

2015

# INSPECTION AND LOCAL MAINTAINING AGENCY REPORT OF THE CENTRAL VALLEY STATE-FEDERAL FLOOD PROTECTION SYSTEM

Code of Federal Regulations, Title 33, Section 208.10

California Water Code Sections 9140 - 9141

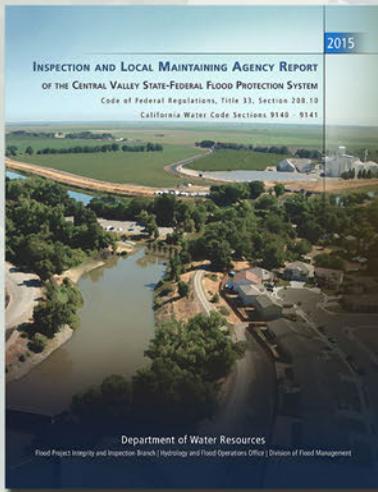


Department of Water Resources

Flood Project Integrity and Inspection Branch | Hydrology and Flood Operations Office | Division of Flood Management



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## Reader's Guide

This report is a compilation of data collected by various programs but primarily the data gathered by FPIIB. It includes information on Project levee maintenance of the State-federal Flood Control System derived from programs such as DWR inspections, DWR's summary of LMA annual reporting derived from Assembly Bill 156 (2007), United States Army Corps of Engineers' (USACE) Inspections, DWR's Erosion Survey in the San Joaquin River, Flood System Repair Project's point of interest data, and the USACE's Sacramento Bank Project erosion data along with other relevant information. The report helps LMAs access their individual agency report as well as other agency's reports easily and conveniently. Because the report covers many programs and activities, this Reader's Guide has been provided to help the reader navigate the report.

The report consists of seven sections and twelve appendices (Appendix A through Appendix L). Appendices A through E are included in the hard copy of the report while Appendices F through L are included in electronic format (CD). A CD is attached to the back of the report.

Appendices A and B cover LMA summary profiles for the Sacramento and San Joaquin River Flood Control Systems. Each individual LMA summary profile contains a cover page with LMA contact information, an aerial map(s) of the levee segment(s), levee information, DWR inspection results, erosion surveys, USACE inspection results and current eligibility in the Rehabilitation and Inspection Program (RIP), and LMA summary reporting. The contact information presented in this report is for the highest authority within an LMA jurisdiction. The Directory of Flood Officials uses this contact information in the annual directory produced by the State-federal Flood Operations Center (FOC). A generic threat assessment and recommendation for each LMA has also been developed by DWR. Each of these appendices is preceded by system maps that show the boundaries of LMAs within the Sacramento and San Joaquin River Basins.

Appendix C covers other basins that do not belong to either the Sacramento or San Joaquin River Flood Control System. Non-Project levee reporting on maintenance from an LMA is also included in this section.

Appendix D covers relevant correspondence for the LMA reporting program.

Appendix E covers supplemental figures and tables with results from the inspection program.

Appendices F through L are self-explanatory and include Appendix F: Maintenance Requirements and Responsibilities of Inspection, Appendix G: Inspection Category Rating Descriptions, Appendix H: Fall 2015 Levee Maintenance Inspection Summary Reports, Appendix I: 2015 Channel Maintenance Inspection Summary Reports, Appendix J: 2015 Structure Maintenance Inspection Summary Reports, Appendix K: 2015 Pumping Plant Maintenance Inspection Summary Reports, and Appendix L: 2015 Supplemental Erosion Survey of the San Joaquin River System Detailed Reports.

It may be helpful for the reader to refer to the document titled State Plan of Flood Control Descriptive Document (November 2010), included as an attachment to the 2012 Central Valley Flood Protection Plan (CVFPP, July 2012). The information included in the State Plan of Flood Control Descriptive Document complements this report.

## Contents

<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
1.1	Purpose and Scope of Inspection Program	1
1.2	Highlights of Inspection Program for 2015	3
1.3	Purpose and Scope of LMA Reporting Program	4
1.4	Highlights of LMA Reporting Program for 2015	5
1.5	Outcomes and Benefits of the Levee Inspection and the LMA Reporting Programs	7
<b>2</b>	<b>2015 LEVEE MAINTENANCE INSPECTION RESULTS</b>	<b>8</b>
<b>3</b>	<b>2015 CHANNEL MAINTENANCE INSPECTION RESULTS</b>	<b>16</b>
<b>4</b>	<b>2015 STRUCTURE MAINTENANCE INSPECTION RESULTS</b>	<b>20</b>
<b>5</b>	<b>SAN JOAQUIN RIVER FLOOD CONTROL SYSTEM EROSION SURVEY</b>	<b>26</b>
5.1	Purpose	26
5.2	Highlights	26
5.3	Results	26
<b>6</b>	<b>LMA REPORTING REQUIREMENTS (CWC SECTIONS 9140-9141)</b>	<b>32</b>
6.1	Background	32
6.2	Agencies Subject to CWC Section 9140 Requirements	34
6.3	Use of the LMA Reporting by DWR	34
6.4	Communication and Outreach	41
<b>7</b>	<b>OTHER FPIIB ACTIVITIES AND ACCOMPLISHMENTS</b>	<b>44</b>
7.1	Inspection and Reporting for Project Facilities	44
7.2	High Water Staking	44
7.3	Levee Waterside Erosion Surveys	45
7.4	Utility Crossing Inventory Surveys	45
7.5	Other Key Activities	47

## List of Tables

Table 1-1:	Non-reporting LMAs	5
Table 1-2:	Summary of Information Reported by LMAs	6
Table 2-1:	Summary of Levee Maintenance Ratings for 2011 to 2015	8
Table 2-2:	Overall Maintenance Rating by Area for 2011 to 2015	12
Table 3-1:	Summary of Channel Maintenance Ratings for 2011 to 2015	16
Table 3-2:	Overall Channel Maintenance Ratings for 2011 to 2015	18
Table 4-1:	Summary of Structure Maintenance Ratings for 2011 to 2015	20
Table 4-2:	Overall Structure Ratings for 2011 to 2015	23
Table 4-3:	Overall Pumping Plant Ratings for 2011 to 2015	25
Table 5-1:	Summary of Erosion Site Status and Rating for 2015	27
Table 5-2:	Erosion Site Ratings by LMA for 2015	28

**List of Figures**

Figure 2-1: Summary of Area Maintenance Ratings for 2011 to 2015 . . . . . 10

Figure 2-2: Area Maintenance Rating Changes for 2011 to 2015 . . . . . 11

Figure 3-1: Comparison of Overall Channel Ratings for 2011 to 2015. . . . . 17

Figure 4-1: Comparison of Overall Structure Ratings for 2011 to 2015 . . . . . 21

Figure 4-2: Comparison of Overall Pumping Plant Ratings for 2011 to 2015 . . . . . 22

Figure 6-1: Reporting Compliance for 2011 to 2015. . . . . 35

Figure 6-2: Comparison of Reporting Compliance by Systems for 2011 to 2015 . . . . . 36

Figure 6-3: Reporting Mode for 2011 to 2015 . . . . . 37

Figure 6-4: Key Performed Activities Reported for 2011 to 2015 . . . . . 38

Figure 6-5: Key Planned Activities Reported for 2012 to 2016. . . . . 39

Figure 6-6: Compliance by Reporting Area for 2008 to 2015. . . . . 40

Figure 6-7: LMA Reporting Program Activities. . . . . 43

**List of Appendices**

Appendix A: Sacramento River Flood Control System: Individual Agency Summary Profiles

Appendix B: San Joaquin River Flood Control System: Individual Agency Summary Profiles

Appendix C: Miscellaneous Summary Reports

Appendix D: Relevant Correspondence for the LMA Reporting Program

Appendix E: Supplemental Figures and Tables for the Inspection Program

Appendix F: Maintenance Requirements and Responsibilities—Included on the enclosed CD

Appendix G: Inspection Category Rating Descriptions—Included on the enclosed CD

Appendix H: Fall 2015 Levee Maintenance Inspection Summary Reports—Included on the enclosed CD

Appendix I: 2015 Channel Maintenance Inspection Summary Reports—Included on the enclosed CD

Appendix J: 2015 Structure Maintenance Inspection Summary Reports—Included on the enclosed CD

Appendix K: 2015 Pumping Plant Maintenance Inspection Summary Reports—Included on the enclosed CD

Appendix L: 2015 Erosion Survey of the San Joaquin River System Detailed Reports—Included on the enclosed CD

## Abbreviations and Acronyms

AB	Assembly Bill
CDEC	California Data Exchange Center
CO	Completely Obstructing
CVFMP	Central Valley Flood Management Planning
CFR	Code of Federal Regulations
CVFPB	Central Valley Flood Protection Board
CVFPP	Central Valley Flood Protection Plan
CVRWQCB	Central Valley Regional Water Quality Control Board
CWC	California Water Code
DFG	Department of Fish and Wildlife
DWR or Department	Department of Water Resources
FCC	Federal Communications Commission
FCSSR	Flood Control System Status Report
FCWCA	Flood Control and Water Conservation Agency
FEMA	Federal Emergency Management Agency
FloodSAFE	California's comprehensive program to improve public safety through integrated flood management
FOC	State-federal Flood Operations Center
FPIIB	Flood Project Integrity and Inspection Branch
FSRP	Flood System Repair Program
IRWMP	Integrated Regional Water Management Planning
LB	Left Bank
LD	Levee Districts
LM	Levee Mile
LMA/LMAs	Local Maintaining Agency/Agencies
LMR	Levee Mile Reports
LOM	Library of Models
MA	Maintenance Areas
NA	Named Areas
NEMDC	Natomas East Main Drainage Canal
NLIP	Natomas Levee Improvement Program
NULE	Non-Urban Levee Evaluation
O&M	Operation & Maintenance
OMRRR	Operation, Maintenance, Repair, Rehabilitation and Replacement
PI	Periodic Inspection
PL 84-99	Public Law that defines federal rehabilitation assistance for flood control works
PO	Partially Obstructing
RB	Right Bank
RIP	Rehabilitation and Inspection Program
RD	Reclamation Districts
RM	River Mile
RS	Rock Site
SAFCA	Sacramento Area Flood Control Agency
SJAFCA	San Joaquin Area Flood Control Agency
SJRFCS	San Joaquin River Flood Control System
SPFC	State Plan of Flood Control
SPRR	Southern Pacific Railroad
ST	State Maintained Area
UCIP	Utility Crossing Inventory Program
USACE	U.S. Army Corps of Engineers

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# 1 INTRODUCTION

## 1.1 Purpose and Scope of Inspection Program

Congress authorized the Sacramento River Flood Control Project (SRFCP) in 1917, and subsequent supplemental authorizations (e.g. Sacramento River major and minor tributaries, American River levees, etc.) have added components to the SRFCP over the years. The San Joaquin River Flood Control System consists of a number of separate federally authorized flood control projects, most of which have been built since the 1940's (e.g. Merced and Fresno county stream groups, Lower San Joaquin River, federal projects and State designated floodways on virtually all the Sierra rivers draining into the San Joaquin Valley and the Tulare Lake Basin). The two major river flood control systems have combined totals of approximately 1,600 miles of federal Project levees, 1,200 miles of designated floodways (148,000 acres), several thousand acres of project channels, and 53 other major flood protection works (as an example overflow weirs, flood relief structures, outfall gates, and pumping plants).

The federal government acting through the United States Army Corps of Engineers (USACE) designed and constructed many of these federal levees and other flood control works; some existing levees were also incorporated into the Sacramento and San Joaquin protection systems through the passage of federal statute. The State generally provides lands, easements, and rights-of-ways when necessary for project construction. An exception to this process is the Lower San Joaquin River Flood Control Project that was designed and constructed to federal standards by the State (substituting physical works for acquisition of more costly flowage easements required for the authorized federal project). Local public entities, called Local Maintaining Agencies (LMAs) within both river systems have the responsibility, liability, and duty to maintain and operate the levees and other flood protection works on a day-to-day basis in accordance with guidelines provided in the USACE's Standard Operations and Maintenance (O&M) Manual and each applicable supplement for individual project units. The only flood protection features for which operation and maintenance is not performed by local entities are those SRFCP works maintained by the Department of Water Resources (DWR) in accordance with Water Code § 8361, and those SRFCP levees within maintenance areas that are maintained by DWR, with local beneficiaries paying the costs, under Water Code § 12878.

DWR, under the authority of Water Code § 8360, § 8370, and § 8371, performs a verification inspection of the maintenance of the SRFCP levees performed by the local responsible agencies, and reports to the USACE periodically regarding the status of levee maintenance accomplished under the provisions of Title 33, Code of Federal Regulations (CFR), Section 208.10. While there are no specific water code provisions directing DWR to inspect and report on Maintenance of the San Joaquin River Flood Control System, DWR has performed inspections and provided reports for many years as a matter of practice that is consistent with Title 33, CFR. The inspections thus verify, for both river basins, that local agencies are performing their legal and statutory responsibilities pursuant to Water Code § 12642 and § 12657, and are meeting their legal obligations under assurance agreements with the State to operate and maintain their flood control projects "on any stream flowing into or in, the Sacramento Valley or the San Joaquin Valley". The State inspects and reports only on the status of maintenance practices and on observable levee conditions. The State does not routinely conduct field studies to assess the structural integrity of the levees or their foundations as part of its annual inspection program. However, in support of the State's system-wide planning efforts and flood

### Maintenance Inspection Reporting

#### **2015 Inspection and Local Maintaining Agency Report of the Central Valley State-Federal Flood Protection System.**

Annual report prepared by DWR based on DWR's fall and summer inspections and levee information submitted by the LMA - this report.

#### **San Joaquin River Flood System Erosion Report.**

Annual report prepared by DWR based on supplemental inspections conducted by FPIIB personnel-this report.

**Levee Mile Report.** Reports generated from inspections detailing maintenance deficiencies found during the inspection. A Levee Mile Report is generated for each unit and includes photos of some issues noted. These reports are available on the Flood System Inspection page on the California Data Exchange Center's webpage.

**Reports to the CVFPB.** Verbal presentations by FPIIB outlining inspection activities.

project implementation, the State utilized funding from the Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1E) to conduct extensive geotechnical data collection efforts and studies to assess the structural integrity of the levees and their foundations under the urban and non-urban levee evaluations programs.

The *Inspection and Local Maintaining Agency Report of the Central Valley State-Federal Flood Control System* has been produced for many decades and has undergone a series of changes. This report is also known as the *Status of Project Levee Maintenance* in some documents.

- Beginning in 2003, the DWR Flood Project Inspection Section (FPIS) and subsequently the Flood Project Integrity and Inspection Branch (FPIIB) has conducted a field survey of the waterward erosion sites and reported them. In addition, the obvious signs of structural weakness such as longitudinal cracks in the crown or slope of the levee, sloughing, or any other noticeable sign of movement within the cross section of the levee are also reported.
- In 2007 the inspection criteria and tools were modified to be more consistent and document deficiencies in a geo-referenced database format and reports on individual LMAs were modified to provide more complete documentation.
- This report was modified in 2012 to include information submitted by LMAs pursuant to California Water Code (CWC) § 9141 and added general threat assessment and recommendations in new Summary Profiles for each Area. Other information is also shown in the profiles.
- In 2013 this report was modified to include information gathered by the FPIIB as a part of the Utility Crossing Inventory Program. The FPIS conducts two comprehensive levee inspections and one channel and structure inspection each year. Information from USACE erosion surveys on the Sacramento River is also included. Deficiencies are noted and each agency receives a rating for the facilities within its maintenance responsibilities based on the fall inspections.
- In 2013 the erosion criteria was modified to help field personnel evaluate site conditions objectively, more clearly document site conditions during field and office based assessments, and more accurately rate the erosion sites. In addition, the modified erosion criteria is more consistent with erosion criteria used in other programs within DFM.

DWR completes spring inspections in May, documenting the location, size, type, and rating of maintenance deficiencies while working with the LMAs to assist in planning maintenance activities prior to the flood season. DWR completes annual fall inspections in November, verifying the status of previously noted as well as any additional deficiencies that should be corrected to help ensure adequate performance during the flood season. LMAs conduct inspections in the winter and summer, completing the requirement to conduct four inspections each year. Project facilities are inspected at least four times each year and there are other inspection reports for different uses (see side bar, page 6). DWR compiles this information for use by stakeholders and will report to the CVFPB on inspection activities as requested.

The USACE conducts two inspection programs, Routine Inspections and Periodic Inspections (PI). Both of these inspections look at the condition of levees less frequently than DWR does, but the USACE is able to take more time and do a more thorough inspection. The USACE also determines overall ratings differently than DWR, by systems. The USACE defines systems as being comprised of levees that protect a common area. This can include multiple units or LMAs. The USACE uses the overall ratings from these inspections to determine eligibility in its Rehabilitation and Inspection Program (RIP), which is also known as PL 84-99. This report includes the ratings and eligibility status in the RIP for systems impacting LMAs in the LMA summary profiles.

## 1.2 Highlights of Inspection Program for 2015

DWR applied inspection criteria and overall rating methodology similar to those used in inspections since 2007. Overall, the system showed continued maintenance improvements between 2007 and 2010 but deficiencies jumped higher in 2012 and have fluctuated near that level since then.

- The results of the 2015 levee inspections show 42 of the 106 Areas receiving Unacceptable ratings, matching results from 2014. The number of Areas receiving Acceptable ratings decreased from 38 in 2014 to 32 in 2015. The number of Areas receiving Minimally Acceptable ratings increased from 26 in 2014 to 32 in 2015.
- The results of the 2015 erosion survey show 43 of the 105 erosion sites receiving Unacceptable ratings, decreasing from 46 in 2014. The number of erosion sites receiving Minimally Acceptable ratings decreased from 46 in 2014 to 41 in 2015. The number of repaired erosion sites increased from 17 in 2014 to 19 in 2015.
- There was a decrease in the overall length of deficiencies in 2015 compared to 2014. The overall length of issues decreased relatively significantly in the San Joaquin system, while the Sacramento system remained largely the same as 2014. The overall decrease in deficiencies is primarily due to an effort to better control vegetation along the levees in the San Joaquin system.
- DWR continues to follow USACE inspection criteria for most categories, but uses the Levee Vegetation Management Strategy described in the 2012 Central Valley Flood Protection Plan and the Urban Levee Design Criteria for vegetation issues.
- The 2015 inspection yielded 16 channels, 44 structures and 12 pumping plants rated as Acceptable; 10 channels and 8 structures, and one pumping plant rated as Minimally Acceptable; and no channels, structures or pumping plants rated as Unacceptable.
- Inspectors also inspect Central Valley Flood Protection Board encroachment permits for compliance with regulations on behalf of the CVFPB. Inspectors closed 8 permits in 2015.
- In 2015 a project was started to update the Levee Logs using database tools similar to the inspection tool. The goal of the project is to create a geo-referenced inventory of all the features and items on the SPFC levees as well as confirm the locations of items in other databases like the CVFPB encroachment permit database. To date, 550 miles of levees have been surveyed with the corresponding levee logs either finalized or under review for completion. It is anticipated that the levee log update effort will near completion in 2016 depending on resources.
- A new levee mile calculator was created in 2014 and is now available online as part of the FERIX website (Flood Emergency Response Information Exchange). It can be accessed at: <http://ferix.water.ca.gov/webapp/LeveeMile>. As part of that effort, a review of levee alignments was conducted to ensure the alignments were as defined in the USACE O&M manuals.
- In 2015 LMAs were again encouraged to use the online LMA Reporting Application to report findings from their summer and winter inspections. Information added to inspections by the LMAs is available in the field for DWR inspectors during the following inspections.
- FPIIB continued to perform Qualitative Assurance/Quality Control (QA/QC) of the UCIP field data.
- FPIS staff review available data, including inspections and erosion sites, and provide general statements of potential threats in each Area as well as recommendations for future maintenance on a specific Area. These "Threat Assessment & Recommendations" are included in Appendices A and B.
- DWR processed data from the Flood System Repair Program and uses it as Points of Interest. This data is included for each LMA in Appendices A and B. This information can be used by LMAs and other emergency responders to monitor these locations during a high water event.

In this report, detailed analyses of inspection results are included as appendices. A background discussion of the State-federal flood protection system—including relationships between federal, State, and local agencies and the responsibilities outlined in Project O&M Manuals—is also included in Appendix F.

Additional FPIIB 2015 highlights:

- FPIIB continued monthly coordination meetings with the USACE to answer questions that both groups have regarding inspections, maintenance practices and recently enacted regulations. The CVFPB and DWR's Flood Maintenance Office continued their significant participation in these meetings during 2015.
- FPIIB staff continued to coordinate with and support the FOC in conducting and preparing emergency exercises and assisting in Flood Fight Methods training. As of December 8, 37 courses had been taught with an additional 22 courses scheduled. This ultimately will provide 1,700 personnel with flood fight training; a nearly 210% increase over previous years. Inspectors also assisted in many of the Preseason Meetings held by the FOC. All this while still providing general preparedness in responding to any flood emergency.
- In 2015 the USACE and its contractors wrapped up their Periodic Inspections for the foreseeable future. FPIIB coordinated with the LMAs, the CVFPB, and the USACE and its contractors throughout the Periodic Inspection process, primarily by facilitating communication between these entities.
- DWR continues to improve its inspection program, undergo activities detailing the maintenance condition of features, and work with the LMAs to help ensure a functional flood protection system. DWR's inspection program has been made available to interested LMAs for their use.
- A copy of this annual report and other related reports have been published on-line at: [http://cdec.water.ca.gov/current\\_reports.html](http://cdec.water.ca.gov/current_reports.html).

### **1.3 Purpose and Scope of LMA Reporting Program**

To enhance the state response to flood emergencies, California Assembly Bill (AB) 156 (Laird, 2007) Flood Control was introduced in the 2007-2008 Legislative Session. Governor Schwarzenegger signed the bill and Secretary of State Bowen chaptered it on October 10, 2007 (Chapter 368, Statutes of 2007). In addition to other CWC, Sections 9140-9141 were added as the result of AB 156. The purpose of Section 9140 is to receive critical, maintenance and operation information from the local agencies about the levees they maintain so that the State can better prepare for the emergency response during flood events. The purpose of Section 9141 is not only to make this information available to the Flood Responders but also to make this information available to the general public. From 2008-2011, the program developed annual reports covering only this activity. However, from 2012 on, LMA reports are combined with reports from the inspection program and other programs as recommended by the CVFPB at their March 2012 Board meeting.

DWR identified 86 LMAs that are required to submit information to DWR pursuant to California Water Code (CWC) Sections 9140 and 9141. These 86 LMAs encompass 106 unique geographical areas that are called Areas in this report.

LMAs submit specific information to DWR by September 30 of each year regarding the levees they operate and maintain. DWR summarizes the information submitted by LMAs and provides the report to the CVFPB by December 31 of each year. The information submitted by LMAs includes levee conditions and operation and maintenance activities. This information is (1) essential for a comprehensive understanding of the flood protection system in the Central Valley, and (2) critical to flood control system evaluation, assessment, and emergency response. The program is also known as the Five-part Reporting Program as it requires LMAs to submit information on five parts as specified in the code.

## 1.4 Highlights of LMA Reporting Program for 2015

The LMA reporting program includes a compilation of information received from LMAs on the Project levees and certain non-Project levees they maintain in the Sacramento and San Joaquin River Basins.

The statistics provided for the LMA reporting program are based on the following criteria: "LMAs with at least a partial response were considered to have provided reports," which means that if an LMA responds only to one of the five parts, the LMA is considered to have reported. DWR is working with the LMAs to encourage improved and complete reporting. DWR is encouraging the LMAs to provide more comprehensive information in their reports because this information is being used to prepare for flood emergency response. More comprehensive reports mean better information on their levees, improving the emergency response from the State. DWR's grant programs, particularly the ones administered in the Division of Flood Management/DWR, are also using the LMA reporting performance as a basis of increased cost-share criteria for their grants.

Appendices A and B include summary profiles of individual LMAs that maintain Project levees along the Sacramento River and the San Joaquin River, respectively. These profiles include maintenance activity summary reports (known as five-part reporting) as well as other program results like inspection, erosion, etc. DWR will use this information to evaluate levees, monitor levee conditions throughout the system, and provide threat assessments (if applicable) to individual LMAs. The information will also be used by the comprehensive FloodSAFE California initiative to improve public safety and manage residual flood risk. The highlights of the LMA Reporting Program for 2015 are:

- Although submission of annual reporting to DWR is required by law, five LMAs did not respond to this requirement as shown in table 1-1.

**Table 1-1: Non-reporting LMAs**

Sacramento Basin	San Joaquin Basin
Honcut Creek Eastern Area	Madera County Flood Control and Water Conservation Agency
Yolo County Public Works	
Lake County Watershed Protection District	Reclamation District 2075

- 94 percent of LMAs, representing 95 percent of the Areas, complied with the reporting requirement. Table 1-2 summarizes the information LMAs submitted to DWR in 2015.
- 3 out of 81 Areas (4 percent) from the Sacramento Basin and 2 out of 25 Areas (8 percent) from the San Joaquin Basin did not report in 2015. Further details on reporting statistics are shown in Figure 6-2.
- Since 2008, DWR has been facilitating electronic submission and strongly encouraging LMAs to use the LMA Reporting Website. In 2015 about 78 percent of reporting LMAs reported electronically. Details of DWR outreach activities for electronic submission and other activities are provided in Figure 6-3.
- To minimize the LMAs' burden for reporting, DWR continues to enhance and update the web application. The two programs, Inspection and LMA reporting, have been integrated for online users. The data entry for Part 3 of the LMA reporting application has been enhanced to not only allow LMAs to provide their information but also to report on individual inspection issues noted by DWR. DWR inspectors see this feedback during the next inspection cycle. Part 3 of the individual summary profiles highlights the LMAs' corrected and ongoing corrective actions (wherever available).
- 100 Areas reported their maintenance activities for the previous fiscal year, 2014-15. Key reported maintenance activities are vegetation control, rodent control, levee crown grading and access road maintenance, encroachment control, minor structure repair, levee repair, and seepage control.

**Table 1-2: Summary of Information Reported by LMAs**

Reporting Categories	Reporting Measurement Type	Number of Occurrences
<b>Reporting</b>	LMAs subject to reporting requirements	85
	LMAs submitted reports	80
	Geographical Areas subject to reporting requirements	106
	Reports received on geographical Areas	101
	Areas reporting information relevant to condition or performance	83
	Areas reporting conditions that might compromise level of flood protection	90
	Areas reporting summary of activities during the previous fiscal year	100
	Areas reporting summary of activities for the current fiscal year	95
	Areas reporting an estimated budget for maintenance during the current fiscal year	93
<b>Maintenance and Repair Activities Reported</b>	Areas reporting routine annual vegetation maintenance	89
	Areas reporting rodent/animal control	74
	Areas reporting levee crown grading/access road maintenance	41
	Areas reporting encroachment control	52
	Areas reporting minor structure (mile markers, gate, barricades, miscellaneous signs)maintenance or repair	28
	Areas reporting levee repairs (hole grouting, erosion repair, revetment, rip-rap, slope repair)	40
	Areas reporting seepage control	2
<b>Levee Conditions Reported</b>	Areas reporting encroachment issues	60
	Areas reporting erosion, channel migration, or revetment issues	54
	Areas reporting seepage and sand boil issues	13
	Areas reporting levee compaction, settlement, or freeboard issues	9
	Areas reporting sedimentation issues	9

- 95 Areas reported a summary of their maintenance activities for the current fiscal year, 2015-16. Key reported maintenance activities are vegetation control, rodent control, levee crown grading and access road maintenance, encroachment control, minor structure repair, levee repair, and seepage control.
- A number of LMAs provided information on the levee conditions. Key reported issues are encroachment, erosion, seepage and sand boils, levee settlement or freeboard reduction, and sedimentation.
- As indicated earlier, the level of compliance by the LMAs submitting information for this report is less than 100 percent. The quality of reporting for some LMAs is also unsatisfactory. DWR is encouraging LMAs to improve the quality of their reports because the quality of their report will improve the flood emergency response. DWR is also tying the level of cost-share eligibility in grant programs administered by DWR to the quality of LMA reporting to provide further incentive for compliance.
- In 2015, DWR provided individual feedback to each LMA and created a best example report. 43 Reporting Areas received in-depth feedback on their 2014 report.

- Due to the absence of a responsible agency, the maintenance of 1.5 miles of Project levee in Honcut Creek Eastern Area is not currently assigned to any LMA pending a decision by the CVFPB.
- RD 2099, 2100, and 2102, commonly known as Three Amigos, have been excluded from any analysis this year (refer to Appendix D), however DWR acknowledges the fact that the formal process of decertification by the USACE has not taken place yet. These three districts were bought by the U.S. Fish and Wildlife Service over 10 years ago, and are part of the San Joaquin River National Wildlife Refuge. The levees have been breach by floodwaters and no longer hold back water.
- Starting in 2015, NA 65 (Turlock Irrigation District), will no longer be considered an LMA with levee maintenance responsibilities. At the inauguration of the LMA Reporting Program in 2008, a Joint Power of Agreement (JPA) was found that nominated Turlock Irrigation District to be the maintainer of this Spur Levee; therefore, the Department considered Turlock Irrigation District to be the maintainer. However, it was found that Turlock Irrigation district did not give assurances to the CVFPB. Also, USACE's 2015 revised O&M manual list this Spur Levee under the responsibility of RD 2091. Therefore, the Department will no longer consider Turlock Irrigation District as the maintainer of this Spur Levee. This Spur Levee will now be considered Unit 2 of RD 2091.
- This year, 6 LMAs- 5 from the Sacramento River Basin and 1 from San Joaquin River Basin, reported on their non-Project levees. DWR will continue to perform outreach to the LMAs on non-Project levees and will encourage them to report information on other types of non-Project levees.

### **1.5 Outcomes and Benefits of the Levee Inspection and the LMA Reporting Programs**

As mentioned, the Levee Inspection Program inspects approximately 1,600 miles of Project levees twice a year, 106 erosion sites yearly, and 7,500 levee penetrations on a variable schedule. The Program identifies and monitors potential threats to the integrity of the State Plan of Flood Control system. AB 156 requires that Local Maintaining Agencies (LMAs) submit an annual report on the state of their levees to DWR. The information collected by the LMA Report provides a local understanding of system performance, as well as information on their operation and maintenance practices.

Both the Inspections and the LMA Reporting Program provide detailed information about the location and extent of critical levee distress. This information is essential to the flood preparedness activities that ensure timely and appropriate response for flood emergencies.

Outcomes of the programs are:

- Improved coordination with the Local Maintaining Agencies (LMAs), the Central Valley Flood Protection Board (CVFPB), and the US Army Corps of Engineers (USACE)
- Improved levee maintenance by the LMAs
- Improved relationships with the LMAs, which facilitates emergency response efforts
- Up to date information on the levee system, which supports emergency response efforts

Some of the benefits provided to the public by the programs are:

- Reduced risk of flooding which threatens life and property
- Additional certainty for future economic investments and growth in the region protected by the SPFC
- Potential increased property values

## 2 2015 LEVEE MAINTENANCE INSPECTION RESULTS

The results of the 2015 levee maintenance inspections show that the number of Areas whose ratings changed was small, with the ratings declining slightly. More LMAs received worse ratings in 2015 than those who received better ratings. The length of deficiencies noted decreased in 2015 compared to 2014, but remained on par with results from 2012 and 2013. The decrease in deficiencies was largely due to an increased effort in the San Joaquin basin to control vegetation.

Overall, vegetation control is the most pervasive issue the LMA's are dealing with. Complications from funding shortfalls, restrictions on burning, and environmental impact concerns for endangered species continue to contribute to this problem.

FPIIB continues to improve the accuracy and usability of its tools and data to inspect and rate Areas. Each Area received one of three possible ratings based on the state of its levees:

- **Acceptable (A)** – No immediate work required, other than routine maintenance. The flood protection project will function as designed and intended with a high degree of reliability, and necessary cyclical maintenance is being performed adequately.
- **Minimally Acceptable (M)** – One or more deficient conditions exist in the flood protection project that needs to be improved or corrected. However, the project will essentially function as designed with a lesser degree of reliability than what the project could provide.
- **Unacceptable (U)** – One or more deficient conditions exist that may prevent the project from functioning as designed, intended, or required.

DWR rates individual items noted during inspections using similar ratings. The inspection criteria were revised in 2012. No significant changes were made to these criteria subsequently. For more detailed information regarding the inspection criteria, please see Appendices F and G.

DWR continues to research the authorities and responsibilities for maintaining features of the State-Federal Flood Protection System. As a result of this research, minor adjustments to the alignments of the levee crowns were made in the levee mile calculation tool. This resulted in minor changes to the lengths of various levees and those are reflected in this report. State Plan of Flood Control (SPFC) levees and structures are expected to be adjusted in the future through discussions between DWR, the USACE, and the CVFPB.

Table 2-1 and Figure 2-1 show the numbers of Areas receiving each rating for 2011 through 2015.

**Table 2-1: Summary of Levee Maintenance Ratings for 2011 to 2015**

	2011	2012	2013	2014	2015
<b>A=Acceptable</b>	45	47	42	38	32
<b>M=Minimally Acceptable</b>	24	18	24	26	32
<b>U=Unacceptable</b>	37	41	40	42	42

Ratings for each Area are included in Table 2-2. The number of Areas receiving Unacceptable ratings remained the same, the number of Areas receiving Acceptable ratings decreased by six, and the number of Areas receiving Minimally Acceptable ratings increased by six.

The amount of erosion found throughout the system was similar to prior years. DWR has implemented the Flood System Repair Program (FSRP) to assist LMAs through cost shares for projects that repair issues like erosion and drainage pipe failures. DWR also continues to develop and distribute information on how the Sutter and Sacramento Maintenance Yards are addressing rodent control. DWR and other agencies continue to conduct research into both the potential harm and usefulness of woody vegetation on the levees.

Figure 2-2 shows the number of Areas that received better, unchanged, or worse ratings from 2011 through 2015. Ratings appear to be on a slight, but steady decline since 2012 with 2015 being no exception. LMRs contain more detailed information on each LMA's rating and the identified issues that lead to that rating. Appendix F provides a detailed explanation of the threshold percentages and the determination of overall ratings.

Vegetation deficiencies make up the majority of deficient levee miles for 2015, followed by a significant amount of erosion, animal control, and crown surface issues. The remainder of deficient miles comes from encroachments and other items.

Appendix E provides supplemental figures showing further analysis for the two basins and types of deficiencies, including comparisons of the lengths of levee with deficiencies of each category for each year since 2011.

Issues noted by inspectors in the field have one of three Issue Types, Enforcement, Design/System Obsolescence, or Maintenance, associated with them depending on DWR's opinion of the LMA's ability and responsibility to deal with the issue. LMAs may not be able to address some encroachments due to limitations in resources and relationships with the landowners.

Inspectors document some of these encroachments and assign an Issue Type of Enforcement to them. In 2015, 27.04 miles of Unacceptable and 166.6 miles of Minimally Acceptable issues typed as Enforcement were identified. The vast majority of these issues are encroachments with some landowner maintained vegetation. An Issue Type of Design/System Obsolescence may be assigned if an issue is the result of how the structure was originally designed and constructed or for other reasons beyond maintenance responsibilities. In 2015, 1.23 miles of Unacceptable issues and 19.15 miles of Minimally Acceptable

issues typed as Design/System Obsolescence were noted. The majority of these issues were erosion, mostly along one channel. Issues that should be addressed by LMAs have an Issue Type of Maintenance. Only issues with a Maintenance Issue Type are included in the determination of an Area's overall rating. Issue Types are explained further in Appendix F.

During the quarterly LMA coordination meetings in 2014, LMAs expressed concern regarding the size of the LMRs and their complexity. To assist them with concise documentation of what issues DWR views as within their control and what they are expected to address a new version of the LMR was generated. This report, available at <http://cdec.water.ca.gov/fsir.html>, only includes issues with a Maintenance Issue Type.

Through several different inspection criteria, DWR continues to check if LMAs have proper documentation and are prepared to deal with a high water event. These include O&M Manuals, Emergency Supplies and Equipment, and Flood Preparedness and Training. LMAs are required to maintain copies of applicable O&M manuals. DWR has made a collection of these manuals and other applicable documents available to stakeholders at [http://cdec4gov.water.ca.gov/public\\_systems\\_docs.html](http://cdec4gov.water.ca.gov/public_systems_docs.html). LMAs may also access their O&M Manuals through the LMA Reporting web page at <http://cdec.water.ca.gov/lma.html>. This site has limited access; to request access, please contact [webmaster@flood.water.ca.gov](mailto:webmaster@flood.water.ca.gov). LMAs are required to maintain a supply of materials to sustain the initial days of a flood fight. LMAs are encouraged to work with neighboring LMAs to maintain this supply in a central location that serves multiple agencies. LMAs are also required to have a specific, written flood response plan and know how to respond during a flood. DWR is working on tools to help LMAs create these response plans. LMA staff and local residents should also be training in Flood Fight Methods. DWR provides this training, which can be scheduled by contacting Rick Burnett at (916) 574-1203. More details on these criteria can be found in Appendix G.

A summary report showing the length of maintenance deficiencies noted in 2014 and 2015 for each Area can be found in Appendix H. This summary also shows the change in threshold percentage for each of these maintenance deficiency categories. Detailed reports showing the inspections for each Area, including photos, can be found at: <http://cdec.water.ca.gov/fsir.html>.

Figure 2-1: Summary of Area Maintenance Ratings for 2011 to 2015

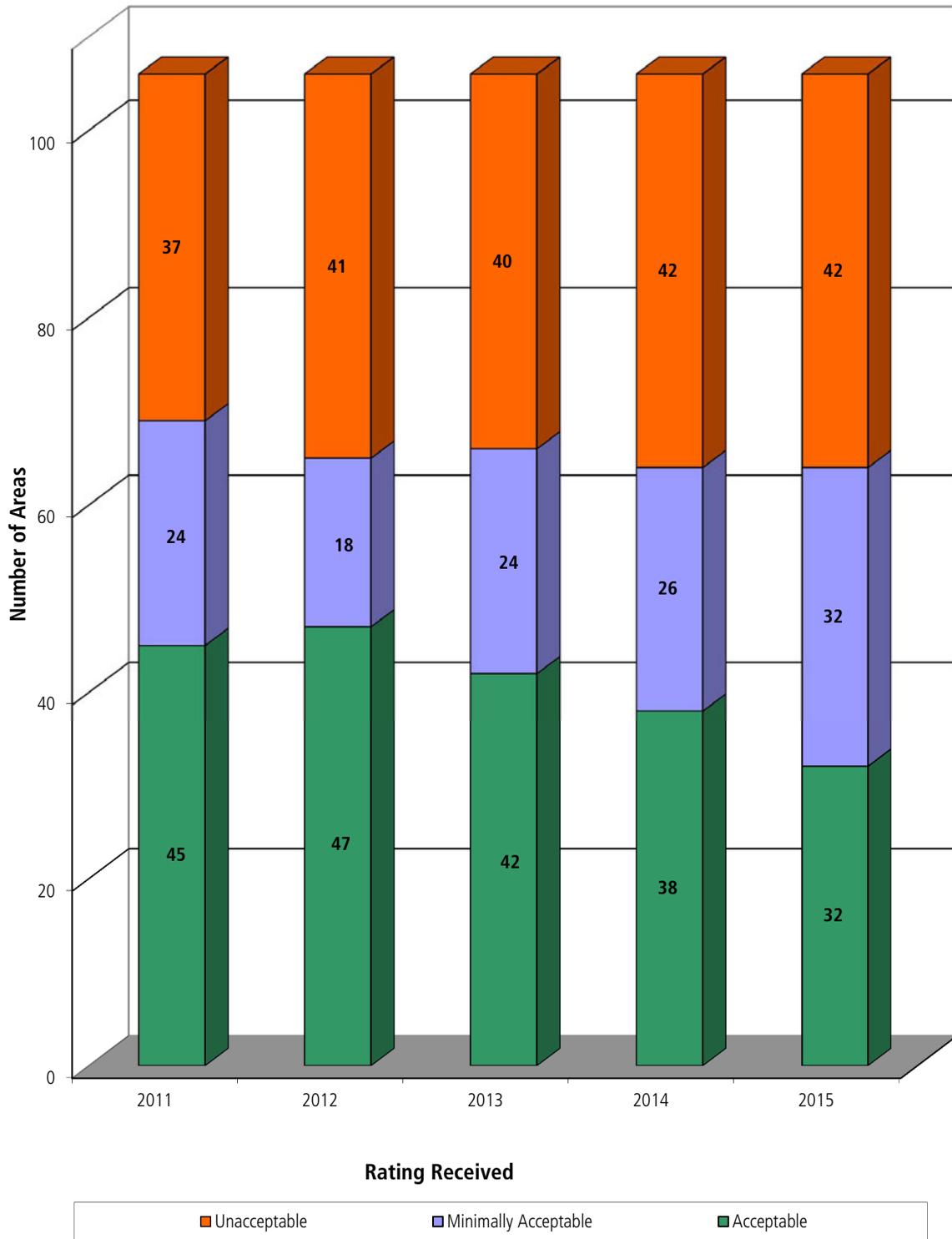
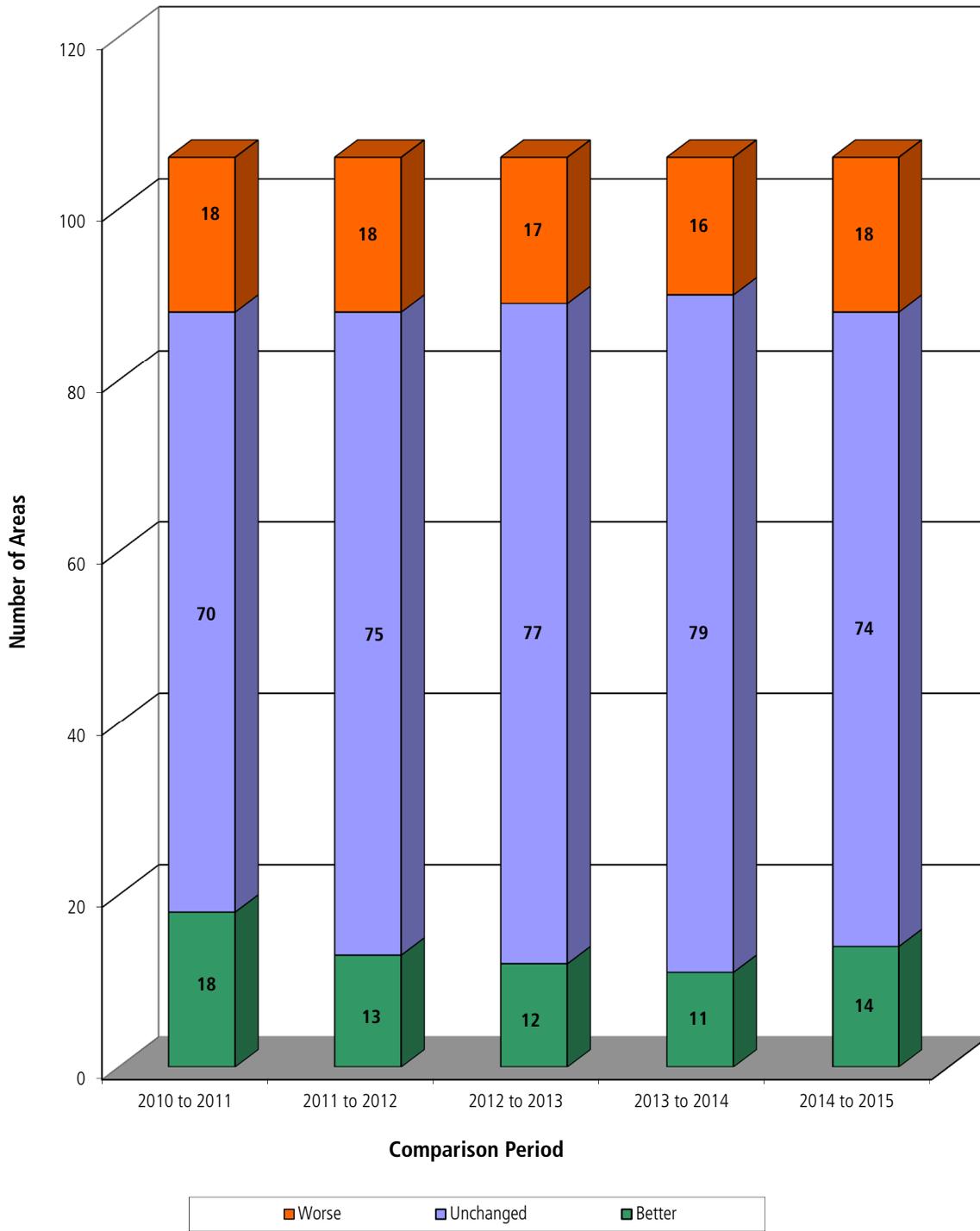


Figure 2-2: Area Maintenance Rating Changes for 2011 to 2015



**Table 2-2: Overall Maintenance Rating by Area for 2011 to 2015**

Area Short Name	Area Name	Overall Rating				
		2011	2012	2013	2014	2015
LD0001G	Levee District No. 0001G (Glenn County)	M	A	A	A	M*
LD0001S	Levee District No. 0001S (Sutter County)	A	A	A	A	M*
LD0002	Levee District No. 0002	A	A	A	A	M
LD0003	Levee District No. 0003	U	M	U	U	U
LD0009	Levee District No. 0009	A	A	M*	M*	M*
MA0001	Maintenance Area 0001	A	A	A	A	A
MA0003	Maintenance Area 0003	A	A	A	M*	A
MA0004	Maintenance Area 0004	A	A	A	M*	A
MA0005	Maintenance Area 0005	A	A	A	M*	M*
MA0007	Maintenance Area 0007	A	A	A	A	M
MA0009	Maintenance Area 0009	M	A	A	A	M*
MA0012	Maintenance Area 0012	A	A	A	A	A
MA0013	Maintenance Area 0013	A	A	A	A	A
MA0016	Maintenance Area 0016	M*	A	M	A	A
MA0017	Maintenance Area 0017	U	U	U	U	U
NA0001	American River Flood Control District	A	A	A	M*	A
NA0002	Brannan Andrus Levee Maintenance District	M	M	U	U	U
NA0003	Butte County Public Works	A	A	A	A	A
NA0004	Marysville Levee Commission	A	M	A	A	U
NA0005	City of Sacramento	A	A	A	A	A
NA0006	Eastern Honcut Creek	U	U	U	U	U
NA0008	Knights Landing Ridge Drainage District	A	A	M*	M*	M
NA0009	Lake County Watershed Protection District	A	A	A	M*	A
NA0010	Lower San Joaquin Levee District	M	U	M*	U	U
NA0011	Madera County FCWCA	U	U	U	U	U
NA0012	Solano County Public Works (Mellin Levee)	A	A	A	A	M*
NA0013	Merced Streams Group	U	U	U	U	U
NA0015	Plumas County	U	U	U	U	U
NA0016	Sacramento River West Side Levee District	A	A	A	A	M*
NA0017	San Joaquin County Flood Control and Water Conservation District	M	M	M*	M*	M
NA0018	California Department of Fish and Game	U	U	U	U	U
NA0019	Tehama County Flood Control and Water Conservation District	M	M	M	M	U

Table 2-2 Continued: Overall Maintenance Rating by Area for 2011 to 2015

Area Short Name	Area Name	Overall Rating				
		2011	2012	2013	2014	2015
NA0021	Yolo County Public Works	U	U	U	U	U
NA0022	Yolo County Service Area 6	U	U	U	U	U
RD0001	Reclamation District No. 0001	A	M*	U	U	M*
RD0003	Reclamation District No. 0003	M*	M*	M*	M*	M
RD0010	Reclamation District No. 0010	U	M	U	A	A
RD0017	Reclamation District No. 0017	A	M*	M*	M*	M*
RD0070	Reclamation District No. 0070	A	A	A	A	A
RD0108	Reclamation District No. 0108	A	A	A	A	A
RD0150	Reclamation District No. 0150	A	A	M*	M*	M*
RD0307	Reclamation District No. 0307	M	U	U	M*	M
RD0341	Reclamation District No. 0341	M*	U	U	U	U
RD0349	Reclamation District No. 0349	U	U	U	U	U
RD0369	Reclamation District No. 0369	M	U	A	U	M
RD0404	Reclamation District No. 0404	M	U	U	M*	M*
RD0501	Reclamation District No. 0501	U	U	U	U	U
RD0524	Reclamation District No. 0524	U	U	U	U	U
RD0536	Reclamation District No. 0536	U	U	U	U	U
RD0537	Reclamation District No. 0537	A	M*	U	M*	U
RD0544	Reclamation District No. 0544	U	U	U	U	U
RD0551	Reclamation District No. 0551	A	M*	A	U	A
RD0554	Reclamation District No. 0554	M	M	U	U	U
RD0556	Reclamation District No. 0556	U	U	U	U	U
RD0563	Reclamation District No. 0563	U	U	U	U	U
RD0755	Reclamation District No. 0755	U	U	U	U	U
RD0765	Reclamation District No. 0765	U	U	U	U	U
RD0784	Reclamation District No. 0784	A	M	M*	A	A
RD0785	Reclamation District No. 0785	U	U	U	U	U
RD0787	Reclamation District No. 0787	A	A	A	A	M
RD0817	Reclamation District No. 0817	M	U	M*	U	U
RD0827	Reclamation District No. 0827	U	A	U	A	U
RD0900	Reclamation District No. 0900	M	U	A	M	A
RD0999	Reclamation District No. 0999	U	U	U	U	U
RD1000	Reclamation District No. 1000	A	A	A	A	A
RD1001	Reclamation District No. 1001	M	U	U	A	A

Table 2-2 Continued: Overall Maintenance Rating by Area for 2011 to 2015

Area Short Name	Area Name	Overall Rating				
		2011	2012	2013	2014	2015
RD1500	Reclamation District No. 1500	A	M	M*	M*	M*
RD1600	Reclamation District No. 1600	U	U	U	U	U
RD1601	Reclamation District No. 1601	A	A	A	A	M
RD1602	Reclamation District No. 1602	U	U	U	U	U
RD1660	Reclamation District No. 1660	A	A	A	A	A
RD2031	Reclamation District No. 2031	M*	M	M*	M*	M*
RD2035	Reclamation District No. 2035	U	M	M	M	M
RD2058	Reclamation District No. 2058	U	A	M*	M*	M*
RD2060	Reclamation District No. 2060	A	A	M*	U	U
RD2062	Reclamation District No. 2062	U	U	M*	M*	M*
RD2063	Reclamation District No. 2063	U	U	M*	A	A
RD2064	Reclamation District No. 2064	U	A	U	U	U
RD2068	Reclamation District No. 2068	M	A	A	A	A
RD2075	Reclamation District No. 2075	M	U	A	M	U
RD2085	Reclamation District No. 2085	U	U	M	M*	M*
RD2089	Reclamation District No. 2089	U	U	U	U	U
RD2091	Reclamation District No. 2091	M*	A	A	A	A
RD2092	Reclamation District No. 2092	M*	A	A	A	A
RD2094	Reclamation District No. 2094	A	A	A	A	A
RD2095	Reclamation District No. 2095	M*	M	M*	M*	A
RD2096	Reclamation District No. 2096	A	U	M	M	A
RD2098	Reclamation District No. 2098	U	A	M*	U	U
RD2101	Reclamation District No. 2101	U	U	U	U	M
RD2103	Reclamation District No. 2103	A	A	M*	A	M*
RD2104	Reclamation District No. 2104	U	U	U	U	U
RD2107	Reclamation District No. 2107	A	A	A	A	A
ST0001	Cache Creek	M*	M*	M*	A	M*
ST0002	East Levee Sutter Bypass	A	A	A	M*	A
ST0003	East Levee Sacramento River	A	A	A	U	M*
ST0004	East Levee Yolo Bypass	A	A	A	A	A
ST0005	Hamilton Bend	A	A	U	U	U
ST0006	Nelson Bend	U	U	U	U	U
ST0007	Putah Creek	M	U	A	U	M
ST0008	Sacramento Bypass	A	A	A	A	A

**Table 2-2 Continued: Overall Maintenance Rating by Area for 2011 to 2015**

Area Short Name	Area Name	Overall Rating				
		2011	2012	2013	2014	2015
ST0009	Tisdale Bypass	A	A	A	A	A
ST0010	Wadsworth Canal	A	A	A	A	U
ST0011	West Levee Yolo Bypass	A	A	A	A	A
ST0012	Willow Slough Bypass	A	A	A	A	M*
ST0014	Murphy Slough at M&T Ranch	U	U	U	U	U
ST0020	East-West Interceptor Canal	U	U	U	U	U

\* Overall unit threshold percentage is less than 10%; however, U rated miles are present, so the overall unit rating is M instead of A.

### 3 2015 CHANNEL MAINTENANCE INSPECTION RESULTS

The annual channel maintenance inspections rely upon a qualitative rating system based on the USACE's O&M manuals. Channels are inspected at specific locations where there are restrictions to the channel like bridges. Excessive vegetation, shoaling, erosion, or other factors that may impact the capacity of the channel are noted. Existing channel capacities are not evaluated in this report. A single overall rating is assigned to each channel by DWR. The rating designations (A, M, and U) described in Section 2 are also used for channel ratings.

Appendix F details the method for determining overall ratings. Table 3-1 and Figure 3-1 show the numbers of each rating for the years 2011 through 2015.

**Table 3-1: Summary of Channel Maintenance Ratings for 2011 to 2015**

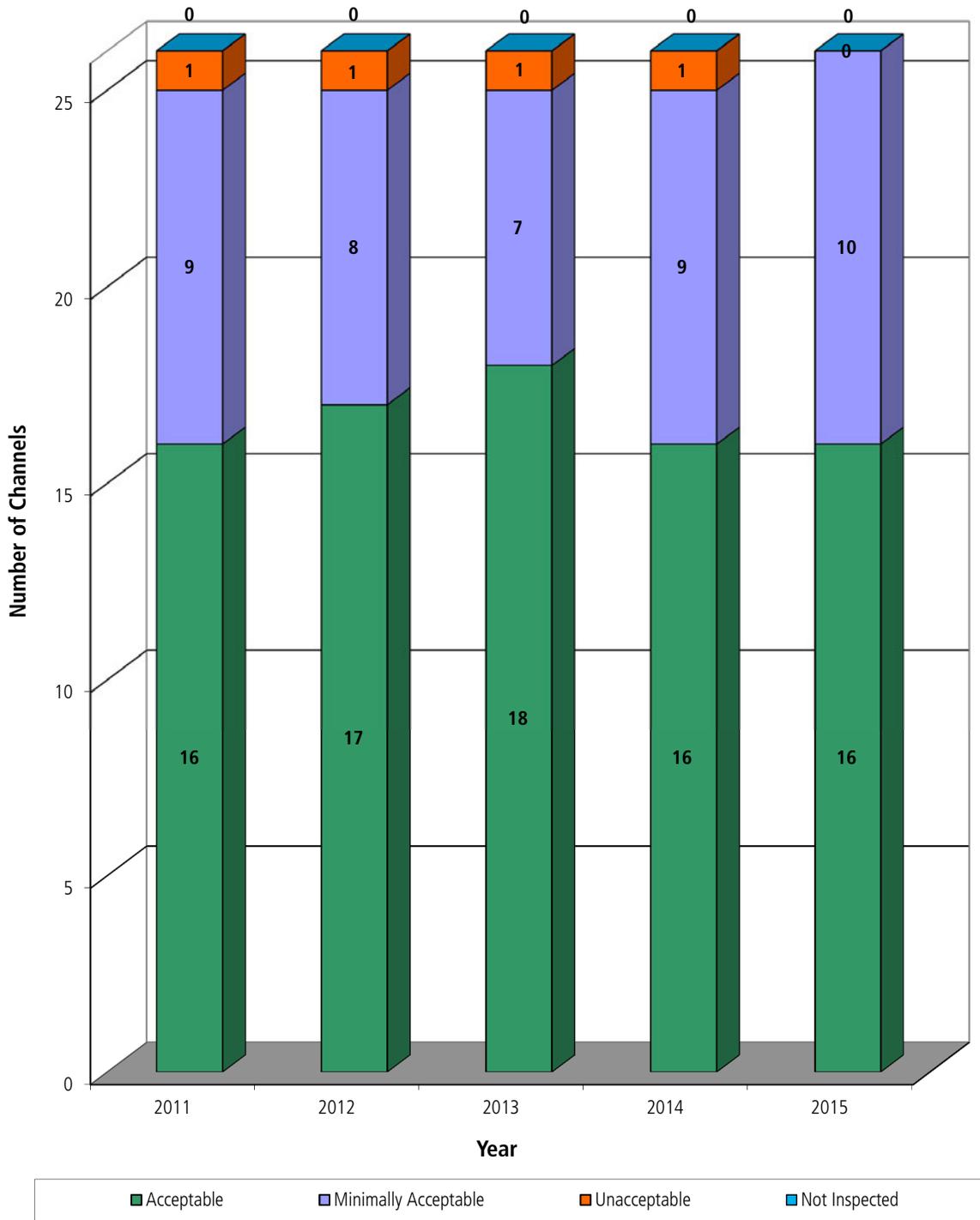
	2011	2012	2013	2014	2015
<b>A=Acceptable</b>	16	17	18	16	16
<b>M=Minimally Acceptable</b>	9	8	7	9	10
<b>U=Unacceptable</b>	1	1	1	1	0
<b>Not Inspected</b>	0	0	0	0	0

No channels were rated as Unacceptable in 2015, 10 were rated as Minimally Acceptable and 16 channels were rated as acceptable, which is slightly better than 2014. Figure 3-1 shows the progression of maintenance ratings from 2011 through 2015.

Table 3-2 shows individual channel ratings for each LMA. To see locations of the channels inspected, see Figure 7-1.

A summary of the ratings for each channel, grouped by LMA and including the rated categories for each, can be found in Appendix I. More detailed reports, including photos for each channel, can be found at <http://cdec.water.ca.gov/fsir.html>.

Figure 3-1: Comparison of Overall Channel Ratings for 2011 to 2015



**Table 3-2: Overall Channel Maintenance Ratings for 2011 to 2015**

Channel	LMA Name					
		2011	2012	2013	2014	2015
<b>Sacramento River Basin</b>						
Ash Creek	Adin Community Service District	A	A	A	A	A
Dry Creek	Adin Community Service District	A	A	A	A	A
Big Chico Creek	DWR Sutter Maintenance Yard	M*	A	A	A	A
Lindo Channel & Sandy Gulch	DWR Sutter Maintenance Yard	A	A	A	A	A
Little Chico Creek	DWR Sutter Maintenance Yard	M*	A	A	A	M*
Sandy Gulch	DWR Sutter Maintenance Yard	N/A	N/A	N/A	N/A	N/A
McClure Creek	Tehama County Flood Control and Water Conservation District	A	A	A	M	M
Salt Creek	Tehama County Flood Control and Water Conservation District	A	A	A	A	A
<b>San Joaquin River Basin</b>						
Ash Slough	Madera County FCWCA	A	A	A	A	A
Berenda Slough	Madera County FCWCA	U	U	U	U	M
Chowchilla River	Madera County FCWCA	A	A	A	A	A
Fresno River	Madera County FCWCA	M	M	M	M	M
Bear Creek	Merced Streams Group	M	M	M	M	M
Black Rascal Creek	Merced Streams Group	M	M	M	M	M
Burns Creek	Merced Streams Group	A	A	A	M	A
Mariposa Creek & Duck Slough	Merced Streams Group	M	M	M	M	M
Miles Creek	Merced Streams Group	A	A	A	A	M*
Owens Creek	Merced Streams Group	A	M	A	A	A
Duck Creek Diversion Channel	San Joaquin County Flood Control And Water Conservation District	A	A	A	A	A
North Littlejohn Creek	San Joaquin County Flood Control And Water Conservation District	A	M	M	M*	M
South Littlejohn Creek	San Joaquin County Flood Control And Water Conservation District	A	A	M	M	M
South Littlejohn Creek North Branch	San Joaquin County Flood Control And Water Conservation District	A	A	A	A	A

**Table 3-2 Continued: Overall Channel Maintenance Ratings for 2011 to 2015**

Channel	LMA Name					
		2011	2012	2013	2014	2015
<b>Miscellaneous Basins</b>						
Laurel Creek	Fairfield Suisun Sewer District	M	M	M	M*	A
Ledgewood Creek	Fairfield Suisun Sewer District	M*	M*	A	A	A
McCoy Creek	Fairfield Suisun Sewer District	M	A	A	A	A
Union Avenue Diversion	Fairfield Suisun Sewer District	A	A	A	A	A
Truckee River	Placer County	A	A	A	A	A

\* Overall channel rating average is less than 0.2; however, U rated issues are present, so the overall rating is M instead of A.

## 4 2015 STRUCTURE MAINTENANCE INSPECTION RESULTS

The types of project structures included in the inspections include fixed crest diversion weirs, controllable diversion structures, outfall structures, drop structures, and interior drainage pumping plants. The rating designations (A, M, and U) described in Section 2 are also used for structure ratings.

The method for determining overall ratings is similar to the one used for channel inspections and is described in Appendix F. Table 4-1 shows the numbers of each rating for 2011-2015 for all structures. Figure 4-1 and Table 4-2 show ratings for each structure, while Figure 4-2 and Table 4-3 show ratings for each pumping plant. The LMAs performance on structure maintenance has fluctuated slightly since 2011, but not one has received an unacceptable rating in that time. FPIS staff have worked with DWR, the USACE, and the CVFPB staff to better understand responsibilities regarding structures. No maintaining agency has been identified for Paradise Dam, but attempts to clarify this are ongoing. FPIS staff continues to research authorizations for the structures and will continue to refine what structures are inspected during these inspections.

**Table 4-1: Summary of Structure Maintenance Ratings for 2011 to 2015**

	2011	2012	2013	2014	2015
<b>Structures Ratings</b>					
A=Acceptable	46	46	42	44	44
M=Minimally Acceptable	3	3	9	8	8
U=Unacceptable	0	0	0	0	0
Not Inspected	0	0	0	0	0
<b>Pumping Plant Ratings</b>					
A=Acceptable	12	11	11	13	12
M=Minimally Acceptable	0	1	2	0	1
U=Unacceptable	1	1	0	0	0
Not Inspected	0	0	0	0	0

Most of the structures remained at a similar level of maintenance to what was reported in 2014.

Tables 4-2 and 4-3 show individual structure ratings for each LMA. Locations of the structures inspected can be found in Figure 7-1.

A summary of the ratings for each structure, grouped by LMA and including the rated categories for each, can be found in Appendix J. A similar report for pumping plants can be found in Appendix K. More detailed reports, including photos for each structure, can be found at <http://cdec.water.ca.gov/fsir.html>.

Figure 4-1: Comparison of Overall Structure Ratings for 2011 to 2015

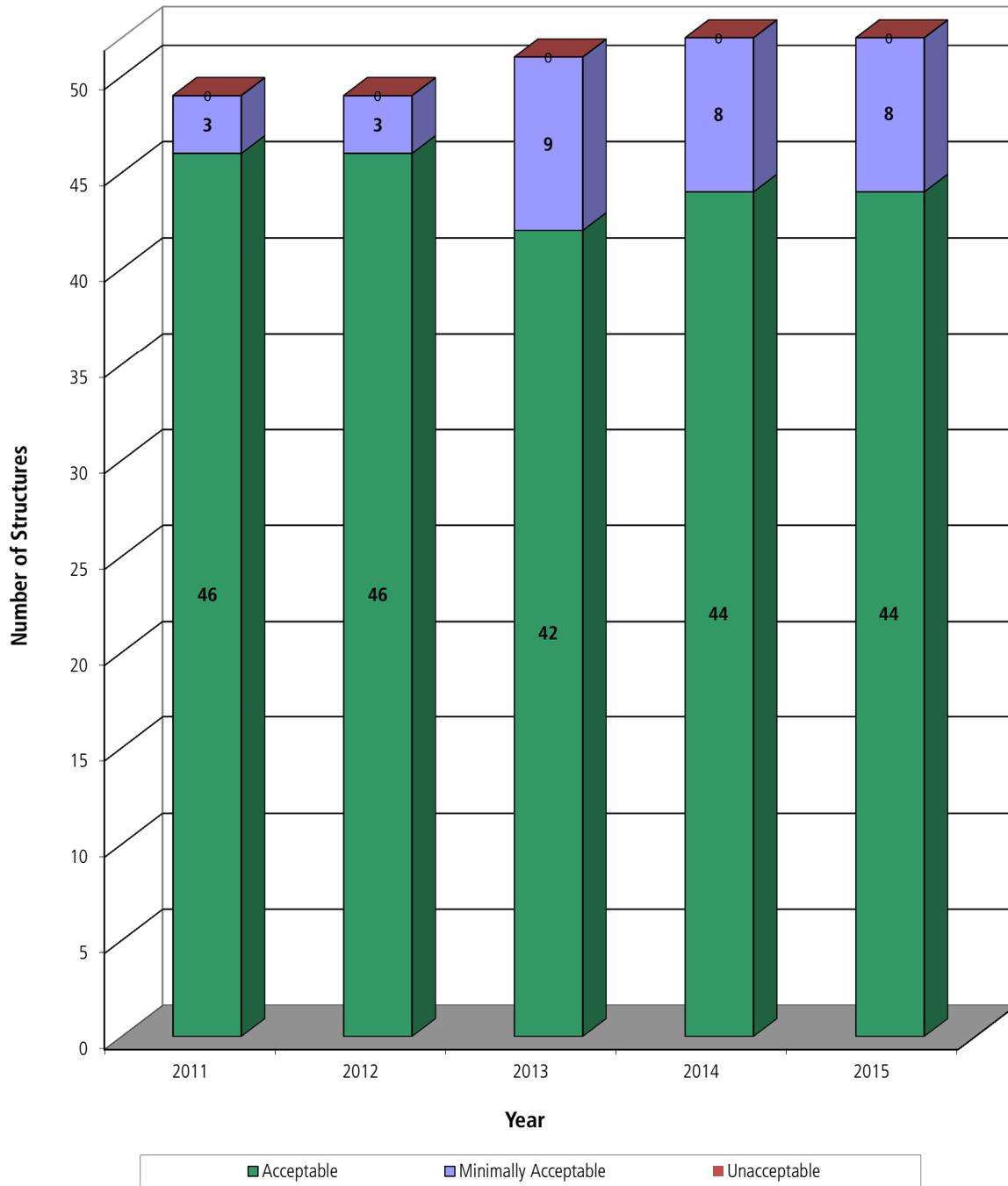


Figure 4-2: Comparison of Overall Pumping Plant Ratings for 2011 to 2015

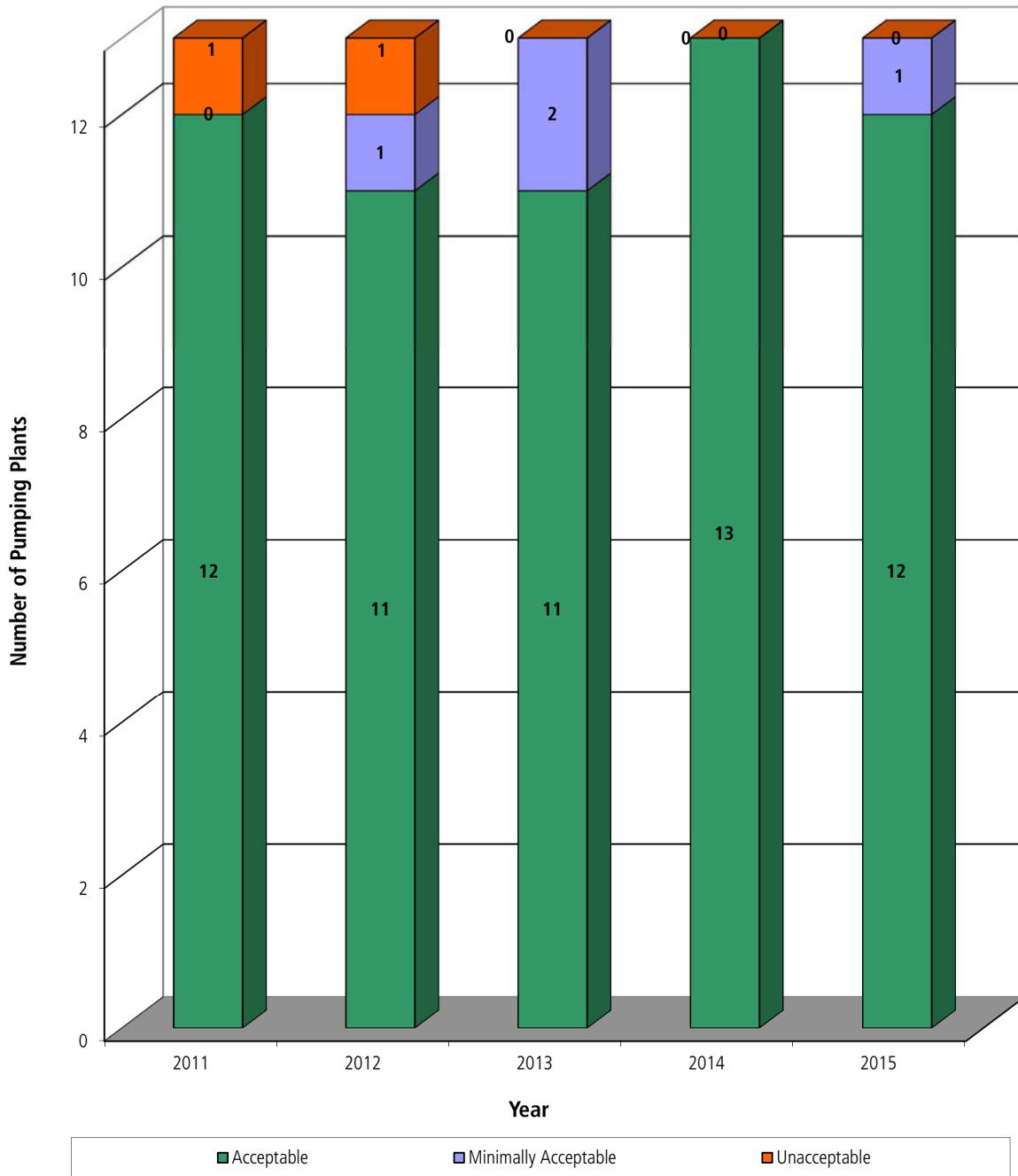


Table 4-2: Overall Structure Ratings for 2011 to 2015

Structure	LMA Name					
		2011	2012	2013	2014	2015
<b>Sacramento River Basin</b>						
Big Chico Creek Control Structure	Butte County Public Works	A	A	A	A	A
Butte Slough Drainage Structure	Sutter Maintenance Yard	A	A	A	A	A
Butte Slough Outfall Structure	Sutter Maintenance Yard	A	A	A	A	A
Cache Creek Settling Basin Weir And Drainage Structure	Sacramento Maintenance Yard	A	A	M	A	A
Clover Creek Diversion Structure	Lake County Watershed Protection District	M	M	M	A	A
Colusa Weir	Sutter Maintenance Yard	A	A	A	A	A
El Camino Avenue Bridge	City of Sacramento	A	A	M	A	A
Elk Slough Inlet Structure	Reclamation District 999	A	A	A	A	A
Fremont Weir	Sacramento Maintenance Yard	A	A	M	M	A
Goose Lake Overflow Structure	Sutter Maintenance Yard	N/A	N/A	M	M	M
Highland Canal Diversion Weir And Drainage Structure	Lake County Watershed Protection District	A	A	A	A	M
Knights Landing Outfall Structure	Sacramento Maintenance Yard	A	A	A	A	A
Lindo Channel Control Structure	Sutter Maintenance Yard	A	A	A	A	A
Lindo Channel Diversion Weir	Sutter Maintenance Yard	A	A	A	A	A
Little Chico Creek Control And Weir Structures	Sutter Maintenance Yard	A	A	A	A	A
M&T Ranch Overflow Structure	Sutter Maintenance Yard	N/A	N/A	A	A	A
Mayhew Drain Closure Structure	Sacramento County	N/A	N/A	N/A	M	M
Moulton Weir	Sutter Maintenance Yard	A	A	A	A	A
Nelson Bend	Sutter Maintenance Yard	A	A	A	A	A
North Fork Feather River Diversion Channel Drop Structure No. 1	Plumas County	A	A	A	A	A
North Fork Feather River Diversion Channel Drop Structure No. 2	Plumas County	A	A	A	A	A
North Fork Feather River Diversion Channel Drop Structure No. 3	Plumas County	A	A	A	A	A
North Fork Feather River Diversion Channel Drop Structure No. 4	Plumas County	A	A	A	A	A
North Fork Feather River Diversion Channel Drop Structure No. 5	Plumas County	A	A	A	A	A
North Fork Feather River Diversion Channel Drop Structure No. 6	Plumas County	A	A	A	A	A

**Table 4-2 Continued: Overall Structure Ratings for 2011 to 2015**

Structure	LMA Name					
		2011	2012	2013	2014	2015
<b>Sacramento River Basin</b>						
North Fork Feather River Diversion Channel Drop Structure No. 7	Plumas County	A	A	A	A	A
North Fork Feather River Diversion Structure	Plumas County	A	A	A	A	A
Sacramento Weir	Sacramento Maintenance Yard	A	A	M	M	A
Sutter Bypass Weir No. 2	Sutter Maintenance Yard	A	A	A	A	A
Tisdale Weir	Sutter Maintenance Yard	A	A	A	A	A
Wadsworth Canal Weir No. 4	Sutter Maintenance Yard	A	A	A	A	A
<b>San Joaquin River Basin</b>						
Ash And Berenda Slough Control Structures	Madera County FCWCA	A	A	A	A	A
Ash Slough Drop Structure No. 1	Lower San Joaquin Levee District	A	A	A	A	A
Ash Slough Drop Structure No. 2	Lower San Joaquin Levee District	A	A	A	A	A
Ash Slough Drop Structure No. 3	Lower San Joaquin Levee District	A	A	A	A	A
Ash Slough Drop Structure No. 4	Lower San Joaquin Levee District	A	A	A	A	M
Bear Creek Diversion Structure	Lower San Joaquin Levee District	A	A	A	A	A
Black Rascal Creek Drop Structure	Merced Streams Group	A	A	A	A	A
Duck Creek Diversion Weir And Control Structure	San Joaquin County Flood Control and Water Conservation District	A	A	A	A	A
Eastside Bypass Control Structure	Lower San Joaquin Levee District	A	A	A	A	A
Eastside Bypass Drop Structure No. 1	Lower San Joaquin Levee District	A	A	A	A	A
Eastside Bypass Drop Structure No. 2	Lower San Joaquin Levee District	A	A	A	A	A
Fresno River Diversion Weir	Madera County FCWCA	A	A	A	M	M
Fresno River Drainage Structure	Lower San Joaquin Levee District	A	A	A	A	A
Mariposa Bypass Control Structure	Lower San Joaquin Levee District	A	A	A	A	A
Mariposa Bypass Drop Structure	Lower San Joaquin Levee District	A	A	A	A	A
Owens Creek Control Structure	Lower San Joaquin Levee District	M	A	M	M	M
Owens Creek Overflow Structure	Lower San Joaquin Levee District	A	A	A	A	A
Owens Creek Siphon Structure	Merced Streams Group	M	M	M	A	A
Paradise Dam	N/A	M	M	M	M	M
San Joaquin River And Chowchilla Canal Bypass Control Structure	Lower San Joaquin Levee District	A	A	A	A	A
San Joaquin River Structure And Sand Slough Structure	Lower San Joaquin Levee District	A	A	A	M	M

\* Overall structure rating average is less than 0.2; however, U rated issues are present, so the overall rating is M instead of A.

**Table 4-3: Overall Pumping Plant Ratings for 2011 to 2015**

Pumping Plant	LMA Name					
		2011	2012	2013	2014	2015
Magpie Creek	City of Sacramento	A	A	M	A	A
Mormon Slough #1	San Joaquin County Flood Control and Water Conservation District	A	A	A	A	A
Mormon Slough #2	San Joaquin County Flood Control and Water Conservation District	A	A	A	A	A
Mormon Slough #3	San Joaquin County Flood Control and Water Conservation District	A	A	A	A	A
American River Pumping Plant #1	Sacramento County	A	A	A	A	A
American River Pumping Plant #2	Sacramento County	A	A	A	A	A
Middle Creek	Sutter Maintenance Yard	A	A	A	A	A
Sutter Bypass #1	Sutter Maintenance Yard	A	A	A	A	A
Sutter Bypass #2	Sutter Maintenance Yard	A	A	A	A	A
Sutter Bypass #3	Sutter Maintenance Yard	A	A	A	A	A
Gomes Lake	Turlock Irrigation District	A	A	A	A	A
Reclamation District 2063 Pumping Plant (Nelson Drain)	Reclamation District 2063	U	U	M	A	A
Wetherbee Lake Pumping Plant & Navigation Gate	Reclamation District 2096	A	M	A	A	M

\* Overall structure rating average is less than 0.2; however, U rated issues are present, so the overall rating is M instead of A.

## 5 SAN JOAQUIN RIVER FLOOD CONTROL SYSTEM EROSION SURVEY

### 5.1 Purpose

Since 2006, the Department of Water Resources Flood Project Integrity and Inspection Branch has conducted an erosion survey of the San Joaquin River Flood Control System (SJRFCS) to document and monitor erosion sites in the SJRFCS. The purpose of the San Joaquin River Flood Control System Erosion Survey (SJRFCSSES) is to: a) inspect the waterside levees for erosion activity, b) document and report new erosion sites, c) document and report the current condition of previously identified erosion sites, and d) rank and rate the severity of erosion sites based upon the findings from the field survey. For the purpose of this report, an erosion site is defined as a site where substantial ground loss associated with erosion has been observed and documented, and where the integrity of the levee may be at risk of an erosion failure during floods or normal flow conditions.

### 5.2 Highlights

- In 2015, the erosion survey shows that 81 of the 102 previously identified erosion sites remain unchanged, including 79 rated existing sites and two unrated sites. Thanks to the dry weather during the last flood season, only two of the existing sites show significantly more erosion than last year. Of the two, the erosion at site NA 0017, river mile 23.35, has progressed significantly and should be repaired as soon as possible.
- Among the 102 surveyed existing erosion sites, 13 sites were repaired prior to the 2014 survey and their performance was evaluated. Six sites were repaired this year and are being monitored.
- Three new erosion sites were documented this year, including one on the San Joaquin River and two on Old River. Due to the lack of high flows, most of the levee distress at the new sites seems to be due to slope instability or irrigation leaks instead from river flows in the past flooding season. While slope instability is not a symptom of erosion, unstable slopes are more prone to erosion during high water and should be monitored, which is why these sites are noted in the erosion survey.
- FPIIB updated the erosion inventory database by adding survey details.
- FPIIB will continue to update the SJRFCSSES yearly.

### 5.3 Results

The results of the 2015 erosion survey continue to show that many local agencies have made significant improvements since 2006. Six previously identified erosion sites were repaired after the 2014 erosion survey. All 13 sites repaired prior to the 2014 erosion survey have been found in good condition. Erosion sites that were not repaired during the previous year and newly documented sites were given one of two possible ratings based on the condition of the site:

- **Minimally Acceptable (M)** – A site that requires annual assessment and monitoring, as it may become a serious levee deficiency in the near future.
- **Unacceptable (U)** – A site that may require immediate attention and corrective action, as it may be a serious levee deficiency that can fail during normal flow or in the next high water event.

Appendix F contains information on the erosion scoring system. In the erosion scoring system, the threshold score that separates Unacceptable sites from Minimally Acceptable sites is set at 59. This score was determined by using the erosion scoring system to conservatively estimate the score of an Unacceptable site (see Appendix F for details).

Table 5-1 lists the number of sites receiving each rating. A detailed summary of each site’s status and rating, including photos, can be found in Appendix L.

**Table 5-1: Summary of Erosion Site Status and Rating for 2015**

	<b>Number of Erosion Sites</b>
M=Minimally Acceptable	41
U=Unacceptable	43
Sites Repaired	19
Sites Not Rated*	2

\*Sites are not rated if they have a berm that is wider than 35 ft. These sites are included in the survey at the request of the LMA.

Table 5-2 shows individual ratings for each erosion site. Most of the erosion sites were in a similar condition as in previous years. While the number of erosion sites rated as U remains high, many of the previously identified sites have since been repaired by local agencies and DWR.

**Table 5-2: Erosion Site Ratings by LMA for 2015**

LMA_INFO	LMA_NAME	Site_ID	Normalized Score	Rating
NA0011	Madera County FCWCA	NA0011U02RM2.57	65	U
NA0013	Merced Streams Group	NA0013U02RM1.31		Repaired
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM23.35	75	U
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM22.74	59	U
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM22.58	63	U
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM22.15	58	M
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM22.01	62	U
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM21.95	47	M
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM21.94	50	M
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM21.05	51	M
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM20.71	52	M
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM20	67	U
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM19.28		Repaired
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM19.23		Repaired
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM19.18	51	M
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM18.69	63	U
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM17.99	71	U
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM17.81	52	M
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM16.27	68	U
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM14.48	45	M

Table 5-2 Continued: Erosion Site Ratings by LMA for 2015

LMA_INFO	LMA_NAME	Site_ID	Normalized Score	Rating
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM13.86	57	M
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM13.72	58	M
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM13.53	40	M
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM12.95	57	M
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM20.62	64	U
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM17.27	62	U
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM15.57	66	U
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U15RM22.91	51	M
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM19.29	35	M
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM17.11	37	M
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U15RM13.87	40	M
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U16RM13.85	63	U
NA0017	San Joaquin County Flood Control and Water Conservation District	NA0017U15RM14.49	50	M
RD0001	Union Island	RD0001U01RM31.4	57	M
RD0017	Mossdale	RD0017U02RM44.32	64	U
RD0017	Mossdale	RD0017U02RM46.03		Repaired
RD0017	Mossdale	RD0017U02RM44.52		Repaired
RD0017	Mossdale	RD0017U02RM45.95	44	M
RD0017	Mossdale	RD0017U02RM45.94		Repaired
RD0017	Mossdale	RD0017U02RM46.89	57	M
RD0017	Mossdale	RD0017U02RM46.1	50	M
RD0404	Boggs	RD0404U01RM41.11	64	U
RD0404	Boggs	RD0404U01RM41.22		Repaired
RD0404	Boggs	RD0404U01RM40.98		Repaired
RD0404	Boggs	RD0404U01RM40.86		Repaired
RD0404	Boggs	RD0404U01RM42.02	54	M

Table 5-2 Continued: Erosion Site Ratings by LMA for 2015

LMA_INFO	LMA_NAME	Site_ID	Normalized Score	Rating
RD0524	Middle Roberts Island	RD0524U01RM45.27		Repaired
RD0524	Middle Roberts Island	RD0524U01RM43.83		Repaired
RD0524	Middle Roberts Island	RD0524U01RM41.59	65	U
RD0524	Middle Roberts Island	RD0524U01RM41.5	69	U
RD0524	Middle Roberts Island	RD0524U01RM41.39	65	U
RD0524	Middle Roberts Island	RD0524U01RM46.39	60	U
RD0524	Middle Roberts Island	RD0524U01RM45.97	64	U
RD0524	Middle Roberts Island	RD0524U01RM45.07	65	U
RD0524	Middle Roberts Island	RD0524U01RM44.13	0	Repaired
RD0524	Middle Roberts Island	RD0524U01RM41.58	68	U
RD0524	Middle Roberts Island	RD0524U01RM40.99	64	U
RD0524	Middle Roberts Island	RD0524U01RM42.79	62	U
RD0524	Middle Roberts Island	RD0524U01RM42.93		Repaired
RD0524	Middle Roberts Island	RD0524U01RM41.92	69	U
RD0524	Middle Roberts Island	RD0524U01RM42.03	63	U
RD0524	Middle Roberts Island	RD0524U01RM43.23		Repaired
RD0524	Middle Roberts Island	RD0524U01RM43.52	64	U
RD0524	Middle Roberts Island	RD0524U01RM40.85	66	U
RD0524	Middle Roberts Island	RD0524U01RM46.06	57	M
RD0524	Middle Roberts Island	RD0524U01RM43.86	67	U
RD0524	Middle Roberts Island	RD0524U01RM42.84	71	U
RD0524	Middle Roberts Island	RD0524U01RM42.09	68	U
RD0524	Middle Roberts Island	RD0524U01RM41.44	71	U
RD0524	Middle Roberts Island	RD0524U01RM46.12		Repaired
RD0524	Middle Roberts Island	RD0524U01RM41.36	54	M
RD0524	Middle Roberts Island	RD0524U01RM41.79	67	U
RD0524	Middle Roberts Island	RD0524U01RM42.2	64	U
RD0544	Upper Roberts Island	RD0544U01RM49.67	63	U
RD0544	Upper Roberts Island	RD0544U01RM48.81		Repaired
RD0544	Upper Roberts Island	RD0544U02RM32.91	58	M
RD0544	Upper Roberts Island	RD0544U02RM33.21	57	M
RD0544	Upper Roberts Island	RD0544U01RM51.09		Repaired
RD0544	Upper Roberts Island	RD0544U01RM51.04	43	M
RD0544	Upper Roberts Island	RD0544U01RM47.12		Repaired
RD0544	Upper Roberts Island	RD0544U02RM33	62	U
RD2031	Elliot	RD2031U01RM0.48	42	M

Table 5-2 Continued: Erosion Site Ratings by LMA for 2015

LMA_INFO	LMA_NAME	Site_ID	Normalized Score	Rating
RD2031	Elliot	RD2031U02RM78.7		Not Rated
RD2058	Pescadero	RD2058U01RM3.97	58	M
RD2062	Stewart	RD2062U03RM30.27	58	M
RD2062	Stewart	RD2062U03RM30.1	58	M
RD2062	Stewart	RD2062U03RM30.02	63	U
RD2062	Stewart	RD2062U03RM29.93	63	U
RD2062	Stewart	RD2062U01RM54.14		Repaired
RD2062	Stewart	RD2062U03RM30.19	62	U
RD2062	Stewart	RD2062U03RM30.43	57	M
RD2062	Stewart	RD2062U03RM31.12	61	U
RD2062	Stewart	RD2062U03RM31.28	64	U
RD2075	McMullin	RD2075U01RM64.34	49	M
RD2085	Kasson	RD2085U01RM67.7		Not Rated
RD2085	Kasson	RD2085U01RM66.5	51	M
RD2089	Stark	RD2089U01RM29.8	58	M
RD2089	Stark	RD2089U01RM29.04	58	M
RD2089	Stark	RD2089U01RM29.61	60	U
RD2089	Stark	RD2089U01RM29.94	51	M
RD2089	Stark	RD2089U02RM28.35	56	M
RD2095	Paradise Cut	RD2095U02RM60.62	40	M
RD2095	Paradise Cut	RD2095U01RM6.74	43	M
RD2095	Paradise Cut	RD2095U02RM60.69	38	M
RD2101	Blewett	RD2101U01RM73.92	68	U

## 6 LMA REPORTING REQUIREMENTS (CWC SECTIONS 9140-9141)

### 6.1 Background

California Assembly Bill (AB) 156 (Laird, 2007) Flood Control was introduced in the 2007-2008 Legislative Session. Governor Schwarzenegger signed the bill and Secretary of State Bowen chaptered it on October 10, 2007 (Chapter 368, Statutes of 2007). CWC Sections 9140-9141 require LMAs to submit an annual report on their operation and maintenance activities on Project levees. The sections also require DWR to submit an annual report summarizing the information received from the LMAs. By establishing these requirements on LMAs, CWC Sections 9140-9141 imposed a state-mandated local reporting program effective July 1, 2008.

#### Local Maintaining Agency Reports

LMAs (including Sacramento and Sutter Maintenance Yards) are required to submit a report regarding the operations and maintenance of their levees to DWR by September 30 each year. According to CWC Section 9140, the information submitted to DWR shall include all of the following five items:

1. Information known to the LMA that is relevant to the condition or performance of the Project levee.
2. Information identifying known conditions that might impair or compromise the level of flood protection provided by the Project levee.
3. A summary of the maintenance performed by the LMA during the previous fiscal year.
4. A statement of work and estimated cost for operation and maintenance of the Project levee for the current fiscal year, as approved by the LMA.
5. Any other readily available information contained in the records of the LMA relevant Project levee, as determined by the CVFPB or DWR.

To aid LMAs with the reporting requirements, DWR developed electronic and hard copy reporting forms. An example of the hard copy reporting forms is shown in Appendix D.

In some cases Project levees abut non-Project levees; therefore, some non-Project levees may also keep flood water out of areas protected by Project levees. In these cases, CWC Sections 9140-9141 requires that LMAs subject to these requirements also include the same information for these non-Project levees in their reports. Other LMAs that maintain only non-Project levees may voluntarily submit their operation and maintenance information to DWR for inclusion in the annual report.

#### Where were the AB 156 LMA Reporting requirements added to the CWC?

AB 156 added Chapter 9, commencing with Section 9110, to Part 4 of Division 5 of the CWC. Water Code additions specific to the Local Maintaining Agency Reporting Program are outlined below:

CWC Section	Topic
Chapter 9, Article 1, Section 9110	Selected Definitions
Chapter 9, Article 1, Section 9140	Local Reports

#### Selected CWC Definitions

**“Local Agency”** means a local agency responsible for the maintenance of a Project levee.

**“Maintenance”** means work described as maintenance by the federal regulations issued by the Secretary of the Army, the Secretary of Agriculture, the department, or the board for any project.

**“Project levee”** means any levee that is part of the facilities of the State Plan of Flood Control

**“State Plan of Flood Control”** means the state and federal flood control works, lands, programs, plans, policies, conditions, and mode of maintenance and operations of the Sacramento River Flood Control Project described in Section 8350, and of flood control projects in the Sacramento River and San Joaquin River watersheds authorized pursuant to Article 2 (commencing with Section 12648) of Chapter 2 of Part 6 of Division 6 for which the board or the department has provided assurances of nonfederal cooperation to the United States, and those facilities identified in Section 8361.

**“Fiscal year”** has the same meaning as set forth in Section 13290 of the Government Code. The fiscal year shall commence on the first day of July.

## Summary Report by DWR

According to CWC Section 9141, DWR is required to prepare and submit an annual report to the CVFPB on the Project levees and certain non-Project levees operated and maintained by LMAs. This report summarizes information received from LMAs, as well as relevant portions of any of the following documents as determined by DWR:

1. The SPFC Descriptive Document.
2. The Flood Control System Status Report (FCSSR).
3. The schedule for mapping described in CWC Section 8612.
4. Any correspondence, documentation, or information deemed relevant by DWR.

The following sections provide a status update for the other documents, reports, and information mentioned above.

<b>CWC Sections 9140 - 9141 Reporting Timelines</b>	
CWC changes became effective: .....	July 1, 2008
Local Maintaining Agency reports to DWR: .....	Due September 30 each year
DWR Annual Report to CVFPB: .....	Due December 31 each year

- **Annual Inspection Report:** The Annual Inspection Report on LMA maintenance is combined in this report.
- **The SPFC Descriptive Document:** The SPFC Descriptive Document was released in November, 2010. The document contains descriptions of flood management facilities, lands, programs, conditions, and mode of O&M for the State-federal flood protection system in the Sacramento River and San Joaquin River watersheds. The report describes the existing system, but it is not a plan for the future. The document is available for download from the Central Valley Flood Management Planning (CVFMP) website: <http://www.water.ca.gov/cvfmp/documents.cfm>.
- **The FCSSR:** The FCSSR was released in December, 2011. This document describes the current status (physical condition) of SPFC facilities at a system-wide level. DWR prepared the FCSSR to meet the legislative requirements of CWC Section 9120, and to contribute to development of the Central Valley Flood Protection Plan (CVFPP). The CVFPP will guide future State investments through projects to address identified problems in the SPFC. The next release of the FCSSR is scheduled for 2017. The current document is available for download from the CVFMP website: <http://www.water.ca.gov/cvfmp/documents.cfm>.
- **The schedule for mapping - DWR's Central Valley Flood Plain Evaluation and Delineation Program (CVFED):** The mapping initiative as described in CWC Section 8612 is part of DWR's CVFED program. This program is now complete and its deliverables are available for use . The CVFED Program provides building blocks to estimate the frequency, depth, and limits of potential flooding in the Central Valley. These building blocks consist of: flood plain assessments, standards, methodologies, tools, and analyses that support multiple flood management and flood risk evaluation applications. These building blocks are used by FloodSAFE programs and projects, and by other State, Federal, and Local Agency projects. The CVFED Program consists of three interrelated projects: (1) Central Valley Topography Acquisition Project, (2) Central Valley Hydraulic Evaluation Project, and (3) Central Valley Floodplain Delineation Project. The Central Valley Topography Acquisition Project produced post processed LIDAR topography for the entire CVFED study area (5,800 sq. miles). The Central Valley Hydraulic Evaluation Project produced reach based, regional and system wide riverine and overland flow foundational hydraulic models for the areas at risk of flooding within the SPFC area of influence. These models have been made available to flood and water management communities within the state on request and are stored in DWR's Library of Flood Models. The Central Valley Flood Delineation Project developed and released informational maps for the urban areas identified in the CVFPP's State System-wide Investment approach.

## 6.2 Agencies Subject to CWC Section 9140 Requirements

### Local Maintaining Agencies Subject to the Reporting Requirements

Most Project levees of the Sacramento and San Joaquin Flood Control Systems are maintained by LMAs and the maintenance activities are funded through assessment of landowner's properties within the LMAs' boundaries. These LMAs are comprised of Levee Districts (LD) and Reclamation Districts (RD). A variety of cities, counties, and other public agencies and municipalities also maintain Project levees; these agencies are identified in this report by the term Named Areas (NA).

### State-Maintained Levees

CWC Section 8361 identifies levees within the Sacramento River Flood Control System that are the State's responsibility. Maintenance of these State-maintained levees (ST) is performed by DWR through the Sacramento and Sutter Maintenance Yards.

### Maintenance Areas

Under Section 12878 of the CWC, DWR is authorized to create Maintenance Areas (MA) for Project levees with no identified LMA, or where the LMAs have failed or refused to perform maintenance or have chosen to relinquish maintenance responsibilities of their own volition. There are currently 10 active MAs in the state, all within the jurisdictional boundaries of the CVFPB. Based on their location, levees within MAs are maintained by either the Sacramento or Sutter Maintenance Yards.

#### More Information on LMAs from the CWC

Type of Agency Section	CWC
Levee Districts	70000
Reclamation Districts	50000
State Maintained Areas	8361
Maintenance Areas	12878

## 6.3 Use of the LMA Reporting by DWR

The information collected by the LMA Report provides a local understanding of system performance, as well as their operation and maintenance practices. This important information contributes to an annual assessment of vulnerability of the flood control system prior to flood season and can be shared with emergency response partners to make sure that appropriate steps are taken for resource monitoring and emergency operations. Providing detailed information about the location and extent of critical levee distresses is essential to the flood preparedness activities that ensure timely and appropriate response for flood emergencies.

The information submitted in Parts 1 and 2 of the five-part reporting program provides critical information for emergency response before flood season to better prepare the first responders. Part 3 provides an opportunity for DWR to assess the current maintenance practices by LMAs throughout the year, in particular during summer and winter. Part 4 provides information on LMAs' planned activities and budgets for the next fiscal year. This information particularly helps DWR to evaluate LMAs' operation and maintenance costs per levee mile. Part 5 deals with any other readily available information that LMA can submit regarding the condition and the performance of the structures. The information in Part 5 is also used to better prepare emergency responders.

Finally, the LMAs provide valuable information about the current conditions of the levees in flood control system. DWR uses this information to develop critical data to evaluate levees, monitor levee conditions, and provide input to emergency response programs to improve public safety.

### Reporting Statistics

There has been an increasing trend (Figure 6-1) of reporting compliance by LMAs during the past five years. A system wide comparison of reporting compliance (Figure 6-2) shows at least 90% of Areas belonging to the Sacramento system and 92% of Areas belonging to the San Joaquin system have reported in the last five years. Overall, about 95% of Areas have submitted their report this year.

The increasing trend of electronic reporting is continuing and is shown in Figure 6-3. This year, about 78% of the Areas submitted reports through DWR’s web-based LMA Reporting tool. This may be attributed to continuous outreach activities and enhancement of reporting infrastructure since the inception of the tool.

**Figure 6-1: Reporting Compliance for 2011 to 2015**

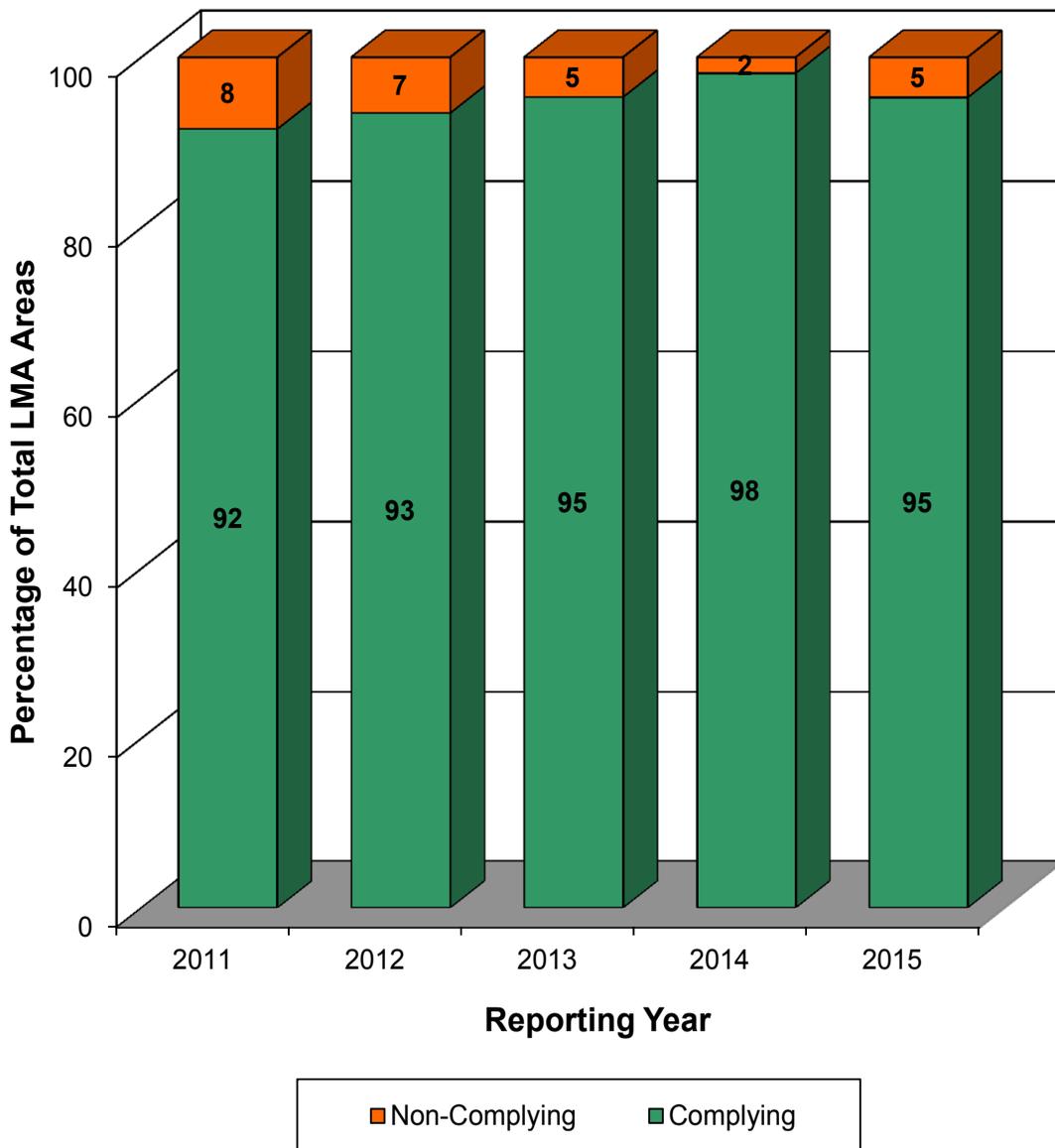


Figure 6-2: Comparison of Reporting Compliance by Systems for 2011 to 2015

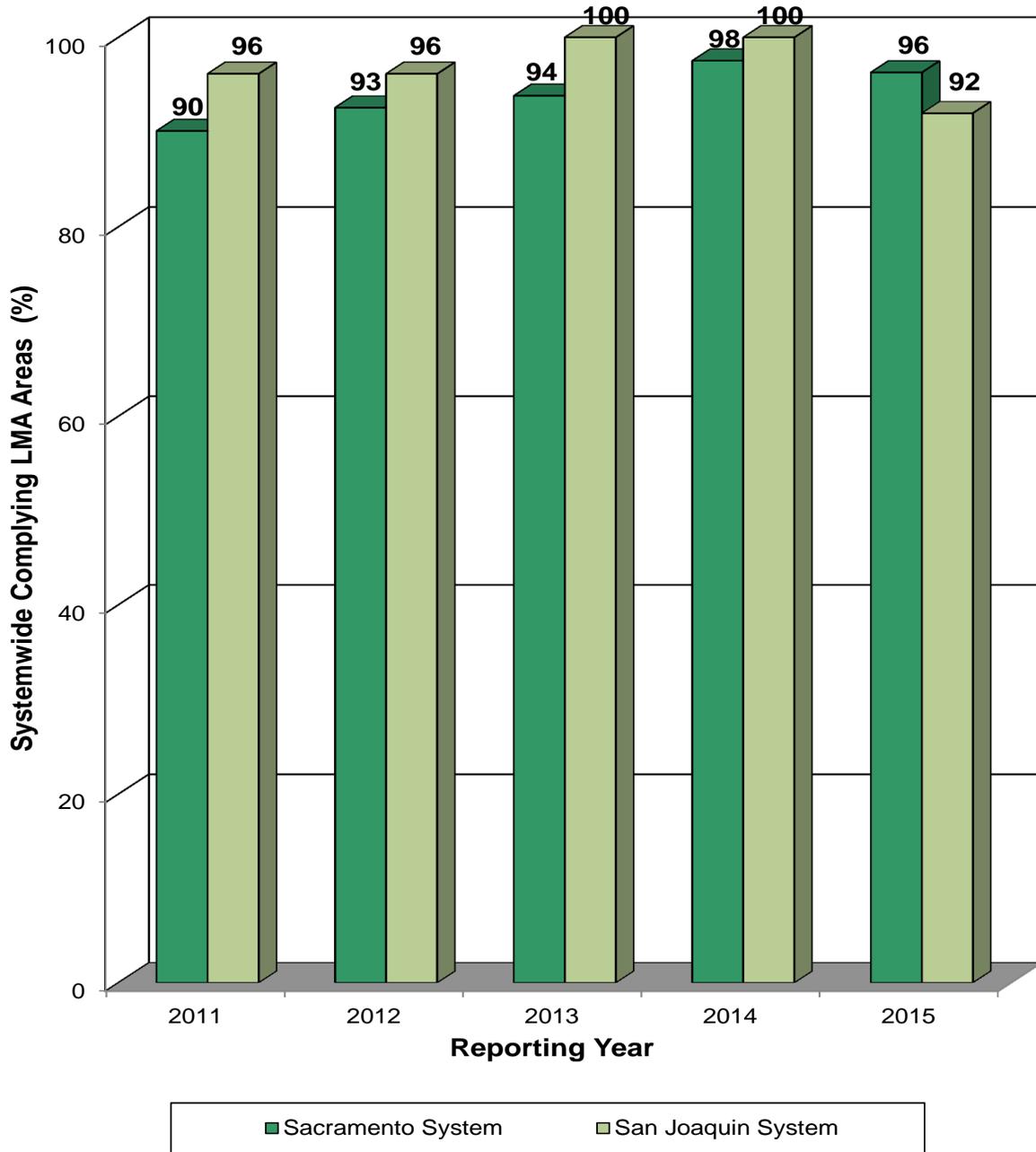
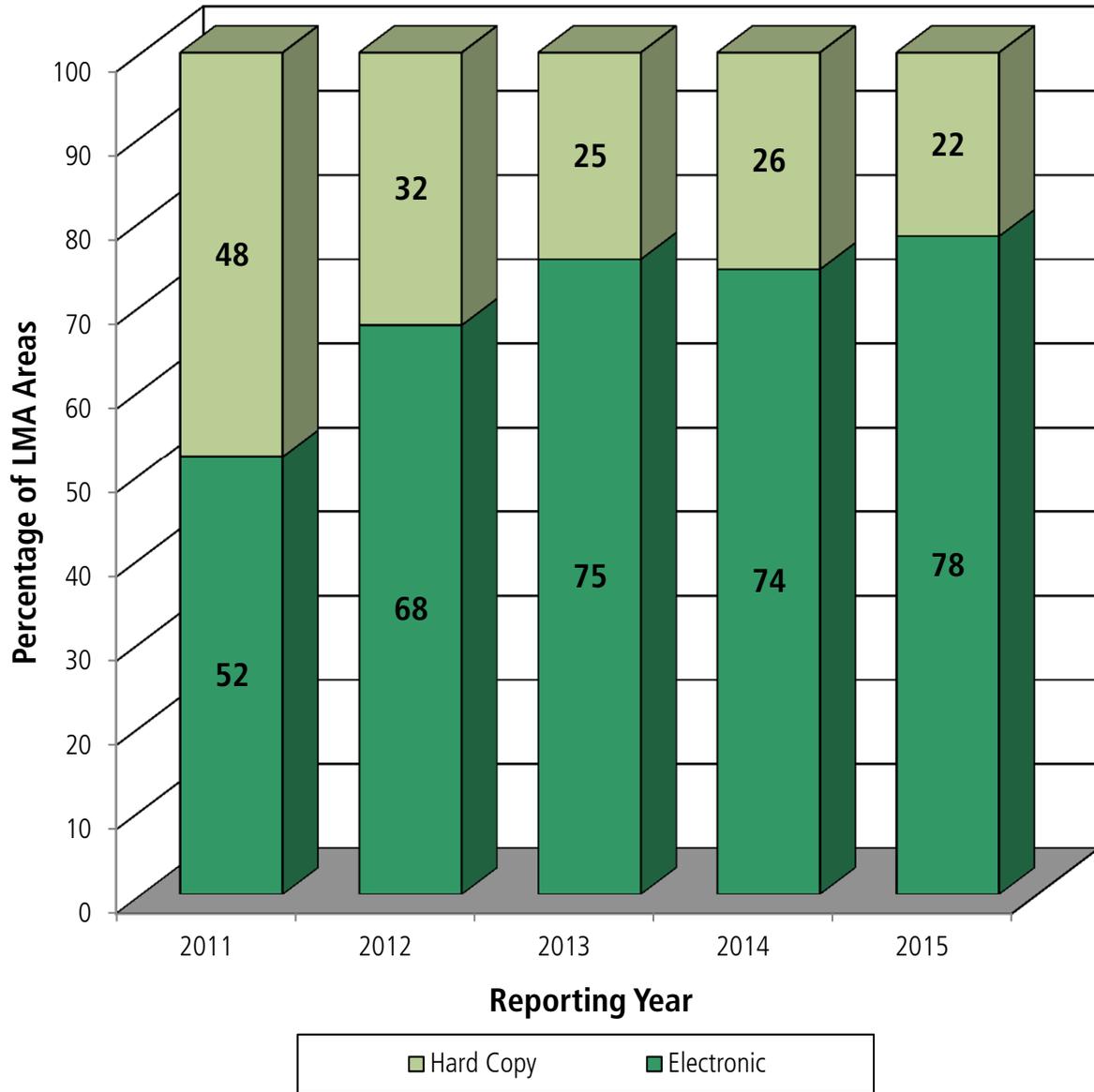


Figure 6-3: Reporting Mode for 2011 to 2015

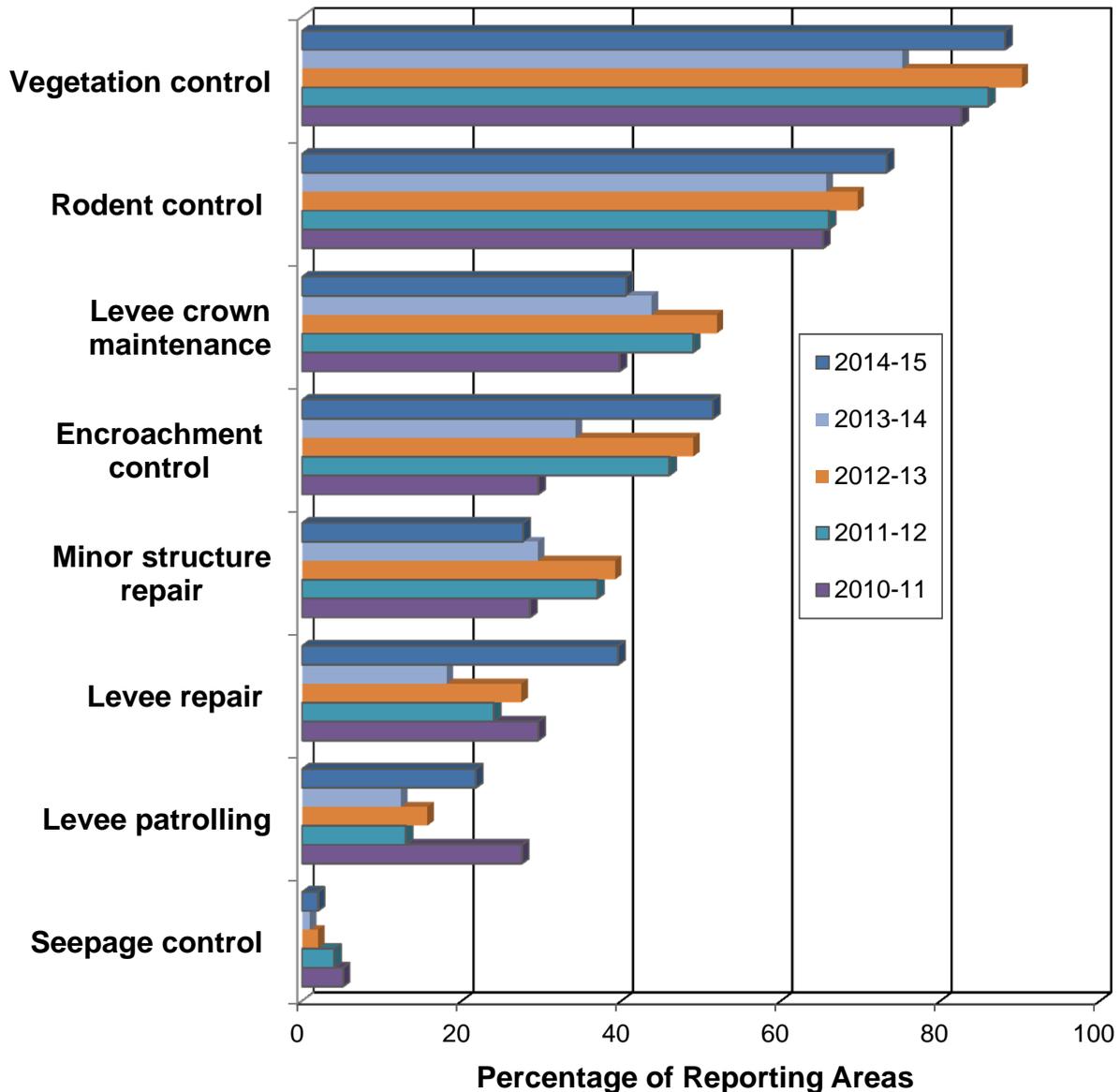


### Reported Key Maintenance Activities

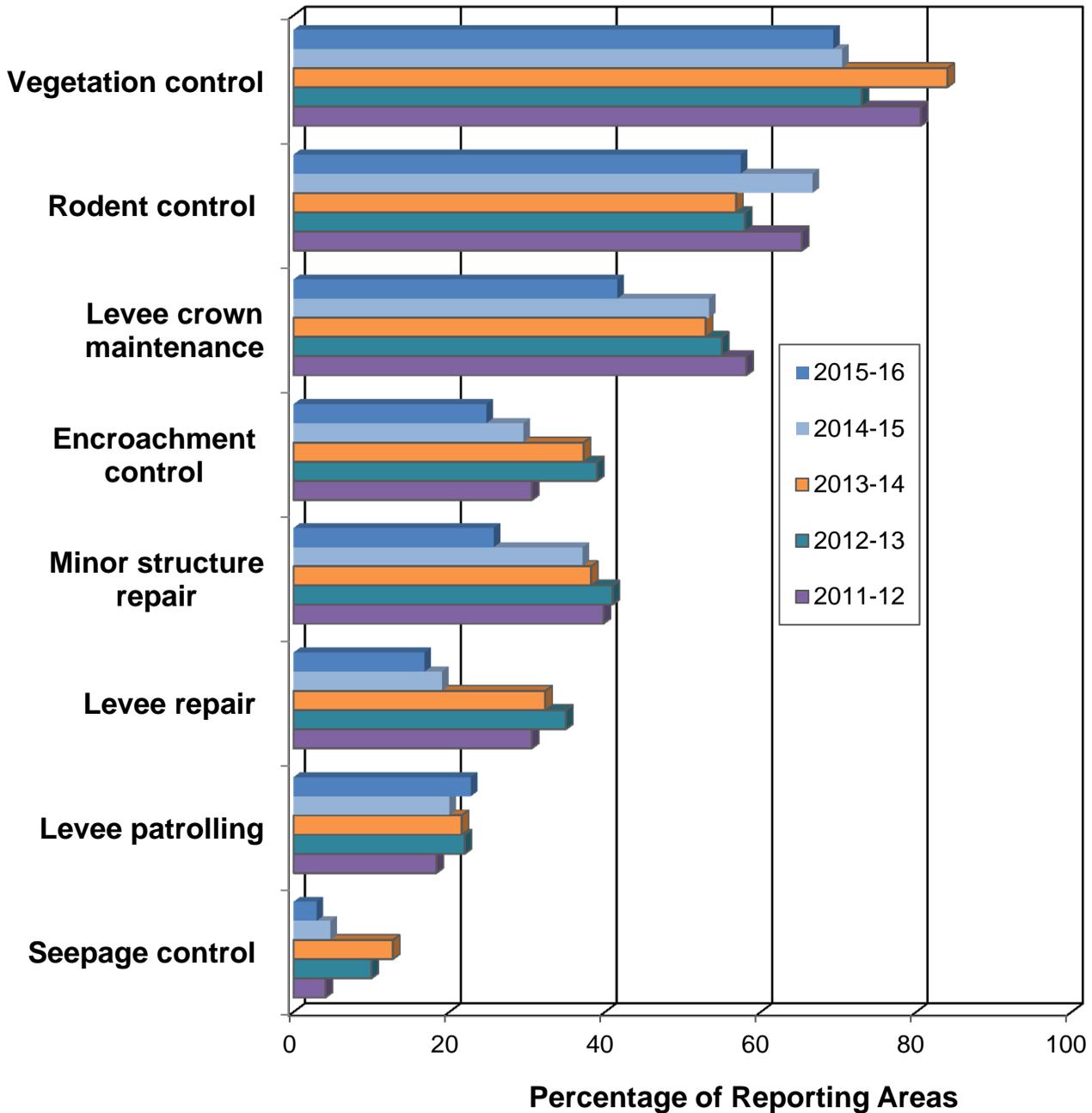
About 99% of reporting Areas provided information on the summary of maintenance activities. As in the previous years, routine vegetation maintenance activities (burning, slope dragging, cutting, trimming, spraying), rodent control, levee crown grading, roadway maintenance and encroachment dominated LMA maintenance activities for fiscal year 2014-15. Figure 6-4 shows the activities Areas reported as having performed as a percentage of the total number of Areas who reported information during that year. Other reported key activities include minor structural repairs (mile markers, gates, barricades, and miscellaneous signs maintenance and repair), and minor levee repairs (erosion repair, hole grouting, revetment, rip-rap and slope repair). Some LMAs also reported levee patrolling and other planning activities such as preparation of five year maintenance plans.

A similar percentage of reporting Areas also provided information on the planned maintenance activities for the current fiscal year 2015-16. The planned activities reflect similar maintenance priorities as performed maintenance activities in fiscal year 2014-15. Figure 6-5 shows planned activities that were reported by LMAs.

**Figure 6-4: Key Performed Activities Reported for 2011 to 2015**



**Figure 6-5: Key Planned Activities Reported for 2012 to 2016**



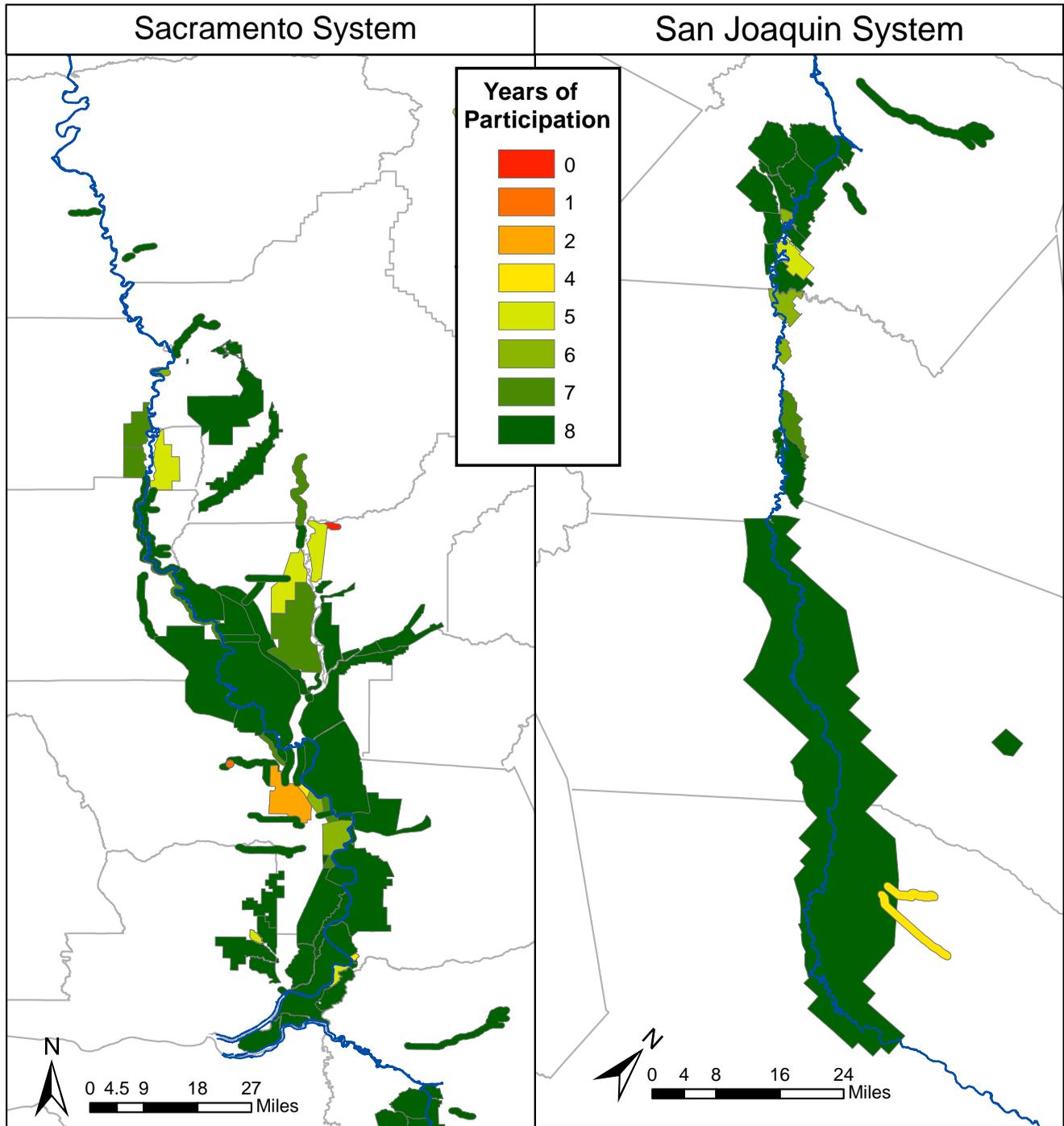
**Issues Reported**

Local Maintaining Agencies reported issues and information critical for the integrity of the Project levees. Key issues pointed out by the LMAs this year include: encroachment, erosion and sedimentation, freeboard and other levee geometry deficiencies, in-channel and levee vegetation, seepage, and sand boils. All of this information is summarized in Part 1 and Part 2 in the summary reports in Appendices A and B.

Figure 6-6 shows a graphical representation of LMA’s compliance with the program for both the Sacramento and San Joaquin systems from 2008 through 2015. For the most part, both Sacramento and San Joaquin system LMAs complied with the

program for majority of the years since 2008. The figure also shows that there is only one LMA in the Sacramento system that never reported to the program. On the contrary, there are no single LMAs in the San Joaquin system that never reported to the program.

**Figure 6-6: Compliance by Reporting Area for 2008 to 2015**



## **6.4 Communication and Outreach**

DWR recognizes that the requirements of CWC Section 9140 placed a new reporting burden on LMAs. To help make reporting easier, DWR developed an outreach program and a web-based reporting tool to assist LMAs. DWR notified LMAs of the new reporting requirements, developed electronic and hard copy reporting options, and held a series of presentations and workshops. The process continues today, with DWR soliciting feedback from LMAs to improve the program. The following subsections and Figure 6-7 describe the chronology of the outreach process for 2015.

### **Local Maintaining Agency Individual Reporting Feedback**

In lieu of an LMA workshop, individual feedback was provided to the LMAs on their 2014 report. LMAs were encouraged to provide more detailed information and they were given an example report showing the level of detail the Department wishes to receive. 43 LMAs also received feedback on their 2014 report along with the example report. A copy of the example report and the letter to LMAs is included in the Appendix D.

### **Web Application User Manual**

A web application User Guide has been updated for the electronic users to facilitate reporting. Along with the LMA reporting module, the guide includes the Utility Crossing Inventory Pipeline Program and the USACE Inspections and Encroachment Records modules. It can also be used to answer frequently asked questions. The guide will be subjected to change as functions and features are updated. The guide can be accessed from the LMA website:

[http://cdec.water.ca.gov/cgi-progs/products/LMA\\_Web\\_Application\\_User\\_Guide.pdf](http://cdec.water.ca.gov/cgi-progs/products/LMA_Web_Application_User_Guide.pdf)

### **Fact Sheet**

A program fact sheet was revised in 2013 to describe changes to the program and reporting requirements. It is posted on the LMA website at <http://cdec.water.ca.gov/lma.html>.

### **Non-Project Levee Information**

In order to further support the CWC 9140 requirement, DWR asked the LMAs (who maintain non-Project levees) to submit information on their non-Project levees starting in 2013. Out of 99 LMAs who responded to DWR's request, 20 LMAs reported non-Project levees they maintain along with the Project levees. The information received was verified and integrated into the LMA reporting tool for these 20 LMAs. This year, 6 LMAs- 5 from Sacramento and 1 from San Joaquin, reported on their non-project levees. DWR will continue to perform outreach to the LMAs for reporting on non-Project levees and collect information on other types of non-Project levees.

### **Submittal to Libraries**

DVDs of the 2014 Annual Report were submitted to 49 libraries within the jurisdictional areas of the LMAs as directed by the code. A copy of the letter to the libraries is included in Appendix D.

### **Submittal to Cities and Counties**

DVDs of the 2014 Annual Report were submitted to 17 cities and counties within the jurisdictional areas of the LMAs. This improvement was added to the program for the first time in 2011. The code requires distribution of the report to any city or county within the local agency's jurisdiction. The counties included were Butte, Plumas, Glenn, Colusa, Tehama, Placer, Sutter, Yolo, Lake, Sacramento, Solano, San Joaquin, Stanislaus, Madera, Merced, and Fresno. A copy of the letter to the cities and counties is included in Appendix D.

### **Reporting Requirements Letter**

On September 9, 2015, a reporting requirements letter was mailed to all LMAs with instructions and the deadline. A copy of the letter is included in Appendix D.

### ***Phone Calls***

DWR performs outreach activities to assist LMAs with meeting the reporting deadline, assist in the web application, and help submit 2015 report successfully.

### ***Email Distribution ListServ***

The existing listserv (email distribution list) has been expanded with more email addresses in 2015. The listserv is used by inspection and other programs within DWR to communicate and outreach to LMAs conveniently and timely.

### ***Website and Electronic Reporting - Web Application Development***

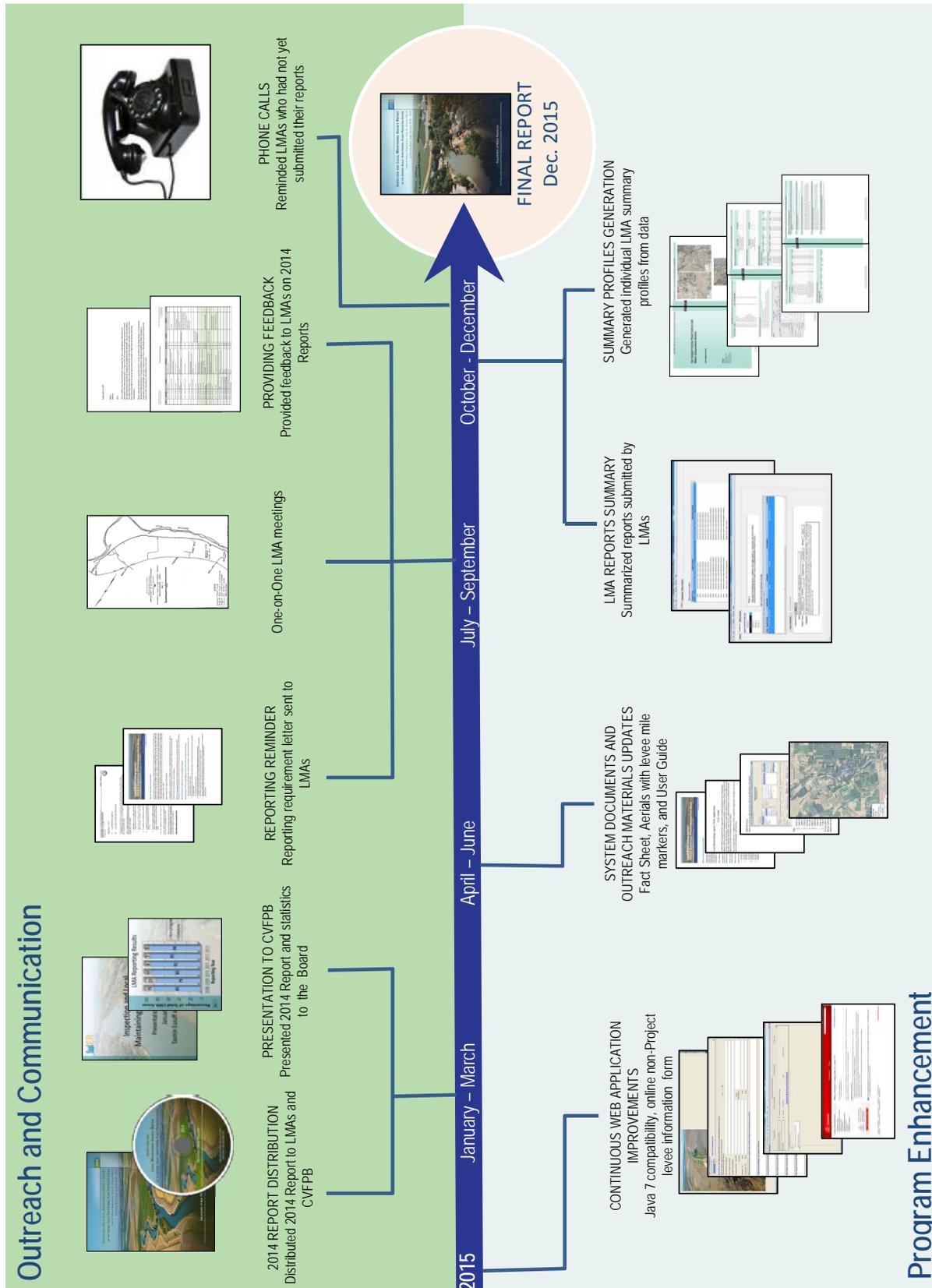
The graphical user interface for the webpage was developed in 2008 with assistance from the California Data Exchange Center (CDEC) staff to improve reporting and information sharing. Various documents regarding the LMA Reporting program can be accessed at <http://cdec.water.ca.gov/lma.html>. The web based reporting application can also be accessed at this location.

To obtain an individual user account for the web application, submit your request to [flood.webmaster@water.ca.gov](mailto:flood.webmaster@water.ca.gov). The application allows LMAs to access certain flood system information and submit required information electronically.

This web application is continually improved and enhanced with features and functions to assist LMAs in fulfilling their reporting requirements. To help LMAs submit acceptable reports, three examples of good reports are posted on our website. To access the examples, please click on the "Reporting Example" link under the Local Agency program website.

The integration between the Inspection and LMA reporting program through the web application has been improved. LMAs are highly encouraged to use the electronic program to submit information required for both the Inspections and LMA Reporting programs in one place. The response has been positive to date; more agencies submitted their reports electronically in 2015 than by hard copy.

Figure 6-7: LMA Reporting Program Activities



## 7 OTHER FPIIB ACTIVITIES AND ACCOMPLISHMENTS

The FPIIB supports flood operations by inspecting, evaluating, and assessing the integrity of the Sacramento and San Joaquin Flood Control Project levee systems through a variety of activities. FPIIB is involved in collecting and managing flood control system information to assist in flood operations efforts. This information includes data on historical levee distress issues, as well as historical flood control system improvements, O&M agreements, O&M standards and practices, and general information related to flood control system facilities.

FPIIB inspects the maintenance of flood control facilities and notifies LMAs of system deficiencies, monitors levee and channel erosion, monitors use of designated floodways, conducts regulatory inspections of CVFPB authorized encroachments, conducts flood fight training, has first-response capability during high-water events, and helps assist in conducting high-water staking.

The following sections provide more detail on key FPIIB activities and accomplishments.

### 7.1 *Inspection and Reporting for Project Facilities*

As described earlier, FPIIB conducts maintenance inspections for Project levees, channels, and structures. Improvements in 2015 inspections and reporting include:

- Continued inspector training and use of more consistent methodology to reduce subjectivity
- Continued refinements to the inspection database program, allowing efficient documentation of system conditions and compatibility with USACE National Levee Database reporting requirements

DWR expects to implement additional changes to the inspection program as existing USACE policies are clarified over time, new policies are developed, and other levee management issues arise.

### 7.2 *High Water Staking*

FPIIB set up a program and protocol to instruct DWR, LMAs, and other interested parties on how to perform high water staking. As part of this effort, FPIIB developed documentation for high water staking in Project levees. They are:

- High Water Staking Field Guidebook
- High Water Event Documentation Program Report

The High Water Staking Field Guidebook is designed to assist field crews with staking procedures. It provides a pre-staking checklist and describes how to stake, where to stake, and what to stake. The High Water Event Documentation Program Report describes issues and concern about the current staking program and recommends improvements. An outreach flyer has been developed to identify partners and stakeholders for this program. DWR is planning to make these documents available on CDEC for public use. High water data gathered from this program will also be available in CDEC.

FPIIB coordinated a high water staking effort with the Floodplain Evaluation Branch, Hydrology Branch, Regional Projects Assessment Branch of DFM, and the Geodetic Branch of the Division of Engineering (DOE) in 2011. DWR collected 243 high water surface elevations over approximately 200 miles of the San Joaquin River Flood System. Staking was done to gather valuable information on high water as well as to test the guidelines and protocols that were developed. The data collected can be used to better understand the performance of the levees, characterize a historical high water event, guide future flood control system improvements, and improve hydraulic modeling of flood control systems.

### 7.3 *Levee Waterside Erosion Surveys*

The USACE, with DWR sponsorship, has contracted for waterside erosion surveys of the Sacramento River system since 1998. As stated earlier, FPIIB began conducting waterside erosion surveys of the San Joaquin River portion of the State-federal flood protection system Project levees in September of 2006. The primary purpose of these surveys is to: a) inspect the waterside levees for erosion activity, b) document and report new erosion sites, c) document and report the current condition of previously identified erosion sites, and d) rank and rate the severity of erosion sites based upon the findings from the field survey. The USACE and its contractors generate the report on erosion found in the Sacramento River system; FPIIB staff supplements their inspection reports with the USACE data as it becomes available.

This year's erosion survey results were received in draft format from the USACE late in the fall of 2015. Much consideration was given to whether or not draft data should be used as part of the inspection criteria. After comparing the 2013 data set with the 2015 data set, it was decided to use the 2015 data. This decision was made when the comparison showed very little change in erosion lengths and a minor number of new or removed erosion sites. The 2015 data is included in this report and the LMRs.

The results from DWR's Erosion Survey of the San Joaquin River System are presented in this report in Section 5. Inspection criteria and rating methodology are described in Appendix F.

DWR and other State, federal, and local entities are working to develop an erosion repair strategy that addresses environmental concerns about erosion maintenance and assigns responsibility for repair of different scales of erosion in the flood protection system.

### 7.4 *Utility Crossing Inventory Surveys*

Levee penetrations are recognized as hazard elements affecting the integrity of project levees. Heavily corroded, leaking, collapsed, or otherwise compromised pipes affect the structural integrity of levee embankment by creating mechanisms of internal erosion. Identification of the precise location of these crossings and documentation of their external conditions constitute important and relevant information used to assess levee vulnerability.

Utility Crossing Inventory Program (UCIP) has developed an inventory of utility crossings penetrating State-federal project levees. The inventory included detailed desk studies to identify the location and characteristics of documented pipes crossing project levees and field surveys to document the external condition of the crossing structures and levee embankment.

While the majority of utilities penetrating project levees are irrigation or drainage discharge pipes, there are many other types of utilities crossing levees such as pressurized gas pipelines, storm drains, sewer lines, and communication conduits.

The utility crossing inventory program:

- Identified locations and characteristics of all pipes penetrating through levees by reviewing historical information such as CVFPB encroachment permits, DWR Levee Logs, Local Maintaining Agency's (LMA) records, and USACE Operation and Maintenance Manuals.
- Performed field surveys to identify the location and document the existing condition of the crossing and levee embankment based on an external visual inspection.
- Documented and updated the status of the crossing (found, indicators found, or not found).
- Assessed utility crossing based on visual evidence of deterioration of the pipe, inlet or outlet structure, and identify maintenance needs (Urgent, Non-Urgent, or No Action Needed).
- Shared utility crossing information with LMAs to assist in the coordination and Operation of Public and Private Facilities during flood fighting.

- Promotes the use of the Local Maintaining Agency Annual Report (Web Application) tool to log the operation and maintenance of the levee sections where utility crossings are present.
- Provides training to LMAs on how to update utility crossing information using the web application.

The UCIP has completed desk studies for about 1600 miles of the SPFC levees. These desk studies entailed extensive review of historical information such as CVFPB encroachment permits, DWR Levee Logs, LMA records, and USACE Operation and Maintenance Manuals to identify location and characteristics of pipes. About 7500 penetrations through the SPFC levees were identified during these desk studies. UCIP also performed field surveys to verify locations and document the existing condition of these pipes based on external visual inspection. Field surveys have been completed for about 1550 miles of levees.

Information collected through this program is being used by inspectors to clarify maintenance issues with the different levee maintaining agencies, and by engineers for vulnerability assessments. Penetrations through SPFC levees documented through the UCIP were included for the first time in the Levee Mile Reports (LMRs) in 2014. Penetrations rated as Urgent in UCIP were noted as Unacceptable on the LMRs while penetrations rated as Non-Urgent were noted as Minimally Acceptable. At this time all UCIP issues are noted as Enforcement issues. However, in the future system features such as storm drains may be used in part to assess an LMA's overall rating.

### ***UCIP Online Application***

Utility crossings (penetrations) require permitting review/approval, construction inspection, and continuing oversight inspection activity by all stakeholders including the USACE, CVFPB, DWR/FPIIB, LMA's and utility owner (permittee). UCIP field survey and desk study data has been integrated with Local Maintaining Agency Annual Reporting web application. This web application will enhance coordination and exchange of UCIP data with LMAs, CVFPB and USACE. This online tool allows the LMAs to record the actions taken to address any identified issues and keep a record of all utility crossings within their jurisdiction.

The UCIP online application:

- Provides a tool that can provide real-time crossing inventory and condition of all utility crossing penetrating through the flood project works by local maintaining agency.
- Provides an enhanced reporting method through the Local Maintaining Agency Annual Report (Web Application) for LMAs/MAs. It provides a transparent communication between DWR and LMAs/MAs with regards to documenting compliance issues, maintenance records, and progress notifications of the corrective action.
- Provides detailed summary sheets of utility crossings and information identifying known conditions that might impair or compromise the level of the project levee, per Water Code Section 9140 (a)(1).
- Provides an annual assessment of the utility crossing based on field surveys. This tool also allows for LMAs/MAs to document which utility crossings, based on visual inspection, pose a threat to the integrity of the flood control system.
- Allows LMAs to record all the steps taken to rectify unauthorized or non-compliant issues with regards to utility crossings.

## 7.5 Other Key Activities

Additional FPIIB activities supporting the assessment of the integrity of the Sacramento and San Joaquin Flood Control Project levee system include:

- CVFPB Permit Inspection: FPIIB's team of inspectors visually inspect the construction and installation of permitted encroachments for adherence to Board conditions. Staff are also coordinating with the CVFPB staff to document all permits in a database so that permit records can be more easily searched by stakeholders.
- Other CVFPB/FOC Inspections: In addition to the issuance of formal permits, the CVFPB authorizes activities on levees and structures in the system. During 2015 staff inspected and documented these activities. Repair and replacement of penetrations through levees and repairs resulting from issues noted in the USACE's inspections continued to be a significant portion of these inspections. FPIIB also conducted investigations into a variety of matters as requested by the CVFPB and the FOC.
- DWR and USACE Inspection Program Working Group: FPIIB, USACE's Sacramento District, CVFPB staff, and DWR meet monthly to coordinate ongoing DWR and USACE inspection program and maintenance activities. The primary focus is to establish a consistent understanding of inspection criteria and to establish consistent guidelines for developing system ratings.
- DWR also meets with a number of LMAs on a quarterly basis to discuss issues affecting them and to help them as much as possible.
- USACE: The USACE and its contractors conducted multiple inspections including a number of Periodic Inspections throughout 2015. FPIIB staff participated heavily in coordination with the LMAs, USACE, and CVFPB. FPIIB staff is helping to ensure that information is properly and completely exchanged between the entities to the greatest extent possible. As the LMAs complete maintenance on areas of concern noted in the Periodic Inspections, FPIIB inspectors work with the CVFPB to verify that the work is completed before the USACE is notified and a re-inspection is requested.
- Additional LMRs continue to be generated and published to <http://cdec.water.ca.gov/fsir.html> that show only maintenance related issues to provide clear information to the LMAs regarding what work they should concentrate on.
- FPIIB inspection data was used in conjunction with other data sources to identify levee vulnerabilities which were then cataloged in the CDEC database. This data can be accessed using the Levee Vulnerability Tool in FERIX, the Flood Emergency Response Information Exchange. This tool provides quick and detailed background information regarding distressed locations for initial analysis during high water events and in assessing system reliability.
- System Documentation: In 2015, FPIIB staff continued to add more documentation to CDEC, made it available to stakeholders, and has continued work with the USACE to update O&M Manuals to include other recent documentation and improvements.
- Flood Fight Training: Inspectors assisted the Flood Fight Specialist in teaching flood fight method courses throughout the state.
- Emergency Response Exercises: FPIIB assisted the FOC in preparing and conducting emergency response exercises. FPIIB staff participated in a simulation for the Forecast-Coordinated Operations (F-CO) group and an Incident Command Team field exercise in 2015.

- A pilot study is being conducted to evaluate the feasibility of an instrumentation network (fully-grouted piezometers) along the Project levees to obtain real-time data pertaining to levee behavior during a flood event. The real-time information will allow DWR to assess seepage conditions through the levee during high water events and enhance its Emergency Preparedness and Response Plan. The instruments have been placed and are being monitored. As part of this pilot study, an instrumentation network of piezometers and data logger system was installed to provide direct, real-time measurement of levee through seepage and under-seepage conditions during medium and high-water events. Data download from the piezometers began after the completion of installation in October, 2011. Of the 36 saturated piezometers, three appear to be providing values outside the expected range. Seepage models were constructed to represent subsurface conditions based on geotechnical borings. Piezometric data recorded from the site was used to calibrate the seepage models.
- A Field Investigation Reporting System is being developed that includes enhancements to the database that is used to gather, track, and manage information collected during field visits to the flood control system regarding integrity issues. The system will be flexible in reporting the type of investigation, and will have the capability to be integrated with CDEC systems and accessible to stakeholders.
- Levee Tree Assessment Tool. In 2015, the inspections staff worked with the Vegetation Assessment Working Group (VAWG) to develop an inspection tool and database specifically used to evaluate trees on or near the levees. This tree assessment tool, which is similar to the inspection tool in form and function, is on track to be completed in 2016.