

Section 1 Background

1.1 Introduction

In recent years, there have been a number of changes, including regulatory changes, environmental considerations, and funding opportunities, that impact the way agencies approach the management of streams and flood control channels. These include regulatory changes that affect non-point source water quality and stormwater runoff, impacts associated with development in floodplains and adjacent to streams, increased public interest in habitat protection and enhancement, and public demand for access to flood control channels and stream right-of-ways for recreational purposes.

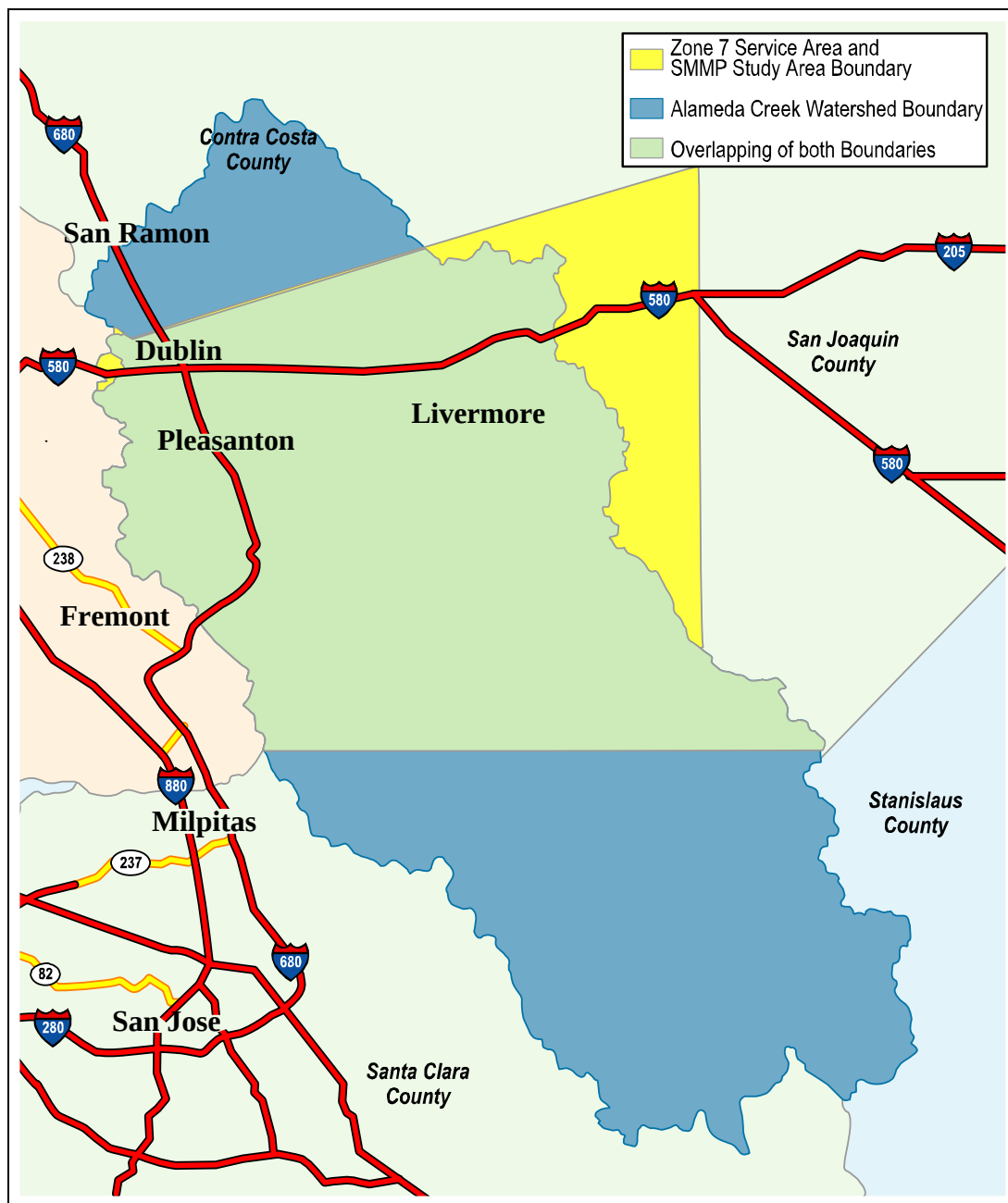


In recognizing these changes, Zone 7 of the Alameda County Flood Control and Water Conservation District (Zone 7) began development of a Stream Management Master Plan (SMMP) in September 2002. The purpose of the SMMP is to develop a master plan that addresses flood protection and drainage issues, as well as other issues affecting management of the streams and arroyos such as water supply, water quality, habitat and environment, recreation, trails, and public education. The SMMP is intended to provide a multi-benefit regional plan that identifies opportunities for other local agencies and Zone 7 to guide the implementation of flood protection and stream management activities in the Livermore-Amador Valley (Valley) through planned build-out of local agency general plans (build-out varies from 2024-2034 in Dublin, 2015 in Pleasanton, to 2025 in Livermore). A separate Implementation Plan will be issued by Zone 7 that documents project priorities, funding, and scheduling in a capital improvement plan (CIP).

1.2 SMMP Study Area

The SMMP study area includes approximately 426 square miles of watershed within the Zone 7 service area, and lies within the greater Alameda Creek watershed, as shown in Figure 1-1. The general drainage pattern of the study area is east to west through three major arroyos, Arroyo las Positas, Arroyo Mocho, and Arroyo del Valle. These arroyos join Arroyo de la Laguna (ADLL) in Pleasanton which drains the Valley in a southerly direction 18 miles to San Francisco Bay via Niles Canyon and Alameda Creek. The study area includes the urbanized areas of Livermore, Dublin, Pleasanton and portions of unincorporated Alameda County.

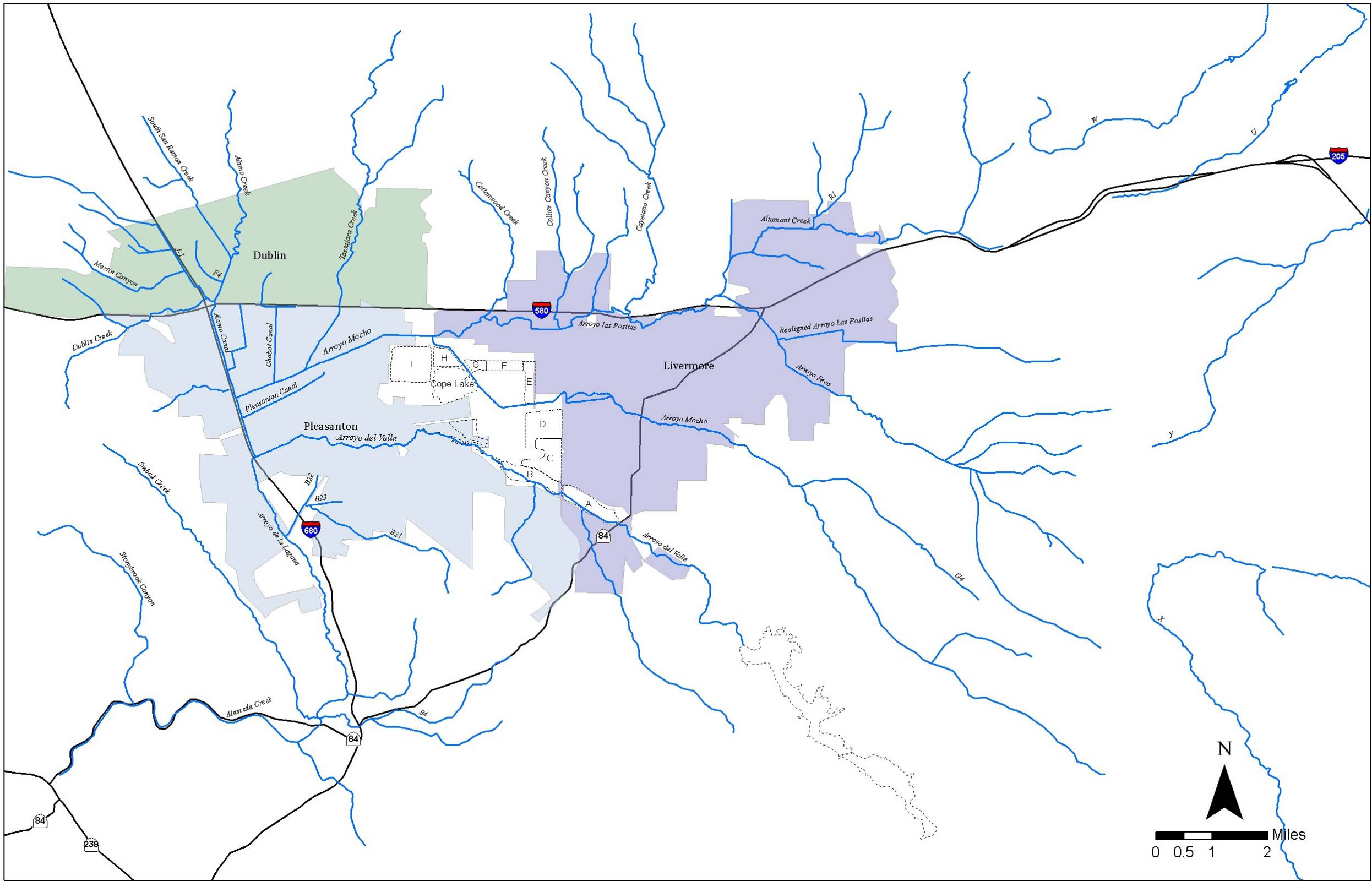
Figure 1-1: Portion of Alameda Creek Watershed in the Zone 7 Service Area



1.3 Zone 7 Responsibilities and Service Area

The Zone 7 service area covers 426 square miles and includes the cities of Pleasanton, Dublin, and Livermore. The streams and flood control channels included in the Zone 7 service area are shown in Figure 1-2 on the following page.

Figure 1-2: Streams and Flood Control Channels Located in the Zone 7 Service Area and SMMP Study Area

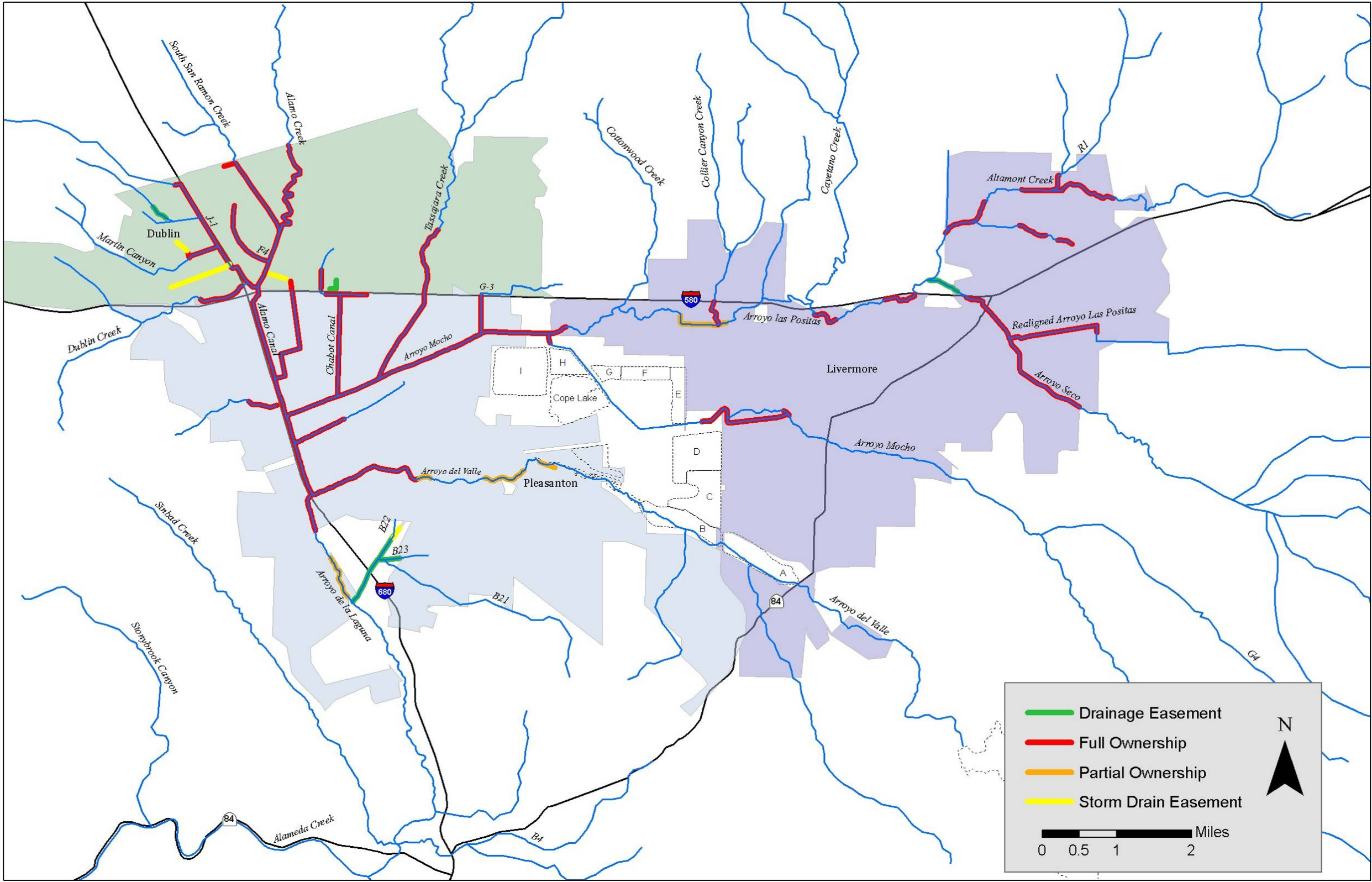


Zone 7 manages the storm water flows in the Livermore-Amador Valley area within the major drainage ways of the Valley floor for the protection of life and property from damage or destruction of such waters. Currently, Zone 7 owns approximately 39 miles of both improved and unimproved channels that are part of the area's major drainage ways which drains the 426 square miles of the Alameda Creek watershed. Zone 7 owned channels range from trapezoidal shaped, concrete-lined or earthen-lined channels to natural creeks. Channels owned by Zone 7 are shown in Figure 1-3. There are many reaches within the storm water conveyance and drainage system comprised of over 120 miles, which are held in private ownership as well as by other public entities. The 39 miles of Zone 7 owned channels are not necessarily contiguous to each other and there are areas where Zone 7 does not own both sides of the channel.

Those channel reaches and areas within Zone 7 ownership are maintained and repaired by Zone 7 within available resources and regulatory constraints. Flood control maintenance activities are funded through local property taxes and include inspections, repair of embankment and drain structures, vegetation management, silt removal, pest control, and other activities to ensure that, within financial constraints, the channels are able to convey flows when a storm event occurs. Zone 7 does however; provide emergency response in non-Zone 7 owned areas when immediate action is deemed necessary by Zone 7 to protect its upstream and downstream facilities. Due to the increased risk of liability associated with property ownership and its attendant responsibilities, Zone 7's acceptance and acquisition of additional channel facilities will need to be made on a case by case basis by taking into account the risks and benefits of ownership.

In addition, as the Valley's water "wholesaler", Zone 7 sells treated water primarily to four retail water agencies: California Water Services Company, the cities of Livermore and Pleasanton, Dublin San Ramon Services District (DSRSD). It also sells untreated water directly to agricultural customers.

Figure 1-3: Channels Owned by Zone 7



1.4 Triggers for Development of the SMMP

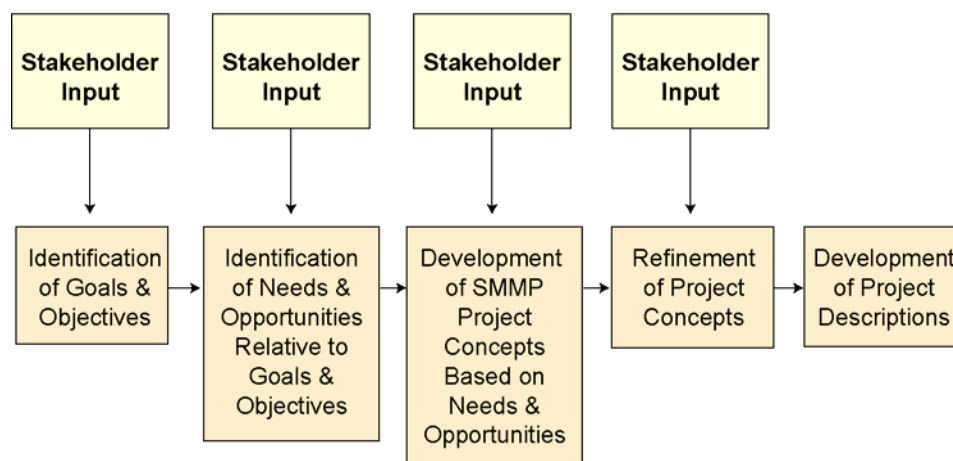
The development of the SMMP stems out of a need to update Zone 7's 1966 Flood Control Master Plan. To update the Master Plan, a series of technical memoranda (TMs) and issue papers were prepared for Zone 7 by West Yost & Associates (WYA) in 2001 and 2002. These TMs focused primarily on the flood protection and drainage issues, and identified potential flood control program alternatives and an operations and maintenance approach for channels and sediment management. The TMs used the peak flow rates from the previous models developed for Zone 7. The WYA TMs and other Zone 7 flood control studies serve as the basis for the flood control analysis conducted for the SMMP.

The Special Drainage Area (SDA 7-1) Program, which is funded by developer fees, is currently the Agency's only source of revenue for improvements to the unimproved creeks, arroyos, and streams within Zone 7's service area. The SDA 7-1 program is the present Flood Control Master Plan that identifies creeks, arroyos, and streams that require improvements, and establishes estimated costs to improve and acquire channel right-of-way. Under this program, channel improvement projects are implemented by either Zone 7 or a developer. If a developer chooses to improve a channel, they may be reimbursed from collected drainage fees for a portion of their improvement costs. A developer must enter into a SDA 7-1 agreement with Zone 7, agree to improve the channel to Zone 7 standards, and upon completion, dedicate the right-of-way to Zone 7, at which time Zone 7 would reimburse a set amount towards improvements and right-of-way.

1.5 SMMP Process

The development of the SMMP program and projects was an iterative process that included identification of needs and opportunities relative to SMMP goals and objectives, development of project concepts to meet the identified needs and opportunities, and then refinement of the project concepts to develop the SMMP projects included in this report. This process is summarized in Figure 1-4, and, as shown in the figure, stakeholder input was an essential part of this process.

Figure 1-4: Approach to Project Development



The SMMP process is currently in its second phase with the development of this SMMP. The initial phase (Phase I) of the SMMP process got underway in late 2002 with the development of goals and objectives. The next step in the process was to develop needs and opportunities, which was done over a series of stakeholder workshops held in February, March, and April of 2003. The purpose of the workshops was to obtain input on needs and opportunities in order to confirm that data reflecting the most current conditions

were being used to identify needs, and to obtain initial feedback on proposed opportunities. Project development was realized through a second series of workshops conducted in June, August, and September of 2003. A final stakeholder workshop was held in December 2003 to present a summary of the Interim Report, which was then released in April 2004. Phase 2 activities, which began in May 2004 after release of the Interim Report include: project refinement and engineering tasks, development of a Draft and Final Master Environmental Impact Report (MEIR), identification of implementation strategies, and completion of a draft and final SMMP.

1.6 Stakeholder Involvement

As shown in Figure 1-4, Stakeholder input has been a key component of the SMMP process. Through a series of workshops, stakeholders were involved in the development of goals and objectives, needs and opportunities, and projects concepts. The input that stakeholders provided on the Phase 1 Interim Report was used to refine projects and project components for this SMMP.

In addition to Zone 7, the stakeholder group included the following:

- Alameda Creek Alliance
- Alameda Creek Fisheries Restoration Workgroup
- Alameda County Public Works
- Alameda County Resource Conservation District
- Alameda County Water District
- Alameda Countywide Clean Water Program
- Cal Water
- California Department of Fish and Game
- City of Dublin
- City of Livermore
- City of Pleasanton
- Dublin San Ramon Sanitation District
- East Bay Regional Park District
- Friends of the Arroyo
- Friends of the Sycamores
- Hacienda Business Park
- Hanson Aggregates
- Jamieson Company, LLC
- Lawrence Livermore National Laboratory
- Livermore Area Recreation and Park District
- National Oceanic and Atmospheric Administration, National Marine Fisheries Service
- Regional Water Quality Control Board
- San Francisco Water Department
- Shapell Industries of Northern California
- Trails Council of Livermore Amador Valley
- Tri Valley Trails
- UC Cooperative Extension
- US Army Corps of Engineers
- US Department of Agriculture – Natural Resources Conservation Service
- Vulcan Mining Company
- Water Task Force, East County Board of Zoning

1.7 SMMP Multidisciplinary Approach

The SMMP utilizes a multidisciplinary approach to management of the streams and arroyos in the Zone 7 service area. The SMMP accomplishes this through its extensive stakeholder input and by looking not only at flood protection, but other resource areas affected by stream management. As such, the SMMP focuses on six resource areas:

- Flood Protection and Drainage

- Erosion and Sedimentation
- Water Supply
- Water Quality
- Habitat and Environment
- Trails, Recreation, and Public Education

A brief overview of the resource areas, conditions, and their relation to the management of the streams and arroyos in the Zone 7 service area, is provided below.

1.7.1 Flood Protection and Drainage

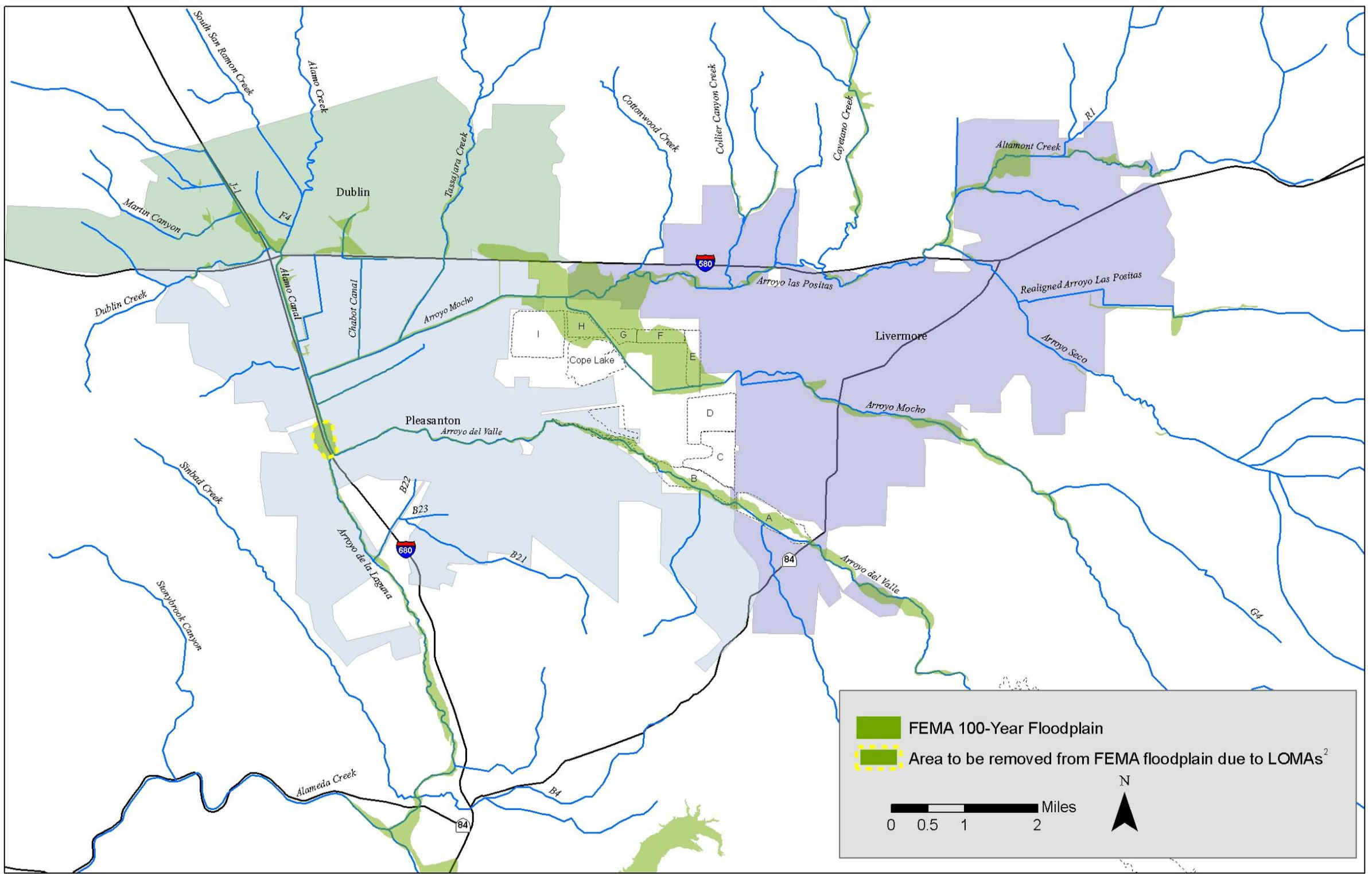
Zone 7 manages the stormwater flow in the Livermore-Amador Valley area within the major drainage ways of the Valley floor. Of the 120 miles of the area's major drainage ways, Zone 7 currently owns approximately 39 miles of both improved and unimproved channels. This makes up approximately one-third of all the arroyos in the drainage basin. Figure 1-2 and Figure 1-3 provide the location of all arroyos in the SMMP study area and the channels owned and maintained by Zone 7, respectively.

As the Valley has been transformed from rural to suburban land uses, the frequency and impact of stormwater runoff has steadily increased. Significant increases in both peak runoff and runoff volume are projected (WYA 2002b). These increases are a result of increases in impervious surfaces caused by construction of buildings and paving of streets and parking lots. They are also a result of natural flood plains that have been lost and natural arroyos that have been converted into trapezoidal channels. Runoff flows in Zone 7 drainage channels are projected to continue to increase until full buildout occurs (approximately 2025-2034).

Zone 7 has conducted a series of flood protection studies over the years and has initiated an update to their 1966 Flood Control Master Plan through technical work and studies conducted by Schaaf & Wheeler (S&W), WYA, and others. These studies form the technical basis for the SMMP and are discussed in detail in Section 3.

There is a potential for flooding in the Valley. The floodplain for the 100-year storm event was mapped by the Federal Emergency Management Agency (FEMA) in the 1980's and updated in 1997. FEMA's hydrologic analyses used to develop the floodplain boundaries are based on 1997 development conditions as well as 1980's development conditions in the case of ADLL, Alamo Canal, and Arroyo Mocho (downstream of its confluence with Arroyo las Positas). Figure 1-5 shows the original FEMA floodplain modified to exclude areas where Letters of Map Revisions (LOMRs) have been adopted by FEMA. These areas include lands adjacent to Altamont Creek (in northeast Livermore), areas within the Chain of Lakes, and the area between the confluence of ADLL and Arroyo Mocho and Pleasanton Canal (Valley Trails neighborhood). It is important to note that Figure 1-5 does not reflect all LOMRs. Instead, only those that removed a significant area out of FEMA's 100-year floodplain were shown. As shown on Figure 1-5, the FEMA 100-year floodplain includes areas along ADLL, and areas along Arroyo las Positas and Arroyo Mocho in the vicinity of the Chain of Lakes.

Figure 1-5: 100-Year Event Floodplain¹



¹ This floodplain map represents a modified version of the current FEMA floodplain map. Modifications were made to exclude areas of Livermore, Dublin, Pleasanton, and Unincorporated Alameda County where LOMRs have been approved as of March 2006 (<http://msc.fema.gov>). This map reflects current flow conditions.

² The area of Pleasanton located within the dotted yellow line will be removed from the 100-year event FEMA floodplain due to recently filed LOMAs not yet reflected in the FEMA floodplain map (City of Pleasanton, February 2006).

The 100-year FEMA floodplain boundaries affect properties located in Pleasanton, Dublin, Livermore and unincorporated Alameda County. The largest floodplain areas include:

- Area around the Chain of Lakes in the City of Livermore, bound to the west by the confluence of Arroyo Mocho and Arroyo las Positas, and to the east by Isabel Avenue;
- The Springtown Natural Communities Reserve along Altamont Creek, in the northeast corner of the City of Livermore;
- Areas in Dublin, upstream of Interstate I-580 (I-580) discharging to Chabot Canal and adjacent to the I-580 and Interstate I-680 (I-680) crossing;
- Lands along Arroyo Mocho, within the Chain of Parks area (from Robertson Park to Mocho Park) and adjacent to Valley Memorial Hospital in the City of Livermore; and
- Smaller areas along Realigned Arroyo las Positas, Arroyo del Valle, and lower ADLL.

Flooding in the Chain of Lakes area is a result of projected flows exceeding the current maximum capacity along Arroyo las Positas and Arroyo Mocho. As shown in Figure 1-5, the floodplain boundaries extend well beyond the channel banks onto the City of Livermore's golf course and airport. Flooding along the Chain of Lakes also results from maximum capacity limits along Arroyo Mocho west of Lake E. This reach experienced localized flooding and bank overtopping during the 10- to 15-year flood event that occurred in 1998.

Flooding along Altamont Creek is limited to the Springtown Natural Communities Reserve, an area supporting a habitat of alkali sink scrub vegetation and vernal pools. Upstream sections of this channel are not expected to flood as the 100-year floodplain boundaries extend only slightly over the banks of the creek. It is important to note that the FEMA floodplain for this area has been modified to reflect LOMRs developed as a result of a reduction in development plans for northeast Livermore.

The 100-year FEMA floodplain along the upper reach of Arroyo Mocho is mainly confined within the "Chain of Parks" from Robertson Parks to Mocho Park, but extends significantly outside of the channel banks downstream of Mocho Park near the Valley Memorial Hospital.

The floodplain boundary along Realigned Arroyo las Positas stays mainly within the channel banks although it extends over the stream banks for a short stretch of stream east of Lawrence Livermore National Laboratories (LLNL).

The Valley Trails and Del Prado neighborhoods are low lying areas with a history of flooding problems. As shown in Figure 1-6, the floodplain used to extend beyond Del Prado neighborhood to areas in the Valley Trails neighborhood between Arroyo Mocho and Pleasanton Canal. This Valley Trails area was removed from the floodplain following a LOMR approved by FEMA in August of 2005. The new hydraulic analysis to conduct the LOMR was based on modifications to the Bernal Avenue bridge abutment and new channel cross section data below the Bernal Avenue Bridge. Flows used to conduct the LOMR hydraulic analyses are based on present day conditions. In addition, based on recent Letter of Map Amendments (LOMAs) submitted by property owners in the Del Prado neighborhood, the smaller Del Prado floodplain area shown on Figure 1-6 will be removed from the 100-year event FEMA floodplain.

Flows in ADLL along the Valley Trails and Del Prado neighborhoods are expected to have only minor increases in the future due to increases in impervious surfaces as the Valley is developed to general plan build-out. Further analyses of floodplain boundaries under future build-out flows should be conducted to determine potential future impacts for the Valley Trails and Del Prado neighborhoods. These analyses are recommended to confirm the need for potential local flood wall and pump station improvements recommended in the SMMP. The purpose of these recommended improvements would be to avoid a floodplain designation under future build-out flows and conditions in these areas.

Figure 1-6: Original and Modified FEMA 100-Year Floodplain near the Valley Trails and Del Prado Neighborhoods



¹The area of Pleasanton located within the dotted yellow line will be removed from the 100-year event FEMA floodplain due to recently filed LOMAs not yet reflected in the FEMA floodplain map (City of Pleasanton, February 2006).

1.7.2 Erosion and Sediment

Erosion and sedimentation issues are important considerations in stream management. While sedimentation is a natural process that is important to the overall health of a watershed, excessive sedimentation affects flooding by reducing channel capacity and preventing flood control facilities, such as storm outfalls and flap gates, from functioning properly. In addition, excessive sedimentation or erosion can affect water quality and water supplies needed for human, wildlife, and in-stream aquatic organisms by impacting water temperature, turbidity, and nutrient loading.

The system of major drainage ways within the Valley has experienced erosion and sedimentation problems throughout the 120 mile network of flood control channels. In particular, reach scale, bed-level lowering and subsequent downstream aggradation has stressed the drainage system (Ayres 2001). The dominant supply of sediment in the Valley is generated by overland runoff through Holocene alluvial fan deposits located in the narrow valleys of the upper portions of the Arroyo Mocho and Arroyo las Positas watersheds. Other significant sediment sources are attributed to landslides and streambank failures. Historic landslides are reportedly abundant in the hills of the watershed (Ayres 2001).

Channel stability varies throughout the SMMP study area. There are several areas characterized by bank erosion including Arroyo las Positas, near the confluence of Cayetano Creek, and numerous areas along

ADLL downstream of Bernal Bridge and around Verona Bridge, as shown in Figure 1-7. Bank erosion in some areas of ADLL has seriously affected bank stability creating a potential for bank failure.

Figure 1-7: Bank Erosion along ADLL Downstream of Bernal Bridge



Other areas of the SMMP study area are characterized by sediment deposition. These include Arroyo las Positas along Airway Boulevard (Figure 1-8), Arroyo Mocho through Livermore (from Holmes Street bridge to the Chain of Lakes), and Arroyo Mocho downstream of Santa Rita Road to the confluence with Alamo Canal and ADLL. Overall conditions in the SMMP study area, including areas of sedimentation, erosion, and sources of both are shown in Figure 1-10.

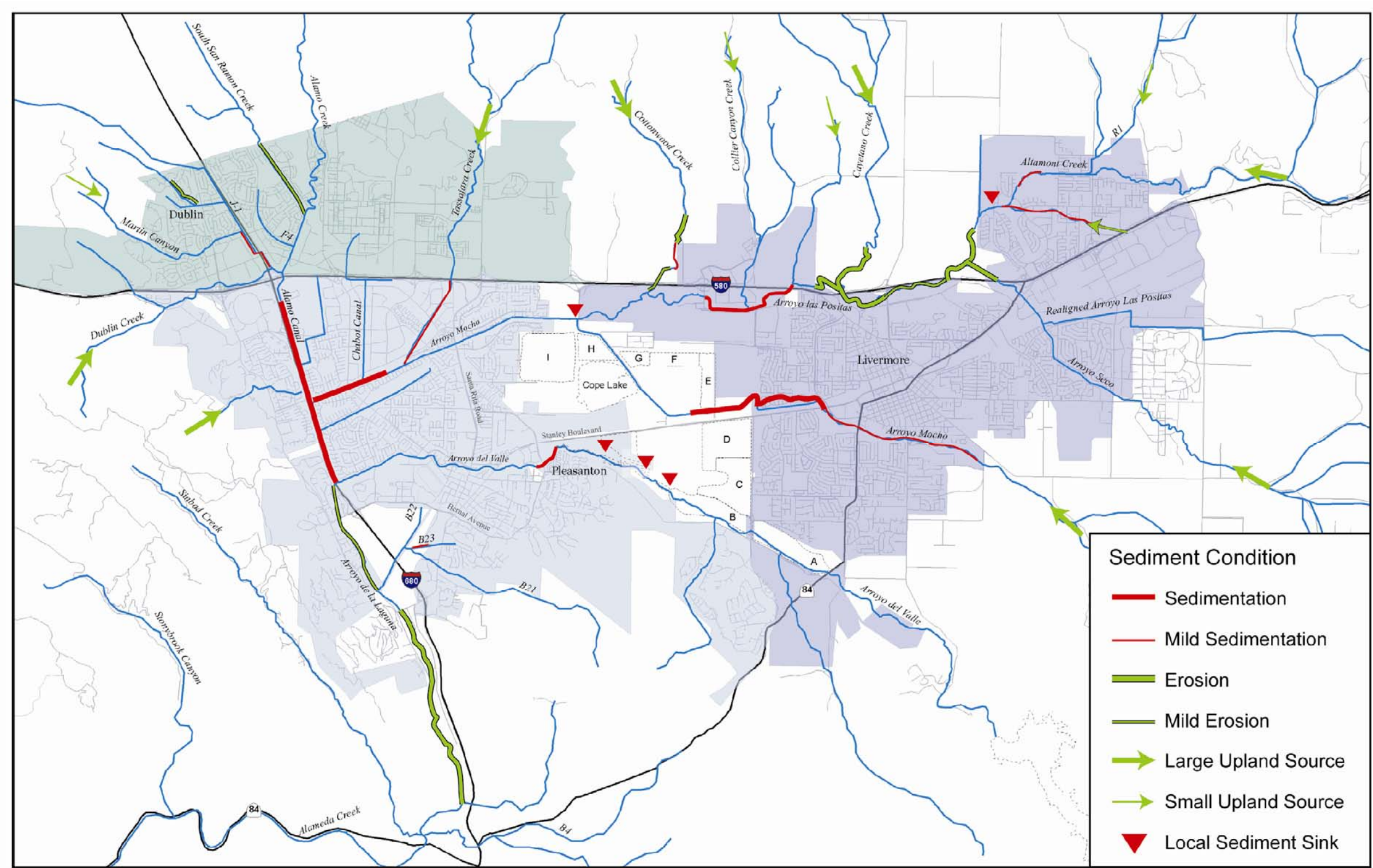
Figure 1-8: Sedimentation along Arroyo las Positas near Airway Boulevard



Figure 1-9: Sedimentation along Arroyo Mocho at Holmes Street Bridge



Figure 1-10: Overall Sediment Conditions in the SMMP Study Area²



² Figure from WYA (WYA 2001b) with modifications by RMC (November 2005).

1.7.3 Water Supply

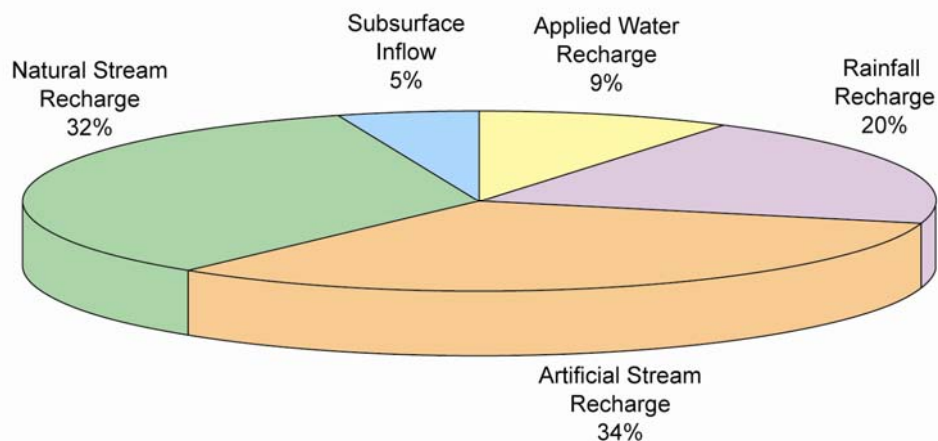
Zone 7 is a wholesale water agency that supplies treated water to cities and retail water purveyors for municipal and industrial use; and raw water to vintners, golf courses and other small users in the Valley for irrigation. Several of the local arroyos are used for conveyance of untreated water supplies and recharge of groundwater supplies, providing a direct connection between water supply and stream management. Upon completion of mining, Zone 7 is planning on using portions of the Chain of Lakes for conveyance, storage, and recharge of water, thus further demonstrating the link between stream management and water supply.

Zone 7 currently has a sustainable water supply of approximately 84,100 acre feet per year (AFY; Zone 7, 2002b) consisting of:

- Imported water supplies from the State Water Project (SWP)
- Surface water stored in the main groundwater basin and local supplies from the Arroyo del Valle watershed
- Other supplies such as water transfers and recycled water

Stream recharge plays an important role in Zone 7 water supply management by replenishing the groundwater basin and ensuring a reliable supply of stored groundwater for Valley residents. As shown in Figure 1-11, natural and artificial stream recharge accounts for two-thirds of the total recharge of the local groundwater supplies (Zone 7, 2004). Zone 7's Artificial Recharge Program involves the release of SWP water from the South Bay Aqueduct (SBA) into Arroyo Mocho and Arroyo del Valle during the spring, summer and fall when the local streams are usually dry. This water percolates through the permeable creek bed soils into the groundwater basin. The Artificial Recharge Program allows Zone 7 to store excess surface water in the groundwater basin during normal and wet years for use during dry years when SWP deliveries are reduced.

Figure 1-11: Breakdown of Groundwater Recharge

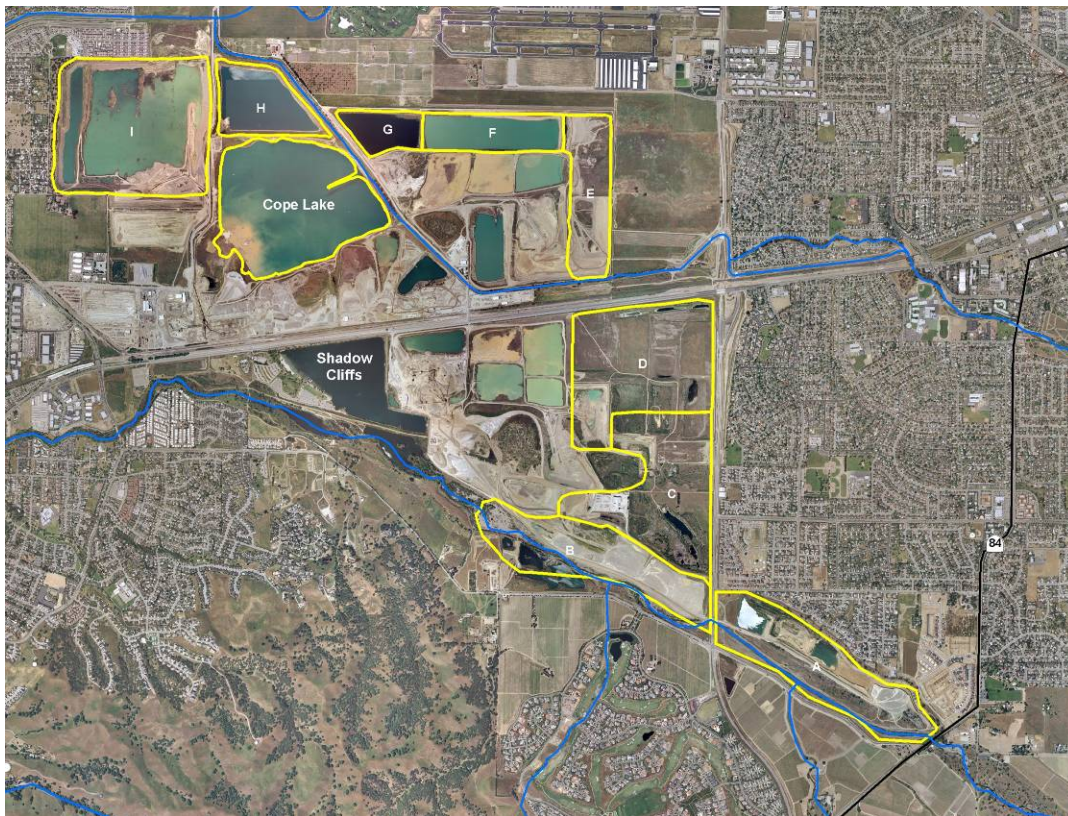


The Chain of Lakes also plays an important role in Zone 7's water supply operations. The Chain of Lakes will be developed from reclaimed former gravel quarries located in the central portion of the Valley, west of Livermore and east of Pleasanton. Figure 1-12 shows aerial view of the Chain of Lakes, with Lakes A through I labeled. Zone 7 is in the process of acquiring Lakes A through

I; and Cope Lake for the purposes of groundwater recharge and storage of local runoff and imported water. Lake I and Cope Lake were turned over to Zone 7 in June 2003 and use rights were granted for Lake H in Spring 2004 (transfer is pending). The remainder of the basin transfer is anticipated on a 10 to 20 year timescale, however transfer is negotiable and transfer does not necessarily preclude use rights. Additional details regarding the Chain of Lakes are discussed in Section 4.

Lakes H and I have a significant ability to increase the recharge to the main groundwater basin. These lakes are designed with high permeability material along certain sides to allow percolation into the groundwater basin. Based on size and location, Lake I is anticipated to be the primary recharge area. Cope Lake is not part of the chain, but was used as a former desilting basin for mining operations. As a result, the bottom of Cope Lake is silted over, providing a clay-like layer that significantly reduces the interaction between Cope Lake and the groundwater basin.

Figure 1-12: Chain of Lakes Area



1.7.4 Water Quality

Zone 7 is committed to providing a reliable supply of high quality water and an effective flood control system to the Valley. The quality of water supply is directly connected with stream management since several of the local arroyos are used for conveyance of untreated water supplies and recharge of groundwater supplies. Water releases from the SBA are conveyed through Arroyo Mocho and Arroyo del Valle for groundwater recharge purposes; thus the quality of recharged water depends heavily on the water quality of SBA deliveries.

Water quality, as well as slowing flows within the reaches is an important factor in groundwater recharge. Areas of channel that lay bare present an opportunity for restoration and improvement to better support aquatic habitat; as well as to slow and filter flows. Regulatory requirements pertaining to water supply quality and in-stream water quality are described below.

Water Supply Quality

Water used for municipal supply must not contain concentrations of chemicals in excess of concentrations specified in California Code of Regulations, Title 22, Chapter 15. Zone 7's water supply meets all drinking water standards.

In addition, water quality objectives for the Alameda Creek Watershed above Niles are defined in San Francisco Bay Basin Plan (RWQCB 2005), as shown in Table 1-1. Zone 7 is embarking on various measures, such as a demineralization program, to ensure future compliance with these objectives.

Table 1-1: Surface and Groundwater Quality Objectives Defined in San Francisco Bay Basin Plan

Surface Water Quality Objectives	
TDS	250 mg/l (90 day-arithmetic mean)
	360 mg/l (90 day-90th percentile)
	500 mg/l (daily maximum)
Chlorides	60 mg/l (90 day arithmetic mean)
	100 mg/l (90-day 90th percentile)
	250 mg/l (daily maximum)

Groundwater Water Quality Objectives	
TDS	Ambient or 500 mg/l, whichever is lower (Central Basin)
	Ambient or 1000 mg/l whichever is lower (Fringe Subbasins)
Nitrate (NO ₃)	45 mg/l

Stormwater Discharge Quality

Under Section 303(d) of the 1972 Clean Water Act (CWA), the State of California is required to develop a list of quality impaired water bodies that do not meet drinking water quality standards (SWRCB 2005). A first list of impaired water bodies was established in 1998 and has recently been revised to incorporate diazinon, a pollutant resulting from urban runoff commonly found in urban streams, and diazinon has been identified in most of SMMP streams. In addition to diazinon, other pollutants of concern are identified in all of San Francisco Central Bay including streams in the SMMP study area. These pollutants need to be addressed in Zone 7's streams because of their impact on downstream waters discharging into San Francisco Bay. Such pollutants include Mercury, Copper, Selenium, Dioxins, Poly-chloro-biphenyls (PCBs) and pesticides. Table 1-2 provides the 303(d) list of Zone 7's impaired streams and pollutants of concerns, and the total maximum daily load (TMDL) report completion date.

Table 1-2: 303(d) List of Impaired Water Bodies and Pollutants of Concern in SMMP Study Area

Waterbody	Pollutant	Source	Priority	TMDL Completion Date
Arroyo las Positas	Diazinon	Urban Runoff/Storm Sewers	High	2005
Arroyo Mocho	Diazinon	Urban Runoff/Storm Sewers	High	2005
Arroyo del Valle	Diazinon	Urban Runoff/Storm Sewers	High	2005
Arroyo de la Laguna	Diazinon	Urban Runoff/Storm Sewers	High	2005
Alameda Creek	Diazinon	Urban Runoff/Storm Sewers	High	2005
Del Valle Reservoir	Mercury*	Non-Point Source	-	-
	PCBs*	Non-Point Source	-	-
Shadow Cliffs Reservoir	Mercury*	Non-Point Source	-	-
	PCBs*	Non-Point Source	-	-
Central San Francisco Bay	Mercury	Non-Point Source	High	2006
	PCBs	Non-Point Source	Medium	2006
	Dioxins	Non-Point Source	High	2005
	Copper	Several	Medium	2008
	Pesticides	Non-Point Source	Low	-
	Selenium	Several	Low	2010
	Furan	Atmospheric	High	2003

Source: SWRCB CWA Section 303(d) Draft List of Water Quality Limited Segments, Updated October 2005

*Mercury and PCBs listings are proposed for Del Valle and Shadow Cliffs Reservoir in the October 2005 Draft List of Water Quality Limited Segments.

Zone 7 is one of the seventeen member agencies that formed the Alameda Countywide Clean Water Program. Alameda County storm-related discharges are regulated under National Pollutant Discharge Elimination System (NPDES) Permit No. CAS0029831 granted on February 19, 2003 (RWQCB 2003a). A permit application for the re-issuance of waste discharge requirements under the NPDES permit was submitted in August 2001, known as Phase II. Through the NPDES permit, each permittee has jurisdiction over their respective separate municipal storm drain systems and water courses. However, the permit emphasizes the need for joint efforts with other permittees, regulatory agencies, public citizens' groups, and universities.

Alameda Countywide Clean Water Program's NPDES permit includes a series of requirements to meet the stormwater-related water quality issues. The NPDES permit is the third permit regulating the Program's stormwater discharges. The new permit requirements are similar to those in previous permits, however requirements related to new developments and redevelopments are more stringent, especially within the Phase II permit. The size for new development/redevelopment projects triggering requirements for on-site control and treatment units has decreased from 5 acres to 1 acre, (Group 2 Projects have decreased to 10,000 square feet). The permittees are also required to update their design standards to minimize water quality degradation, and to treat approximately 80 percent of a typical wet season flow. In addition, pollutant reduction plans are now required to be developed and/or refined; and the focus on

coordination and on a watershed-wide approach needs to be addressed through a watershed management plan. Monitoring activities are also required as part of the NPDES permit including development of annual monitoring plans and annual reports for pollutants of concern. Lastly, the permit also requires development of a Hydromodification Management Plan (HMP) to manage impacts from changes to the volume and velocity of stormwater that could damage downstream watercourses.

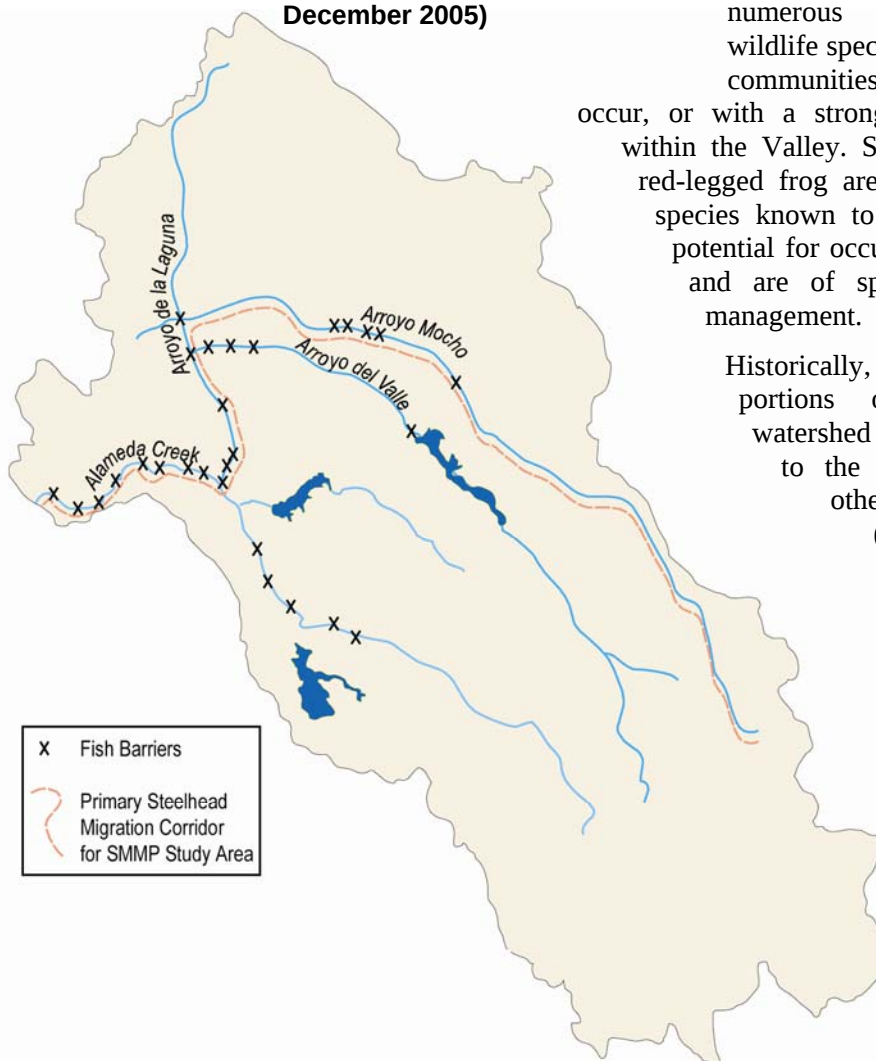
1.7.5 Habitat and Environment

Part of Zone 7's mission is to develop and manage the water resources in a fiscally responsible, innovative, proactive, and environmentally sensitive way. While Zone 7's focus is on flood protection, the agency recognizes the benefits of achieving its flood control mission in ways that minimize impacts to the natural habitat.

Generally, much of the natural habitat of the Valley has been reduced due to urban development. However, streams provide great opportunities for preserving and restoring the remaining habitat in the Valley.

Natural communities encountered within Zone 7's boundaries include freshwater marsh, central

Figure 1-13: Existing Barriers to Steelhead Migration (Gunther et al. 2000; updated December 2005)



coast riparian scrub, alkali meadow, and valley sink scrub in the upper reaches of Arroyo las Positas. There are also numerous special-status plant and wildlife species and special-status natural communities and habitats known to occur, or with a strong potential for occurrence, within the Valley. Steelhead and the California red-legged frog are two special-status wildlife species known to occur, or having a strong potential for occurrence, in Zone 7's streams and are of special relevance to stream management.

Historically, steelhead inhabited some portions of the Alameda Creek watershed in significant numbers prior to the construction of dams and other human development (CEMR 2003). Within the SMMP study area, ADLL and Arroyo Mochito constitute potential migratory habitat for steelhead, and the upper reaches of Arroyo Mochito (upstream of Livermore) offer habitat suitable for steelhead if migratory passage is provided and maintained in lower

portions of the watershed (CEMR, 2003). Arroyo Mocho is considered one of the best potential steelhead spawning and rearing habitats remaining in the watershed (Gunther et al. 2000). Local associations such as the Alameda Creek Alliance are working to restore the steelhead population in Alameda Creek, and to facilitate their introduction into Arroyo Mocho via ADLL. However, steelhead access to the SMMP study area is currently blocked by migration barriers along Alameda Creek. Within the SMMP study area, steelhead access to suitable spawning grounds is limited by migration impediments along Arroyo Mocho and Arroyo del Valle, high sedimentation levels downstream of the confluence of ADLL with Arroyo Mocho, and high water temperatures in some reaches (Gunther et al. 2000). Figure 1-13 provides a schematic of existing barriers and impediments to steelhead passage in the Alameda Creek watershed, and shows the primary migration corridor for the SMMP study area. Efforts are currently underway to remove downstream barriers to steelhead migration.

The California red-legged frog generally inhabits ponds, marshes, and streams that support dense riparian vegetation in deep, still, or slow-moving water, and ephemeral streams that retain pools or saturated soils year round. California red-legged frog populations are jeopardized by the presence of bullfrogs. However, high concentrations of California red-legged frogs have been reported in the SMMP study area including in areas north of I-580 in hillside drainages and stockponds, along Line R-1 and Line P-1 in Sycamore Grove Park along Arroyo del Valle (SA 2002). Additionally, California red-legged frogs have the potential to occur along Altamont Creek, and potentially breed in the vicinity of Arroyo las Positas (ESA 2002a).



There are several areas within the SMMP study area that are of significance from a habitat and environment perspective. The Springtown Natural Communities Reserve is located in northeast Livermore along Altamont Creek. This area contains a complex variety of wetland, scrub and grassland plant communities that support a habitat of alkali sink scrub vegetation and vernal pool areas (EMEC 1996). Many special status species have the potential to occur in the Springtown Reserve including Bird's Beak, California tiger salamander, and burrowing owl (EMEC 1996).

Sycamore Grove Park located along Arroyo del Valle in southern Livermore is another area of environmental significance. The stand of sycamores in this park is one of the oldest, and the third largest stand of western sycamore in California (SA 2002). More detail on the sycamores is provided in Section 3. In addition to the Sycamore trees, the park is home to many special-status species including California red-legged frog, California tiger salamander, western pond turtle, and Alameda whipsnake (SA 2001).

ADLL, which serves as the main drainage for the Valley to Alameda Creek, is another area of environmental significance within the SMMP study area. Riparian cover along ADLL represents one of the last reaches of mature riparian/oak woodland forest within the Valley (ESA 2002b). Western Pond Turtles, a species of concern, have also been observed along ADLL (ESA 2002b). ADLL has the potential to serve as a critical steelhead migration corridor to upstream spawning areas in Arroyo Mocho, once downstream barriers in Alameda Creek are removed; and maintaining the existing riparian cover and in-stream channel conditions will be important in the event it is determined to be appropriate to provide for suitable steelhead migration conditions.

1.7.6 Trails, Recreation, and Public Education

The mission of Zone 7 is to provide a high quality water supply, provide flood protection, and promote water conservation and management. Recreation and public education do not supersede

these responsibilities but are accommodated when possible. It is Zone 7's belief that an informed public will help to protect the arroyos and groundwater basin.

There are several education and outreach programs organized and run by Zone 7. The Zone 7 Board of Directors has taken advantage of the opportunity to utilize its right-of-way mandate along streams not only for maintenance access but also to provide the public with recreation opportunities and open space. Trail agreements were executed for the City of Livermore in 1961, the City of Pleasanton in 1971, and the City of Dublin in 1987. Zone 7's role in this resource area would be only as a coordination and not implementation agency (Zone 7, 1985) and by providing needed flood control right-of-ways to local park and recreation provider agencies as possible.

Incorporation of trails, recreational, and educational features into stream management is generally coordinated through a number of local and regional, park and recreation agencies including:

- City of Pleasanton Parks and Recreation Commission
- City of Dublin Parks and Community Services Department
- Livermore Area Recreation and Parks District (LARPD)
- East Bay Regional Parks District (EBRPD)

The school districts and local interest groups also provide support for recreational and educational efforts and activities.

The linear landscapes along the arroyos and flood control channels in the Valley offer excellent opportunities for local park and recreation provider agencies to incorporate their trail projects with proposed channel improvement projects. In addition, local agencies have existing trail master plans that link parks along the stream corridors that can be used as a basis for trail planning. As such, the existing and proposed trails within the SMMP study area, and coordination with trails groups such as the Trails Council of the Valley, East Bay Area Trails Council (EBATC), and the Tri Valley Trail Blazers is an important element of the SMMP.



1.8 Technical Basis

As stated earlier, Zone 7 has conducted a series of flood protection studies over the years and has initiated an update to their 1966 Flood Control Master Plan through technical work and studies conducted by S&W, WYA, and others. These studies form the technical basis for the SMMP and are discussed in detail in Appendix B.

1.9 Document Organization

This SMMP is divided into the following six sections:

- *Background* – Introduces the SMMP (drivers and development process), and gives a brief description of the study area and resource areas.
- *Goals and Objectives* – Discusses the SMMP goals and objectives including the development and refinement process.
- *Needs and Opportunities* – Discusses the needs and opportunities identified within the SMMP study area by resource area and reach.

- *Regional Storage at Chain of Lakes* – Discusses challenges, technical basis, approach, and components of the Chain of Lakes detention storage projects.
- *SMMP Program and Project Descriptions* – This section details each multidisciplinary project developed for the 12 reaches within the SMMP.
- *Implementation Strategies* – This section lays out the approach for successfully implementing the SMMP which includes discussions on the programmatic environmental and permitting approach, policy development, and public outreach strategies.

In addition, this document includes eight appendices which are as follows:

- Appendix A: References
- Appendix B: SMMP Technical Basis and Previous Studies
- Appendix C: Sediment Analysis
- Appendix D: Hydraulic Analysis of Arroyo de la Laguna
- Appendix E: Frequency of Storage
- Appendix F: Flow Scenario
- Appendix G: SMMP Cost Estimates and Individual Project Cost Details
- Appendix H: Section 6 Supporting Documentation

Additional information and documentation can be found on the Zone 7 website at www.zone7water.com.