Local Floodplain Management Plan

For the County of Sacramento

2001

Prepared by:

County of Sacramento
Public Works Agency
Department of Water Resources
TABLE OF CONTENTS

I. PROBLEM IDENTIFICATION 1
   Sacramento River 1
   Dry Creek / NEMDC & Tributaries 1
   Natural Stream Group & Tributaries 2
   Morrison Creek Stream Group 3
   Southern Portion of County 3

II. FLOOD HAZARD AREA INVENTORY 3
   Sacramento River 3
   Dry Creek / NEMDC & Tributaries 4
   Natural Stream Group & Tributaries 4
   Morrison Creek Stream Group 4
   Southern Portion of County 5

III. REVIEW OF POSSIBLE ACTIVITIES 5
   Sacramento County Multi-hazard Functional Plan 5
   County of Sacramento Development Policies 6
   New Development Policies 7
       Buildable Area 7
       Access 8
       Fill in the Floodplain 9
       Pier Foundations 9
       Fencing 10
       Open Watercourse Easements 10
       Levees 11
       Miscellaneous 12
   Possible Solutions for Existing Problem Areas 13
       Flood Mitigation Assistance (FMA) 13
       Sacramento River 14
       Dry Creek / NEMDC & Tributaries 15
       Natural Stream Group & Tributaries 18
       Morrison Creek Stream Group 19

IV. SELECTION OF APPROPRIATE ACTIVITIES 21

V. PUBLIC INPUT 23

Appendix A. Summary – Repetitive Loss Properties
Appendix B. Summary – County of Sacramento Flood Zone Areas
FOREWORD

A Local Floodplain Management Plan is required for a community to participate in the National Flood Insurance Program (NFIP) Community Rating System. The original plan for the County of Sacramento was prepared in 1997, and was adopted by the County of Sacramento Board of Supervisors on September 16, 1997, Resolution 97-1112. This update for 2001 is the first update of the plan, and incorporates the following significant changes:

a. Adds specific FEMA language related to Sacramento County’s participation in the Flood Mitigation Assistance Grant.
b. Updates the information for the Sacramento County NFIP Repetitive Loss Properties.
c. Revises the description of the major watersheds to remove ambiguous information.
d. Adds flood zone area data for all FEMA watersheds in the unincorporated areas of the County, plus Elk Grove and Citrus Heights.
e. Updates the description of the Sacramento County Multi-Hazard Functional Plan.
f. Updates the Possible Solutions sections, specifically with regard to mitigation actions and emergency services.
g. Updates floodplain illustrations to include locations of fire stations, hospitals, and the Emergency Operation Center. Significant changes to the FEMA 100-year floodplains are also included.

The plan will be reviewed by the Sacramento County Department of Water Resources on an annual basis, and will be updated as required to ensure accurate factual data, and to meet the requirements of the National Flood Insurance Program.
Local Floodplain Management Plan

Major Watersheds and Repetitive Loss Areas

- FEMA 100-year floodplain
- Repetitive loss property
- Mitigation action taken
- Fire Station
Local Floodplain Management Plan — Dry Creek Watershed

- FEMA 100-year floodplain
- Fire Station
- Repetitive loss property
- Mitigation action taken

Sacramento County, California
Citrus Heights/Carmichael

Sacramento County, California

Local Floodplain Management Plan - Natural Streams Group

- FEMA 100-year floodplain
- Fire Station
- Hospital
- Repetitive loss property
- Mitigation action taken
- City/County Emergency Operations Center
City of Sacramento

Sacramento County, California

Local Floodplain Management Plan - Morrison Creek Watershed

- FEMA 100-year floodplain
- Fire Station
- Repetitive loss property
- Mitigation action taken
Isleton
Sacramento County, California

Local Floodplain Management Plan – Isleton

- FEMA 100-year floodplain
- Fire Station
- Repetitive loss property
- Mitigation action taken
COUNTY OF SACRAMENTO FLOODPLAIN MANAGEMENT PLAN

A Floodplain Management Plan is a comprehensive plan that describes how a community will deal with its flooding problem(s) and protect the natural and beneficial functions of its floodplain. This plan will identify the major watersheds and watercourses within the unincorporated area of Sacramento County, the flooding problems associated with these watercourses, and the measures being taken to minimize the flood risk for each watercourse. A similar Floodplain Management Plan was adopted by the County of Sacramento Board of Supervisors on September 16, 1997, resolution 97-1112.

Repetitive loss areas are of particular interest in this plan. Repetitive loss properties are those that have had two or more flood insurance claims paid in a ten-year period. These properties account for $5,411,784 versus $17,917,301 or approximately 30% of flood insurance claims in Sacramento County (source: California Floodplain Management Newsletter, Golden State Floodlight, summer 2000).

I. PROBLEM IDENTIFICATION

There are five major watersheds within the County of Sacramento. The individual watercourses and their respective flood zone areas are identified in Appendix B.

- Sacramento River
- Dry Creek / NEMDC & Tributaries
- Natural Stream Group & Tributaries
- Morrison Creek Stream Group
- Southern Portion of the County (Cosumnes River), Beach Stone Lakes

SACRAMENTO RIVER

The majority of Sacramento County drains ultimately to the Sacramento River, which defines the west border of the County, and flows to the southwest. For the purpose of this plan, the floodplain issues will be related to the properties along the levees and banks of the Sacramento River. There are hundreds of structures that are located along the banks of the Sacramento River, and records indicate that many of these structures have experienced flooding during record storm events. There are 28 structures on the repetitive loss list that are located adjacent to the Sacramento River. See appendix A.

DRY CREEK / NEMDC & TRIBUTARIES

Dry Creek and the Natomas East Main Drainage Canal (NEMDC) along with their tributaries are located within the northwestern portion of the County. Dry Creek drains to NEMDC, which drains
to the American River, which drains to the Sacramento River. The major flooding problems within this drainage basin occur where the north and south branches of Dry Creek converge. There are 35 structures on the repetitive loss list that are located within this drainage area. See Appendix A.

Watercourses within this drainage area include:

- Dry Creek
- Basin "A"
- Magpie Creek
- Robla Creek
- Sierra Creek
- NEMDC
- NEMDC Tributary F
- NEMDC Tributary G
- NEMDC Tributary I
- Linda Creek & Tributaries**

** Linda Creek is a tributary of Dry Creek, however it is also considered as a Natural Stream.

**NATURAL STREAM GROUP & TRIBUTARIES**

There is a group of 23 streams (not including tributaries) within the northeasterly portion of the County that are commonly referred to as the natural stream group. The major collectors are Arcade Creek and the American River. Many of these creeks are undersized for the 100-year flood event. There are limitations to the types of improvements allowed to these creeks due to their natural stream status with the County and other regulatory agencies. There are 53 structures on the repetitive loss list that are located within this drainage area, see Appendix-A.

Watercourses within this drainage area include:

- Arcade Creek
- Arcade Creek South Branch
- Brooktree Creek
- Mariposa Creek
- Carmichael Creek
- Chicken Ranch Slough
- Coyle Creek
- Cripple Creek
- Diablo Creek
- Fair Oaks Stream Group
- Alder Creek
- Manlove Creek
- Kohler Creek
- Linda Creek
- Buffalo Creek
- Mayhew Slough
- Minnesota Creek
- San Juan Creek
- Strong Ranch Slough
- Sunrise Creek
- Verde Cruz Creek
- Boyd Station Channel
- Cordova/Coloma Stream Group
**MORRISON CREEK STREAM GROUP**

Morrison Creek is located within the mid-southern portion of the County. There are approximately eleven creeks that drain into Morrison Creek, where summer flows drain to the Sacramento River and flood flows can spill to the Mokelumne River. Because development in this area of the County has been fairly recent, many of the creeks are being constructed/improved as part of overall development projects. This has lead to many of the creeks providing adequate freeboard and 100-year flood protection. There are currently six repetitive loss structures within this drainage area (see Appendix A).

Watercourses within this drainage area include:

- Elder Creek
- Elk Grove Creek
- Florin Creek
- Gerber Creek
- Laguna Creek (& Tributary)
- Morrison Creek
- Strawberry Creek (all branches)
- Unionhouse Creek
- Whitehouse Creek

**SOUTHERN PORTION OF THE COUNTY (COSUMNES RIVER)**

Most of the southern portion of the County is rural with patches of homes on large parcels. The majority of the floodplains in this area are associated with the Cosumnes River. There is also flooding due to inadequate roadside ditches. Major flooding occurred due to record flows in the Cosumnes River in February 1986 and January 1997, causing breaches of the private river levees. There are currently six repetitive loss properties within this drainage area

**II. FLOOD HAZARD AREA INVENTORY**

**SACRAMENTO RIVER**

For the purposes of this report, Sacramento River includes properties on the river or levee bank and on the Delta Islands. The repetitive loss properties are located adjacent to either the Sacramento River, or a watercourse (slough) that drains directly to the river. Many of the repetitive loss properties are along the Garden Highway, which is a levee road that runs along the Sacramento River north of Sacramento. Typically, these repetitive loss structures were built many years ago and are situated on the "wet side" of the levee road. Some of these properties have finished floors above the base flood elevation and had claims based on damage other than into the main living areas. There are also repetitive loss properties located on two islands in the Sacramento River Delta near the City of Isleton.


**DRY CREEK / NEMDC & TRIBUTARIES**

Dry Creek experiences flooding problems and overbank storage in extreme flood events. There are two branches of Dry Creek and the area between the two is designated as the floodway for Dry Creek. Several residences are located inside the floodway and experience recurrent flooding. A large volume of overbank storage occurs outside the floodway. Dry Creek is fed by several tributaries with a total shed area of 116 square miles. The worst flooding occurs where the two branches of Dry Creek converge.

Dry Creek Tributaries include Basin “A” and “B” as identified in the Antelope Drainage Study, Magpie Creek, Sierra Creek and Robla Creek. These areas are either currently urbanized or planned for development in the future.

The Natomas East Main Drain Canal (NEMDC) tributaries are located in an agriculturally developed area of the County of Sacramento. The downstream end of the tributaries is subject to the backwater of the NEMDC, a drainage channel conveying flows from neighboring Sutter County. The NEMDC tributaries are primarily natural or man made narrow ditches. However, in peak flow events the floodplain is quite wide. In 1998, the flood insurance rate maps were revised to reflect the NEMDC pump station constructed to reduce water surface elevation and accompanying back water effect on the NEMDC tributaries.

**NATURAL STREAMS GROUP & TRIBUTARIES**

This includes most of north Sacramento County. Most of this area is completely developed, with houses built many years ago before current FEMA and County regulations. During large storm events, some of these watercourses experience out of bank flows. Flooding can occur, in peak storm events, due to over-bank flows, overland surface water flows, or overwhelmed piped storm drain systems.

**MORRISON CREEK STREAM GROUP**

The Morrison watershed consists of both urbanized and agricultural areas. The urbanized areas have been developed with piped storm water conveyance, pump stations, and concrete lined channels. Much of this development occurred many years ago, prior to current floodplain management policies. In the agricultural areas, the drainage is by roadside ditches and the channels are unimproved. The Morrison Creek stream group discharges into Beach Stone Lakes flowing southwest to the Delta.
**SOUTHERN PORTION OF THE COUNTY (COSUMNES RIVER)**

Since little development is occurring in this area, drainage improvements have not been made. The area is mostly agricultural and creeks, streams and roadside ditches convey drainage. The flooding that has occurred in the past is commonly due to one of the following occurrences:

- Breaches and breaks in private levees along the Cosumnes River during record floods.
- Large storm events exceeding the capacity of agricultural ditches with little overland relief available due to flat topography.

**III. REVIEW OF POSSIBLE ACTIVITIES**

The goals of this Local Floodplain Management Plan are:

- Protect new development from the potential of flooding from a 100-year flood event.
- Identify possible activities to reduce the potential of flood damage to existing structures.

Sacramento County relies upon several documents to enforce floodplain regulations. Below is a list of these documents, along with a brief summarization of the document contents, and when the document was adopted.

**Sacramento County Multi-Hazard Functional Plan**

The County of Sacramento Department of Water Resources has identified six "hot spot" areas along local creeks where out of bank flooding has caused damage to adjacent structures. These areas are: Lower Dry Creek, Lower Chicken and Strong Ranch Sloughs, Arcade Creek, the Cosumnes River, Morrison Creek near Highway 99, and the Beach-Stone Lakes area. To identify the likelihood of flooding in these areas detailed GIS and AUTOCAD mapping showing historical flooding, finished floor elevations, and depth of flooding during a "100-year" storm has been created. Potential flood fight and sandbag locations are also shown on the maps.

In addition, historic records of nearby ALERT stream and rain gages, along with predicted water surface profiles based upon related to rainfall depths have been assembled for use during major storm events. A Web page ([www.floodready.org](http://www.floodready.org)) makes real time information available on the Internet with stream gage and rainfall data gathered by the ALERT system. During major storm events, periodic StormAlert reports are generated. These reports are used to advise local officials.
of the severity of the storm status. A sandbag distribution program is enacted during serious storm events.”

**County of Sacramento Development Policies**

**General Plan and Community Plan Policies** - The recently adopted County General Plan (County of Sacramento Department of Planning and Community Development, *General Plan: Planning for the 21st Century*, December 15, 1993) includes a comprehensive set of policies stressing flood hazard avoidance and mitigation in the planning and approval of new development. Policies applicable to drainage and flood control planning are included in the Safety Element, Conservation Element, and Open Space Element.

**Drainage Ordinance** - On November 23, 1993 (effective December 23, 1993), the Board of Supervisors adopted Ordinance No. SCZ 93-0061, *An Ordinance Adding Title IX to the Sacramento County Zoning Code Relating to Floodplain Management*. Title IX updated County floodplain management standards, construction standards in floodplain areas, and permit and mapping requirements relating to the National Flood Insurance Program.

**Sacramento County Water Agency Code and Drainage Impact Fee** - On January 30, 1996, the SCWA Board of Directors adopted the *Sacramento County Water Agency Code*, which replaced the existing Drainage Fee Ordinance, and continued and expanded the permanent impact fee funding mechanism for drainage improvements to include flood control detention and other new requirements. Since December 1991, flood control detention in Morrison Creek Stream Group watershed had been funded through the interim mechanism of a fair-share contribution by new development).

**Repetitive Loss Plan** - The *Repetitive Loss Plan for the County of Sacramento* (January 1992) screened alternative flood hazard mitigation activities and proposed appropriate measures for the 23 repetitive loss properties within the unincorporated County. That plan has been replaced by this floodplain management plan.

**Drainage Master Planning Program** - Since 1990, the Sacramento County Water Resources Division has advance an extensive program of drainage master planning, to provide for the ultimate storm water quality, drainage, and flood control needs of the County. In planning and implementing cost-effective drainage and flood control systems, the master plans must: accommodate development, provide the objective levels of service and protection to existing and future communities, minimize continuing maintenance and operation costs, and minimize/mitigate downstream flooding and water quality impacts. One goal of the planning program is to plan and implement drainage and flood control projects that protect and enhance habitat, visual, recreational, and other water-related and riparian values. Drainage master plans have been completed for four...
watersheds, and several others are nearing completion. Future planning efforts will include flood hazard mitigation for Morrison Creek and Arcade Creek watershed.

**Floodplain Management Policies** - On March 9, 1993, Sacramento County Board of Supervisors adopted the *Floodplain Management and Interim Floodplain Development Policies*, which were developed by the Water Resources Division of the Sacramento County Public Works Agency in consultation with Region IX of the Federal Emergency Management Agency. The floodplain Policies establish requirements and guidelines for minimizing and mitigating impacts of new development upon floodplains in most areas of Sacramento County, and how new development may be planned in or near floodplains.

**Stormwater Ordinance and Grading and Erosion Control Ordinance** – Address discharge of pollutants to storm drainage system.

**New Development Policies**

The following is a list of policies that are applicable to development within the entire County, with the exception of the Delta area. The Delta is defined as that portion of the County bounded on the east by the Western Pacific Railroad tracks, on the north by the southern city limits of the City of Sacramento, and on the south and west by the Sacramento County boundary.

**Buildable Area**

The lack of buildable area above the 100-year floodplain is a constant problem. Homeowners expect to be able to construct swimming pools and other structures associated with residential property. In the past, lots have been created that do not allow enough area above the 100-year floodplain to construct such structures, and in some cases only the residence or commercial structure itself is located above the floodplain. The proposed policies regarding fill in the floodplain will prohibit such structures from being constructed. Specific minimum buildable areas are proposed to create areas where normal property uses will not be prohibited by policy.

1. Deny creation of parcels that do not have buildable areas outside the 100-year floodplain. The buildable area may be constructed by the placement of fill as long as it conforms to the other policies contained herein. The minimum buildable area per lot required for specific zoning is defined below. Note that for the purposes of this policy, "buildable area" only refers to the area above the 100-year floodplain. The entirety of this area may not be buildable due to setbacks or other requirements.
2. For residential zoning, the area outside the 100-year floodplain must be contiguous or reasonably situated to provide buildable area for a residence and associated structures, such as pools, sheds, barns, and detached garages.

3. Buildable areas above the 100-year floodplain must be constructed prior to map recordation. Floodplain and/or floodway easement will be required over the floodplain outside the buildable area. Exceptions may be made for parcel maps provided a condition of approval is attached to the map requiring site plan review prior to issuance of building permits. Requirements including locations of excavation and fill, limitations on fill in the floodplain, etc. will be clearly indicated in the conditions of approval.

**Access**

Minimum access is required for all newly created parcels to allow ingress-egress during storm events. This is required for emergency access and to avoid creating "islands" during normal flooding. The idea is to provide "reasonable" access, but what is reasonable is highly subjective. At a minimum, access should be above the 10-year flood elevation, to minimize the occurrences of restricted access.

The least number of watercourse crossings are encouraged to minimize the impact to flood elevations, as well as to the riparian corridor.

1. Vehicular access to the buildable area of newly created parcels must be at or above the 10-year flood elevation. Exceptions may be made when the existing public street from which access is obtained is below the 10-year elevation

2. Watercourse crossings shall be minimized. Creation of lots that require watercourse crossings for single lots, or that will likely encourage watercourse crossings to be built by property owners (lots with useable area on both sides of a watercourse) will not be allowed. Exceptions may be granted on a case-by-case basis for Agricultural and Agricultural-Residential zoned parcels larger than five acres.
**Fill in the Floodplain**

Reclaiming floodplain by importing fill has the effect of increasing flow downstream. Importing fill into the existing floodplain removes floodplain storage. Water that may have otherwise ponded outside the effective flow area of a watercourse will be forced downstream instead, thereby increasing the flow and water surface elevations downstream. Merely replacing fill with an offsetting amount of excavation will not always be adequate to mitigate any impact on flood elevations. The most important loss of storage in most watercourse situations is the fill that occurs at elevations near where the peak flood elevation will occur. Off-stream storage that occurs at the time of peak runoff will be the most effective in attenuating peak flow. It is therefore recommended that in-kind replacement storage be provided whenever fill is allowed to be placed within the 100-year floodplain for most watercourses. In-kind replacement is defined as excavating at the same elevation (hydraulically equivalent) as fill occurs. The impact of lost floodplain storage to flood elevations will vary from watercourse to watercourse depending on several factors such as width of the floodway, total in-stream and off-stream storage, etc.

1. Fill will not be allowed where the depth of the 100-year flood is greater than two feet. Exceptions may be made on a case-by-case basis for the following:
   
   (a) Agricultural and Agricultural-Residential zoned parcels;

   (b) Minor tributary swales and areas where piped drainage is required by County Improvement Standards;

   (c) Watercourse crossings.

2. There will be no net loss of storage with the 100-year floodplain. In-kind replacement of lost storage will be required, with the following exceptions allowed:

   (a) Morrison Basin in-fill areas;

   (b) Basin "A", Sierra Creek, and Magpie Creek, on a case-by-case basis;

   (c) Agricultural and Agricultural-Residential zoned parcels of five acres or more, on a case-by-case basis;

   (d) Areas where piped drainage is required by the County Improvement Standards.

**Pier Foundations**

Pier foundations allow structures to be built in areas subject to flooding by elevating the structure
above the adjacent low-lying lands. In no case should a pier foundation be placed in areas where storm water is conveyed. On a case-by-case basis, some structures may be allowed where floodwaters pond, as opposed to areas where the flow velocities are significant.

1. Pier foundations for structures are acceptable only when outside the conveyance area of a watercourse. Pier foundations may be allowed on a case-by-case basis for the following:

   (a) Agricultural and Agricultural-Residential zoned parcels;

   (b) Existing parcels that are within the 100-year floodplain and do not meet the buildable area criteria.

Fencing

Fencing within the floodplain occurs frequently and can significantly increase flood elevations. This is due to the fences collecting debris and effectively creating a dam. Limited fencing will be allowed within the floodplain provided it does not create flow restrictions and allows for the free flow of water. The policies will not apply to Agricultural or Agricultural-Residential zoned parcels greater than five acres, except where flood elevations are significantly impacted.

1. Fencing will be prohibited within the floodway of a watercourse. Open fencing parallel to the flow direction may be allowed within the floodway on a case-by-case basis.

2. Fencing outside the floodway but within the conveyance area of a watercourse will be restricted to the least flow-restrictive types of open fencing (3-strand wire, 3-board rail, etc.). Chain link, spaced board fencing, etc. will not be allowed.

3. Fencing outside the conveyance area of a watercourse but within the 100-year floodplain will be restricted to fencing that allows the passage of water.

Open Watercourse Easements

The County is requiring fee title or easements be dedicated over the 100-year floodplain on sites that are developed or subject to discretionary actions. Different types of easements will be required dependent on the flow situation within the specific floodplain. Dedication of the easement will be required to prevent any development within the floodplain that would impact flooding, including post-development fencing, grading, importation of fill, and construction of secondary structures. The easements are intended to provide some measure of assurance that the floodplain will not be significantly altered, thereby impacting flooding. Easements will be required as conditions of discretionary actions, including rezone and map approval.
1. Upon development of a site, including rezones, and certain applications for building or use permits, the following easements will be required to be dedicated to the County:

   (a) Floodway easement will be required over the area of a watercourse necessary to pass the peak 100-year flow at an elevation designated by the Water Resources Division.

   (b) Floodplain easement will be required over the remainder of the 100-year floodplain outside areas to be master planned, or consistent with provisions of an adopted Drainage Master Plan, if the site will be fully built-out under the proposed zoning.

   (c) When a site is not being fully built-out under the present zoning, or if a Drainage Master Plan has not yet been adopted, then a Conditional Floodplain Easement may be granted over that portion of the floodplain that is less than two feet below the 100-year water surface elevation. A Conditional Floodplain Easement is an easement over that portion of the 100-year floodplain where the depth is less than two feet, only used when a site is not fully built-out. It is intended to delineate the area where, at some later date and in accordance with County policies regarding development within the floodplain, a property owner may grade to create additional buildable area. The premise is not to take a normal easement over the entire floodplain before a site is fully built-out, since the property owner generally feels once the easement is given, the County has no reason to abandon a part of it later to allow the creation of additional buildable area. Therefore, the conditional easement is to be created with specific conditions under which portions of the easement may be abandoned at a later date.

2. Floodplain easements as set forth in policy 1(b) and 1(c) above will not be required for Agricultural and Agricultural-Residential parcels except on a case-by-case basis.

Levees

Levee construction to reclaim floodplain for new development is strongly opposed by the Water Resources Division. There are several possible impacts arising from levee construction. Levees may increase flood elevations outside the protected areas due to loss of floodplain storage and decreased conveyance area, possibly protecting one area only to increase the flood risk elsewhere.

Levees also put newly reclaimed areas unnecessarily at risk for a variety of reasons:
(a) Levees must be maintained to assure they will work when needed. Despite the best maintenance programs, levees may fail when subjected to extended flooding.

(b) Pumping will be required to evacuate local storm runoff. The pumps will require maintenance, which have the potential of failure during a storm event. Also, when an event occurs that is greater than the design event for a pump, there is no overland release for the excess storm water.

There is also the problem of an event in excess of the design event occurring and overtopping the levee. For example, if a levee is designed for the 100-year event, and an event in excess of the 100-year event occurs, the levee could be breached, causing significant flooding to occur behind the levee. In this scenario, the flooding could be catastrophic if the flood depths behind the levee are significant. For this reason, it is proposed that if a levee is allowed to be constructed, the levee be designed to withstand a 200-year flood. Besides providing greater than 100-year protection, this requirement also provides some assurance that if the 100-year flood elevation is increased in the future due to new information, the area behind the levee will be protected and will not suddenly be placed within FEMA’s 100-year floodplain and subject to new insurance and development restrictions. It also lessens the chances of catastrophic flooding and possible fatalities associated with deep flooding.

It should also be recognized that levees and associated pumping systems are expensive to construct initially as well as to maintain in perpetuity. Gravity drainage systems are generally much less expensive alternatives.

It is not the intent of these policies to prevent the construction of levees to protect existing development. However, such proposals must be reviewed very carefully on a case-by-case basis to assure they will not adversely impact flooding elsewhere.

1. Levees will not be allowed to be constructed in order to reclaim floodplain for new development.

2. If levee construction is approved to reclaim floodplain for new development, then 200-year flood protection is required, to the satisfaction of the Chief of the Water Resources Division.

**Miscellaneous**

It is proposed that newly improved watercourses be designed to allow for low maintenance. The watercourses will be sized properly to allow for increased vegetative growth that may be expected. This is particularly important in areas within watercourses that are designated as wetland mitigation areas.

It is also proposed that street frontage be encouraged adjacent to floodplains where physically possible.
reasonable. Street frontage allows access to floodplain areas, typically provides additional floodplain storage, and discourages property owners from dumping trash in the floodplain by putting it in full public view.

Density within the floodplain should not be increased through up zoning prior to preparation of master plans. Rezones of parcels that are partially within a floodplain will be allowed outside the floodplain, and within the floodplain consistent with the policies in this document, such as allowing some cut and fill along the edge of the floodplain.

1. Improvements to watercourses in currently undeveloped areas will be designed for low maintenance. Appropriate Manning's "n" values will be used in design of the watercourse to reflect future vegetative growth (including mitigation plantings) associated with the low maintenance concept.

2. Development adjacent to floodplains shall, where physically reasonable, provide a public street paralleling at least one side of the floodplain.

3. Naturally appearing channels will be encouraged for watercourses in newly developing areas (outside of identified in-fill areas).

4. The placement of concrete lining within watercourses will be strongly discouraged. However, it will not be prohibited in identified in-fill areas where it is consistent with the existing adjacent reaches of the watercourse. Concrete drainage outfall structures, access ways, bicycle trails, roadway crossings, etc. will not be prohibited.

5. Areas within a 100-year floodplain shall not be up zoned to a more intensive use unless and until a Master Drainage Plan is prepared that identifies areas of the floodplain that may be developed, except where development is allowed under the other policies contained within this document. For example, AR-5 zoning within a floodplain shall not be rezoned to RD-5.

POSSIBLE SOLUTIONS FOR EXISTING PROBLEM AREAS

Flood Mitigation Assistance

In order to mitigate against the long term risk of flood damage to repetitive loss structures county wide, and reduce or eliminate flood claims, Sacramento County Department of Water Resources is applying for a Federal Emergency Management Agency sponsored Flood Mitigation Assistance Grant (FMA). These funds would be used to acquire or elevate repetitive loss structures located in Sacramento County in accordance with the County General Plan. The priority properties are those repetitive loss structures contained within the NFIP Repetitive Loss List, ranked in the order they appear. In the FMA application, Sacramento County Department
of Water Resources will seek permission to include other viable elevation applicants in addition to the repetitive loss properties. This request for expanded eligibility reflects the fact that many structures on the National Flood Insurance Program (NFIP) Repetitive Loss List have already been mitigated under the HMGP Home Elevation Program.

**Specific Problem Areas**

The following are activities that are specific for each of the watersheds identified in Section I. The following is a brief summary for the causes of flooding in each area, along with possible activities that can be implemented to mitigate the problems of flooding.

**SACRAMENTO RIVER**

The Sacramento River weir protocol is being reviewed by the California Department of Water Resources, the Army Corps of Engineers and the Sacramento Area Flood Control Agency. Currently, it is recommended that the flood victims located on the wet side of the Sacramento River levee elevate above flood risk.

There are several repetitive loss properties that were built low, before the current County of Sacramento floodplain policies (pre-FIRM). There are other newer (post-FIRM) homes that have been built above the base flood elevation but still have repetitive loss claims. Additional investigation may conclude that flood damages are not due to water entering the main living areas.

The following are possible activities for structures located along the Sacramento River:

**Flood Control** The US Army Corps of Engineers in conjunction with the Sacramento Area Flood Control Agency have made numerous improvements to the river levees improving flood protection for properties on the dry side of the levees. However, the homes that have been built on the wet side of the levees are still at risk.

**Property Protection.** For new development, all structures are required to be constructed one foot or higher than the highest 100-year base flood elevation determined by the County. Elevation of existing structures is possible and has been accomplished in both the Garden Highway and Isleton areas. All owners of repetitive loss properties have been invited to participate in the elevation program, and some have been elevated.

**Emergency Services.** In the event that structures in this area have the potential of being flooded, sandbagging or other flood proofing method may be a feasible solution. Property owners will be responsible for these activities.

**Floodplain Management.** The County's Grading and Erosion Control Ordinance and Stormwater Ordinance apply countywide, including this area. The County has no comprehensive plan or zoning
ordinance in place for this area, nor is one planned for the near future. There are existing residential and commercial parcels that should enjoy their property rights without causing any negative impacts to the floodway of the Sacramento River.

**Elevation of Structures.** The County has received grant monies from the Federal Emergency Management Agency to facilitate elevation of repetitive loss structures.

**DRY CREEK / NEMDC & TRIBUTARIES**

Dry Creek will essentially be treated as a natural stream in that there are existing flooding problems and overbank storage in extreme flood events. Sacramento and Placer Counties are jointly studying flooding along Dry Creek and have developed new hydrology for the watershed. Water Resources Division has used the results of this study to determine the 100-year flood elevation and floodplain location. Detention will not be required in this watershed (downstream of Placer County), per determination of the joint Placer/Sacramento County study.

**Dry Creek Tributaries** include Basin "A" and Basin "B" (also known as Sierra Creek), Magpie Creek, and Robla Creek. Robla Creek should be treated as a natural stream until a master plan is provided. Only short reaches of Basin "A" and Magpie Creek have not been previously channelized. More substantial reaches of Sierra Creek have not been channelized to date. New development within these watersheds will be considered in-fill. Flood control detention will not be required for these watercourses, consistent with results of the joint Placer/Sacramento County Dry Creek Study. Further channelization is acceptable since these are in-fill areas. It is recommended that development in these floodplains be reviewed on a case-by-case basis.

**The NEMDC Tributaries** are located in largely undeveloped areas. The downstream, or westerly end of the watercourses are in the backwater area of the NEMDC. The watercourses are typically very small, and need to be deepened to gravity drain adjacent lands before substantial development can occur. The Water Resources Division recommends that master plans be prepared prior to any large-scale development within this watershed.

**Conclusions from the Review**

From its review of the numerous past studies, Sacramento County Water Resources Division draws the following conclusions:

- Local and regional flood control detention above Roseville may be beneficial to halt increases in, or potentially reduce, peak flood flows.
- The Sacramento Area Flood Control Agency (SAFCA) project to raise existing levees and build new levees will protect portions of Rio Linda and the City of Sacramento near the
mouth of Dry Creek.

- Local projects are needed to protect areas that are now threatened, and those projects must be designed or mitigated to prevent any increased risk elsewhere in the watershed.

- Acquisition of properties within the Dry Creek floodway is deemed an appropriate mitigation measure. Sacramento Area Flood Control Agency and the County of Sacramento ultimately desire to rezone this floodway area to open space. Some properties have been acquired and the County is currently working with FEMA to obtain additional grant monies for acquisitions.

- Elevation of structures to above the base flood elevation is an effective mitigation measure and has been occurring in this area.

Possible activities for Dry Creek / NEMDC area are as follows:

**Flood Control.** For the Natomas tributaries, flood control detention may be required for subdivisions and any commercial sites larger than one acre, as deemed necessary and to be determined on a case-by-case basis.

**Property Protection.** For new development, all structures are required to be constructed at least one-foot above the highest 100-year base flood elevation determined by the County. The most effective protection for existing structures will be the acquisition of properties in the Dry Creek Parkway between the North and South branches of Dry Creek, and the elevation of properties in the floodway fringes. A total of 13 properties have been acquired, including 8 repetitive loss properties. Five of the repetitive loss structures in this area have been elevated.

**Emergency Services.** The County of Sacramento Department of Water Resources (County DWR) offers continuous technical assistance to property owners who want to protect themselves for flood risk. County DWR has a web site with real time rain gage, creek, stream and river flow information. Flood warning is done in conjunction with the County Sheriff and emergency operation personnel. Unfortunately, this area is prone to flash flooding, so warning time is minimal. In the event that structures in this area have the potential of being flooded, sandbagging is sometimes a feasible solution. Property owners will be responsible for the sandbagging of their properties.
**Floodplain Management Policies Related to New Construction.**

Along with the County’s Grading and Erosion Control Ordinance and Stormwater Ordinance (apply county-wide), the following policies are applicable for this area:

**For the Natomas tributaries:**
1. Development and rezones to increase density may not occur within the 100-year floodplain prior to the establishment of a master drainage plan, except as outlined below. Building permits for single structures on a parcel will be reviewed on a case-by-case basis. Some development and rezones may occur in the floodplain fringe provided:
   
   (a) the depth of the 100-year flood is less than two feet;
   
   (b) there is no net loss of storage within the 100-year floodplain;
   
   (c) there is in-kind replacement of lost floodplain storage;
   
   (d) substantial grading within the floodplain will not occur less than 75 feet from the centerline of the existing watercourse.

2. Areas outside the 100-year floodplain designated as possible areas of channel realignment, detention sites, or urban runoff treatment sites during preliminary phases of the master plan study will not be allowed to develop until the study is complete.

3. Development and rezones will be allowed in areas outside the 100-year floodplain prior to the establishment of a master drainage study provided a fair share contribution is made toward the cost of future drainage improvements and master drainage plan study cost, with the exceptions listed in policy 2 above.

**For Dry Creek:**
1. Development may not cause an offsite increase in the 100-year flood elevation.

2. Adequate topography with one-foot contours will be required for all land less than two feet above the 100-year flood elevation.

3. A certified grading plan will be required once grading is complete.

4. New development and increased zoning density will not be allowed in the floodway of Dry Creek, including building permits for single structures on single lots.
For the Dry Creek Tributaries:
1. Floodplain encroachment will be allowed outside the floodway where the depth of the 100-year flood is less than two feet, except for Robla Creek, where development must be reviewed on a case-by-case basis. Floodplain encroachment where the depth of the 100-year flood is greater than two feet may be allowed on a case-by-case basis provided it is consistent with existing development in the watershed.

NATURAL STREAM GROUP & TRIBUTARIES

The majority of the watersheds are approaching full buildout. The drainage corridors have been crowded by development. The effect of new development in the basins on increasing stream flow due to increased impervious area is considered minor for most of these watercourses.
Possible activities within the Natural Stream Group area are as follows:

Flood Control. Levees and detention are not feasible due to the minimal open area available adjacent to creeks, and nearly full buildout of the watersheds. Channel improvements are discouraged, however some exceptions may be allowed for the following situations:

(a) as prescribed in the Natural Streams Plan;
(b) to provide erosion protection;
(c) for necessary transitions, crossings, maintenance ramps, etc.;
(d) as determined in approved master drainage plans; and
(e) minor tributary drainage.

Property Protection. For new development, all structures are required to be constructed one foot or higher than the highest 100-year base flood elevation determined by the County. The most effective protection for existing structures will be elevation of the structures. A total of 9 repetitive loss properties have been elevated in this area. There have also been several flood control projects, including drainage improvements and floodwalls that have reduced the flood risk on at least 11 repetitive loss properties in this area.

Emergency Services. This area is prone to flash flooding. The County DWR provides real time rain gage and stream gage information on the internet. In the event that structures in this area have the potential of being flooded, sandbagging may be a feasible solution. Property owners will be responsible for the sandbagging of their properties.
Floodplain Management Policies Related to New Construction.

Along with the County's Grading and Erosion Control Ordinance and Stormwater Ordinance (apply county-wide), the following policies are applicable for this area:

1. Development shall not cause an offsite increase in the 100-year water surface elevation due to encroachment within the conveyance portion of a watercourse unless a floodplain easement is obtained for all impacted offsite floodplain areas. Exceptions may be considered for watercourse crossings on a case-by-case basis.

2. Provisions of the Natural Streams Plan will be followed.

3. Adequate topography with one-foot contours will be required for all areas where the land is less than two feet above the 100-year water surface elevation. The topography must be based upon an onsite survey and stamped and signed by a licensed land surveyor or registered civil engineer.

4. A certified grading plan will be required once grading is complete.

5. Floodway easements will be required over those portions of the 100-year floodplain determined to be within the conveyance area of a watercourse.

MORRISON CREEK STREAM GROUP

The Morrison Creek Stream Group (MCSG) watershed will be divided into two groups for floodplain policy, representing in-fill areas and currently undeveloped areas. The in-fill areas consist of watercourses that have previously been channelized and are generally surrounded by existing development, often to the channel banks. The undeveloped areas will include areas where little or no channel improvement has occurred and there is little or no existing development.

All watercourses within the MCSG flow into the City of Sacramento outfalling to Beach Stone Lakes and ultimately to the Sacramento River Delta.

In-fill Areas of the MCSG

The in-fill portions of these watercourses have previously been channelized and have significant urbanized area near the channel. Much of the original floodplain has been reclaimed. The existing improved channels often do not represent the ultimate required channel section as they were designed for lesser flows than are currently recognized as the 100-year flows. Channel improvements may still occur in these watercourses as they are not designated natural streams, and
these improvements may reclaim land that is currently within the 100-year floodplain.

**Undeveloped areas within the MCSG**

The watercourses in these areas have not been channelized beyond ditches constructed by private property owners. The floodplains are generally shallow and relatively wide. Some channel improvements will be necessary to provide gravity outfall to drain the adjacent lands. Regional detention may be required to keep the ultimate buildout flows to existing condition flows. Comments for the in-fill areas concerning peak flow apply to the undeveloped areas as well.

Possible activities for the MCSG are as follows:

**Flood Control.**

There are various, however yet unapproved, plans for flood control at the Beach Stone Lakes outfall area. Flood warning is available by real time ALERT system internet site. This area does not typically flash flood, some warning time is available, assuming accurate weather forecasts. Sandbagging can be an effective emergency measure.

**Property Protection.** For new development, all structures are required to be constructed at least one-foot above the highest 100-year base flood elevation determined by the County. Elevation will be an effective method of protection of existing structures. Two homes are currently being considered for elevation under the FEMA grant program.

**Emergency Services.** In the event that structures in this area have the potential of being flooded, sandbagging is a feasible solution and should work effectively. Property owners will be responsible for the sandbagging of their properties.

**Floodplain Management Policies Related to New Construction.**

Along with the County's Grading and Erosion Control Ordinance and Stormwater Ordinance (apply county-wide), the following policies are in place for the in-fill areas of the MCSG:

1. Floodplain encroachment will be allowed outside of the floodway where the depth of the 100-year flood is less than two feet.

2. Encroachment into the conveyance area of a floodplain will not cause an increase in the peak 100-year flood elevation unless the increase has no adverse impact on existing development.
The following are policies in place for the undeveloped areas of the MCSG:

1. Development and rezones to increase density may not occur within the 100-year floodplain prior to the establishment of a master drainage plan, except as outlined below. Building permits for single structures on a single parcel will be reviewed on a case-by-case basis. Some development and rezones may occur in the outer edge of the floodplain provided:
   (a) the depth of the 100-year flood is less than two feet;
   (b) there is no net loss of storage within the 100-year floodplain;
   (c) there is in-kind replacement of lost floodplain storage;
   (d) substantial grading will not occur within the floodplain less than 150 feet from the centerline of the existing channels for Morrison, Elder (downstream of Bradshaw Road), Laguna, and Laguna Tributary #1 (downstream of the CCTRR) creeks; and not less than 75 feet from the centerline of all other watercourses.

2. Areas outside the 100-year floodplain designated as possible areas of channel realignment, detention sites, or urban runoff treatment sites during preliminary phases of the master plan study will not be allowed to develop until the master drainage plan is complete.

IV. SELECTION OF APPROPRIATE ACTIVITIES

Based on the Review of Possible Activities, it is recommended that the County implement the following activities:

- Continue to implement and enforce the Countywide policies listed in Section III- Review of Possible Activities. The majority of these policies are enforced by the Water Resources Division. The implementation and enforcement of these policies are ongoing, and funding is provided through the normal budget of Water Resources Division.

- Provide annual inspection and maintenance on all drainage channels, streams, ditches, and creeks within the County's jurisdiction, and record all work performed. This activity is currently in practice by the Operations and Maintenance section of the Water Resources Division. All creeks shall be inspected and individually evaluated, and any special maintenance needed for each creek will be investigated and undertaken if practical. This activity is ongoing throughout each year, and is funded through the normal budgeting of Storm Water Utility monies.
• Pursue the acquisition of properties within the Dry Creek Parkway Corridor. The Sacramento County Department of Parks and Recreation is currently in the process of attempting to acquire parcels located within the floodplain, some of which are repetitive loss properties. This activity is ongoing and is funded through grants from FEMA.

• Review the Sacramento County repetitive loss properties on an annual basis to identify candidates for mitigation action. The primary mitigation actions are likely to be elevation of structures above the base flood elevation or acquisition of properties, but can also include improvement of local drainage, installation of flood walls, or flood-proofing of the structures.

• Provide technical advice to residents who want to know more about flood protection and flood preparedness. This information is made available to the public by personnel at the Water Resources Division via annual utility bill mailers, the Internet and at the public counter. If any questions should arise that can not be immediately answered, then the inquirer will either be instructed of other sources to call for technical advice, such as FEMA, or will be contacted later after research is performed by Water Resources Division. This activity is ongoing throughout each year, and is funded through the normal budget of Water Resources Division.

• Other activities are also being implemented by other agencies that affect Sacramento County. Work is being performed along the Sacramento River levees in the Natomas and South Sacramento areas. The lead agency for this work is the Army Corps of Engineers (COE), and the local agencies are the State Department of Water Resources (Cal-DWR) and the Sacramento Area Flood Control Agency (SAFCA). This work being performed will bring the levees back to their original design capacity.

• The COE, along with Cal-DWR and SAFCA, are currently strengthening levees and are proposing other improvements at the lower American River; near the Folsom Dam. These activities are still at the feasibility stages, therefore it is uncertain whether the above projects will be undertaken.
V. PUBLIC INPUT

This plan was developed after meeting with and/or having telephone conversations with residents of the repetitive loss properties, along with review by the following agencies:

- Federal Emergency Management Agency
- State of California Department of Water Resources
- Sacramento Area Flood Control Agency
- City of Sacramento, Department of Utilities
- Reclamation District 1000
- County of Sacramento Department of Planning
- County of Sacramento Department of Environmental Review
- County of Sacramento Sheriff’s Department
- County of Sacramento Department of Water Resources

It is entered into public record by an advertised County of Sacramento Board of Supervisors meeting.

Their input was greatly appreciated and was considered and incorporated into this Local Floodplain Management Plan.
## Appendix A

Summary - Sacramento County Repetitive Loss Properties - July 2000

Number of Properties in Each Area

<table>
<thead>
<tr>
<th>Category</th>
<th>Sacramento River</th>
<th>Dry Creek</th>
<th>Natural Streams</th>
<th>Morrison Creek</th>
<th>Southern Area</th>
<th>Total by Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevated</td>
<td>3</td>
<td>5</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>Bought Out</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Drainage Improvement</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>County Floodproofing</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Homeowner Floodproofing</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
</tbody>
</table>

### Mitigation Action Completed

| Funded                          | 1                | 2         | 3               | 1              | 1             | 8                 |
| Not Active                      | 2                | 6         | 10              | 1              | 0             | 19                |
| Not yet Planned                 | 3                | 3         | 7               | 1              | 0             | 14                |

### Elevation is Recommended

| Previously Offered              | 0                | 4         | 0               | 0              | 0             | 4                 |
| Not yet Offered                 | 0                | 4         | 0               | 0              | 0             | 4                 |

### Buyout is Recommended

| Drainage Improvement            | 1                | 0         | 3               | 0              | 2             | 6                 |
| Floodproofing                   | 5                | 0         | 1               | 1              | 2             | 9                 |
| House System Relocation         | 0                | 0         | 0               | 2              | 0             | 2                 |

### Other Mitigation Recommended

| Based on Cost vs Benefit        | 0                | 0         | 0               | 0              | 0             | 0                 |
| Based on Claim History          | 1                | 0         | 2               | 0              | 0             | 3                 |

### Mitigation Not Economically Feasible

| Further Study is Required       | 11               | 2         | 5               | 0              | 0             | 3                 |

### Area Totals

| Total                           | 28               | 35        | 53              | 6              | 6             | 128               |

(Properties are located in the unincorporated areas of Sacramento County, and the City of Citrus Heights)
# Appendix B
**Summary - County of Sacramento Flood Zone Areas**

<table>
<thead>
<tr>
<th>Watercourse</th>
<th>FLOOD ZONE AREAS - SQUARE MILES</th>
<th>AE</th>
<th>A</th>
<th>AO</th>
<th>AH</th>
<th>A99</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sacramento County - excluding Elk Grove and Citrus Heights</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American River</td>
<td>5.561</td>
<td>0.220</td>
<td>0.028</td>
<td>8.112</td>
<td>13.921</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arcade Creek</td>
<td>0.248</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arcade Creek - South Branch</td>
<td>0.081</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arkansas Creek</td>
<td>1.021</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Badger Creek</td>
<td>3.924</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Badger Creek - North Fork</td>
<td>3.756</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brooktree Creek</td>
<td>0.025</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Browns Creek</td>
<td>0.772</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carmichael Creek</td>
<td>0.037</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carson Creek</td>
<td>0.549</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicken Ranch Slough</td>
<td>0.205</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cosumnes River</td>
<td>34.405</td>
<td>24.146</td>
<td></td>
<td></td>
<td></td>
<td>58.551</td>
<td></td>
</tr>
<tr>
<td>Coyle Creek</td>
<td>0.022</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crevas Creek</td>
<td>1.192</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cripple Creek</td>
<td>0.036</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dead Horse Cut</td>
<td>0.049</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deadman Gulch</td>
<td>0.824</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deer Creek</td>
<td>2.500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta Area (South of Locke)</td>
<td>61.157</td>
<td>61.157</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta Cross Channel</td>
<td>0.084</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry Creek</td>
<td>1.828</td>
<td>0.213</td>
<td></td>
<td></td>
<td></td>
<td>2.041</td>
<td></td>
</tr>
<tr>
<td>Dry Creek Near Galt</td>
<td>0.420</td>
<td>8.129</td>
<td></td>
<td></td>
<td></td>
<td>8.549</td>
<td></td>
</tr>
<tr>
<td>Elder Creek</td>
<td>1.118</td>
<td>0.063</td>
<td></td>
<td></td>
<td></td>
<td>1.181</td>
<td></td>
</tr>
<tr>
<td>Florin Creek</td>
<td>0.140</td>
<td>0.051</td>
<td>0.003</td>
<td></td>
<td></td>
<td>0.194</td>
<td></td>
</tr>
<tr>
<td>Georgiana Slough</td>
<td>0.916</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.916</td>
</tr>
<tr>
<td>Gerber Creek</td>
<td>0.596</td>
<td>0.329</td>
<td></td>
<td></td>
<td></td>
<td>0.925</td>
<td></td>
</tr>
<tr>
<td>Hadselville Creek</td>
<td>1.962</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.962</td>
<td></td>
</tr>
<tr>
<td>Hen Creek</td>
<td>0.325</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.325</td>
<td></td>
</tr>
<tr>
<td>Laguna Creek</td>
<td>1.727</td>
<td>0.065</td>
<td>0.188</td>
<td></td>
<td></td>
<td>1.980</td>
<td></td>
</tr>
<tr>
<td>Laguna Creek Near Galt</td>
<td>16.088</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16.088</td>
<td></td>
</tr>
<tr>
<td>Linda Creek</td>
<td>0.153</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.153</td>
<td></td>
</tr>
<tr>
<td>Magpie Creek</td>
<td>0.251</td>
<td>0.481</td>
<td></td>
<td></td>
<td></td>
<td>0.732</td>
<td></td>
</tr>
<tr>
<td>Mather Field Main Drain</td>
<td>0.155</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.155</td>
<td></td>
</tr>
<tr>
<td>Mather Field Main Drain</td>
<td>0.001</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Tributary</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mather Field West Drain</td>
<td>0.028</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.028</td>
<td></td>
</tr>
<tr>
<td>Mather Lake Tributary</td>
<td>0.050</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.050</td>
<td></td>
</tr>
<tr>
<td>Mokelumne River</td>
<td>0.917</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.917</td>
<td></td>
</tr>
<tr>
<td>Mokelumne River North Fork</td>
<td>1.012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.012</td>
<td></td>
</tr>
<tr>
<td>Mokelumne River Overflow</td>
<td>0.300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.300</td>
<td></td>
</tr>
<tr>
<td>Chann</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morrison Creek</td>
<td>3.568</td>
<td>0.003</td>
<td>0.015</td>
<td></td>
<td></td>
<td>3.586</td>
<td></td>
</tr>
<tr>
<td>Natomas East Drainage Canal</td>
<td>6.404</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6.404</td>
<td></td>
</tr>
<tr>
<td>Natomas North Drainage Canal</td>
<td>0.189</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.189</td>
<td></td>
</tr>
<tr>
<td>Natomas West Drainage Canal</td>
<td>3.730</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.730</td>
<td></td>
</tr>
<tr>
<td>NEMDC</td>
<td>0.952</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.952</td>
<td></td>
</tr>
<tr>
<td>NEMDC Tributary F</td>
<td>0.398</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.398</td>
<td></td>
</tr>
<tr>
<td>NEMDC Tributary G</td>
<td>0.540</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.540</td>
<td></td>
</tr>
<tr>
<td>NEMDC Tributary I</td>
<td>0.321</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.321</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix B

**Summary - County of Sacramento Flood Zone Areas**

<table>
<thead>
<tr>
<th>Watercourse</th>
<th>FLOOD ZONE AREAS - SQUARE MILES</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AE</td>
<td>A</td>
</tr>
<tr>
<td>Robla Creek</td>
<td>0.456</td>
<td>0.201</td>
</tr>
<tr>
<td>Sacramento River</td>
<td>9.952</td>
<td></td>
</tr>
<tr>
<td>San Joaquin River</td>
<td>15.245</td>
<td></td>
</tr>
<tr>
<td>Seven Mile Slough</td>
<td>0.380</td>
<td></td>
</tr>
<tr>
<td>Sierra Creek</td>
<td>0.048</td>
<td></td>
</tr>
<tr>
<td>Skunk Creek</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snodgrass Slough (South of Locke)</td>
<td>0.620</td>
<td></td>
</tr>
<tr>
<td>Steamboat Slough</td>
<td>0.769</td>
<td></td>
</tr>
<tr>
<td>Stone Lakes Area</td>
<td>36.389</td>
<td>0.235</td>
</tr>
<tr>
<td>Strawberry Creek</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strong Ranch Slough</td>
<td>0.442</td>
<td></td>
</tr>
<tr>
<td>Sutter Slough</td>
<td>0.194</td>
<td></td>
</tr>
<tr>
<td>Three Mile Slough</td>
<td>0.495</td>
<td></td>
</tr>
<tr>
<td>Todd Creek</td>
<td>0.045</td>
<td></td>
</tr>
<tr>
<td>Todd Creek Tributary</td>
<td>0.022</td>
<td></td>
</tr>
<tr>
<td>Tracy Ravine</td>
<td>0.125</td>
<td></td>
</tr>
<tr>
<td>Unionhouse Creek</td>
<td>0.125</td>
<td>0.048</td>
</tr>
<tr>
<td>Verde Cruz Creek</td>
<td>0.042</td>
<td>0.008</td>
</tr>
<tr>
<td>Willow Creek</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>182.650</td>
<td>80.122</td>
</tr>
</tbody>
</table>

### Elk Grove

<table>
<thead>
<tr>
<th>Watercourse</th>
<th>FLOOD ZONE AREAS - SQUARE MILES</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AE</td>
<td>A</td>
</tr>
<tr>
<td>Cosumnes River</td>
<td>0.279</td>
<td></td>
</tr>
<tr>
<td>Deer Creek</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elk Grove Creek</td>
<td>0.224</td>
<td></td>
</tr>
<tr>
<td>Laguna Creek</td>
<td>1.227</td>
<td></td>
</tr>
<tr>
<td>Laguna Creek - North Fork</td>
<td>0.139</td>
<td>0.015</td>
</tr>
<tr>
<td>Laguna Creek Tributary No. 1</td>
<td>0.226</td>
<td></td>
</tr>
<tr>
<td>Stone Lakes Area</td>
<td>0.111</td>
<td></td>
</tr>
<tr>
<td>Strawberry Creek</td>
<td>0.086</td>
<td>0.060</td>
</tr>
<tr>
<td>Whitehouse Creek</td>
<td>0.333</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.625</td>
<td>0.060</td>
</tr>
</tbody>
</table>

### Citrus Heights

<table>
<thead>
<tr>
<th>Watercourse</th>
<th>FLOOD ZONE AREAS - SQUARE MILES</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AE</td>
<td>A</td>
</tr>
<tr>
<td>Arcade Creek</td>
<td>0.238</td>
<td></td>
</tr>
<tr>
<td>Arcade Creek - South Branch</td>
<td>0.028</td>
<td></td>
</tr>
<tr>
<td>Brooktree Creek</td>
<td>0.044</td>
<td></td>
</tr>
<tr>
<td>Coyle Creek</td>
<td>0.006</td>
<td></td>
</tr>
<tr>
<td>Cripple Creek</td>
<td>0.339</td>
<td></td>
</tr>
<tr>
<td>Mariposa Creek</td>
<td>0.027</td>
<td></td>
</tr>
<tr>
<td>San Juan Creek</td>
<td>0.052</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.734</td>
<td>0</td>
</tr>
</tbody>
</table>

### Community Totals

|                                    | 186.009 | 80.182 | 1.652 | 0.027 | 8.112 | 275.982 |