

REPETITIVE LOSS AREA ANALYSIS REPORT

JULY 2015

Sacramento County Repetitive Loss Area Analysis

Table of Contents

EXECUTIVESUMMARY	2
1. BACKGROUND	3
1.1 Problem Statement	3
1.2 National Flood Insurance Program (NFIP)	3
1.3 Community Rating System (CRS)	4
1.4 Repetitive Loss Area (RLA)	4
1.5 Sacramento County Floodplain Management Ordinance	4
1.6 Repetitive Loss Area Analysis (RLAA)	6
2. REPETITIVE LOSS AREA ANALYSIS PROCESS	7
2.1 Advise the Residents	7
2.2 Contact Agencies or Organizations	11
2.3 Visit RLAs and Collect Basic Building Data	11
2.4 Review Alternatives	12
2.4.1 Preventative	12
2.4.2 Property Protection	13
2.4.3 Natural Resources Protection	19
2.4.4 Emergency Services	19
2.4.5 Structural Projects	19
2.4.6 Public Information	19
2.5 Document the Findings	20
2.5.1 Data Collection	20
2.5.2 Types of Foundations	21
2.6 Funding Assistance	22
APPENDICES	24
Appendix 1	Dry Creek Floodplain
Appendix 2	Laguna Creek Floodplain (Inter-Basin Transfer) Gerber Creek
Appendix 3	Local Drainage (Andrew Alan Lane and Winding Way)

Appendix 4	Chicken Ranch Slough Floodplain
Appendix 5	Lower Cosumnes River / Beach-Stone (Twin Cities Road)
Appendix 6	Brooktree Creek Floodplain
Appendix 7	Morrison Creek Floodplain
Appendix 8	Cosumnes River Floodplain
Appendix 9	South Branch of Arcade Creek Floodplain
Appendix 10	Strong Ranch Slough Floodplain
Appendix 11	Linda Creek Floodplain
Appendix 12	Grand Island Road & Vieira's Resort
Appendix 13	Local Floodplain (Badger Creek)
Appendix 14	Arcade Creek Floodplain
Appendix 15	Local Floodplain (Dillard Road/Berry Road)
Appendix 16	Robla Creek Floodplain
Appendix 17	Sacramento River Floodplain (Garden Highway)
Appendix 18	Local Floodplain (Leona Circle)
Appendix 19	Local Floodplain (Tangerine Avenue)
Appendix 20	Local Floodplain (Treehouse Lane)
Appendix 21	Rio Linda Dry Creek Floodplain
Appendix 22	North Natomas East Main Drain Canal
Appendix 23	Morrison Creek Floodplain
Appendix 24	Arcade Creek Floodplain at Park Road
Appendix 25	Local Floodplain Madison Avenue at Rollingwood
Appendix 26	Strong Ranch Slough
Appendix 27	Brooktree Creek Floodplain
Appendix 28	Verda Cruz Creek Floodplain

EXECUTIVE SUMMARY

The purpose of this Repetitive Loss Area Analysis Report (Report) is to assist homeowners in reducing their flood risk by providing a broader understanding of the potential and existing flooding problems and identifying potential solutions. This is one component of Sacramento County's overall floodplain management program. Due to the number of properties in Sacramento County that meet the National Flood Insurance Program's (NFIP's) definition of repetitive loss properties, a Repetitive Loss Area Analysis (RLAA) is required for Sacramento County as a part of its participation in the Community Rating System (CRS) program. This Report contains all twenty-eight (28) designated repetitive loss areas (RLAs) within Sacramento County.

The County followed a process prescribed by the CRS program. An area analysis must be prepared and adopted for each repetitive loss area in the community. The analyses must meet the following criteria:

- The repetitive loss areas must be mapped.
- A five-step process must be followed. Although all five steps must be completed, steps 2–4 do not have to be done in the order listed. For example, staff may want to contact agencies and organizations to see if they have useful data (Step 2) after the site visit is conducted (Step 3).
- The repetitive loss area analysis report(s) must be submitted to the community's governing body and made available to the media and the public. If private or sensitive information is included in the report, then a summary report may be prepared for the media and the public. The complete repetitive loss area analysis report(s) must be adopted by the community's governing body or by an office that has been delegated approval authority by the community's governing body.
- An annual evaluation report must be done.
- The analysis must be updated in time for each CRS cycle verification visit.

Properties in the RLAs were notified of the analysis and data was collected from various sources to identify the hazard and capabilities to mitigate them.

Section 2 of this Report describes the specific steps, which include: implementing recommended flood hazard mitigation measures, obtaining funding assistance for these measures, and annually updating this Report.

1. BACKGROUND

1.1 Problem Statement

More than 370 square miles of Sacramento County are within the FEMA Special Flood Hazard Area as designated on the Flood Insurance Rate Map (FIRM). Additionally, the Department of Water Resources has identified many other areas that are subject to local flood hazards that are not shown on FEMA's maps. Flooding is a reoccurring problem for communities within Sacramento County, and neighborhood flooding events disrupt transportation, commerce, and lives. Property damage due to flooding is more than an inconvenience; it carries a significant price of both time and money.

Flooding is defined as a damaging overflow of water into a building or onto land that is dry most of the time. One type of flooding occurs when streams or rivers overflow into a floodplain, but flooding also occurs outside of floodplains when the rate of storm water runoff exceeds the capacity of the drainage system. Flooding in Sacramento County is due to the capacity of the drainage system and to overflowing rivers or streams.

The purpose of this Report is to help homeowners reduce their flood risk by providing a broader understanding of the problems and identifying potential solutions. This is one component of Sacramento County's overall floodplain management program. Due to the number of properties in Sacramento County that meet the National Flood Insurance Program's (NFIP's) definition of repetitive loss properties, a Repetitive Loss Area Analysis (RLAA) is required for Sacramento County as a part of its participation in the Community Rating System (CRS) program.

1.2 National Flood Insurance Program (NFIP)

The NFIP is based on a cooperative agreement between the Federal Emergency Management Agency (FEMA) and local units of government. FEMA agrees to underwrite flood insurance policies within a community and the community agrees to regulate development in the floodplain. Participation in the NFIP is voluntary, but communities have incentive to join because federally-backed flood insurance is not available in non-participating communities and a non-participating community will not receive federal aid for damage to insurable buildings in the floodplain.

The three basic components of the NFIP are floodplain mapping, flood insurance, and floodplain management regulations. Floodplain mapping is provided by FEMA on a series of maps called Flood Insurance Rate Maps (FIRM), which designate areas of a community according to various levels of flood risk. Regardless of its risk level, any building in a participating community can be covered by a National Flood Insurance policy. A flood insurance policy is mandated by most mortgage lenders when a building is within the Special

Flood Hazard Area. Any new buildings constructed in a floodplain, and any improvements or repair of existing buildings in a floodplain, is subject to the Sacramento County Floodplain Management Ordinance (Chapter 6).

1.3 Community Rating System (CRS)

The CRS is a voluntary program designed to reward a community for doing more than meeting the NFIP minimum requirements to reduce flood damages. Communities can be rewarded for activities such as: reducing flood damage to existing buildings, managing development in areas not shown in the floodplain on the FIRM, protecting new buildings from floods greater than the 100-year flood, helping insurance agents obtain flood data, and helping people obtain flood insurance. The reward for these activities comes in the form of reduced premiums for flood insurance policy holders.

Once a community has been accepted into the CRS, the community's floodplain management activities are rated according to the scoring system described in the CRS Coordinator's Manual. CRS communities are rated on a scale of 1-10. A Class 10 community receives no reduction in flood insurance premiums, but every class above 10 receives an additional 5% premium reduction. Class 1 requires the most credit points and provides a 45% premium reduction. Sacramento County is currently a Class 3 and flood insurance policies are reduced by up to 35%.

1.4 Repetitive Loss Area (RLA)

The NFIP considers a property a repetitive loss property if two or more flood insurance claims of more than \$1,000 have been paid within any 10-year period since 1979. According to FEMA records, there are 101 repetitive flood loss properties within Sacramento County. Several more properties within Sacramento County may have reached the damage threshold for repetitive loss, but not all properties are covered by flood insurance and flood insurance claims are not submitted for all flood damage sustained.

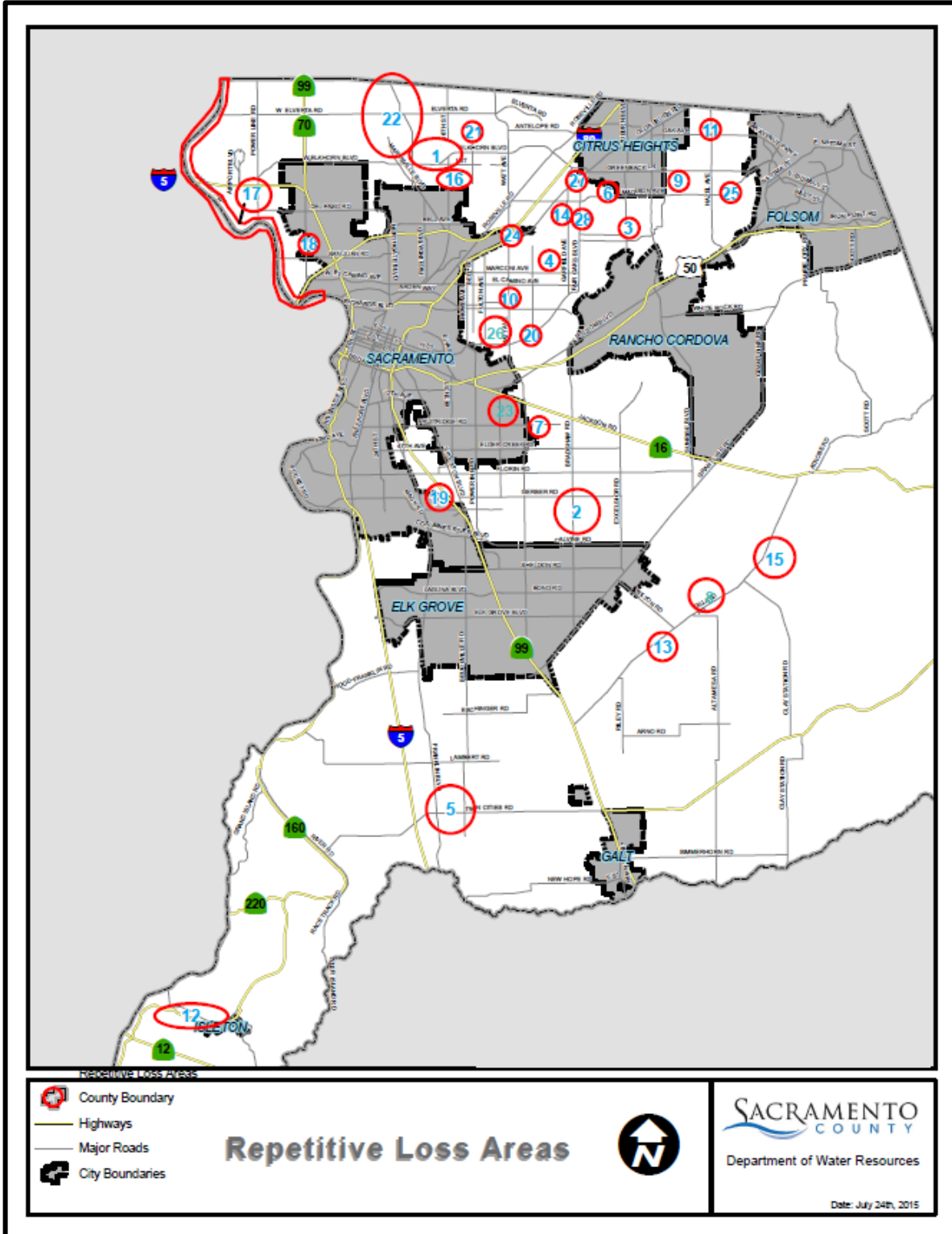
A Repetitive Loss Area (RLA) consists of repetitive loss properties and the surrounding properties that experience the same or similar flooding conditions, whether or not the buildings on those surrounding properties have been damaged by flooding. Figure 1 shows the 26 RLAs in Sacramento County.

1.5 Sacramento County Floodplain Management Ordinance

The Floodplain Management Ordinance specifically describes what types of development activities are allowed and how proposed development may be permitted. The floodplain management is to realize the extent of flood hazards and to manage the flooding in a manner so

as to reduce damage to structures and infrastructure and to minimize the risk of human casualties.

FIGURE 1
Repetitive Loss Areas in Sacramento County



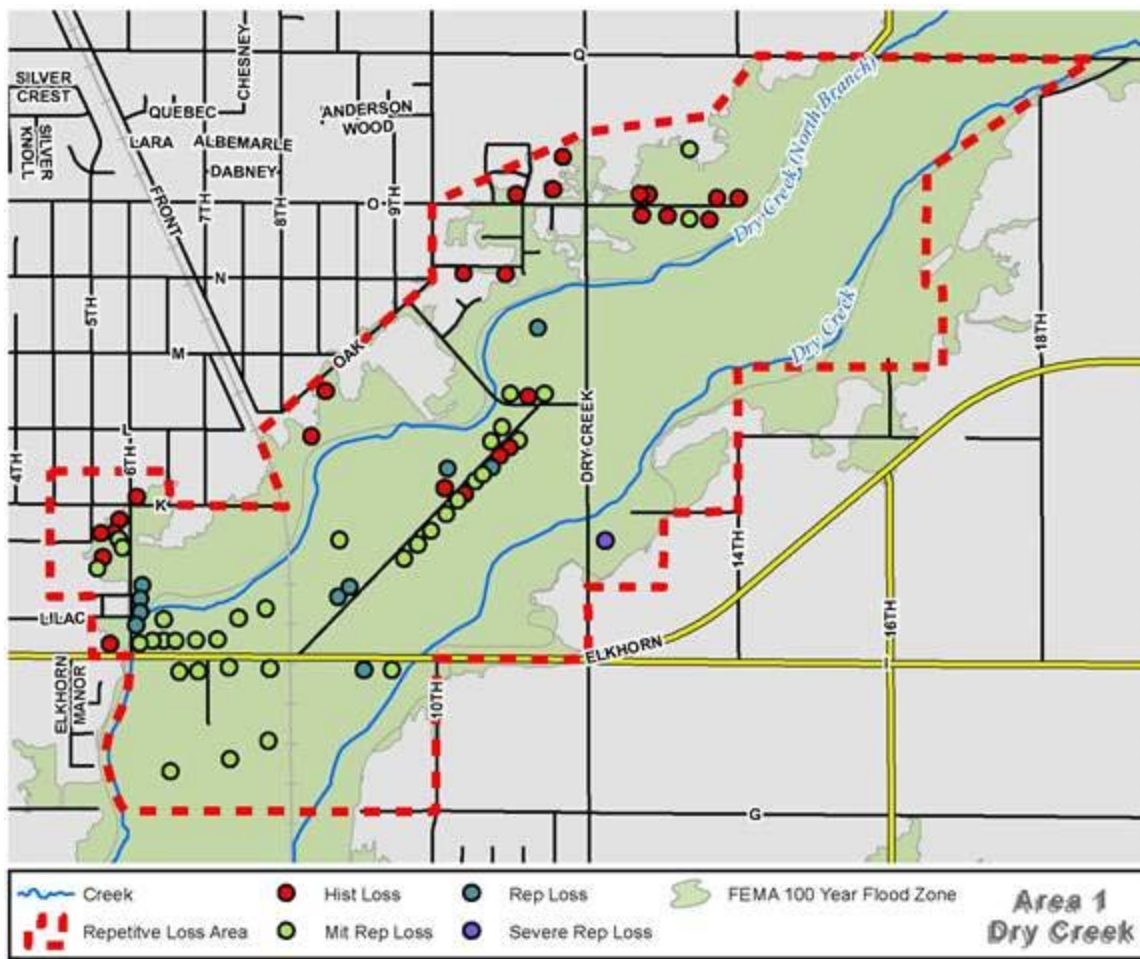
1.6 Repetitive Loss Area Analysis (RLAA)

A repetitive loss area analysis is a detailed mitigation plan for a repetitive loss area. It provides more specific guidance on how to reduce damage from repetitive flooding than the local hazard mitigation plan. The summary RLAA can be found in the Sacramento County Local Hazard Mitigation Plan.

As with a local hazard mitigation plan, CRS credit is dependent upon the community's following an appropriate process. The five steps for an area analysis are less involved than the 10-step local hazard mitigation planning process, but the analysis must evaluate each building in the repetitive loss area(s).

Figure 2 demonstrates a RLAA map with the typical information in the legend.

FIGURE 2
Repetitive Loss Area



2. REPETITIVE LOSS AREA ANALYSIS PROCESS

The process of developing a RLAA consists of five steps:

Step 1 – Advise all the properties in each Repetitive Loss Area (RLA) that the analysis will be conducted and request their input on the hazard and recommended actions.

Step 2 – Collect data from agencies or organizations that may have plans or studies that could affect the cause or impacts of the flooding.

Step 3 – Inspect each building in the RLA and collect basic data. Building entry is not necessary for this step since adequate information can be collected by observing the building from the street.

Step 4 – Review alternative approaches and determine whether any property protection measures or drainage improvements are feasible. The review must consider the full range of property protection measures for the types of buildings affected, including: preventative activities, property protection activities, natural resource protection activities, emergency services measures, structural projects, and public information activities.


Step 5 – Document the findings in a report. The report should include: a summary of the process that was followed and how property owners were involved in the process; a problem statement with a map of the affected area; a list or table showing basic information for each building in the affected area; the alternative approaches that were reviewed; and a list of action items identifying the responsible party, when the action should be completed, and how it will be funded.

2.1 Advise the Residents

Sacramento County sent Storm Ready letters and mailers to all residents informing them of the potential flooding they may experience during storm events. Annual outreach letters have been mailed to residents in RLAs since 1992. Further a website has been developed and communicated to residence for more information on measures to take in advance of the rainy season to prepare for inclement weather and possible flooding, www.stormready.org.

Sacramento County shall notify residents of the ongoing RLAA and requested their input. Upon completion of a draft of this Report, a letter and survey was sent out to residents in each of the RLAA's informing them of this Report, where and how they would be able to review it, and where and how they might submit comments regarding it. Both communication documents are shown in Figure 2A & 2B respectively.

FIGURE 2A Repetitive Loss Area Report Letter

<p>Robert B. Leonard Chief Deputy County Executive</p> <p>Department of Water Resources Michael L. Peterson, Director</p>		<p>Bradley J. Hudson County Executive</p>
<p>County of Sacramento</p>		

Dear Resident,

The Sacramento County Department of Water Resources is conducting a Repetitive Loss Area Analysis (RLAA) report. A Repetitive Loss Area (RLA) includes the properties on the repetitive loss list obtained from FEMA and all nearby properties with the same or similar flooding conditions. It is important to note that the only reason a property appears on FEMA's list is because the structure had flood insurance and received two or more claims of at least \$1,000 during any given 10-year period. These properties are merely representative of the County's overall repetitive flooding problem.


You are receiving this letter because this property has been identified in a RLA. Sacramento County is looking for input from residents in these areas about their flooding experiences and for comments on our draft report. Please take a few minutes to complete the attached survey and return it by **DATE** to:


Sacramento County
Department of Water Resources
827 7th St. Suite 301
Sacramento, CA 95814
Attention: Floodplain Management

You may also fax your survey to (916)874-3789 or email it to floodj@saccounty.net. The survey is also available online survey at www.surveymonkey.com. At the end of the survey, you will have the opportunity to express your interest in commenting on our draft report or just to review it.

Thank you in advance for your assistance. If you have any further questions, please contact Sacramento County Department of Water Resources Floodplain Management at (916) 874-6851.

FIGURE 2B-1
Repetitive Loss Area Report Survey





1. Address _____

2. How long have you lived at this address? _____ Months Years

3. Was your home built before 1979? NO YES DON'T KNOW

4. What Type of Foundation does your house have?
 Slab Crawlspace (answer #5) Post/piles (answer #5)

5. If your house has a crawlspace or post/piles foundation, please indicate how high from the grade (ground) your lowest floor of the living area. _____ (in, ft.)

6. Has the property ever flooded? YES NO


7. In what year(s) did your structure(s) flood? _____


8. Did you experience flooding in your Home Attached Garage Other
 If other indicate type of structure (barn, detached garage, etc.) _____

9. Please indicate the depth of flooding:
 Home Depth of flooding _____ inches
 Attached Garage Depth of flooding _____ inches
 Other (describe): _____
 Depth of flooding _____ inches
 Flood water was kept out of structure by sandbagging or other protective measure. Describe: _____

Sacramento County Department of Water Resources | Drainage Development |

FIGURE 2B-2
Repetitive Loss Area Report Survey





10. What caused the flooding? Check all that apply.

<input type="checkbox"/> Drainage from adjacent properties	<input type="checkbox"/> Storm system backup
<input type="checkbox"/> Storm surge from nearby waterways	<input type="checkbox"/> Clogged/undersized drainage ditch
<input type="checkbox"/> Overbank flooding from nearby ditch	<input type="checkbox"/> Other _____

11. Have you taken any measures to protect your property from flooding?

1. <input type="checkbox"/> Installed drains or pipes to improve drainage	5. <input type="checkbox"/> Installed a floodwall
2. <input type="checkbox"/> Sandbagging	6. <input type="checkbox"/> Water Proofed outside walls
3. <input type="checkbox"/> Moved Utilities/content to a higher level	7. <input type="checkbox"/> Elevated all or part of structure(s)
4. <input type="checkbox"/> Regraded yard to keep water away	8. <input type="checkbox"/> Other _____

12. Did any of the measures checked in item #11 work? YES NO

If YES, which ones? _____

If not, do you know why it didn't work? _____

13. Do you have Flood Insurance? YES NO

14. Are you interested in reviewing a copy of the Repetitive Loss Report

YES NO

If yes, please refer to ...

Would you like one of our technicians to visit your property to discuss mitigation measures? Call 874-#### to make an appointment.

Sacramento County Department of Water Resources | Drainage Development
2

2.2 Contact Agencies or Organizations

Agencies or organizations who might have plans or studies that could affect the cause or impacts to flooding include:

- Sacramento County Department of Transportation
- Sacramento Area Flood Control Agency
- Sacramento County Planning and Environmental Review
- Department of Water Resources Drainage Maintenance Engineering

2.3 Visit RLAs and Collect Basic Building Data

On-site inspections of buildings in the RLA will be performed subject to invitation from the property owners. This inspection was performed from the public right-of-way by a County Certified Floodplain Manager (CFM). As such, the CFM did not survey building elevations in relation to the 100-year flood elevation. Therefore, the flood protection assessments in this Report are based upon visual observation of relative elevations and information obtained, and when available from Elevation Certificates on file. Each property within the RLA was visited and the following attributes were documented:

- Foundation type and condition;
- Garage location and relative elevation;
- Property grading;
- Neighborhood topography and flow routes.

A table will be used for each RLA property to summarize the findings.

Condition of Structure – These data are based on the level of repair required. Consultation with the local building official is highly recommended.

- **Good** (optional minor repair) – Select this option when only cosmetic type repairs are needed.
- **Fair** (needs minor repair) – Select this option when the following characteristics are observed:
 - Minor shrinkage cracks due to thermal expansion and contraction
 - Signs of rust on iron or steel members
 - Signs of corrosion of rebar
- **Poor** (needs significant repair) – Select this option when the following types of damage are observed:
 - Bowed brick veneer wall or parapet walls
 - Leaning of wall
 - Cracking of wall due to excessive settlement

- Building settlement
- Large cracking around sills, eaves, chimneys, parapets, and iron or steel lintels
- Differential settlement of chimney
- Fungal and insect attack of wood
- Exposed rebar in concrete walls due to corrosion
- Fire damage

Foundation Type – The selection of a foundation type may require a close inspection of the structure. Consultation with the local building official is highly recommended (see Section 2.5).

2.4 Review Alternatives

Many types of flood hazard mitigation exist, and there is not one mitigation measure that fits every case. Nor is there even one application that fits most cases. Successful mitigation often requires multiple strategies. The CRS Coordinator’s Manual breaks the primary types of mitigation down as displayed in Figure 3.

FIGURE 3
Categories of Floodplain Management Activities (FEMA FIA-15, 2013)

1. **Preventive** activities keep flood problems from getting worse. The use and development of flood-prone areas is limited through planning, land acquisition, or regulation. They are usually administered by building, zoning, planning, and/or code enforcement offices.
2. **Property Protection** activities are usually undertaken by property owners on a building-by- building or parcel basis.
3. **Natural Resource Protection** activities preserve or restore natural areas or the natural functions of floodplain and watershed areas. They are implemented by a variety of agencies, primarily parks, recreation, or conservation agencies or organizations.
4. **Emergency Services** measures are taken during an emergency to minimize its impact. These measures are usually the responsibility of city or county emergency management staff and the owners or operators of major or critical facilities.
5. **Structural Projects** keep flood waters away from an area with a levee, reservoir, or other flood control measure. They are usually designed by engineers and managed or maintained by public works staff.
6. **Public Information** activities advise property owners, potential property owners, and visitors about the hazards, ways to protect people and property from the hazards, and the natural and beneficial functions of local floodplains. They are usually implemented by a public information office.

2.4.1 Preventative

Sacramento County regulates residential and commercial development through its building code, planning and zoning requirements, stormwater management regulations and floodplain

management ordinances. Any project located in a floodplain, regardless of its size, requires a permit from Sacramento County, unless the project can be characterized as routine maintenance.

2.4.2 Property Protection

These measures are generally performed by the property owners or their agents. FEMA has published numerous manuals that help a property owner determine which property protection measures are appropriate for particular situations, several of which are listed below. The manuals listed below are available for review at FEMA website.

- FEMA 259, Engineering Principles and Practices of Retrofitting Floodprone Residential Structures
- FEMA 312, Homeowner's Guide to Retrofitting: Six Ways to Protect Your House from Flooding
- FEMA 551, Selecting Appropriate Mitigation Measures for Floodprone Structures
- FEMA 348, Protecting Building Utilities from Flood Damage
- FEMA 511, Reducing Damage from Localized Flooding
- FEMA 102, Floodproofing Non-Residential Structures
- FEMA 84, Answers to Questions about the NFIP
- FEMA 54, Elevated Residential Structures Book
- FEMA 268, Protecting Floodplain Resources: A Guidebook for Communities
- FEMA 347, Above the Flood: Elevating Your Floodprone House
- FEMA 85, Protecting Manufactured Homes from Floods and Other Hazards

For a complete guide to retrofitting your home for flood protection see *FEMA P-312, Homeowner's Guide to Retrofitting 3rd Edition (2014)*. The primary methods of property protection in Sacramento County are:

1. Demolition/Relocation.
2. Elevation (structure or damage prone components such as furnace or AC unit)
3. Dry flood-proof (so water cannot get in).
4. Wet flood-proof portions of the building (so water won't cause damage).
5. Direct drainage away from the building.
6. Drainage maintenance.
7. Sewer Improvements.

Demolition

The only way to ensure a structure will not accumulate additional losses from future flood events is to demolish the structure completely. There are two options demolishing a structure.

- A government agency can purchase the property, demolish the structure, and convert the property to a park or other open space.
- The property owner may retain ownership, demolish the structure, and build a new structure in a manner that meets all local building and flood protection code requirements.

Home Elevation

Sometimes dry or wet floodproofing are not enough and greater measures must be taken. For example, if the floodwaters are too high for dry floodproofing and the inhabited area is too low for wet floodproofing, it may be necessary to raise the structure. Whenever the floor of a home is below the 100-year flood elevation, physically elevating the structure is often recommended as it is one of the most effective means to prevent flood damage. Financial assistance may be available through FEMA. In the past, Sacramento County has utilized FEMA hazard mitigation grant funding for nearly 100 qualified elevation projects.

The structure in Figure 4 is an example of a home that is elevated above the 100-year flood elevation. The Sacramento County Floodplain Management Ordinance requires all substantially improved residential buildings have their lowest floor elevated 18 inches above the 100-year flood elevation. Note that the handling of a basement area under the home is complicated by the increasing flood insurance costs and must be handled with care.

FIGURE 4
Elevated House



Dry Floodproofing

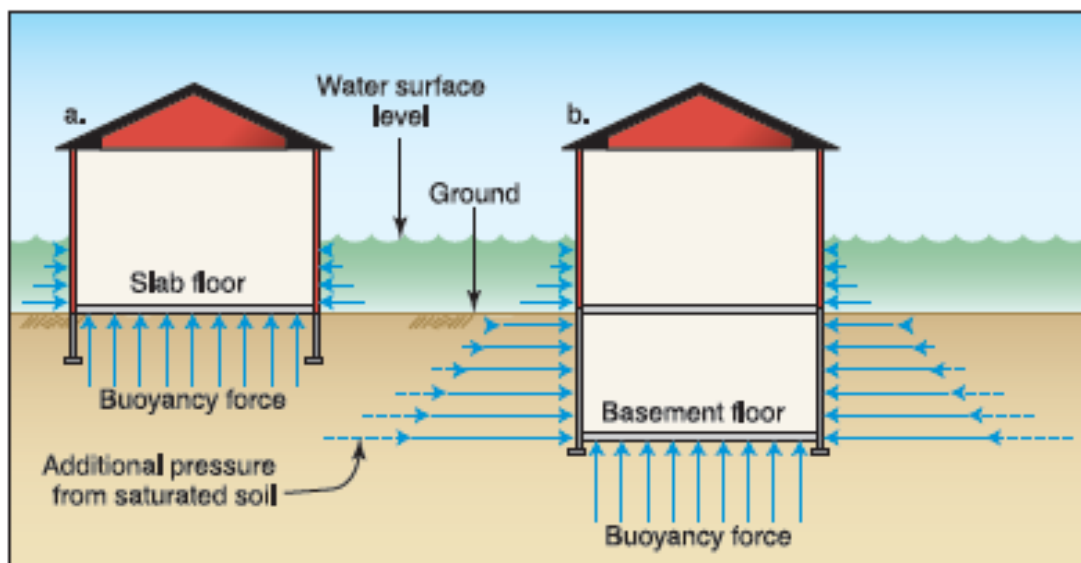
Dry floodproofing consists of completely sealing around the exterior of the building so that water cannot enter the building (see Figure 5). Dry floodproofing is not a good option for

areas where floodwater is deep or flows quickly. The hydrostatic pressure and/or hydrodynamic force can structurally damage the building by causing the walls to collapse or causing the entire structure to float. However, in areas that have minimal velocity and low depth, dry floodproofing can be a good option

Many flood hazards can be mitigated with various forms of dry flood proofing. Properties that do not have adequate protection of their low opening (window or basement door) can effectively raise the low opening height with a window well or a flood gate. The ultimate height of the low opening depends on several factors, such as: the level of flood protection desired, the appearance, and cost. The flood protection elevation could be set 1-foot higher than the existing low opening elevation, or it could be set to match the elevation of the lowest opening into a home that cannot be raised. This might be the elevation of the threshold of a door, for example.

The NFIP only allows dry floodproofing for residential retrofits that are not classified as a substantial improvement. A substantial improvement is any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the "start of construction" of the improvement.

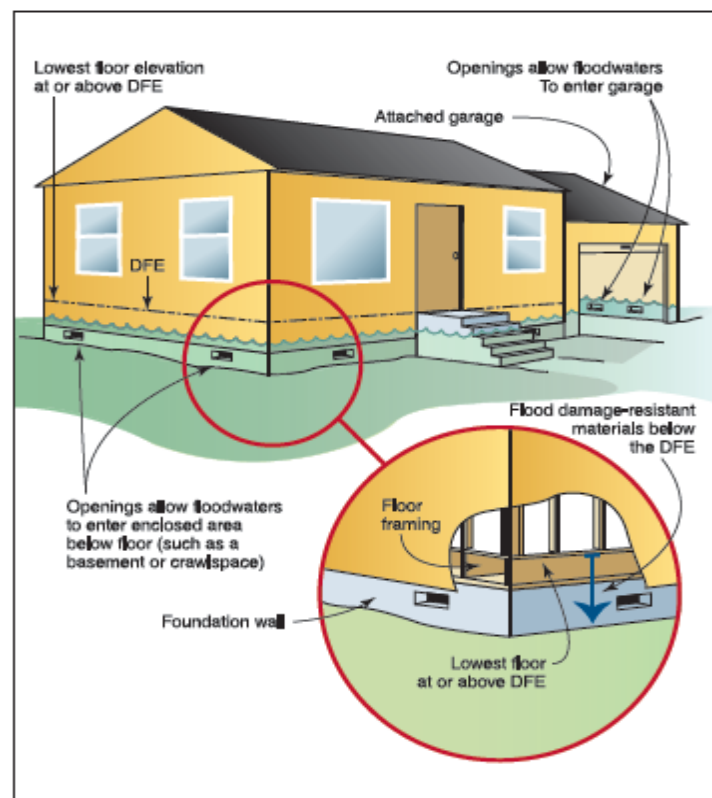
FIGURE 5
Dry Floodproofing Example (FEMA P-312, June 30, 2014)



Wet Floodproofing

Wet floodproofing consists of modifying uninhabited portions of a home, such as a crawl space, garage, or unfinished basement with flood-damage resistant materials, to allow floodwaters to enter the structure without causing damage (see Figure 6). Wet floodproofing requires portions of the building need to be cleared of valuable items and mechanical utilities. A key component of wet floodproofing is providing openings large enough for the water to flow through the structure such that the elevation of the water in the structure is equal to the elevation of the water outside of the structure. This equilibrium of floodwater prevents hydrostatic pressure from damaging structural walls.

FIGURE 6
Wet Floodproofing Example (FEMA P-312, June 30, 2014)



Direct Drainage Away From the Building

In some cases, there are things that the property owner can do on-site such as directing shallow floodwater away from a flood-prone structure. In other cases, there are drainage improvement projects that can be constructed by Water Resources staff.

Shallow flooding can often be kept away from a structure if some simple improvements are made to the yard. Sometimes structures are built at the bottom of a hill or in a natural

drainage way or ponding area, so that water naturally flows toward them.

One solution is to regrade the yard. If water flows toward the building; a new swale or wall can direct the flow to the street or a drainage way. Filling and grading next to the building can also direct shallow flooding away. Although water may remain in the yard temporarily, it is kept away from the structure. When these types of drainage modifications are made, care must be taken not to adversely affect the drainage patterns of adjacent properties.

Over time, the swales along the lot lines or in the back yard may get filled in. Property owners build fences, garages, sheds, swimming pools, and other obstructions up to the lot line. These drainage problems can be fixed by removing the obstructions and restoring the swales so they will carry water away from the building

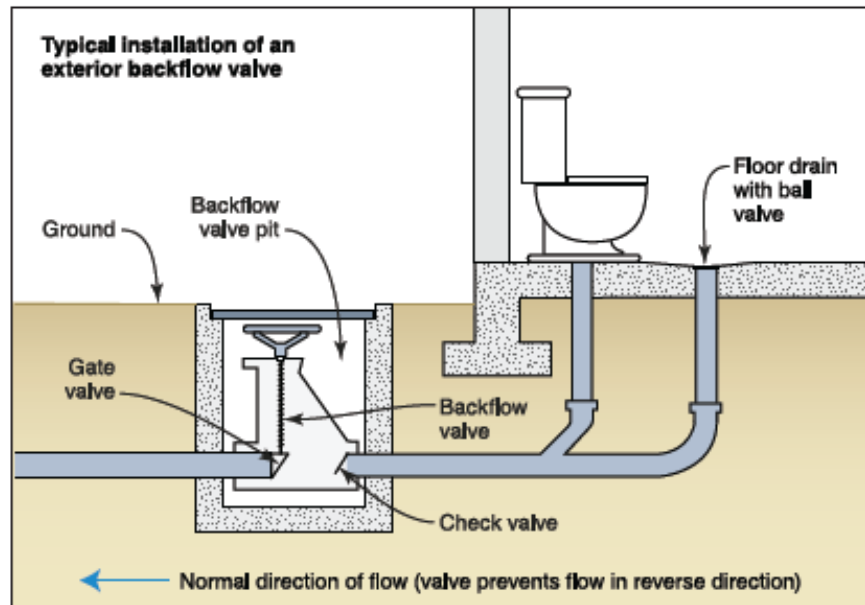
Drainage Maintenance

Rake leaves from inlets. If a nearby creek has fallen or collected debris, call 875-rain. The Stormwater Utility provides funds for systematic maintenance of the County's storm drain system, and allows for repair and construction projects that directly target local flooding problems. Do not dump or throw anything into drainage ditches, streams or storm drains. Dumping into our drainage system is a Sacramento County Code violation. Debris can accumulate and restrict the flow of stormwater which increases the potential of localized - flooding. To report flood problems or illegal dumping into the drainage system, please call (916) 875-RAIN (7246).

Sewer Improvements

Heavy rains can saturate the soil and infiltrate the sanitary sewer system through leaky joints or cracks in the pipes. The inflow of stormwater floods the sanitary sewer system causing water to back-up into the home through lower level plumbing fixtures. This occurrence can be prevented by installing a sewer backflow preventer (see Figure 7). A backflow preventer will allow the sanitary sewer water to flow freely from the home to the sewer, but restrict the reverse flow. Backflow preventers do require maintenance and can fail if debris in the sewer prevents the valve seating properly. An overhead sewer system pumps wastewater from basement level plumbing fixtures up to an elevation near the ground level, where it can drain by gravity into the sewer service line. This higher sewer makes it unlikely that water will back-up into the building.

FIGURE 7
Install Sewer Backflow Valves Example (FEMA P-312, June 30, 2014)



Temporary Barriers

Several types of temporary barriers are available to address typical flooding problems. They work with the same principles as permanent barriers, such as floodwalls or levees, but can be removed, stored, and reused in subsequent flood events (Figure 8).

FIGURE 8
Temporary Flood Barrier



2.4.3 Natural Resources Protection

Care should be taken to maintain the streams, wetlands and other natural resources within a floodplain. Removing debris from streams and channels prevents obstructions. Preserving and restoring natural areas provides flood protection, preserves water quality and provides natural habitat. Most of the natural resources within Sacramento County are in open spaces owned and maintained by the Sacramento County Park District or Sacramento County.

2.4.4 Emergency Services

Advance identification of an impending storm is only the first part of an effective Flood Warning and Response Plan. To truly realize the benefit of an early flood warning system, the warning must be disseminated quickly to floodplain occupants and critical facilities. Appropriate response activities must then be implemented, such as: road closures, directing evacuations, sandbagging, and moving building contents above flood levels. Finally, a community should take measures to protect public health and safety and facilitate recovery. These measures may include: cleaning up debris and garbage, clearing streets, and ensuring that that citizens have shelter, food, and safe drinking water.

2.4.5 Structural Projects

In response to the flood damage resulting from severe storm events, Sacramento County initiated several Flood Risk Reduction Assessments to determine what structural improvements could be made to mitigate flood damage from future storm events in the areas that have proven to be the most susceptible to flooding.

2.4.6 Public Information

One of the most important, and often overlooked, aspects of mitigation is public awareness. Awareness starts with recognition of the flood risk. FIRM panels, which designate areas of a community according to various levels of flood risk, can be viewed at www.FEMA.gov. Also, real estate transactions require disclosure of known flood hazards.

The next level of awareness is related to hazard mitigation measures. Often homeowners can greatly reduce their risks with mitigation efforts; they just do not know it. *For that reason, as part of this analysis, every resident in the RLA has been contacted and informed of the opportunity to review this Report.* In addition, Sacramento County sends out an annual outreach letter to every resident in each RLA.

2.5 Document the Findings

This report outlines the process that was followed and any relevant general background information. A separate analysis for each Repetitive Loss Area was done and is detailed in each respective area to this plan in the appendices. Each area analysis will include

- A summary of property owner responses, logged phone calls, survey results, etc.
- The problem statement with a map of the area affected.
- A table showing basic information for each building, such as address, foundation type, condition, and appropriate mitigation measures.
- Any alternative approaches that were reviewed.
- Action items that include:
 - ✓ Who is responsible for implementing the action,
 - ✓ When it will be done,
 - ✓ How it will be funded.

The summary report for Repetitive Loss Area Analysis is included in the Sacramento County Local Hazard Mitigation Plan 2011, approved December 6, 2011 by resolution number 2011-0886 and WA-2818. *This report is the complete repetitive loss area analysis and has been approved by the governing body of Sacramento County.*

An annual evaluation report will be completed in the fall of each year and submitted with the CRS annual recertification. The evaluation report will review each action item, describe what was implemented (or not implemented), and recommend changes to the action items as appropriate. The annual report will cover all the repetitive loss areas in the appendices and be made available to the media and public.

In time for each CRS cycle verification visit, the repetitive loss area analysis will be updated. The update will review the flooding and building conditions as well as any changes to FEMA's repetitive loss list, to determine whether the number of buildings on the list or other circumstances have changed, and revise the mapping and action items accordingly. The update may be a new report or an addendum to the existing report.

2.5.1 Data Collection

Sacramento County Plans and studies were utilized in this analysis. The sources listed below provided data related to the causes and impacts of flooding in the RLA.

- FEMA - NFIP Repetitive Loss Update CD that includes the repetitive loss properties. The mitigated and unmitigated properties are provided for reference purposes, and to assist in defining repetitive loss areas.

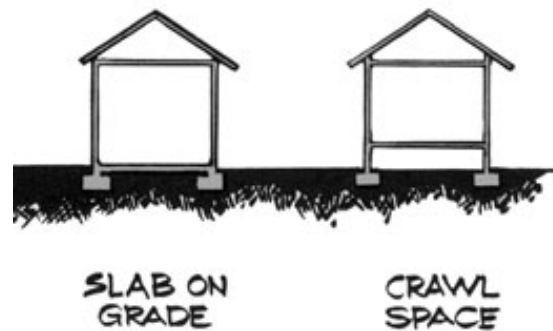
- Sacramento County Hazard Mitigation Grant Program (HMGP) - HMGP provided grants to Sacramento County residence to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.
- Local Floodplain Management Activities – Sacramento County has over the years collected base flood elevations related to actual surveyed ground elevation to determine the local flood hazard areas. The review of Elevation Certificates, Local Floodplain Mapping and general review of topography.
- GIS – Data for elevations, number of structures, location of structures, and other pertinent data to determine the potential risk of flooding.
- FIRM – Federal floodplain mapping, *Flood Insurance Study – Sacramento County, California and Incorporated Areas* (FEMA 06067C0062H and 06067C0054H August 2012)
- Drainage Maintenance and Engineering Section (DME) Service Request Tracking System provided storm event dates, customer problem descriptions, and specific address of affected flooding areas.

2.5.2 Types of Foundations

Within Sacramento County there are basically two types of foundations either slab on grade, crawl space (raised). Figure 12 shows the two common foundation types, which on the Elevation Certificate these are referenced as 1, 1A, 1B, or 8:

1. Crawl Space or raised foundation is a common type that you'll find in home construction. This foundation gets its name due to the fact that it's built above the ground, allowing for just enough room to crawl underneath. There are stem walls on the perimeters, pierced in-between and then a girder system and floor joists on top of that. The foundation is high enough to that you have at least 2' under there to crawl around to take care of the mechanical systems of the house.
2. Slab foundation is usually concrete poured directly onto the ground. This type of foundation is also different from other foundations in that it uses concrete, not wood, to help support the weight of the home.

FIGURE 12
Foundation Types



2.6 Funding Assistance

The most common hazard mitigation assistance programs are: the Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation (PDM), and Flood Mitigation Assistance (FMA). Each program has its own eligibility and funding criteria, but each can be used to fund property protection measures as shown in Figure 8 below, provided that the Benefit Cost Ratio exceeds 1.0. In general, these programs are funded when FEMA approves an application prepared jointly by a local government. In most cases, FEMA pays 75% of eligible expenses, but the federal share can reach 90% for Repetitive Loss Properties and 100% for Severe Repetitive Loss (SRL) properties.

FIGURE 13

Eligible Activities by Hazard Mitigation Assistance Program
(FEMA Hazard Mitigation Assistance Unified Guidance, July 2013)

Eligible Activities	HMG	PDM	FMA
Property Acquisition and Structure Demolition	√	√	√
Structure Elevation	√	√	√
Mitigation Reconstruction			√
Dry Floodproofing of Historic Residential Structures	√	√	√
Dry Floodproofing of Non-residential Structures	√	√	√
Minor Localized Flood Reduction Projects	√	√	√
Structural Retrofitting of Existing Buildings	√	√	
Non-structural Retrofitting of Existing Buildings	√	√	√
Infrastructure Retrofit	√	√	√
Post-Disaster Code Enforcement	√		
5 Percent Initiative Projects	√		
Advance Assistance	√		

2.7 Conclusion

Sacramento County is serious about flood safety and mitigation of flood risk. Property owners are encouraged to contact the County's floodplain management office to learn more about the flood hazard and risk associated with their home, investments, and businesses. Land developers must abide by strict improvement standards to assure no adverse impact upstream and downstream of their developing property. The County has a very good working relationship with FEMA and has achieved a respectable ranking the Community Rating System. This is due, in large part, with the fact that flood risk mitigation is a priority to the floodplain management office.

APPENDICES

REPETITIVE LOSS REPORT

