development, a local financing plan that the community could support, and a plan that addressed the entire watershed Countywide. The project on the Napa River is an example of how the goal of flood control is being replaced by flood management and hazard mitigation with integrated ecological sensitivity.

Funds from FEMA and the Governor's OES are for use in elevating 25 conventional, single-family, wood-frame homes in unincorporated areas of the County. A grant approved under FEMA's Hazard Mitigation Grant Program, which is administered by the Governor's OES, will fund the third phase of a pending effort to raise homes at least one foot above the base flood elevation, taking them out of reach of high-velocity water. Another purpose of the elevation project is to lessen soil erosion, undercutting and undermining, which will in turn decrease silt and other debris floating in the rushing waters of the Napa River.

PUBLIC HEALTH

The following is a summary of information published in the County Health Status Profiles 2004, by the California DHS, Center for Health Statistics. Data from this report was taken between 2000 and 2002, and for most indicators, the published value represents a three year average. Data from 2003 and 2004 will not be incorporated into official public documents until 2005, and 2006 respectively. Comparisons between previous Napa County Data (1997-1999) and the most recent data (2000 – 2002) provide a look at how general health indicators have changed over time. Data depicting spatial trends within the County are not available.

The male, female, and total age adjusted death rate for Napa County is provided in Table 7-13. Data for the entire state of California is provided for comparison. The age adjusted death rates for the County in 2000 and 2001 were 4.5% and 2.4% higher respectively than the overall rate for California. However, between 1994 and 1999, Napa County had similar or lower age adjusted death rates. Between 1994, and 2001, the number of births per year in the County remained relatively constant, with only a 4% increase between 1993 and 2001 (Table 7-14). The infant death rate in Napa County tends to be lower than the average rate for California, with 1.9 deaths per thousand in 2001 compared to the California average of 5.3 in 2001. County and state infant death rates for the period of 1993-2003 are provided in Table 7-15.

The 2004 County Health Status Profile indicates that Napa County met the *Healthy People 2010*[1] objective for reducing the death rate due to coronary heart disease. National health objectives for breastfeeding initiation were also met Countywide.

In Napa County, the *Healthy People 2010* objectives were not met for reducing death rates due to unintentional injuries, all cancers, lung cancer, female breast cancer, and cerebrovascular disease. Other objectives not met related to low birth weight infants, late or no prenatal care, and adequate/adequate plus prenatal care.

Table 7-13: Age Adjusted Death Rate (per 100,000 people)

Year	male	female	total	California Average
1994	1,126.4	685	463.3	466.4
1995	1,072.7	681.8	452.8	455.9
1996	1,064.9	663.7	428.6	438.6
1997	1,137	623.7	436.2	423.8
1998	1,034.9	662.5	415.7	415.3
1999	987.8	584.5	761.4	776.8
2000	919.2	684.5	789.1	755.3
2001	957.4	624.1	767	749.3

Source: California DHS 2004

Table 7-14: Births per Year in Napa County

Year	Male	Female	Total
1994	753	752	1,505
1995	752	711	1,463
1996	782	727	1,509
1997	766	733	1,499
1998	764	713	1,477
1999	718	775	1,493
2000	795	702	1,497
2001	778	787	1,565

Note: Birth rates are based on the mother's place of residence, rather than occurrence.
Only babies born to mothers who are residents of Napa County are counted.
Source: California DHS 2004

[1] The *Healthy People 2010* objectives are statements of national health objectives designed to identify the most significant preventable threats to health and to establish national goals to reduce these threats.

Table 7-15: Infant Deaths in Napa County

Year	Number of deaths	Deaths per 1000 births	California Average
1994	9	6	7
1995	8	5.5	6.3
1996	7	4.6	5.9
1997	5	3.3	5.9
1998	5	3.4	5.7
1999	2	1.3	5.4
2000	6	4	5.4
2001	3	1.9	5.3

Source: California DHS 2004

The 2000-2002 age specific birth rate was 29.2 per 1,000 females population, 14.1% less than the 1997-1999 rate of 34.0. The 2000-2002 percent of low birth weight infants was 5.5 per 100 live births, and increase of 12.2% from the 1997-1999 percentage of 4.9. The number of births per year in Napa County from 1994 to 2001 is presented in Table 7-14.

LAW ENFORCEMENT

There are five main law enforcement units within the County including the Napa County Sheriff's Department, the City of Napa Police Department, the City of Calistoga Police Department, the City of St. Helena Police Department, and the CHP. In general, all of the law enforcement agencies within the County maintain mutual aid agreements with each other.

NAPA COUNTY SHERIFF'S DEPARTMENT

The Napa County Sheriff's Department provides police services to unincorporated areas of Napa County including American Canyon, Yountville, Angwin, and Berryessa. The Sheriff's Department has its central office in the City of Napa and has several substations in various locations in the County including the following addresses.

- 5520 Knoxville Road, Napa;
- 3111 N. St. Helena Highway, St. Helena;
- 100 Howell Mountain Road, Angwin;
- 2185 Elliot Drive, American Canyon; and
- 7401 Solano Avenue, Yountville.

Between all of the offices, the Department maintains 24 patrol officers. Response times vary between offices and depend on the priority of the specific call. For priority 1, 2, and 3 calls, the average response times in 2003 within the entire County were 22:03, 12:12, and 15:07 minutes, respectively. The Sheriff's Department in American Canyon responded to priority 1, 2, and 3 calls in 1:33, 3:39, and 4:54 minutes while the Department in Yountville responded in 0:36, 8:27, and 9:16 minutes, respectively.

CALISTOGA POLICE DEPARTMENT

The City of Calistoga Police Department provides police services in the incorporated areas of Calistoga. The current ratio of police officers is 2.2 per thousand residents. However, up to 10,000 visitors a day may be in the City during the summer, adding to the resident population. The Police Department headquarters is located at 1235 Washington Street, and has eleven sworn officers including one chief, one lieutenant, two sergeants, six patrol officers and one investigator. The Emergency Services Coordinator is also under the direction of the Police Department. The average response time within the city limits is approximately two minutes. Depending on location, response time outside of the city limit is approximately five minutes.

ST. HELENA POLICE DEPARTMENT

The St. Helena Police Department provides police services to the City of St. Helena. The Department operates out of their headquarters at 1480 Main Street, St. Helena, and maintains a staff of twelve sworn officers including one chief, three sergeants, one corporal, and seven patrol officers.

EMERGENCY RESPONSE AND EVACUATION

Napa County OES works with County departments, state agencies, and community groups to handle major disasters that affect County residents. The Director of Emergency Services is the City Manager. In the event of a disaster, an Emergency Operations Center (EOC) is setup and staffed with trained professionals who coordinate all communications, logistics, resources, and recovery programs. The Public Information Center becomes active along with the EOC, and relays all information from the EOC to citizens. Napa County OES maintains a website which provides a variety of information on emergency response plans, emergency preparedness, current hazardous conditions, and other services (Napa County Office of Emergency Services 2004).

GENERAL EMERGENCY PREPAREDNESS

The following agencies/departments provide emergency preparedness services in Napa County:

- Federal Emergency Management Agency (FEMA) – 800.462.9029
- Napa County Road Conditions – 707.299.1595
- County of Napa Public Information – 707.299.1593

- City of Napa Flood Information – 707.258.7813
- City of Napa Public Information Office – 707.258.7817
- PG&E Emergency and Customer Care – 800.743.5000
- PG&E Power Outage Hotline – 800.743.5002
- SBC Repair Services – 611
- Napa City Sewer Emergency Number – 707.258.6014
- Emergency Radio Stations (KVON 1440 AM/KVYN 99.3 FM) – 707.252.1440
- Volunteer Center of Napa County – 707.252.6222
- American Red Cross: Napa – 707.257.2900, St. Helena – 707.963.2717
- Travel Information (Roads and Bridge) – 800.817.1717
- Napa County Humane Society – 707.255.8118

EVACUATION SHELTERS

Designated evacuation shelters include the Napa County Fairgrounds in Calistoga, St. Helena High School in St. Helena, and Yountville Community Hall in Yountville. There is currently no listed evacuation shelter in the City of Napa.

NAPA COUNTY OFFICE OF EMERGENCY SERVICES (OES)

The Napa County OES Website provides the information on how to prepare for earthquakes and floods www.co.napa.ca.us/LIVING/living.asp?LID=195.

CONCLUSIONS AND REPORT UPDATE RECOMMENDATIONS

HUMAN-MADE HAZARDS

TRAFFIC

- Traffic accidents in Napa County have increased by 30% in the last decade (1993-2003).
- For the last year of record (2002), Napa County has the highest number of motorcyclists killed in the region.
- The City of Napa accounts for about 60% of all traffic accidents in the County in 2003. However, the number of individuals killed in the City accounts for 0.05% of total deaths from traffic accidents in the County.
- Traffic accident data are provided for the entire County but not differentiated by road segments or intersections.
- There is a lack of traffic accident statistics for cities (besides the City of Napa).

CRIME

- Population-adjusted reported crime incidents in Napa County are lower than that of the state.
- Population-adjusted reported crime incidents in Napa County are lower than some adjoining counties, including Solano, Yolo, and Lake Counties.
- Reported crime incidents have declined overall in the last decade (1993-2003).
- The year with the lowest number of crime reports occurred in 2000 and the year with the highest reported crime occurred in 1994.
- Larceny-theft is the most common type of reported crime in the County, followed by property crimes, violent crimes, and arson.
- While violent crimes remain low overall, of the four types of violent crimes, aggravated assault is the most prevalent, followed by robbery, rape, and homicide.
- There are no goals and regulations related to the reduction of crime in the Napa County General Plan or County Code.

HAZARDOUS AND CONTAMINATED SITES

- There are several federal, state, and local policies and regulations that apply to public health and safety issues in Napa County.
- There are no sites in Napa County on the NPL or the PNPL, twenty-seven sites identified in the Calsites Database (Brownfields), two sites identified on the Cortese List, 322 sites on the Geotracker database, and a total of 26 oil and gas wells and 27 facilities in Napa County identified through the SWIS database search.

- Contaminated sites that are in close proximity to a well may pose a greater threat to human health than those that are further away.

- Not accounting for municipal water supplies, there are 142 small water systems in Napa County, which are defined as water systems with less than 200 service connections.

- Within their respective cities, the City of Napa has identified 1,150 private wells, St. Helena has identified 261 wells, and Calistoga has identified 237 wells (on record). At this time, a count for American Canyon is not available, and Yountville does not have a current count of wells within its city limits.

- Napa County has documented 240 public and private water wells. Some of these are used as drinking water sources, while others are solely for irrigation, cooling, or other purposes. Only the addresses of these wells are provided in the database; the precise locations are not referenced.

- LUSTs (over 322 documented in Napa County) are the most common source of groundwater pollution.

- Pesticides are also a major source of groundwater pollution that frequently contaminates drinking water and irrigation wells.

- The database includes 27 such sites in Napa County, including landfills (open and closed) and other solid waste disposal facilities.

- Dry cleaning operations and historical operation of tanneries have led to soil and groundwater contamination by solvents, including PCE, TCE, and chromium.

- There are approximately 400 businesses in Napa County that generate hazardous wastes. They consist mainly of CESQGs, which are facilities that generate less than 100 kilograms of hazardous waste per month.

- There are five records of LUFTs owned by NVP and one record for NVP in the CalSites database.

NATURAL HAZARDS

EARTHQUAKES, SEISMICITY, AND OTHER GEOLOGIC HAZARDS

- There are several acts, codes, ordinances, etc., from the federal to the county level that require geologic or geotechnical study or investigation, and for which the County is required to provide some form of response, regulation or review. These various laws are for the purposes of protecting public safety and welfare, and environmental protection.

- The bedrock types of the County are varied and are made up of two principal components: a) an older set of rocks comprised of amalgamated, highly deformed terrenes that have been displaced (at least in part) via plate tectonics, from hundreds to thousands of kilometers from their position of origin and, b) a younger, less deformed set of rocks that overlie the amalgamated terrains and which are roughly in their original position.

- The continued structural evolution of the County occurs as a number of ongoing, but deceptively slow, subtle geologic processes. The results of these processes are best identified over long time periods known as “geologic time.” An episodic and more abrupt geologic process that is more obvious to the layperson is the presence of active faulting, which occasionally results in felt and sometimes damaging earthquakes. The most recent damaging earthquake was the Napa earthquake of 2000.

- Important among these younger structures in Napa County, are three active faults. They are the West Napa fault, the northernmost few miles of the Green Valley fault and the Hunting Creek fault.

- A number of geologic and seismic hazards exist in Napa County, including: a) landsliding, b) structural damage directly caused by earthquake shaking or from ground failures resulting from the shaking, c) surface fault rupture caused by movement along a fault trace as a result of an earthquake, d) seismic and non-seismic subsidence and settlement, e) expansive soils, f) accelerated erosion, and g) water wave damage by seiche and tsunami.

- The losses from these various hazards can be greatly reduced by diligent adherence to the laws, regulations and codes described in this report.

- On a yearly basis, landsliding is potentially the most damaging hazard.

- On a longer-time frame (decades), greater damage is projected to result from earthquake ground shaking.

- At the present time it is estimated that there is a there is a 67% chance for a magnitude 6.7 or larger earthquake to occur in the Bay Area by the year 2032. Depending on the proximity to the County and actual magnitude of the earthquake, shaking damage could range from nominal to high.

- Older, unreinforced masonry buildings and other buildings constructed before 1930 that have not been seismically retrofitted are most subject to structural failure/collapse.

- Worst-case earthquake scenarios indicate that intense ground shaking generated by a very large earthquake (greater than 6.7) on one of the Bay Areas major faults in relatively close proximity to the County could cause loss (structural damage, injury and social/economic dislocation) within the County totaling upwards of $300 million. As the County becomes more populated and developed this figure would increase. Smaller or more distant earthquakes could cause loss in the millions to tens of millions of dollars.

- The three known active faults listed above have the potential to cause surface fault rupture within the County.
- Damage from surface fault rupture is relatively low compared to the much wider effects of earthquake ground shaking.
- The potential for damage caused by seiches and tsunamis is judged to be low, but further study is necessary for confirmation.

FIRE HAZARD SEVERITY

- Regional topography and climate contribute to the County's high wildland fire potential.
- Recent developments in firefighting technology, state and local policies and regulations, and development trends have led to increasing fuel loads, greater occupancy of remote wildlands, and greater potential for catastrophic wildfire.
- A GIS model was developed to assess fire hazard severity from conditions such as historical data, landscape characteristic, and weather.
- Model results determined that the Napa Valley Floor has the largest amount of high structural fire hazard acres, while Knoxville has the least. Overall, Napa County has 47,441 acres (10.5%) of high structural fire hazard area.

FLOODING

- The City of Napa is the most flood prone populated area in Napa County and the fifth most flood prone community in California in terms of flood damage payments from the FEMA.
- Between 1862 and 1997, the City of Napa has experienced 27 floods, the largest of which occurred on February 18, 1986.
- Flooding from tidal fluctuations in Napa County does not cause significant economic damage and is limited to areas in the lowland sloughs of the southern county.

REPORT UPDATE RECOMMENDATIONS

HUMAN-MADE HAZARDS

TRAFFIC

- Using the results of the historical data and trends analysis, community planners and public works engineers should coordinate in determining projects to include in the County Public Works Department's Capital Improvements Plan. These may include installation of signals at intersections, design or redesign of intersection/roads, etc. that would reduce conflicts between automobiles, bicycles, and pedestrians.
- The GIS database should be updated annually with data provided by California's Statewide Traffic Records System, prepared by the CHP.

CRIME

- Although not required by the State of California General Plan guidelines (State of California, Governor's Office of Planning and Research 2003), the County should consider incorporating the subject of crime reduction into the Safety Element of the Napa General Plan.
- The County should continue to track baseline crime statistics in both unincorporated areas and incorporated cities within Napa County.
- The County should continue identifying goals and policies related to crime response by enforcement agencies. These may include specific response time goals for the police and sheriff's departments.
- Individual enforcement agencies within Napa County should collaborate in updating this BDR section.

HAZARDOUS AND CONTAMINATED SITES

- Inventory lands adversely affected by mining, prolonged irrigation, landfill activities, the storage or disposal of hazardous materials, erosion, etc., for which reclamation may be feasible.
- Continue to identify existing and potential water pollution sources.
- Maintain a current inventory of hazardous material dumps, ponds, and storage sites (using information plans developed pursuant to Health and Safety Code §25500, et seq.).
- Identify proposed, existing, and abandoned landfill sites.
- Examine the results of groundwater tests conducted in the vicinities of landfills and hazardous material dumps, ponds, tanks, and storage areas.
- Inventory existing and proposed land uses that could contribute to the pollution of streams and other waters.
- Control hazardous materials in areas where water pollution is possible.

- Identify hazardous or substandard structures that may be subject to collapse in the event of an earthquake, including, but not limited to, unreinforced masonry buildings (§8875, et seq.).

- The GIS database should be updated annually, by searching the databases as listed on page 7-11 of this section. These include federal and state databases, and any new information can be added to the existing Hazfac GIS database maintained by the County.

NATURAL HAZARDS

EARTHQUAKES, SEISMICITY AND OTHER GEOLOGIC HAZARDS

- The County should continue to provide regulation, review and other oversight duties of the various acts, codes and ordinances that contain geologic and geotechnical provisions. Some of the more pertinent of these have been described in this report.

- A formalized geologic peer review process should be developed by the County and implemented for large, complex projects. In particular, peer review should be done for those projects with significant, recognized or potential geologic or seismic hazards.

- Part of the peer review development process should include identifying a small number highly qualified geologic and geotechnical consultants experienced in the review process, and developing criteria for avoiding conflict of interest.

- The various GIS-based and hard copy maps that have been compiled and reviewed for use in the geologic data base should be routinely updated by the County or their consultants. The update search should be formalized and done yearly.

- The USGS maps of Graymer et al 2002 and 2004 (in press) should be referred to as the most recent geologic maps that provide Countywide coverage. However, there are also recent (2004) geologic maps that provide partial coverage of the County that is of at least equal detail. These are of 1:24,000 scale maps of the California Geological Survey and are presently only available for the southernmost part of the County. These maps should also be referred to for these southern areas.

- Subsidence in all areas of mud levees needs to be evaluated.

- A workshop should be conducted by the data base geologists for those County personnel responsible for utilizing the many maps and related documents comprising the database. The purpose would be to clarify the proper use of the database by developing use methodology.

- When the forthcoming maps for the Seismic Hazards Mapping Program (Seismic Hazards Mapping Act of 1990) become available, it will be necessary for the County to comply with the provisions of the Act. The basic responsibilities the County will have can be found in publications (electronic and hard copy) by the California Geological Survey.

- On a yearly basis, landsliding is the principle geologic hazard in the County. This dictates the need for careful review and investigation of landslide hazards as they relate to public and private improvements.

- A GIS database should be created to track and monitor these landsliding areas to determine frequency and severity of slides.

- In the longer-term (years to decades) it should be recognized that the greatest damage potential will be from earthquake ground shaking.

- The County should consider further study or investigation for tsunami and seiche potential.

FIRE HAZARD SEVERITY

- Continue working with CDF personnel, specifically Mike Wilson and Kate Dargan, to further refine the GIS model as necessary. It will be very important to maintain communication with CDF/Napa County Fire to ensure that both the County and CDF are working with the same datasets and analysis parameters. Therefore, it is recommended that the County GIS staff speak with CDF's GIS staff at least quarterly.

- The historic fires GIS coverage should be updated whenever a wildland fire greater than 100 acres occurs. Otherwise, the GIS coverage should be updated annually.

FLOODING

- The County should consider development of a comprehensive flood management program. A comprehensive approach to flood hazard management provides for a better understanding of the river and floodplain system. Objectives of such a watershed based plan may be to: prevent future flood damages, solve existing flood/drainage problems, preserve the natural and beneficial functions of the natural drainage system, and preserve and enhance water quality.

- The County should continue to regulate structures in the floodway and floodplains subject to flooding in the 100 year flood.

- The Army Corps of Engineers is slated to publish a new flood zone GIS coverage in 2006, the County should stay in contact with the Corps so they may receive this data and any supplemental reports at that time.

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