

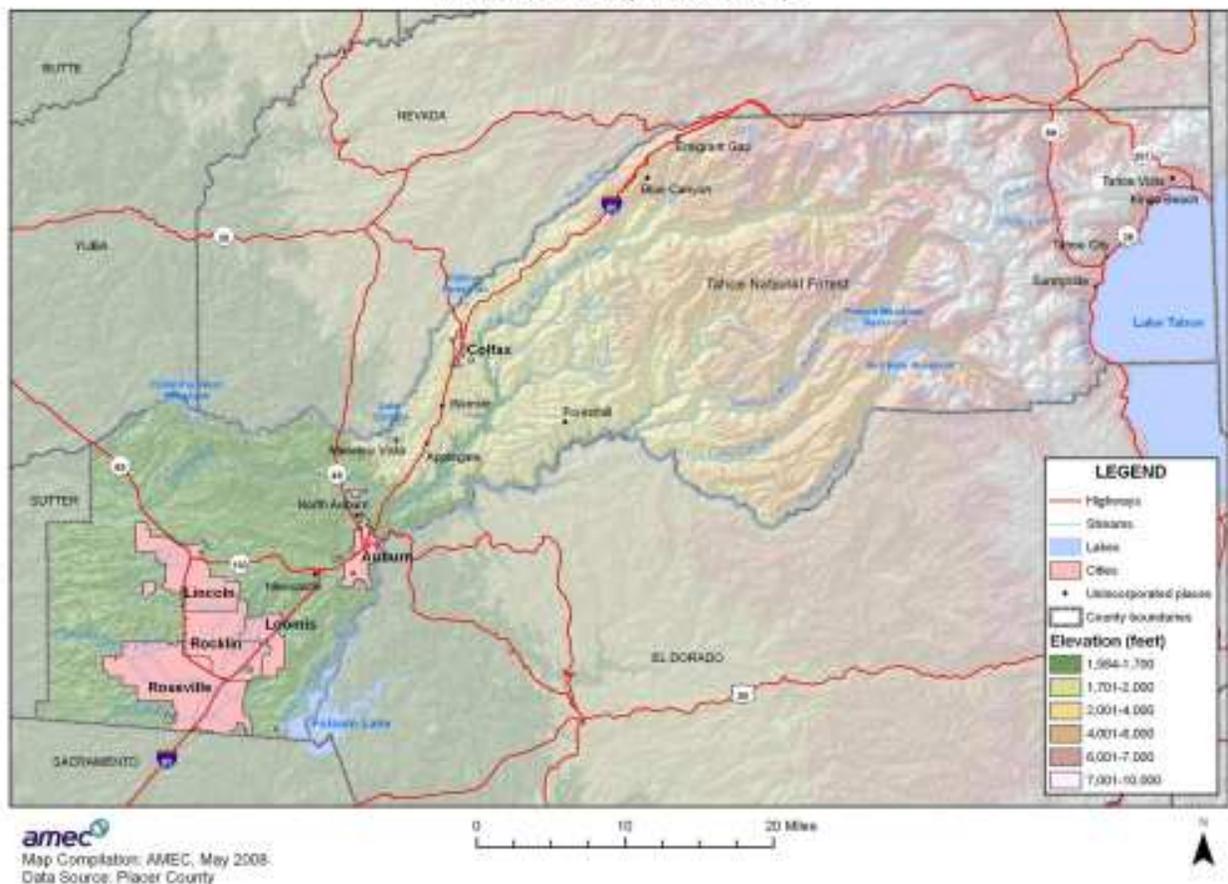


# ANNEX J: PLACER COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT

## J.1 District Profile

Figure J.1 shows the water service area of the Placer County Flood Control & Water Conservation District.

**Figure J.1. Placer County Flood Control & Water Conservation District**



The Placer County Flood Control and Water Conservation District was established in 1984 by the State Legislature as a Special District, separate from County government, to address flood control issues arising with growth. District boundaries are the same as Placer County boundaries.

The primary purpose of the District is to protect lives and property from the effects of flooding by comprehensive, coordinated flood prevention planning. The District uses consistent standards to evaluate flood risk, and implements flood control measures such as requiring new

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development to construct detention basins and operation and management of a flood warning system.

The District:

- Implements regional flood control projects
- Develops and implements master plans for selected watersheds in the County
- Provides technical planning, support and information during times of flood and drought for the cities, the County, and the development community
- Operates and maintains the County flood warning system
- Reviews proposed development projects to see they meet District standards
- Develops hydrologic and hydraulic models for County watersheds
- Provides technical support for Office of Emergency Services activities

## **J.2 Hazard Identification and Summary**

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The Placer County planning team identified the hazards that affect the District and summarized their frequency of occurrence, spatial extent, potential magnitude, and significance specific to the District (see Table J.1).

**Table J.1. Placer County Flood Control and Water Conservation District—Hazard Summaries**

Hazard	Probability of Occurrence	Spatial Extent	Potential Magnitude	Significance
Agricultural Hazards				
Avalanche				
Dam Failure*	unlikely	significant	critical	high
Drought	occasional	significant	critical	Medium
Earthquake				
Flood (100-year)	occasional	significant	critical	high
Flood (Stormwater)	likely	significant	limited	medium
Human Health Hazards:				
West Nile Virus				
Landslide				
Severe Weather:				
Extreme Temperatures				
Fog				
Heavy Rain/ Thunderstorm/Hail/ Lightning/Wind	likely	extensive	critical	medium
Snow				
Tornado				
Soil Hazards:				
Erosion				
Expansive Soils				
Volcano				
Wildfire				

**Guidelines for Hazard Rankings**

**Frequency of Occurrence:**

Highly Likely—Near 100 percent probability in next year  
 Likely—Between 10 and 100 percent probability in next year or at least one chance in ten years  
 Occasional—Between 1 and 10 percent probability in next year or at least one chance in next 100 years  
 Unlikely—Less than 1 percent probability in next 100 years

**Spatial Extent:**

Limited—Less than 10 percent of planning area  
 Significant—10-50 percent of planning area  
 Extensive—50-100 percent of planning area

**Potential Magnitude:**

Catastrophic—More than 50 percent of area affected  
 Critical—25 to 50 percent  
 Limited—10 to 25 percent  
 Negligible—Less than 10 percent

**Significance (subjective):**

Low, Medium, High

\* Assumes one of Folsom Dikes fails and Granite Bay and all of downtown Roseville is impacted by floodwaters (BOR has dam failure mapping reflecting this scenario)

Source: Placer County Flood and Water Control District

Impacts of past events and vulnerability to specific hazards are discussed below (see Section 4.1 Hazard Identification for more detailed information about these hazards and their impacts on Placer County). The District has also created, and annually updates, its own Flood response

Handbook (FRH). The FRH addresses emergency communications procedures, emergency material supplies and equipment availability, technical resources and data to help predict flooding events, and State level emergency operations manuals. The FRH also contains countywide GIS based Flood Hazard Awareness Mapping, including areas of known flooding, locations of critical facilities such as police and fire stations, government centers, schools, nursing homes, and hospitals. Roads subject to flooding closures and preferred evacuation routes are also identified. This mapping is also posted at the County’s Emergency Operations Center (EOC) and distributed to our member agencies.

### J.3 Vulnerability Assessment

The intent of this section is to assess the District’s vulnerability separate from that of the planning area as a whole, which has already been assessed in Section 4.3 Vulnerability Assessment in the main plan. For more information about how hazards affect the County as a whole, see Chapter 4 Risk Assessment in the main plan.

#### J.3.1 Assets at Risk

This section considers the District’s assets at risk. Table J.2 lists District assets identified by representatives from the Placer County Flood Control and Water Conservation District as important to protect in the event of a disaster.

**Table J.2. Placer County Flood Control and Water Conservation District -Critical Facilities and Other District Assets**

Name of Asset	Type	Replacement Value	Displacement Cost	Occupancy/ Capacity#	Hazard Specific Info
Stream and rain gages	ALERT type gage	\$7,000 each	\$7,000	13 stream gages and 14 rain gages	Theft, vandalism, damage due to flooding
Miners Ravine Off-Channel Detention Basin Facility and Dam	Flood Control Facility	4 million	4.8 million	26 acre facility located at 7500 Sierra College Boulevard, Roseville, CA	Damages due to flooding or dam failure

Source: Placer County Flood and Water Control District

### Natural Resources

The geographical boundaries of the Placer County Flood Control and Water Conservation District are the same as those for the Placer County Planning Area. As such, the Natural Resources for District boundaries are the same as those for the entire planning area included in Section 4 of the main plan.

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## **Growth and Development Trends**

The geographical boundaries of the Placer County Flood Control and Water Conservation District are the same as those for the Placer County Planning Area. As such, the Growth and Development Trends for District boundaries are the same as those for the entire planning area included in Section 4 of the main plan.

### **J.3.2 Estimating Potential Losses**

With the geographical boundaries of the Placer County Flood Control and Water Conservation District being the same as those for the Placer County Planning Area, the risk and vulnerability of the agency to identified natural hazards are similar to those presented in Section 4 Risk Assessment portion of the main plan. The sections that follow highlight those hazards of greatest concern to the agency and identify those District assets most vulnerable to these hazards.

#### **Dam Failure**

A dam failure can range from a small uncontrolled release to a catastrophic failure, caused by prolonged rainfall and flooding. The primary danger associated with dam failure is the high velocity flooding of those properties downstream of the dam. Dam failure flooding varies by area depending on which dam fails and the nature and extent of the dam failure and associated flooding.

Vulnerability to dam failures is generally confined to the areas subject to inundation downstream of the facility. Based on analysis provided in the Placer County General Plan Background Report, only four dams within Placer County have the potential to affect more than 100 persons. Again, with the District's boundaries being the same as for the Planning Area, Section 4 of the main plan describes the risk and vulnerability of the District to dam failure.

Those agency assets located within flood inundation areas are the most vulnerable to extensive flooding caused by a dam failure. These include the District's ALERT system of stream level and rain gages listed in Table J.2 as well as the land improvements associated with the District's Miners Ravine Off-Channel Detention Basin Facility and dam located at 7500 Sierra College Boulevard in Roseville, California. A specific dam failure analysis prepared for the State Division of Safety of Dams exists for the District's Miners Ravine Off-Channel Detention Basin Facility and dam as prepared by RBF Consulting in October 2004.

#### **Earthquake**

As indicated on the Earthquake Shaking Map in Section 4.2.11 of the main plan, the shaking potential is greatest in the eastern portion of the County, but the western portion of the County is also at risk, primarily due to the location of development and population being concentrated in the middle to western portion of the County. The District's risk and vulnerability from earthquake is set forth in Section 4.2.11 of the main plan that includes the earthquake analysis for

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the entire Placer County Planning Area. Due to their location, year and type of construction, those agency assets most vulnerable to an earthquake include the assets listed in Table J.2.

## **Flood**

Flooding due to heavy rains and snow runoffs has been a historical problem in the Placer County Planning Area. Abundant snowfall in the mountains combined with rain and steep terrain can mean rapid runoff and flooding in the mountainous eastern section of the County. Of particular concern in this area of the County are rain-on-snow type events producing high runoff volumes. In the more heavily populated western portion of the County, flooding is often the result of heavy rains over lower permeability soils found within the relatively large Dry Creek and Cross Canal watersheds. Many of the small creeks within these watersheds respond quickly to heavy rains in the winter season producing peak flood flows within relatively short time frames. The historical practice of development within or in close proximity to floodplains has resulted in frequent and repeated flood losses in specific areas.

Significant flooding events resulting in federal disaster declarations for Placer County occurred in 1986, 1995, and 1997, with the most substantial damages occurring within the Cross Canal, Dry Creek, and Truckee River watersheds. The primary impacts from flooding within the District boundaries include damage to roads, utilities, bridges; and flooding of homes, businesses and critical facilities. Road closures create difficulties in providing emergency services to areas cut off by flooding and limit the area's ability to evacuate. With respect to District-owned assets, areas subject to stormwater flooding are the biggest concern. District assets at the greatest risk include those listed in Table J.2.

## **Severe Weather: Heavy Rain/Thunderstorm/Hail**

Heavy rain, thunderstorm activity, and hail usually occur on an annual basis in the Placer County Planning Area. Often during these events, the local stormwater drainage system can be impacted and landslides and localized erosion can occur. Recent significant events include the heavy rains occurring during December 2005 into January 2006. An estimated 2-year rain event in January 2008 resulted in approximately \$14,000 worth of hillside erosion and drainage repairs at the District's Miners Ravine Off-Channel Detention Basin Facility. No other severe weather damages have occurred to date that significantly impacted District assets.

## **Wildfire**

Over one hundred years of aggressive fire suppression under the national fire suppression policy has rendered wild lands severely overgrown. Much of the private land in the Placer County Planning Area is in the wildland urban interface with increasing residential development. Those Agency assets at greatest risk to wildland fire include the ALERT system of stream and rain gages listed in Table L.2.

## J.4 Capability Assessment

Capabilities are the programs and policies currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. This capabilities assessment is divided into five sections: regulatory mitigation capabilities; administrative and technical mitigation capabilities; fiscal mitigation capabilities; mitigation outreach and partnerships; and other mitigation efforts.

### J.4.1 Regulatory Mitigation Capabilities

Table J.3 lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in the Placer County Flood Control and Water Conservation District.

**Table J.3. Placer County Flood Control and Water Conservation District Regulatory Mitigation Capabilities**

Regulatory Tool	Yes/No	Comments
General plan	No	Not applicable
Zoning ordinance	No	Not applicable
Subdivision ordinance	Yes	See District Stormwater Management Manual (SWMM)
Site plan review requirements	Yes	See SWMM and Coordination Agreement with our member agencies
Growth management ordinance	Yes	See District Board Resolution No. 95-3
Floodplain ordinance	Yes	See District Board Resolution No. 95-3 as well as District SWMM
Other special purpose ordinance (stormwater, water conservation, wildfire)	Yes	See District Board Resolutions No. 92-2 and No. 94-4 Supporting Stormwater Quality Goals
Building code	No	Not applicable
Fire Department ISO Rating	No	Not applicable
Erosion or sediment control program	Yes	See District Stormwater Management Manual (SWMM)
Storm water management program	Yes	See District Stormwater Management Manual (SWMM)
Capital improvements plan	Yes	See District's Short- and Long-term Workplans
Economic development plan	No	Not applicable
Local emergency operations plan	Yes	District's Flood Response Handbook
Other special plans	Yes	Regional Watershed Wide Flood Control Plans and studies
Flood Insurance Study (FIS) or other engineering study for streams	Yes	District maintains full set of regulatory FEMA FIS Study and Flood Insurance Mapping for entire County

Source: Placer County Flood and Water Control District

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As indicated above, the District has several programs, plans, policies, codes and ordinances in place. These include regional watershed wide flood control plans and a county-wide stormwater management manual. The District, working cooperatively with Placer County and other local agencies, developed three major flood control plans in the early 1990's which cover a majority of the watersheds within western Placer County. In addition to the Plans listed below the District maintains and references a number of detailed local drainage studies from its library.

### **Stormwater Management Manual**

For policy, guidelines, specific design criteria for the development and management of natural resources, drainage facilities, and infrastructure for stormwater management please download the current version of the Placer County Flood Control & Water Conservation District Stormwater Management Manual (SWMM) here. (a link to our SWMM is on the District's website page at [www.placer.ca.gov](http://www.placer.ca.gov))

### **Dry Creek Watershed Flood Control Plan**

The purpose of the 1992 dated Dry Creek Watershed Flood Control Plan is to provide the District and other governmental agencies in both Placer and Sacramento Counties with the information and policies necessary to manage flood waters within the Dry Creek Watershed, which includes Miners Ravine, Linda Creek, Secret Ravine, Antelope Creek, Cirby Creek, and Dry Creek. The Plan evaluates existing flooding problems and identifies flood management options as well as a funding mechanism to achieve Plan recommendations. The plan was first drafted in 1992 but is currently being updated for re-publication estimated to occur in 2010.

### **Cross Canal Watershed Flood Control Plan**

The purpose of the 1994 dated Cross Canal Watershed Flood Control Plan is to provide the District and other governmental agencies in both Placer and Sacramento Counties with the information and policies necessary to manage flood waters within the Cross Canal Watershed, which includes Pleasant Grove, Auburn Ravine, Markham Ravine, and Coon Creek. The Plan evaluates existing flooding problems and identifies flood management options as well as a funding mechanism to achieve Plan recommendations.

### **Auburn/Bowman Community Plan Hydrology Study**

The purpose of the 1992 dated Auburn Bowman Community Plan Hydrology Study is to provide the District and other governmental agencies in Placer County with the information and policies necessary to manage flood waters within the study area, which includes Auburn Ravine, Mormon Ravine, Dutch Ravine, and many other tributaries. The Plan evaluates existing flooding problems and identifies flood management options as well as a funding mechanism to achieve Plan recommendations.

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## **County-wide Grading Ordinance, 1988:**

A county-wide grading ordinance was completed in 1988. It has since been adopted by the County and cities and last updated in 2000 as Article 15.44 of the County Code.

## **Placer County Flood Damage Prevention Regulations:**

Placer County has adopted Flood Damage Prevention Regulations, Article 15.52 of the County Code, which have as its purpose “to promote public health, safety and general welfare, and to minimize public and private losses due to flood conditions in specific areas.” The regulations provide specific construction and development standards for flood hazard reduction in areas of special flood hazard.

### **J.4.2 Administrative/Technical Mitigation Capabilities**

The District is governed by a nine-person board of directors. Members include a representative from each of the six incorporated cities in Placer County, two representatives from the Board of Supervisors and one member-at-large appointed by the Board of Supervisors.

The cities, the County and the District have adopted a formal coordination agreement to identify responsibilities. There are two District Advisory Committees. The Policy Advisory Committee (PAC) has seven voting members - the six city managers of the incorporated cities and the County Executive Officer. The PAC provides guidance on policy and program issues that affect all jurisdictions. The Technical Advisory Committee (TAC) is composed of representatives of Placer County, incorporated cities, Placer County Resource Conservation District, Placer County Water Agency, Sacramento County Water Agency, Nevada Irrigation District, Sutter County Flood Control and Water Conservation District, and the Reclamation District 1001. The TAC is relied on for technical analysis and interpretation of ideas, policies, and programs.

The State legislation creating the District allows Placer County employees to act as District employees. There are three District staff members: the District Engineer; the Development Coordinator; and the District Secretary. The Placer County Director of Public Works serves as the Executive Director of the District.

Table J.4 identifies the personnel responsible for activities related to mitigation and loss prevention in the Placer County Flood Control and Water Conservation District.

**Table J.4. Placer County Flood Control and Water Conservation District's Administrative and Technical Mitigation Capabilities**

Personnel Resources	Yes/No	Department/Position	Comments
Planner/Engineer with knowledge of land development/land management practices	Yes	Development Review Coordinator	
Engineer/Professional trained in construction practices related to buildings and/or infrastructure	Yes	Development Review Coordinator, District Engineer, Executive Director	All positions hold Professional Engineering Licenses
Planner/Engineer/Scientist with an understanding of natural hazards	Yes	Development Review Coordinator and District Engineer	
Personnel skilled in GIS	No		
Full time building official	No		
Floodplain Manager	Yes	District Engineer	Certified Floodplain Manager by ASFPM
Emergency Manager	Yes	Development Review Coordinator and District Engineer	
Grant writer	Yes	District Engineer	
Other personnel	Yes	District Secretary and Executive Director	
GIS Data	Yes	District Engineer	See District's Flood Hazard Awareness Mapping within District Flood Response Handbook
Warning Systems/Services (Reverse 9-11, cable override, outdoor warning signals)	Yes	Development Review Coordinator	District's ALERT system of Flood Warning Gages

Source: Placer County Flood and Water Control District

### J.4.3 Fiscal Mitigation Capabilities

Table J.5 identifies financial tools or resources that the District could potentially use to help fund mitigation activities.

**Table J.5. Placer County Flood Control and Water Conservation District's Fiscal Mitigation Capabilities**

Financial Resources	Accessible/Eligible to Use (Yes/No)	Comments
Community Development Block Grants	No	
Authority to levy taxes for specific purposes	Yes	Authority is for Benefit Assessments levied, collected and enforced in the same manner as County taxes
Fees for water, sewer, gas, or electric services	No	
Impact fees for new development	Yes	
Incur debt through general obligation bonds	Yes	

<b>Financial Resources</b>	<b>Accessible/Eligible to Use (Yes/No)</b>	<b>Comments</b>
Incur debt through special tax bonds	No	
Incur debt through private activities	No	
Withhold spending in hazard prone areas	No	

Source: Placer County Flood and Water Control District

#### **J.4.4 Mitigation Outreach and Partnerships**

The District boundaries are the boundaries of Placer County. District programs are accomplished through a cooperative effort involving Placer County and all of the municipalities in the County which include: the City of Auburn, City of Colfax, City of Lincoln, Town of Loomis, City of Rocklin, and City of Roseville. In addition, cooperative agreements have been established with Sacramento and Sutter Counties for addressing issues in commonly shared watersheds, and other governmental agencies, such as Reclamation District 1001, the Nevada Irrigation District, and the Placer County Water Agency who also participate in District programs.

The cities and County formally adopted a Coordination Agreement in February 1986, which was also reaffirmed with minor changes in 1997. The agreement identifies mutual responsibilities and established the Technical Advisory Committee and the Policy Advisory Committee as forums for formulating standards, policies, and programs to be recommended to the Board of Directors.

#### **J.4.5. Other Mitigation Efforts**

The District is involved in a variety of mitigation activities including public outreach and project activities. These mitigation activities include:

- Provides information and support to the public on flood and drought related issues
- Collects and interprets data from a network of stream and precipitation gages operated by the District and others
- Collects data and coordinates with the National Weather Service
- Performs annual stream maintenance on the Dry Creek Watershed
- Provides technical support to the cities, county, and private sector by reviewing plans for public and private lands and for policy issues in flood control, drainage, and related areas
- Develops and implement master plans for key watersheds
- Supports regional floodplain management, including coordination with the NFIP
- Participates on special flood control and drainage projects.

The District has also created, and annually updates its own Flood Response Handbook (FRH). The FRH addresses emergency communication procedures, emergency material supplies and equipment availability, technical resources, and data to help predict flooding events, and State level emergency operations manuals. The FRH also contains countywide GIS based Flood

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Hazard Awareness Mapping including areas of known flooding, locations of critical facilities such as police and fire stations, government centers, schools, nursing homes, and hospitals. Roads subject to flooding closures and preferred evacuation routes are also identified. This mapping is also posted at the County's Emergency Operations Center (EOC) and distributed to our member agencies.

Specific accomplishments of the District since the 2004 LHMP include:

**2004:** Land acquisition is completed for the 26-acre Miners Ravine off-channel basin project in Roseville. Major consulting contract for the Miners Ravine off-channel basin facility including planning, permitting, design, and construction oversight is awarded and begun. Land acquisition negotiations begin for proposed Secret Ravine floodplain restoration site in Rocklin. A study of remaining alternative regional detention sites in the Dry Creek Watershed is completed with no viable sites found. ALERT system software upgrades and three new gage installations are completed. An electronic version of the District's Stormwater Management Manual (SWMM) as well as Board meeting agenda/minutes are posted to the web. Biennial audit is completed. Work on development of the County's Local Hazard Mitigation Plan per the Disaster Mitigation Act of 2000 is completed.

**2005:** The District is awarded \$300,000 from the State Department of Water Resources under the Urban Streams Restoration Program and the District procures a consultant to perform planning, design, permitting, and construction oversight of the Secret Ravine floodplain restoration project. A new five-year MOU with the Department of Fish and Game is finalized for continued Dry Creek watershed stream channel maintenance activities. Planning and design of the Miners Ravine off-channel detention basin project reaches a 95 percent level of completion. An update of the District's Flood Response Handbook is completed and distributed.

**2006:** District staff respond to the New Years Day flooding event by helping activate the County's emergency operation center and by providing technical assistance as necessary. District offices are moved into the new Community Development Resources Center building in July. The Board approves all CEQA related documents and construction bid documents for the Miners Ravine Off-Channel Detention Basin Facility. Construction bids are received, all necessary permits are obtained, a construction contract is awarded, and construction commences on the Miners Ravine Facility in August. Construction reaches an approximate 70 percent completion level prior to winterization of the Miners Ravine site in early November. Planning and design of the Secret Ravine Floodplain restoration project begins and reaches an approximate 30 percent completion level by the end of the year. The District's ALERT flood warning software system is upgraded to the web-based Conrail system and plans are approved to install up to seven new gages.

**2007:** Construction of the Miners Ravine Off-Channel Detention Basin Facility is completed and the start of long-term operations and maintenance activities begins. A five year long vegetation and debris maintenance contract is executed with the California Conservation Corps

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(CCC) for the Miners Facility. The Secret Ravine Floodplain Restoration Project is placed on hold and an existing grant with the Department of Water Resources (DWR) is terminated due to easement acquisition difficulties and limited benefits of the proposed project. A \$2.8 million grant application for the Scilacci Farms Flood and Conservation Easement Project on Coon Creek is submitted to the DWR Flood Protection Corridor Program. Six new ALERT stream level and precipitation gages are purchased, installed and made operational within the District's ALERT system of gages. A professional services agreement is awarded to complete an update to the 1992 dated Dry Creek Watershed Flood Control Plan.

**Regional Retention Flood Control Facility in Cross Canal Watershed:** Recently, in November of 2007, a grant application was submitted to improve the floodplain and wetland habitat resources on Scilacci Farms. Grant funding will support the District and its co-sponsors efforts to acquire flood and conservation easements to improve the floodplain and wetland habitat resources on Scilacci Farms, a 456-acre property north and west of Lincoln along Coon Creek in western Placer County. The project co-sponsors include Ducks Unlimited, Placer County Planning Department, and Placer County Redevelopment Agency. The District's purchase of 330 acres of flood and conservation easements on this rice production land will complement efforts on agricultural lands immediately to the east including a Department of Water Resources (DWR) protected site that also provides improved floodplain and riparian protection. These adjacent properties include the 138-acre Lakeview Farms Conservation project which was awarded a grant through the same Flood Corridor Protection Program several years earlier, as well as the Lakeview Farms NCRS easements that are part of a larger restoration effort. Wetlands habitat will be reconstructed to the primary benefit of the numerous waterfowl and migratory birds that are found in the area. Acquisition of flood and conservation easements on Scilacci Farms will:

- Conserve 330 acres of agricultural land adjacent to Coon Creek in an area of increasing development pressure
- Quickly and efficiently provide approximately 500 acre-feet of increased volumetric storage (retention) within the existing floodplain during a 100-year flood event (Phase I). Provide approximately 800 acre-feet of increased retention during a 100-year flood event over the long term (Phase II).
- Preserve and maintain surrogate wetlands
- Preserve open space, providing linkages with surrounding preserve areas
- Benefit migratory birds and wildlife
- Maintain habitat and connectivity for state and federal species of concern (Central Valley Steelhead, Chinook Salmon, Swainson's Hawk, Northern Harrier, California Sandhill Crane, White-tailed Kite, Western Pond Turtle, and potentially Giant Garter Snake)
- Helps secure balance of property—119 acres of riparian woodlands and adjacent wheat field—for future habitat restoration
- Provide flood control benefits quickly and at relatively low cost per acre-foot of storage (a proposed project schedule is included in Section VI, Part E)

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**2008:** Significant progress is made towards completing the update to the 1992 dated Dry Creek Watershed Flood Control Plan. The District's Miners Ravine Off-Channel Detention Basin Facility wins an award for engineering excellence and long term operations, maintenance, and monitoring activities continue at the facility. The Scilacci Farms Flood and Conservation Easement project is submitted to the State of California Department of Conservation grant program for consideration. FEMA coordinates with District to release results of 60 miles of creek re-studies and digitized floodplain mapping.

## **J.5 Mitigation Strategy**

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### **J.5.1 Mitigation Goals and Objectives**

The Placer County Flood Control and Water Conservation District adopts the hazard mitigation goals and objectives developed by the HMPC and described in Chapter 5 Mitigation Strategy.

### **J.5.2 Mitigation Actions**

The planning team for the Placer County Flood Control and Water Conservation District identified and prioritized the following mitigation actions based on the risk assessment. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, partners, potential funding, estimated cost, and schedule are included.

#### ***1. Elevate Remaining 95 Homes in the Dry Creek Watershed***

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**Issue/Background:** Historically, flooding in the Dry Creek watershed has been a major concern. The February 1986 flood caused widespread damage in most of the Dry Creek watershed. Nearly all bridges and culverts were overtopped, with 30 sustaining embankment damages and one crossing washing out; two bridges over Dry Creek were damaged, street cave-ins occurred at a number of locations, and over 125 homes flooded. Of the 145 homes subject to historical flooding within the Watershed, 95 structures remain non-elevated. Of these 95 remaining homes, 25-30 declined initial grant money for elevation as did the three repetitive loss structures. Placer County is not only concerned with existing flooding problems, but with future problems resulting from increased growth and development in the area. According to the 1992 Dry Creek Watershed, Flood Control Plan, substantial flood damages will occur with the 100-year flood under existing conditions. Areas with the most extensive and frequent damages include areas in the location of the 95 homes. The report indicates that some of these areas are susceptible to flooding from storms as frequent as the 10-year storm. Elevating the remaining 95 homes will reduce future flood-related losses.

**Other Alternatives:** No action.

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**Responsible Office:** Placer County Flood Control and Water Conservation District, in conjunction with its member agencies including Placer County and the cities of Rocklin, Loomis, and Roseville.

**Priority:** Medium

**Cost Estimate:** The cost to elevate is estimated at \$40 per square foot. Homes need to be elevated anywhere from one to six feet. Of the 95 homes where elevating is feasible, it is estimated to cost \$6 million or \$50 to \$60 thousand per home.

**Benefits (Losses Avoided):** Life Safety; Reduction in Property Loss.

**Potential Funding:** HGMP, PDM, Dry Creek Trust Fund.

**Schedule:** Within three years

## ***2. Pursue Regional Detention and Retention Projects within the Dry Creek and Cross Canal Watersheds***

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**Issue/Background:** Historically, flooding in the Dry Creek and Cross Canal watersheds has been a major concern. Placer County is not only concerned with existing flooding problems, but with future problems resulting from increased growth and development in the area. Specifically, this action recommends a plan be developed for regional retention project identification and funding within the Cross Canal watershed. Implementation of specific regional floodplain restoration sites along secret ravine in the Dry Creek Watershed is also recommended. These sites are identified within the August 2003 feasibility study prepared for the Placer County Flood Control and Water Conservation District. Implementation of regional detention and retention projects will reduce future flood-related losses.

**Other Alternatives:** No action.

**Responsible Office:** Placer County Flood Control and Water Conservation District, in conjunction with its member agencies.

**Priority:** High

**Cost Estimate:** \$20 million +.

**Benefits (Losses Avoided):** Life safety; reduction in property loss.

**Potential Funding:** HGMP, PDM, Dry Creek Trust Fund, grant (federal, state).

**Schedule:** Within five years.

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### **3. Update Hydrology and Hydraulic Models within the Critical Dry Creek and Cross Canal Watersheds**

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**Issue/Background:** Base hydrology models for both the Dry Creek and Cross Canal watersheds are outdated having been performed in 1992 and 1993 respectively. Rapid urbanization within these watersheds has occurred and is projected to continue with significant impacts to creeks within the watershed due to increasing amounts of impervious surfaces and altered land uses. Updated hydrology and hydraulic models, including base topography for over 90 miles of creeks are proposed for both flood control and land use planning purposes.

**Other Alternatives:** Continue to review urbanization projects with outdated models.

**Responsible Office:** Placer County Flood Control and Water Conservation District and its member agencies.

**Priority:** High

**Cost Estimate:** \$800,000.

**Benefits (Losses Avoided):** Improved flood control and land use planning capabilities throughout southwestern Placer County.

**Potential Funding:** Placer County Flood Control District reserves, PDM

**Schedule:** Immediate and ongoing.

### **4. Implementation of Identified Bridge and Culvert Replacement Projects**

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These projects include:

- 1) Lake Tahoe Area Culvert And Crossing Restoration and Improvements - \$1,210,000.
- 2) Western Placer County Culvert Improvements (7 Locations) - \$2,140,000.
- 3) Cavitt-Stallman Road at Miners Ravine Bridge Improvements - \$300,000.
- 4) Auburn/Bowman Area Drainage Improvements (26 Locations) - \$1,800,000.
- 5) Horseshoe Bar Road Drainage Improvements - \$370,000.
- 6) Leibinger Lane at Miners Ravine Drainage Improvements - \$450,000.
- 7) Placer Hills Road at Meadow Lane Drainage Improvements - \$1,000,000.
- 8) Creekhaven Road Culvert Improvements - \$890,000.
- 9) All Culverts beneath Western Pacific Railroad at Major Cross Canal Watershed Drainage Crossings.
- 10) Bridges to be Replaced Include 16 Bridges Identified in Jmm 1992 Dry Creek Watershed Flood Control Plan in Table 4-2. High Priority: Watt Ave at Dry Creek; Cook Riolo Ave at Dry Creek; Barton Road at Miners Ravine; Salerga Ave at Dry Creek.
- 11) Recommend Planning Study of Specific Bridges and Culverts to be Replaced in Cross Canal Watershed.

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**Issue/Background:** Historically, flooding throughout Placer County has been a major concern. Past floods have caused widespread damage to infrastructure located in these flood-prone areas. Various restoration, drainage, and culvert improvement projects have been identified to minimize future impacts associated with specific areas of concern.

**Other Alternatives:** No Action.

**Responsible Office:** Placer County Department of Public Works in conjunction with Placer County Flood Control and Water Conservation District and its member agencies

**Priority (H, M, L):** High

**Cost Estimate:** See above.

**Benefit:** Life safety; reduction in property loss.

**Potential Funding:** HGMP, PDM.

**Schedule:** Within one year.

#### ***5. Elevate Highway 89, Lake Tahoe Area in Two Places***

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**Issue/Background:** Highway 89 in the Lake Tahoe area became an issue during the January 1997 Floods. The 1997 flooding, which may have been greater than a 100-year flood event, may have been compounded by undersized and blocked culverts. According to the HMPC, two publicly-owned areas along Highway 89 continue to experience flooding problems during large storms. During the 1997 storm, Highway 89 was underwater in the Truckee River south of Alpine Meadows Road. During periods of flooding, access to residents and emergency vehicles is cut off or severely limited.

**Other Alternatives:** Culvert replacement; Improved maintenance.

**Responsible Office:** CAL Trans.

**Priority (H, M, L):** Low

**Cost Estimate:** High

**Benefit:** Life Safety; Reduction in property loss. This also is an emergency management issue as the road becomes impassable due to flooding issues.

**Potential Funding:** HGMP, PDM.

**Schedule:** Within five years.

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## **6. Upgrade of Flood Warning System to Include Additional Gage Locations and Flood Forecasting Capabilities**

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**Issue/Background:** The Placer County Flood Control District, in conjunction with OES, has installed an ALERT flood warning system in the County. The existing system, including ALERT gages owned and operated by the City of Roseville and Sacramento County, consists of approximately 28 rain gages and 22 stream gages. Additionally, the District monitors several rain and stream gages in the Truckee River Watershed. These ALERT gages provide the District with real-time rainfall amounts and stream level data. An upgraded system to include real time flood-warning gages and flood forecasting capabilities for flood-prone areas would increase the warning time for implementation of effective mitigation measures and necessary evacuations.

**Other Alternatives:** No action.

**Responsible Office:** Placer County Flood Control District and Placer County Office of Emergency Services.

**Priority (H, M, L):** Medium

**Cost Estimate:** \$100,000.

**Benefit:** Life-safety, reduction in property loss, improved warning, increased lead time.

**Potential Funding:** PDM, HGMP, Flood Control District reserves.

**Schedule:** Within two years.