CENTRAL VALLEY
FLOOD MANAGEMENT
PLANNING PROGRAM

FloodSAFE
CALIFORNIA

# Errata to the Public Draft

## 2012 Central Valley Flood Protection Plan

# Volume IV – Attachments 8F through 8L

## June 2012

STATE OF CALIFORNIA
THE NATURAL RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES

*This page left blank intentionally.*

CENTRAL VALLEY FLOOD MANAGEMENT PLANNING PROGRAM

FloodSAFE CALIFORNIA

# Errata to the Public Draft 2012 Central Valley Flood Protection Plan Volume IV – Attachments 8F through 8L

1. **Attachment 8F – Flood Damage Analysis, Section 3.8, page 3-44**

   Of the total 2.2 million acres of the CVFPP HEC-FDA planning area (floodplains) in the Sacramento and San Joaquin river basins, about 1.6 million acres are irrigated crop land. Crop flood damages under the CVFPP No Project condition were evaluated using the same approach as in the Comprehensive Study (i.e., using the Comprehensive Study Agricultural Damage Spreadsheet (Ag damage spreadsheet) as the tool to estimate damage values for the Sacramento and San Joaquin river basins (USACE, 2010b)).

2. **Attachment 8H – Regional Economic Analysis for the State Systemwide Investment Approach, Universally**

   Update attachment title throughout as follows:

   Attachment 8J: ~~Designs and Costs~~ Cost Estimates

3. **Attachment 8H – Regional Economic Analysis for the State Systemwide Investment Approach, Section 2.1, page 2-1, footnote**

   Replace Footnote 2 as follows:

   ~~All jobs are converted to equivalent annual full-time jobs for reporting purposes.~~ Employment values represent annual full-time, part-time, and temporary positions.

4. **Attachment 8H – Regional Economic Analysis for the State Systemwide Investment Approach, Table 2-1, page 2-2**

   Replace Table 2-1 Footnote 3 as follows:

   ~~All jobs are converted to equivalent annual full-time jobs for reporting purposes.~~ Employment values represent annual full-time, part-time, and temporary positions.

5. **Attachment 8H – Regional Economic Analysis for the State Systemwide Investment Approach, Table 2-2, page 2-3**

   Replace Table 2-2 Footnote 2 as follows:

   ~~All jobs are converted to equivalent annual full-time jobs for reporting purposes.~~ Employment values represent annual full-time, part-time, and temporary positions.

6. **Attachment 8H – Regional Economic Analysis for the State Systemwide Investment Approach, Section 3.0, page 3-1, second bullet**

   U.S. ~~Army Corps of Engineers (USACE)~~ Water Resources Council. 1983. Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies

7. **Attachment 8H – Regional Economic Analysis for the State Systemwide Investment Approach, Section 3.0, page 3-1, third bullet**

   ~~USACE~~ U.S. Army Corp of Engineers (USACE). 2000. Planning Guidance Notebook

8. **Attachment 8H – Regional Economic Analysis for the State Systemwide Investment Approach, Section 3.1.1, page 3-2, third bullet**

   Employment is measured by the number of ~~equivalent annual full-time jobs. One annual job is equivalent to one person being employed during a single year. One person being employed for 5 years is equal to five equivalent annual full-time jobs.~~ annual full-time, part-time, and temporary positions. Estimated changes in employment are tied to economic relationships between industry output and labor productivity, regardless of availability and fluidity in the local labor force.

9. **Attachment 8H – Regional Economic Analysis for the State Systemwide Investment Approach, Section 3.4, page 3-13, first sentence of third paragraph**

   For this regional economic impact analysis, indirect and induced economic effects were not quantified for avoided ~~content and~~ structure and content, and agricultural production damages, as well as avoided loss of life.

10. **Attachment 8H – Regional Economic Analysis for the State Systemwide Investment Approach, Section 3.4.2, page 3-15**

    Replace section text with the following:

    Avoided agricultural production and commodity damages, which represent an avoided loss of agricultural output within a region, are a direct economic effect to the region. This direct economic effect in agricultural production has a multiplier effect throughout the regional economy, impacting jobs and output in other supporting sectors. Direct agricultural production damages expected to be avoided with implementation of the SSIA were estimated and documented in Attachment 8F: Flood Damage Analysis.

    This analysis did not estimate the indirect and induced effects, or ripple effects, of direct, avoided agriculture damages because direct agriculture damages estimated in the flood damage analysis are based on a net income approach which only allows induced economic effects to be estimated with IMPLAN.

**11. Attachment 8H – Regional Economic Analysis for the State Systemwide Investment Approach, Table 4-2, page 4-4**

Replace Table 4-2 Footnote 3 as follows:

~~Jobs are equivalent annual full-time jobs. One annual job is equivalent to one person being employed during a single year. One person being employed for 5 years is equal to five equivalent annual full-time jobs.~~ Employment values represent annual full-time, part-time, and temporary positions.

**12. Attachment 8H – Regional Economic Analysis for the State Systemwide Investment Approach, Section 4.2.2, page 4-8, Table 4-5**

Replace Table 4-5 Footnote 1 as follows:

~~Jobs are equivalent annual full-time jobs. One annual job is equivalent to one person being employed during a single year. One person being employed for 5 years is equal to five equivalent annual full-time jobs.~~ Employment values represent annual full-time, part-time, and temporary positions.

**13. Attachment 8H – Regional Economic Analysis for the State Systemwide Investment Approach, Section 4.2.2 , page 4-10, Table 4-6**

Update the avoided loss of output for the regional economic impact study area for accuracy.

~~$100.86~~$103.87

**14. Attachment 8H – Regional Economic Analysis for the State Systemwide Investment Approach, Section 4.3.1, page 4-10**

Replace section text with the following:

Employment values represent annual full-time, part time, and temporary positions that can be converted to full-time annual equivalent jobs with ratios based on national averages from the BEA. Full-time annual equivalent jobs represent positions that involve 2,080 hours of work in a standard year. It is expected that the application of full-time annual equivalent conversion ratios to employment value results of this analysis would result in approximately a ten percent reduction in the number of jobs reported.

Estimated changes in employment are tied to economic relationships between industry output and labor productivity, regardless of availability and fluidity in the local labor force. In reality, hiring decisions are complex and typically take into account the duration of anticipated changes in production. Jobs reported for this analysis may be new, or created, jobs within each region or jobs simply supported in the industries affected by implementation of the SSIA. Project construction and flooding are short-term events that may not necessarily result in hiring of new employees; instead, existing employee work patterns may be adjusted in response to fluctuations in demands.

**15. Attachment 8H – Regional Economic Analysis for the State Systemwide Investment Approach, Section 4.3.4, page 4-12**

Replace section text with the following:

Regional economic effects related to avoided structure and content damages expected with implementation of the SSIA were not quantified in this analysis because detailed information and analyses were not available for determining the potentially offsetting nature of flood damages and reconstruction and replacement effects.

Direct agricultural production damages expected to be avoided with implementation of the SSIA were estimated and documented in Attachment 8F: Flood Damage Analysis. This analysis did not estimate the indirect and induced effects, or ripple effects, of direct, avoided agriculture damages because direct agriculture damages estimated in the flood damage analysis are based on a net income approach which only allows induced economic effects to be estimated with IMPLAN.

Regional economic effects related to transportation and energy disruptions, emergency services, and population displacement due to flooding were not analyzed for this high level regional economic impact analysis. These analyses may be completed for future State basin-wide feasibility studies to support regional planning activities.

Regional economic effects of recreation disruptions during project construction were not analyzed for this high level regional economic impact analysis. Recreation disruptions during project construction may be analyzed for future State basin-wide feasibility studies to support regional planning activities.

**16. Attachment 8H – Regional Economic Analysis for the State Systemwide Investment Approach, Section 5.0, page 5-1, second sentence of first paragraph**

This section describes other potential regional economic effects of the SSIA that were not quantified in Section 4. For the 2012 CVFPP, available information did not support detailed analyses for these effects. These analyses may be completed for future State basin-wide feasibility studies. These effects include:

**17. Attachment 8H – Regional Economic Analysis for the State Systemwide Investment Approach, Section 6.0, page 6-1**

U.S. Army Corps of Engineers (USACE). ~~1983. Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. U.S. Water Resources Council. U.S. Government Printing Office, Alexandria, Virginia. March 10.~~

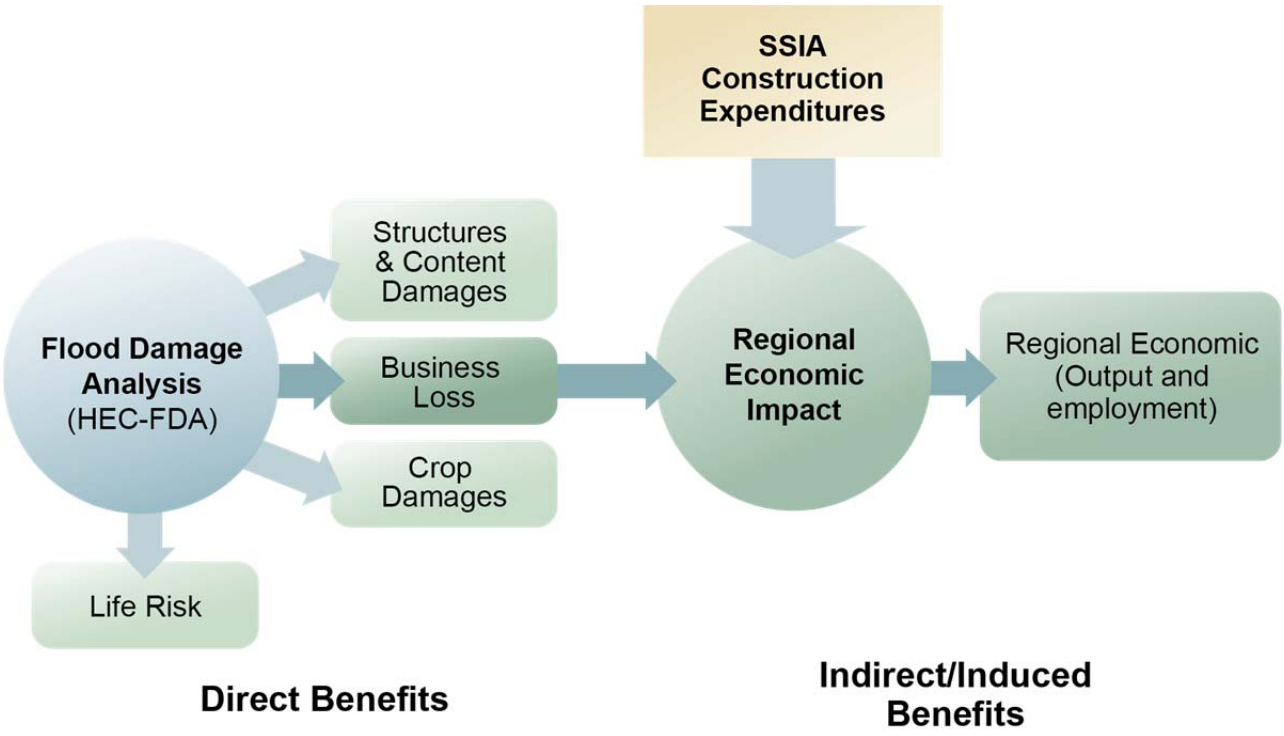
~~———.~~2000. Planning Guidance Notebook. Washington D.C., April 22. Available at: <http://140.194.76.129/publications/eng-regs/er1105-2-100/toc.htm>

———. 2011. Regional Economic Development Procedures Handbook. Institute of Water Resources, Alexandria, Virginia. May 2011.

U.S. Water Resources Council. 1983. Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. U.S. Water Resources Council. U.S. Government Printing Office, Alexandria, Virginia. March 10.

**18. Attachment 8I – Framework for Benefit Assessment, Figure 3-1, page 3-4**

Replace Figure 3-1 with the CVFPP Figure 3-8 as follows:




Key:
HEC-FDA = U.S. Army Corps of Engineers Hydrologic Engineer Center Flood Damage Analysis
SSIA = State Systemwide Investment Approach

**Figure 3-1. CVFPP Economic Assessment Approach**

**19. Attachment 8I – Framework for Benefit Assessment, Section 4.3, pages 4-6 and 4-7**

Table 4-3 displays the direct, indirect, and induced employment and economic output effects resulting from the following factors:

- Construction expenditures related to the implementation of the SSIA over a 20 year period
- Avoided annual flood-related business losses (direct business losses are also included in the EAD estimates)

~~However, s~~Secondary economic effects of the above factors were ~~not~~ only estimated for the ~~other approaches~~ SSIA. The methods and data used to estimate regional economic effects related to the factors listed above, and other potential regional economic effects not quantified are described in Attachment 8H: Regional Economic Analysis for the State Systemwide Investment Approach.

**20. Attachment 8J – Cost Estimates, Section 2.1, page 2-1, third line of second bullet**

… The SPFC provides flood protection to nearly 1 million …

**21. Attachment 8J – Cost Estimates, Section 2.2, page 2-3, Table 2-1 title and heading row**

**Table 2-1. Summary of Cost Estimate Ranges for Preliminary Approaches Considered and Preferred State Systemwide Investment Approach**

| Flood Management Element | Preliminary Approaches Considered | | | State Systemwide Investment Approach ($ million) |
|---|---|---|---|---|
| | Achieve SPFC Design Flow Capacity ($ million) | Protect High Risk Communities ($ million) | Enhance Flood System Capacity ($ million) | |

**22. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 1.0, page 1-2, second sentence of Section 4 bullet**

The flood management elements represent different types of ~~are organized into groups based on their primary~~ improvements made to the flood protection system (systemwide, urban, rural-agricultural).

**23. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 2.2.2, page 2-3, first sentence of fourth paragraph**

… for each of the flood management ~~component~~components based on …

**24. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.1, page 3-2, first paragraph**

… management elements and are ~~component~~components of the …

**25. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.1, page 3-6, Table 3-4**

Revise the third row as follows:

| | | | | |
|---|---|---|---|---|
| All Weather Roads on Levee Crowns | YES (1) | NO | YES (1) | YES |

Add note as follows:

Note:
(1) Costs for All Weather Roads on Levee Crowns are included in two preliminary approaches under Non-Urban Levee Improvements to Achieve SPFC Design Capacity (Table 3-3).

**26. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.2, page 3-7, second sentence of first paragraph**

… the flood management ~~component~~components included in each approach.

**27. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.2, page 3-7, fourth sentence of first paragraph**

Additional information on ~~included~~ improvement costs to each of the nine regions is provided…

**28. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.2, page 3-7, title of Table 3-5**

Table 3-5. Cost Summary for ~~Four~~ Three CVFPP Preliminary Approaches and State Systemwide Investment Approach ($millions, 2011 dollars)

**29. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.2.1, page 3-9, Table 3-6**

Add notes to the bottom of the table as follows:

Notes:
The Achieve SPFC Design Flow Capacity Approach is one of three preliminary approaches initially considered for the CVFPP. Additional detail for specific components is provided in Tables 6-1 through 6-4.

**30. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.2.2, page 3-10, Rural Agricultural Improvements paragraph**

Only the small community improvements component~~components are~~ is included in...

**31. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.2.2, page 3-12, Table 3-7**

Add notes to the bottom of the table as follows:

Notes:
The Protect High-Risk Communities Approach is one of three preliminary approaches initially considered for the CVFPP. Additional detail for specific components is provided in Tables 6-5 through 6-8.

**32. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.2.3, page 3-13, second sentence of first paragraph**

… combines ~~component~~components of the above two approaches…

**33. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.2.3, page 3-13, second sentence of third paragraph**

Most of the system improvements ~~component~~components are needed …

**34. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.2.3, page 3-14, last sentence of second paragraph**

This ~~component~~component is not included …

**35. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.2.3, page 3-15, Table 3-8**

Add notes to the bottom of the table as follows:

Notes:
The Enhance Flood System Capacity Approach is one of three preliminary approaches initially considered for the CVFPP. Additional detail for specific components is provided in Tables 6-9 through 6-12.

**36. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.2.4, page 3-16, second sentence of third paragraph**

Most of the system improvements ~~component~~components are needed…

**37. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.2.4, page 3-17, first sentence of first paragraph**

…when combined with some of the floodplain management ~~component~~components …

**38. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.2.4, page 3-17, third paragraph**

Residual risk management is a significant part of the SSIA, by providing cost-effective alternative (through floodplain management component~~components~~) to provide protection (reduced risk) in rural floodplains through the enhanced flood emergency response and floodplain management ~~component~~components (which is more comprehensive than in the other approaches). The floodplain management component~~components~~ provides a mechanism…

**39. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.2.4, pages 3-18 and 3-19, Figures 3-1 and 3-2**

Replace Figures 3-1 and 3-2 with the following:

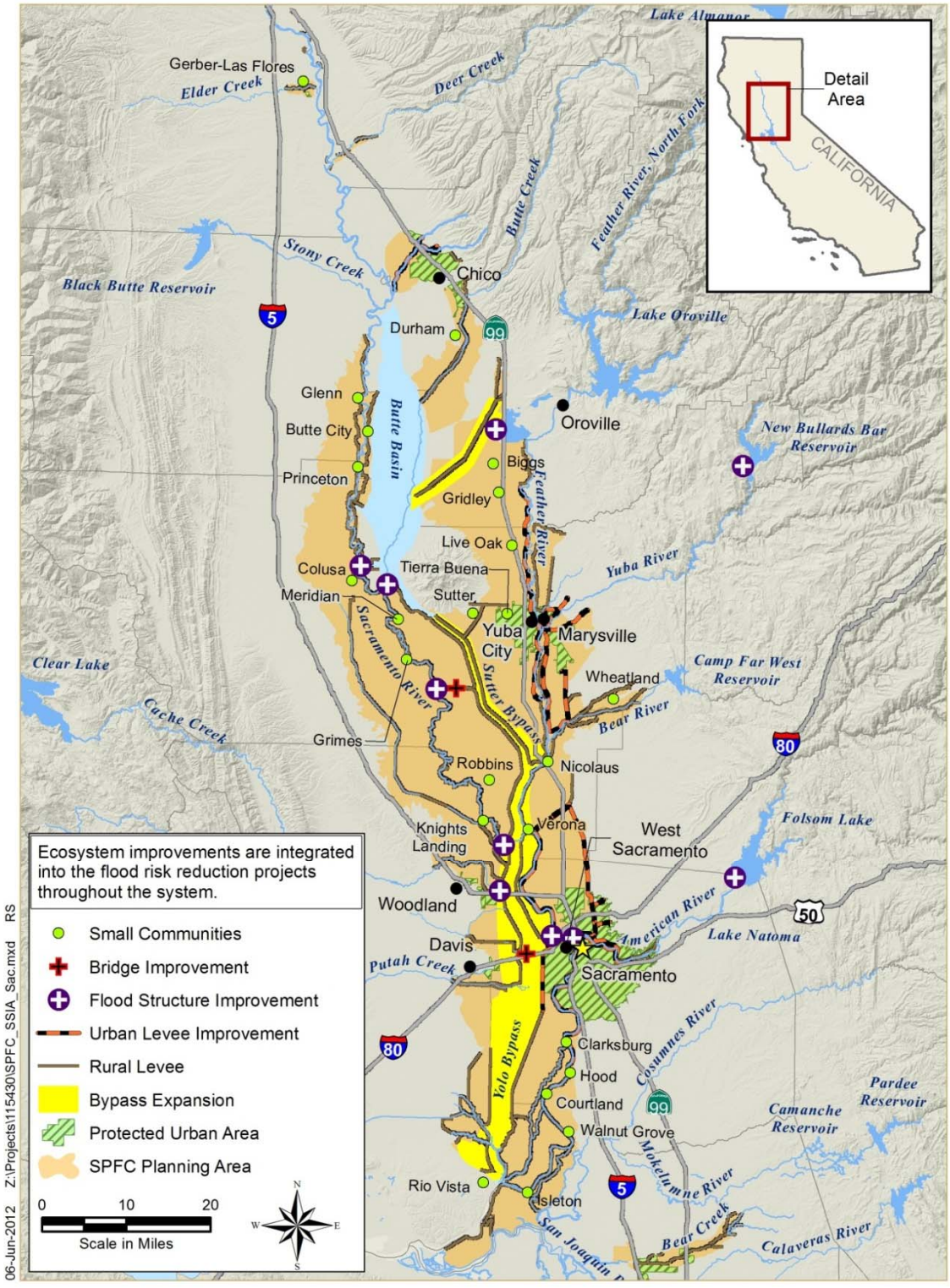



**Figure 3-1.** ~~**Location of Major System Improvements in the Sacramento River Basin**~~ **State Systemwide Investment Approach – Sacramento River Basin Major Capital Improvements Under Consideration**

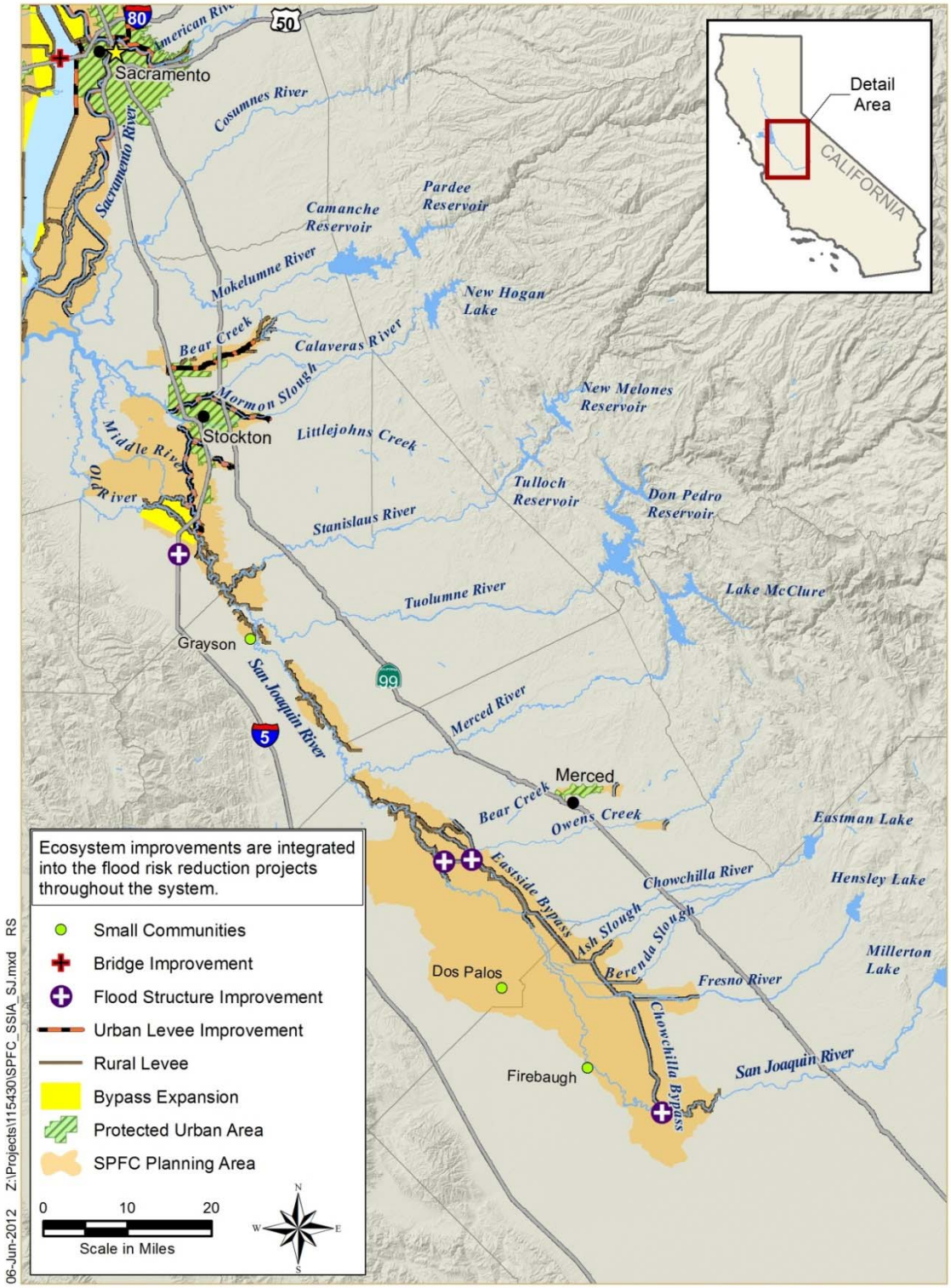



**Figure 3-2.** ~~Location of Major System Improvements in the San Joaquin River Basin~~ **State Systemwide Investment Approach – San Joaquin River Basin Major Capital Improvements Under Consideration**

**40. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 3.2.4, page 3-20, Table 3-9**

Add notes to the bottom of the table as follows:

Notes:
The State Systemwide Investment Approach is the State's preferred approach for the CVFPP.
Additional detail for specific components is provided in Tables 6-13 through 6-16.

**41. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1, page 4-1, first sentence of second paragraph**

This flood management element includes purchasing land and easements for the bypasses and levees, and making environmental improvements to the lands included in the expanded bypasses.

**42. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1, page 4-2, bulleted list, bullets 4 through 9**

- Levee improvements for new and expanded bypasses
  - New levee construction
  - Improving existing levees
- Flood system structures
- ~~Major flood system structures~~
- Fish passage structures

**43. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1.1, page 4-3, first paragraph**

… Table 4-2. Land acquisition costs are based on a market value analysis to determine an aggregate value for each region. Region-specific costs vary by land use type (example unit costs are provided in Attachment 8J, Appendices B and C), structure relocations, and other factors. ~~and include costs of structure relocations. Additional information on development of land acquisition acreage and cost are included in Attachment 8J, Appendices B through E.~~

**44. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1.1, page 4-3, Table 4-2**

Add notes to the bottom of the table as follows:

Notes:
Land acquisition costs include purchase of land (fee title), which varies by region.
Costs for land acquisition are included in one preliminary approach considered (Enhance Flood System Capacity) and are also included in the State Systemwide Investment Approach.

**45. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1.2, page 4-4, Table 4-3**

Add notes to the bottom of the table as follows:

Notes:
Agricultural conservation easements would preserve agricultural land uses. These differ from easements (Section 4.1.9) because there is no provision for storage of flood flows within an agricultural conservation easement.
The cost for an agricultural easement is assumed to be 35 percent of the cost of acquiring the land (see Table 4-2).
Costs for agricultural conservation easements are included in one preliminary approach considered (Enhance Flood System Capacity) and are also included in the State Systemwide Investment Approach.

**46. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1.3, page 4-5, Table 4-4**

Add notes to the bottom of the table as follows:

Notes:
It is assumed that 25 percent of lands acquired (see Table 4-1) would be developed for environmental conservation and 75 percent leased back to farmers for environmentally friendly agricultural practices such as planting of corn, rice, and other grains, except for the Sutter Bypass Expansion, where environmental conservation is designated for 50 percent of lands acquired.
Environmental conservation cost includes development of or improvement to habitat, and is estimated at $35,000 to $45,000 per acre.
Costs for environmental conservation are included in one preliminary approach considered (Enhance Flood System Capacity) and are also included in the State Systemwide Investment Approach.

**47. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1.4, page 4-6, Table 4-5**

Add notes to the bottom of the table as follows:

Notes:
Unit costs of $22 million to $26 million are based on recent levee projects in the Central Valley.
Costs for new levees for bypass extension are included in one preliminary approach considered (Enhance Flood System Capacity) and are also included in the State Systemwide Investment Approach.

**48. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1.4, page 4-7, Table 4-6**

Add a note to the bottom of the table as follows:

Note:
Costs for levee repairs for bypass extension are included in one preliminary approach considered (Enhance Flood System Capacity) and are also included in the State Systemwide Investment Approach.

**49. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1.5, page 4-7, fourth sentence of last paragraph**

When no information was available for identified new facilities, the facility-specific cost estimates were used to guide cost estimates for similar structures.

**50. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1.5, page 4-8, Table 4-7**

Add notes to the bottom of the table as follows:

Notes:
Where available, facility-specific cost estimates were used for the new system improvements. When no information was available for identified new facilities, the facility-specific cost estimates were used to guide cost estimates for similar structures.
Costs for flood system structures are included in one preliminary approach considered (Enhance Flood System Capacity) and are also included in the State Systemwide Investment Approach.

**51. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1.6, page 4-8, second sentence of first paragraph**

Fish passage improvement opportunities primarily include ~~primarily~~ projects located within the SPFC …

**52. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1.6, page 4-9, Table 4-8**

Add notes to the bottom of the table as follows:

Notes:
Project-specific designs or cost estimates were not available for the projects being considered; costs are programmatic in nature and were approximated based on similar fish passage projects elsewhere in California.
Costs for fish passage structures are included in one preliminary approach considered (Enhance Flood System Capacity) and are also included in the State Systemwide Investment Approach.

**53. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1.6, page 4-9, first bullet**

- **Fish Passage Collaboration –** This component includes $25 million for collaboration activities with the U.S. Department of the Interior, Bureau of Reclamation and other agencies to advance fish passage opportunities. ~~Costs for these a~~Activities ~~are estimated at $25 million, and are~~ include~~d in the~~ risk assessment, feasibility, engineering, and permitting of the fish passage projects…

**54. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1.7, page 4-10**

Add the following paragraph to the end of the section:

Costs for reservoir operations are included in all three preliminary approaches considered (Achieve SPFC Design Flow Capacity, Protect High-Risk Communities, Enhance Flood System Capacity) and are also included in the State Systemwide Investment Approach.

**55. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1.8, page 4-11, Table 4-9**

Add notes to the bottom of the table as follows:

Notes:
Costs for new reservoir flood storage are programmatic in nature, and are determined as unit costs to purchase new storage and mitigate impacts in flood storage or multipurpose facilities.
Costs for new reservoir flood storage are included in one preliminary approach considered (Enhance Flood System Capacity) and are not included in the State Systemwide Investment Approach.

**56. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1.9, page 4-11, seventh sentence of first paragraph**

~~Additional information about the land costs is included in Attachment 8J, Appendices B-E.~~

**57. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1.9, page 4-12, Table 4-10**

Add notes to the bottom of the table as follows:

Notes:
Easements allow for temporary and periodic storage of flood flows from adjacent waterways. Specific locations have not yet been identified.
The cost for an easement is assumed to be 60 percent of the cost of acquiring the land (see Table 4-2).
Costs for easements are only included in one preliminary approach considered (Enhance Flood System Capacity) and are not included in the State Systemwide Investment Approach.

**58. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.1.10, page 4-13, Table 4-11**

Add notes to the bottom of the table as follows:

Notes:
System erosion and bypass sediment removal costs represent a one-time expenditure for sediment removal from bypasses and weirs to address deferred maintenance.
Costs for system erosion and bypass sediment removal are included in one preliminary approach considered (Enhance Flood System Capacity) and are also included in the State Systemwide Investment Approach.

**59. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.2, page 4-13, last sentence of first paragraph**

… as shown on Figures 3-1 ~~4-2~~ and 3-2 ~~4-3~~.

**60. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.2, page 4-13, second paragraph**

~~Three~~ Two options are considered for estimating urban improvement costs: a 200-year level of protection based on project-specific costs collected from ongoing feasibility studies or other information provided by local flood and other agencies and an alternative option of achieving the SPFC design flow capacity through levee improvements based on deficiencies identified by the

ULE program. An improvement for urban improvements to non-SPFC levee is also described below.

**61. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.2.1, pages 4-14 and 4-15, Table 4-12**

Revise certain table entries, first column, as follows:

- LD1-EIP-Lower Feather River Setback Levee at Star Bend ~~*~~ [1]
- Marysville Ring Levee Reconstruction [2]
- TRLIA – EIP – Feather River Levee Improvement Project [3]
- TRLIA – EIP – Upper Yuba River Levee Improvement Project ~~*~~ [1,3]
- RD 2103 EIP - Bear River North Levee Rehabilitation ~~*~~ [1]
- WSAFCA-~~EIP-CO West Sacramento~~ West Sacramento Levee Improvement Program [4]
- West Sacramento Project G~~G~~RR

Add notes to the bottom of the table as follows:

Projects would provide a 200-year level of protection for urban areas.
Folsom Dam Raise is an authorized project to provide flood protection for the City of Sacramento.
Costs were collected from ongoing feasibility studies or other information provided by local flood and other agencies.
Costs for the urban flood protection projects in this table are included in two preliminary approaches considered (Protect High-Risk Communities, Enhance Flood System Capacity) and are also included in the State Systemwide Investment Approach.
[1] ~~*~~ Construction of flood improvement project is completed. Not cost range is identified and contingencies for risk assessment, feasibility, and permitting are not applied.
[2] After additional analysis and input from David Lamon (City of Marysville) provided on the public draft CVFPP (December 30, 2011), the current implementation cost is estimated to be $70 to $92.5 million.
[3] Based on input from Larry Dacus (MBK Engineers) provided on the public draft CVFPP (December 30, 2011), two additional TRLIA projects should be considered to be part of this component. These are the TRLIA Proposition 13 RD 784 Levee System Improvements (Feather River, cost $61 to $105 million) and the TRLIA Goldfields High Ground Evaluation (Yuba River, cost $10 to $50 million). Although these projects are not explicitly named in the table, the costs to include them are encompassed within the range of total costs of this component ($4,277 to $5,097 million).
[4] After additional analysis and public comment from Derek Larsen (MBK Engineers) on the public draft CVFPP (December 30, 2011), the current cost of implementing the WSAFCA program recommendations is expected to be $440 to $526 million. Ongoing studies may further refine these costs. This information was not available at the time this table was prepared, but the higher cost of this program are encompassed within the range of total costs of this component ($4,277 to $5,097 million).

**62. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.2.2, page 4-16, last sentence of last paragraph**

~~The costs used in Table 4-13 are estimates from the ULE Program (Attachment 8J, Appendix B) and were used as the low end of the costs estimate.~~ Costs from the ULE Program (Attachment 8J, Appendix B) were used as a guide to develop a suitable cost range for each project. These ranges are shown in Table 4-13.

Option 2 costs are used in the Achieve SPFC Design Capacity Approach.

**63. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.2.2, page 4-17, Table 4-13**

Add notes to the bottom of the table as follows:

Notes:
Levee repair projects would restore the SPFC design capacity but may not necessarily provide a 200-year level of protection.
Project costs were developed as part of the Urban Levee Evaluation Program.
Costs for SPFC urban levee improvements from the Urban Levee Evaluation Program are included in one preliminary approach considered (Achieve SPFC Design Flow Capacity) and are not included in the State Systemwide Investment Approach.

**64. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.2.3, page 4-17, section title**

4.2.3 ~~Option 3:~~ Non-SPFC Urban Levee Improvements

**65. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.2.3, page 4-18, first sentence of second paragraph**

~~Option 3~~ The costs for improving non-SPFC urban levees are used in the …

**66. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.2.3, page 4-18, Table 4-14**

Add notes to the bottom of the table as follows:

Notes:
Projects include repairs to levees that are not part of the SPFC. Although the condition of these levees is not currently known, it was assumed that some repair would be needed at a unit cost of $6 to $8 million per levee mile. This unit cost is lower than SPFC levee repair costs because these levees are generally on smaller tributary streams and as a result are smaller than other levees, and certain improvement projects have already been completed.
Costs for non-SPFC urban levee improvements are included in all three preliminary approaches considered (Achieve SPFC Design Flow Capacity, Protect High-Risk Communities, Enhance Flood System Capacity) and are also included in the State Systemwide Investment Approach.

**67. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.3.1, page 4-19, Table 4-15**

Revise the fourth row as follows:

| | |
|---|---|
| 3 - Feather River | Verona, Biggs, Gridley, Live Oak, Sutter, Tierra Buena, Wheatland, Nicolaus |

**68. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.3.1, page 4-20, top of page**

Add the following paragraph above the existing paragraph of text:

Small community improvements would provide a 100-year level of protection for small communities within the SPFC that are not protected by other systemwide and/or urban improvements. When the cost of protection exceeds $100,000 per house, non-structural measures would be taken (see Residual Risk Management). The total population in protected small communities is estimated at 47,000 people, and would require about 120 miles of new or improved levees. All levee improvements to protect small communities for this approach are included in this cost element, although some of the small communities may receive protection from other urban improvements. The assumed construction costs include a combination of levee improvements and construction of new levees for each individual community.

**69. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.3.1, page 4-20, Table 4-16**

Add notes to the bottom of the table as follows:

Small community improvements would provide a 100-year level of protection for small communities within the SPFC that are not protected by other systemwide and/or urban improvements.
Attachment 8J, Appendix D, provides additional detail for small community cost estimates.
Costs for small community improvements are included in two preliminary approaches considered (Protect High-Risk Communities, Enhance Flood System Capacity) and are also included in the State Systemwide Investment Approach.

**70. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.3.2, page 4-21, Option 1: Site Specific Rural-Agricultural Improvements, first sentence**

~~The alternative r~~Rural-agricultural improvements ~~include improvements~~ have been identified from recent levee inspections …

**71. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.3.2, page 4-22, Table 4-17**

Revise title as follows:

Table 4-17. Non-Urban Levee Erosion Repair Needs and Cost Estimate per Region

Add notes to the bottom of the table as follows:

Notes:
Repair needs were identified in 2011 levee inspections.
Costs for site-specific non-urban levee improvements are not included in any of the preliminary approaches but are included in the State Systemwide Investment Approach.

**72. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.3.2, page 4-22, Table 4-18**

Revise title as follows:

Table 4-18. Site-Specific Non-Urban Levee Improvements

Add notes to the bottom of the table as follows:

Notes:
Repair needs include freeboard improvements identified in the NULE program (see Attachment 8J, Appendix C).
Costs for site-specific non-urban levee improvements are not included in any of the preliminary approaches but are included in the State Systemwide Investment Approach.

**73. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.3.2, page 4-23, last sentence of first paragraph**

Add text and insert a paragraph break so the last sentence begins a new paragraph as follows:

The costs of the nonurban levee repairs are summarized by region in Table 4-19. The NULE Program costs include a 30% contingency for miscellaneous repairs, including remediating utility and canal hazards and reconstructing paved roads on levees. Therefore, approaches that include this component are assumed to also include all-weather roads on levee crowns (a component under the residual risk management element). The detailed cost tables in Section 6 do not include separate costs for all-weather roads because those costs are included in this component.

These estimates include repairs to SPFC project levees only…

**74. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.3.2, page 4-24, Table 4-19**

Add notes to the bottom of the table as follows:

Notes:
Costs are identified in Attachment 8J, Appendix C, and address SPFC project levee deficiencies such as under-seepage, through-seepage, stability, erosion, and freeboard. NULE Program costs also include levee crown road all weather resurfacings for all rural levees.
Costs for the NULE Program are included in two preliminary approaches considered (Achieve SPFC Design Flow Capacity, Enhance Flood System Capacity) and are not included in the State Systemwide Investment Approach.

**75. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.3.3, page 4-25, Table 4-20**

Revise the third row as follows:

| | | |
|---|---|---|
| MSAC_01 | Mid-Sacramento | $200 to ~~$300~~290 |

Revise the last row as follows:

| | |
|---|---|
| **Total** | **$3,250 to $~~4,530~~ 4,520** |

Add notes to the bottom of the table as follows:

Notes:
Setback levees would add lands to the floodways by widening portions of the Sacramento and San Joaquin rivers.
Costs include purchase of land, removal of existing levees, and construction of new levees. Attachment 8J, Appendix E, provides additional detail for setback levee cost estimates.
Costs for setback levees are included in only one preliminary approach considered (Enhance Flood System Capacity) and are not included in the State Systemwide Investment Approach.

**76. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.1, page 4-25, third sentence of last paragraph**

This component supports additional planning and response efforts in preparation of flood events beyond ~~the~~ current level~~s of each of these components~~, and …

**77. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.1, page 4-26, All-Weather Roads on Levee Crowns, second sentence of first paragraph**

This component includes approximately 1,200 miles of SPFC~~) of~~ rural-agricultural levees.

**78. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.1, page 4-26, All-weather Roads on Levee Crowns, second paragraph**

The Achieve SPFC Design Flow Capacity Approach and the Enhanced Flood System Capacity include the a~~A~~ll-weather roads as part of the NULE levee improvements (a component under the Rural-Agricultural Improvement Element), and the costs are included in that component. The Protect High Risk Communities does not include this improvement. The State Systemwide Investment Approach includes this improvement as ~~part of~~ its own component under the Residual Risk Management Element because NULE improvements are not part of that approach.

**79. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.1, page 4-26, Additional Flood Information Collection and Sharing, first paragraph**

This component includes the additional (beyond current levels of implementation) identification and notification of the flood hazards to residents, broadcasting real-time flood information to rural-agricultural areas, mapping evacuation routes and providing them to the public, and increasing the number of flood monitoring stations in rural areas. The cost varies for different CVFPP approaches for this component because the implementation assumptions are different. For planning purposes, the cost is estimated to be a one-time expenditure of $30 million per region for the Protect High Risk Communities Approach. This cost is high because this approach focuses on the flood systems protecting urban areas and small communities, and leaves more than a thousand miles of rural-agricultural levees unimproved, requiring a more robust notification system. The cost per region is $8 million per region for the Achieve SPFC Design Flow Capacity and Enhance Flood System Capacity approaches because these approaches include improvements to the entire levee system, requiring less residual risk investment. The cost per region is $15 million for the State Systemwide Investment Approach because the extent of rural-agricultural improvements is between the other approaches. The level of effort is estimated from the DWR Hydrology and Flood Operations Office. ~~The implementation of this component varies among the approaches based on the level of rural-agricultural levee improvements in the given approach.~~

**80. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.1, page 4-27, first sentence of second paragraph**

The Delta North Region costs include $~~85~~80 million for a one-time purchase…

**81. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.1, page 4-28, Table 4-21**

Add notes to the bottom of the table as follows:

Notes:
Costs are estimated as a one-time expenditure of $500,000 to $600,000 per Levee Flood Protection Zone.
The Delta North region includes an additional $80 million for a one-time purchase of Delta flood-fight materials and $5 million for increased Delta communications.
Costs for local flood emergency planning are included in all three preliminary approaches considered (Achieve SPFC Design Flow Capacity, Protect High-Risk Communities, Enhance Flood System Capacity) and are also included in the State Systemwide Investment Approach.

**82. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.2, page 4-28, first sentence of first paragraph of section**

This component provides for future O&M of the flood protection system ~~in response to the continuous~~ with regular activities to keep the SPFC facilities in good working order.

**83. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.2, page 4-29, first paragraph**

This component includes one-time costs for inspecting the flood system after any major flood event to identify new threats to the flood system, and repair them before they become major repair projects. For planning purposes, the level of effort was estimated for the State Systemwide Investment Approach at approximately $10 million per year over 25 years for a total cost of $231 to $300 million. The costs are distributed across the regions proportionally to the number of rural levee miles. The implementation of this component is expected to vary on a year-to-year basis. Additionally, this level of effort was scaled up or down for each approach, based on the magnitude of rural levee repairs planned to be completed for each of the three approaches. Approaches with larger rural levee improvements (Achieve SPFC Design Flow Capacity and Enhance Flood System Capacity approaches) would have a lesser need compared to approaches with no or little rural levee improvements (Protect High Risk Communities Approach). The more significant

**84. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.2, page 4-29, Table 4-22**

Add notes to the bottom of the table as follows:

Notes:
Costs are estimated as $10 million per year for the State Systemwide Investment Approach, lower for approaches with larger rural levee improvements, and higher for the approach with fewer rural levee improvements. Costs are distributed across regions proportionally based on number of rural levee miles.
Costs for identification and repair of erosion are included in all three preliminary approaches considered (Achieve SPFC Design Flow Capacity, Protect High-Risk Communities, and Enhance Flood System Capacity approaches) and are also included in the State Systemwide Investment Approach.

**85. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.2, page 4-30, second sentence of first paragraph**

For planning purposes, the cost for this component is estimated to total $4 to $5 million per year for 25 years (total of $100 to $125 million).

**86. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.2, page 4-30, second paragraph**

This component includes the Sacramento River Bank Protection Program and the Channel and Levee Management Program. The State would assume responsibilities for O&M of the bypasses as well as the water side of the project levees in Sacramento River System.

**87. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.2, page 4-30, Table 4-23**

Add notes to the bottom of the table as follows:

Notes:
Costs are estimated to total $4 to $5 million per year for 25 years (total of $100 to $125 million).
Costs for Sacramento Channel and Levee Management, and Bank Protection Implementation are included in all three preliminary approaches considered (Achieve SPFC Design Flow Capacity, Protect High-Risk Communities, Enhance Flood System Capacity) and are also included in the State Systemwide Investment Approach. Distribution of the cost between the various regions is preliminary and is subject to refinement.

**88. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.3, page 4-31, last sentence of last paragraph**

The number of houses that may participate in this program was estimated based on the distribution of houses in the rural areas. ~~as listed in~~ Table 4-24 lists the estimated costs per region. This component is only included in the State Systemwide Investment Approach.

**89. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.3, page 4-32, Table 4-24**

Add notes to the bottom of the table as follows:

Notes:
Includes removing or raising structures within floodplains in rural areas.
Budget costs were based on 3,000 homes, distributed throughout the regions, at $75,000 to $100,000 per home.
Costs for raising and waterproofing structures and building berms are not included in any of the preliminary approach considered, but are included in the State Systemwide Investment Approach.

**90. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.3, page 4-32, last sentence of last paragraph**

The number ~~distribution~~ of houses that may participate in this program was estimated based on the distribution of houses in the rural areas. ~~as listed in~~ Table 4-24 lists the estimated costs per region. This component is only included in the State Systemwide Investment Approach.

**91. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.3, page 4-33, Table 4-25**

Add notes to the bottom of the table as follows:

Notes:
Budget costs were based on 3,000 homes, distributed throughout the regions, at up to $100,000 per home.
Costs for purchasing and relocating homes in floodplains are not included in any of the preliminary approach considered, but are included in the State Systemwide Investment Approach.

**92. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, Section 4.4.3, page 4-33, last sentence of last paragraph**

This component will be applied the same in each approach, except for the Enhance Flood System Capacity Approach. The costs for Enhance Flood System Capacity Approach are half of the other approaches because this approach includes improvement to the entire non-urban SPFC levees as well as system element improvements, thereby reducing the need for residual risk management.

**93. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, pages 6-3 through 6-32**

Add odd page headers as follows:

**6.0 Detailed Cost Tables**

Add even page headers as follows:

**Attachment 8J: Cost Estimates –
Appendix A. CVFPP Cost Estimate Methodology**

## 94. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, page 6-4, Table 6-1

Table 6-1 "System Improvement Costs for the Achieve SPFC Design Flow Capacity Approach" is replaced by the revised version as follows:

| REGION | Land Acquisition[1] | | Agricultural Conservation Easement[2] | | Ecosystem Restoration and Enhancement[3] | | LEVEES | | | | Flood System and Fish Passage Structures[6] | Reservoir Operations | | Easements[9] | System Erosion and Bypass Sediment Removal Project[10] | Estimated Total Cost | Risk Assessment, Feasibility, Engineering, and Permitting (25%) | Range of Estimated Total Cost over Program Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | New Levee Construction[4] | | Improve Existing Levees[5] | | | Forecast-Coordinated Operations / Forecast-Based Operations[7] | New Reservoir Storage[8] | | | | | |
| | Acreage | Cost | Acreage | Cost | Acreage | Cost | Length | Cost | Length | Cost | Cost | Cost | Cost | Cost | Cost | | | |
| | (acres) | Low High | Low High | Low High | (acres) | Low High | (miles) | Low High | (miles) | Low High | Low High | Low High | Low High | Low High | Low High | Low High | Low High | Low High |
| 1 Upper Sacramento Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $9 to $12 | $0 to $0 | $0 to $0 | $0.0 to $0.0 | **$9 to $12** | **$3 to $3** | **$12 to $15** |
| 2 Mid-Sacramento Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 | $0.0 to $0.0 | **$0 to $0** | **$0 to $0** | **$0 to $0** |
| 3 Feather River Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $9 to $12 | $0 to $0 | $0 to $0 | $0.0 to $0.0 | **$9 to $12** | **$3 to $3** | **$12 to $15** |
| 4 Lower Sacramento Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $5 to $6 | $0 to $0 | $0 to $0 | $0.0 to $0.0 | **$5 to $6** | **$2 to $2** | **$7 to $8** |
| 5 Delta North Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $9 to $12 | $0 to $0 | $0 to $0 | $0.0 to $0.0 | **$9 to $12** | **$3 to $3** | **$12 to $15** |
| 6 Delta South Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 | $0.0 to $0.0 | **$0 to $0** | **$0 to $0** | **$0 to $0** |
| 7 Lower San Joaquin Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $5 to $6 | $0 to $0 | $0 to $0 | $0.0 to $0.0 | **$5 to $6** | **$2 to $2** | **$7 to $8** |
| 8 Mid-San Joaquin Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $9 to $12 | $0 to $0 | $0 to $0 | $0.0 to $0.0 | **$9 to $12** | **$3 to $3** | **$12 to $15** |
| 9 Upper San Joaquin Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $23 to $30 | $0 to $0 | $0 to $0 | $0.0 to $0.0 | **$23 to $30** | **$6 to $8** | **$29 to $38** |
| Total | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $69 to $90 | $0 to $0 | $0 to $0 | $0 to $0 | **$69 to $90** | **$18 to $23** | **$91 to $114** |

Notes:

4 All cost estimates are based on 2011 costs rounded to nearest $million.

The Achieve SPFC Design Flow Capacity Approach is one of three preliminary approaches initially considered for the CVFPP.

System Improvement Assumptions:

1 Land Acquisition: Not included in this approach

2 Agricultural Conservation Easement: Not included in this approach

3 Ecosystem Restoration and Enhancement: Not included in this approach

4 New Levee Design and Construction: Not included in this approach

5 Improve Existing Levees: Not included in this approach

6 Flood System and Fish Passage Structures: Not included in this approach

7 F-CO/F-BO: Includes up to 15 F-CO/F-BO in the Sacramento Basin (up to seven reservoirs) and the San Joaquin Basin (up to eight reservoirs), with $4.5 to $6.0 million per reservoir

8 New Reservoirs: Not included in this approach

9 Easements: Not included in this approach

10 System Erosion and Bypass Sediment Removal Project: Not included in this approach

## 95. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, page 6-5, Table 6-2

Table 6-2 "Urban Improvement Costs for the Achieve SPFC Design Flow Capacity Approach" is replaced by the revised version as follows:

| Urban Levee Improvements (ULE) – Design Capacity Improvements for SPFC and Non-SPFC Levees~~12~~ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **REGION** | **Estimated Project Cost[11]** | | | **Risk Assessment, Feasibility, Engineering, and Permitting ~~(25%)~~~~13~~12** | | | **Range of Estimated Total Cost over Program Duration** | | |
| | **Low** | | **High** | **Low** | | **High** | **Low** | | **High** |
| 1 Upper Sacramento Region | $0.0 | to | $0.0 | $0.0 | to | $0.0 | $0.0 | to | $0.0 |
| 2 Mid-Sacramento Region | $0.0 | to | $0.0 | $0.0 | to | $0.0 | $0.0 | to | $0.0 |
| 3 Feather River Region | $997.0 | to | $1,246.0 | $199.0 | to | $249.0 | $1,196.0 | to | $1,495.0 |
| 4 Lower Sacramento Region | $1,274.0 | to | $1,593.0 | $255.0 | to | $319.0 | $1,529.0 | to | $1,912.0 |
| 5 Delta North Region | $240.0 | to | $300.0 | $48.0 | to | $60.0 | $288.0 | to | $360.0 |
| 6 Delta South Region | $120.0 | to | $150.0 | $24.0 | to | $30.0 | $144.0 | to | $180.0 |
| 7 Lower San Joaquin Region | $198.0 | to | $247.0 | $40.0 | to | $49.0 | $238.0 | to | $296.0 |
| 8 Mid-San Joaquin Region | $360.0 | to | $450.0 | $72.0 | to | $90.0 | $432.0 | to | $540.0 |
| 9 Upper San Joaquin Region | $0.0 | to | $0.0 | $0.0 | to | $0.0 | $0.0 | to | $0.0 |
| **Urban Levee Improvements (ULE) Subtotal** | **$3,189.0** | **to** | **$3,986.0** | **$638.0** | **to** | **$797.0** | **$3,827.0** | **to** | **$4,783.0** |
| **Urban Improvements Total** | **$3,189.0** | **to** | **$3,986.0** | **$638.0** | **to** | **$797.0** | **$3,827.0** | **to** | **$4,783.0** |

~~Assumptions:~~

Notes:

All cost estimates are based on 2011 costs rounded to nearest $million.

The Achieve SPFC Design Flow Capacity Approach is one of three preliminary approaches initially considered for the CVFPP.

Assumptions:

11 ~~Estimated Project Costs:~~

~~12~~ ~~Levee Improvements to for~~ Urban - Design Capacity Improvements:

SPFC Levee Improvements based on ULE Cost Estimates for individual urban areas identified on Table ~~A8~~ 4-13. Would restore SPFC design capacity but may not necessarily provide 200-year level of protection.

Non-SPFC Urban Levee ~~Improvements~~Improvement costs estimated at $6 to $8 million per mile for approximately 120 miles of Non-SPFC Urban Levees because no levee evaluation data ~~is~~ are available at this time. These improvement ~~area~~ costs are less than other improvement cost estimates because these levees are generally on smaller tributary streams and as a result are smaller than other levees, and certain improvements projects have already been completed.

~~13~~12 Risk Assessment, Feasibility, Engineering, and Permitting ~~(20%)~~ ~~R~~ranges by project from 0% to 20% depending on level of project development

## 96. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, page 6-6, Table 6-3

Table 6-3 "Rural-Agricultural Improvement Costs for the Achieve SPFC Design Flow Capacity Approach" is replaced by the revised version as follows:

| REGION | Small Community Improvement[13] | Non-Urban - Design Capacity Improvements[14] | Rural Setback Levees[15] | Site-Specific Rural Agricultural Improvement[16] | | | Estimated Total Costs[17] | | Risk Assessment, Feasibility, Engineering, and Permitting (25%) | | Range of Estimated Total Cost over Program Duration | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Levee Improvement to Provide 100-Year Protection for Small Communities | | | Miles of Rural Levees | Levee Improvements | Known and Identified Erosion Repairs | Low | High | Low | High | ($) | | |
| **1 Upper Sacramento Region** | $0.0 | $408.0 | $0.0 | 0 | $0.0 to $0.0 | $0.0 | $408.0 | $510.0 | $102.0 | $128.0 | **$510.0** | **to** | **$638.0** |
| **2 Mid-Sacramento Region** | $0.0 | $2,578.0 | $0.0 | 0 | $0.0 to $0.0 | $0.0 | $2,578.0 | $3,222.0 | $645.0 | $806.0 | **$3,223.0** | **to** | **$4,028.0** |
| **3 Feather River Region** | $0.0 | $1,631.0 | $0.0 | 0 | $0.0 to $0.0 | $0.0 | $1,631.0 | $2,038.0 | $408.0 | $510.0 | **$2,039.0** | **to** | **$2,548.0** |
| **4 Lower Sacramento Region** | $0.0 | $1,147.0 | $0.0 | 0 | $0.0 to $0.0 | $0.0 | $1,147.0 | $1,434.0 | $287.0 | $359.0 | **$1,434.0** | **to** | **$1,793.0** |
| **5 Delta North Region** | $0.0 | $3,111.0 | $0.0 | 0 | $0.0 to $0.0 | $0.0 | $3,111.0 | $3,889.0 | $778.0 | $973.0 | **$3,889.0** | **to** | **$4,862.0** |
| **6 Delta South Region** | $0.0 | $503.0 | $0.0 | 0 | $0.0 to $0.0 | $0.0 | $503.0 | $629.0 | $126.0 | $158.0 | **$629.0** | **to** | **$787.0** |
| **7 Lower San Joaquin Region** | $0.0 | $272.0 | $0.0 | 0 | $0.0 to $0.0 | $0.0 | $272.0 | $340.0 | $68.0 | $85.0 | **$340.0** | **to** | **$425.0** |
| **8 Mid-San Joaquin Region** | $0.0 | $379.0 | $0.0 | 0 | $0.0 to $0.0 | $0.0 | $379.0 | $473.0 | $95.0 | $119.0 | **$474.0** | **to** | **$592.0** |
| **9 Upper San Joaquin Region** | $0.0 | $1,044.0 | $0.0 | 0 | $0.0 to $0.0 | $0.0 | $1,044.0 | $1,305.0 | $261.0 | $327.0 | **$1,305.0** | **to** | **$1,632.0** |
| **Total** | **$0.0** | **$11,073.0** | **$0.0** | **0** | **$0.0 to $0.0** | **$0.0** | **$11,073.0** | **$13,840.0** | **$2,770.0** | **$3,465.0** | **$13,843.0** | **to** | **$17,305.0** |

Notes:

All cost estimates are based on 2011 costs rounded to nearest $million.

The Achieve SPFC Design Flow Capacity Approach is one of three preliminary approaches initially considered for the CVFPP.

Assumptions:

[13] Small Community Improvements:

Not included in this approach - Existing levees around small communities would be improved as part of the recommendations from NULE Program

[14] Non-Urban - Design Capacity Improvements:

Estimates from NULE program for improvements to non-urban project levees (see Attachment 8J, Appendix C) to address levee deficiencies such as under-seepage, through-seepage, stability, erosion, and freeboard.

The NULE improvements ~~are expected to~~ include Levee Crown Road All Weather resurfacings for all rural levees ~~(total 1200 miles) at cost of $50,000 per mile~~.

[15] Rural Setback Levees: Not included in this approach

[16] Site-Specific Rural Agricultural Improvements: Not included in this approach

[17] High estimate includes 25% increase for Non-Urban Design Capacity Improvements to account for upper cost estimate range.

## 97. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, page 6-7 to 6-8, Table 6-4

Table 6-4 "Residual Risk Management Costs for the Achieve SPFC Design Flow Capacity Approach" is replaced by the revised version as follows:

| REGION | Enhanced Flood Emergency Response | | | | | Enhanced Operation and Maintenance | | | | | Floodplain Management | | | | | Estimated Total Costs | Risk Assessment, Feasibility, Engineering, and Permitting (25%) | Range of Estimated Total Cost over Program Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Additional Flood Information Collection and Sharing[16~~18~~] | All Weather Roads on Levee Crowns[17~~19~~] | Local Flood Emergency Response Planning[18~~20~~] | | Additional Forecasting and Notification[19~~21~~] | Identification and Repair of After Event Erosions[20~~22~~] | | Develop and Implement Enhanced O&M Programs and Regional Organizations[21~~23~~] | | Sacramento Channel and Levee Management and Bank Protection[22~~24~~] | Raising and Waterproofing Structures and Building Berms[23~~25~~] | | Purchasing and Relocating Homes in Floodplains[24~~26~~] | | Land Use and Floodplain Management Integration[25~~27~~] | | | |
| | | | Number of Levee Flood Protection Zones | Cost | | Miles of Rural Levees | Cost of Repairs | Number of LFPZs | Cost of Repairs | | Potential Number of Homes | Costs | Potential Number of Homes | Costs | Costs | | | |
| 1 Upper Sacramento Region | $8.0 | $0.0 | 10 | $5 to $6 | $0.0 | 71 | $7 to $9 | 10 | $4 to $6 | $12 to $15 | 0 | $0 to $0 | 0 | $0 to $0 | $7.5 to $10 | **$44 to $54** | **$0 to $0** | **$44 to $54** |
| 2 Mid-Sacramento Region | $8.0 | $0.0 | 16 | $8 to $10 | $0.0 | 301 | $29 to $38 | 16 | $7 to $9 | $18 to $23 | 0 | $0 to $0 | 0 | $0 to $0 | $33.0 to $44 | **$103 to $132** | **$0 to $0** | **$103 to $132** |
| 3 Feather River Region | $8.0 | $0.0 | 25 | $13 to $15 | $0.0 | 162 | $16 to $21 | 25 | $11 to $14 | $ 2 7 to $36 | 0 | $0 to $0 | 0 | $0 to $0 | $13.5 to $18 | **$88 to $112** | **$0 to $0** | **$88 to $112** |
| 4 Lower Sacramento Region | $8.0 | $0.0 | 38 | $19 to $23 | $0.0 | 43 | $5 to $6 | 38 | $16 to $22 | $41 to $54 | 0 | $0 to $0 | 0 | $0 to $0 | $6.0 to $8 | **$95 to $120** | **$0 to $0** | **$95. to $120** |
| 5 Delta North Region* | $8.0 | $0.0 | 19 | $95 to $97 | $0.0 | 252 | $24 to $32 | 19 | $8 to $11 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $19.5 to $26 | **$155 to $174** | **$0 to $0** | **$155 to $174** |
| 6 Delta South Region | $8.0 | $0.0 | 17 | $9 to $11 | $0.0 | 54 | $6 to $7 | 17 | $7 to $10 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $13.5 to $18 | **$44 to $54** | **$0 to $0** | **$44 to $54** |
| 7 Lower San Joaquin Region | $8.0 | $0.0 | 37 | $19 to $23 | $0.0 | 38 | $4 to $5 | 37 | $16 to $21 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $3 to $4 | **$50 to $61** | **$0 to $0** | **$50 to $61** |
| 8 Mid-San Joaquin Region | $8.0 | $0.0 | 19 | $10 to $12 | $0.0 | 51 | $6 to $7 | 19 | $8 to $11 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $6 to $8 | **$38 to $46** | **$0 to $0** | **$38 to $46** |
| 9 Upper San Joaquin Region | $8.0 | $0.0 | 40 | $20 to $24 | $0.0 | 228 | $22 to $29 | 40 | $17 to $23 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $48 to $64 | **$115 to $148** | **$0 to $0** | **$115 to $148** |
| **Total** | **$72.0** | **$0.0** | **221** | **$198 to $221** | **$0.0** | **1,200** | **$119 to $150** | **221** | **$94 to $125** | **$98 to $125** | 0 | **$0 to $0** | 0 | **$0 to $0** | **$150 to $200** | **$732 to $901** | **$0 to $0** | **$732 to $901** |

Notes:

All cost estimates are based on 2011 costs rounded to nearest $million.

The Achieve SPFC Design Flow Capacity Approach is one of three preliminary approaches initially considered for the CVFPP.

Residual Risk Management Assumptions:

[16~~18~~] Additional Flood Information Collection and Sharing:

Includes $8 million per region to improve:

- Identification and notification of the flood hazards to residents
- Effectively broadcasting real-time flood information to rural areas
- Map evacuation routes and provide them to public
- Additional flood monitoring stations in rural areas

All Weather Roads on Levee Crowns:

Improvements ~~expected to~~ would be made as part of ~~ULE and~~ NULE ~~levee improvements~~ Program and costs are included in the non-urban design capacity component of the rural-agricultural improvement element.

Local Flood Emergency Response Planning:

Includes a one-time expenditure of $500,000 to $600,000 per Levee Flood Protection Zone to improve:

- Assist local agencies to prepare flood emergency response plan
- Train flood patrolling and flood fight
- Conduct flood exercises with local entities
- Develop communication tool and process for flood emergency response
- *Includes $80 million for purchase of Delta Flood fight materials and $5 million for increased Delta Communications

Additional Forecasting and Notification:

Not included in this approach

Forecasting and Notification will continue to operate at its current level.

Identification and Repair of After Event Erosions:

Inspect the flood system after any major flood event to identify erosion sites. Repair erosion sites in a timely manner before they are expected to become a major remaining project.

Costs are estimated to be approximately $5 million per year for 25 years and are distributed across regions proportionally based on number of rural levee miles.

Develop and Implement Enhanced O&Ms:

Includes annual expenditures of $4,000,000 to $5,000,000 per year for 25 years, regionally distributed according to the number of Local Flood Protection Zones to:

- Develop and implement an enhanced O&M program and establish regional maintenance organizations.

Sacramento Channel and Levee Management and Bank Protection:

Channel and levee management program includes system capacity evaluation and remediation and Sacramento River Bank Protection. Assumes $4 to $5 million per year over next 25 years. Distribution of the cost between the various regions is preliminary and is subject to refinement. The State will assume responsibilities for O&M of the bypasses as well as the water side of the project levees in Sacramento River System.

Raising and Waterproofing Structures and Building Berms:

Not included in this approach

Purchasing and Relocating Homes in Floodplains:

Not included in this approach because of extensive levee improvements made in ULE and NULE programs

Land Use and Floodplain Management Integration :

Land use and floodplain management integration including preparing multi-hazard plans, multi-hazard plans, floodplain management plan, local general plan updates, etc.

Costs estimated to be up to $200 million, and were regionally distributed based on the number of houses in rural areas.

## 98. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, page 6-9 to 6-10, Table 6-5

Table 6-5 "System Improvement Costs for the Protect High Risk Communities Approach" is replaced by the revised version as follows:

| REGION | Land Acquisition[1] | | Agricultural Conservation Easement[2] | | Ecosystem Restoration and Enhancement[3] | | LEVEES | | | | Flood System and Fish Passage Structures[6] | Reservoir Operations | | Easements[9] | System Erosion and Bypass Sediment Removal Project[10] | Estimated Total Cost | Risk Assessment, Feasibility, Engineering, and Permitting (25%) | Range of Estimated Total Cost over Program Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | New Levee Construction[4] | | Improve Existing Levees[5] | | | Forecast-Coordinated Operations / Forecast-Based Operations[7] | New Reservoir Storage[8] | | | | | |
| | Acreage | Cost | Acreage | Cost | Acreage | Cost | Length | Cost | Length | Cost | Cost | Cost | Cost | Cost | Cost | | | |
| | (acres) | Low High | Low High | Low High | (acres) | Low High | (miles) | Low High | (miles) | Low High | Low High | Low High | Low High | Low High | Low High | Low High | Low High | Low High |
| 1 Upper Sacramento Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $9 to $12 | $0 to $0 | $0 to $0 | $0 to $0 | $9 to $12 | $3 to $3 | $12 to $15 |
| 2 Mid-Sacramento Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 |
| 3 Feather River Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $9 to $12 | $0 to $0 | $0 to $0 | $0 to $0 | $9 to $12 | $3 to $3 | $12 to $15 |
| 4 Lower Sacramento Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $5 to $6 | $0 to $0 | $0 to $0 | $0 to $0 | $5 to $6 | $2 to $2 | $7 to $8 |
| 5 Delta North Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $9 to $12 | $0 to $0 | $0 to $0 | $0 to $0 | $9 to $12 | $3 to $3 | $12 to $15 |
| 6 Delta South Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 |
| 7 Lower San Joaquin Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $5 to $6 | $0 to $0 | $0 to $0 | $0 to $0 | $5 to $6 | $2 to $2 | $7 to $8 |
| 8 Mid-San Joaquin Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $9 to $12 | $0 to $0 | $0 to $0 | $0 to $0 | $9 to $12 | $3 to $3 | $12 to $15 |
| 9 Upper San Joaquin Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $23 to $30 | $0 to $0 | $0 to $0 | $0 to $0 | $23 to $30 | $6 to $8 | $29 to $38 |
| Total | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0.0 | $0 to $0 | 0.0 | $0 to $0 | $0 to $0 | $69 to $90 | $0 to $0 | $0 to $0 | $0 to $0 | $69 to $90 | $18 to $23 | $91 to $114 |

Notes:

All cost estimates are based on 2011 costs rounded to nearest $million.

The Protect High Risk Communities Approach is one of three preliminary approaches initially considered for the CVFPP.

System Improvement Assumptions:

1 Land Acquisition: Not included in this approach

2 Agricultural Conservation Easement: Not included in this approach

3 Ecosystem Restoration and Enhancement: Not included in this approach

4 New Levee Design and Construction: Not included in this approach

5 Improve Existing Levees: Not included in this approach

6 Flood System and Fish Passage Structures: Not included in this approach

7 F-CO / F-BO: Includes up to 15 F-CO/F-BO in the Sacramento Basin (up to seven reservoirs) and the San Joaquin Basin (up to eight reservoirs), with $4.5 to $6.0 million per reservoir.

8 New Reservoirs: Not included in this approach

9 Easements: Not included in this approach

10 System Erosion and Bypass Sediment Removal Project: Not included in this approach

**99. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, page 6-11 to 6-12, Table 6-6**

Table 6-6 "Urban Improvement Costs for the Protect High Risk Communities Approach" is replaced by the revised version as follows:

| REGION | Estimated Project Cost[11] | | | Risk Assessment, Feasibility, Engineering, and Permitting ~~(20%)~~[1312] | | | Range of Estimated Total Cost over Program Duration | | |
|---|---|---|---|---|---|---|---|---|---|
| | Low | | High | Low | | High | Low | | High |
| **Upper Sacramento Region** | **$100.0** | **to** | **$120.0** | **$20.0** | **to** | **$24.0** | **$120.0** | **to** | **$144.0** |
| Chico Urban Levee Improvements | $100.0 | to | $120.0 | $20.0 | to | $24.0 | $120.0 | to | $144.0 |
| **Mid-Sacramento Region** | **$0.0** | **to** | **$0.0** | **$0.0** | **to** | **$0.0** | **$0.0** | **to** | **$0.0** |
| | $0.0 | to | $0.0 | $0.0 | to | $0.0 | $0.0 | to | $0.0 |
| **Feather River Region** | **$760.0** | **to** | **$891.0** | **$131.0** | **to** | **$157.0** | **$891.0** | **to** | **$1,048.0** |
| Sutter County Feasibility Study | $8.5 | to | $10.2 | $1.7 | to | $2.0 | $10.2 | to | $12.2 |
| Feather River West Levee SBFCA | $245.0 | to | $294.0 | $49.0 | to | $58.8 | $294.0 | to | $352.8 |
| LD1-EIP-Lower Feather River Setback Levee at Star Bend | $20.8 | to | $20.8 | $0.0 | to | $0.0 | $20.8 | to | $20.8 |
| Marysville Ring Levee Reconstruction | $161.9 | to | $194.3 | $32.4 | to | $38.9 | $194.3 | to | $233.1 |
| Yuba River Basin GRR | $15.4 | to | $18.5 | $3.1 | to | $3.7 | $18.5 | to | $22.2 |
| TRLIA-EIP Feather River Levee Improvement Project | $222.0 | to | $266.4 | $44.4 | to | $53.3 | $266.4 | to | $319.7 |
| TRLIA-EIP-Upper Yuba River Levee Improvement Project | $68.0 | to | $68.0 | $0.0 | to | $0.0 | $68.0 | to | $68.0 |
| RD 2103-EIP-Bear River North Levee Rehabilitation Project | $18.2 | to | $18.2 | $0.0 | to | $0.0 | $18.2 | to | $18.2 |
| **Lower Sacramento Region** | **$3,117.0** | **to** | **$3,726.0** | **$145.0** | **to** | **$173.0** | **$3,261.0** | **to** | **$3,899.0** |
| American River Common Features Project/GRR | $12.8 | to | $15.4 | $2.6 | to | $3.1 | $15.4 | to | $18.4 |
| American River Common Features-WRDA96/99 Projects/Remaining Sites | $282.0 | to | $338.4 | $0.0 | to | $0.0 | $282.0 | to | $338.4 |
| Folsom Dam Modifications-Joint Federal Project (Gated Auxiliary Spillway) | $800.0 | to | $1,000.0 | $0.0 | to | $0.0 | $800.0 | to | $1,000.0 |
| Folsom Dam Raise, Bridge Element Study and Implementation | $130.0 | to | $140.0 | $0.0 | to | $0.0 | $130.0 | to | $140.0 |
| Folsom Dam Raise - Reservoir Enlargement | $125.0 | to | $130.0 | $0.0 | to | $0.0 | $125.0 | to | $130.0 |
| South Sacramento County Streams | $104.0 | to | $124.8 | $0.0 | to | $0.0 | $104.0 | to | $124.8 |
| SAFCA-EIP-NCC Natomas Levee Improvement Project | $70.0 | to | $84.0 | $0.0 | to | $0.0 | $70.0 | to | $84.0 |
| SAFCA-NLIP,CO Natomas Levee Improvement Project | $310.0 | to | $372.0 | $0.0 | to | $0.0 | $310.0 | to | $372.0 |
| Natomas Basin Design and Construction (Future) | $385.0 | to | $462.0 | $0.0 | to | $0.0 | $385.0 | to | $462.0 |
| Magpie Creek Project (Future) | $9.8 | to | $11.8 | $2.0 | to | $2.4 | $11.8 | to | $14.1 |
| American River South and Sacramento River Future Improvements | $500.0 | to | $600.0 | $100.0 | to | $120.0 | $600.0 | to | $720.0 |
| Slip Repair | $53.0 | to | $63.6 | $10.6 | to | $12.7 | $63.6 | to | $76.4 |
| WSAFCA-EIP-CO West Sacramento | $105.0 | to | $126.0 | $21.0 | to | $25.2 | $126.0 | to | $151.2 |
| West Sacramento Project GGR | $10.0 | to | $12.0 | $2.0 | to | $2.4 | $12.0 | to | $14.4 |
| Woodland/ Lower Cache Creek Feasibility Study and Implementation | $190.0 | to | $210.0 | $0.0 | to | $0.0 | $190.0 | to | $210.0 |
| Davis-Willow Slough | $30.0 | to | $36.0 | $6.0 | to | $7.2 | $36.0 | to | $43.2 |
| **Delta North Region** | **$0.0** | **to** | **$0.0** | **$0.0** | **to** | **$0.0** | **$0.0** | **to** | **$0.0** |
| | $0.0 | to | $0.0 | $0.0 | to | $0.0 | $0.0 | to | $0.0 |
| **Delta South Region** | **$0.0** | **to** | **$0.0** | **$0.0** | **to** | **$0.0** | **$0.0** | **to** | **$0.0** |
| | $0.0 | to | $0.0 | $0.0 | to | $0.0 | $0.0 | to | $0.0 |

**Table 6-6. Urban Improvement Costs for the Protect High Risk Communities Approach (contd.)**

| REGION | Estimated Project Cost[11] | | | Risk Assessment, Feasibility, Engineering, and Permitting ~~(20%)~~[13] | | | Range of Estimated Total Cost over Program Duration | | |
|---|---|---|---|---|---|---|---|---|---|
| | Low | | High | Low | | High | Low | | High |
| **Lower San Joaquin Region** | $162.0 | to | $194.0 | $33.0 | to | $39.0 | $194.0 | to | $233.0 |
| Lower San Joaquin Feasibility Study | $15.4 | to | $18.5 | $3.1 | to | $3.7 | $18.5 | to | $22.2 |
| RD 17-EIP-100-Year Levee Seepage Area Project | $76.0 | to | $91.2 | $15.2 | to | $18.2 | $91.2 | to | $109.4 |
| Mormon Slough Bypass/ Stockton Diverter Canal | $40.0 | to | $48.0 | $8.0 | to | $9.6 | $48.0 | to | $57.6 |
| Smith Canal Closure Structure (EIP Project) | $30.0 | to | $36.0 | $6.0 | to | $7.2 | $36.0 | to | $43.2 |
| **Mid- San Joaquin Region** | **$0.0** | **to** | **$0.0** | **$0.0** | **to** | **$0.0** | **$0.0** | **to** | **$0.0** |
| | $0.0 | to | $0.0 | $0.0 | to | $0.0 | $0.0 | to | $0.0 |
| **Upper San Joaquin Region** | $138.0 | to | $166.0 | $28.0 | to | $34.0 | $166.0 | to | $199.0 |
| Merced County Streams Group (Bear Creek Unit) | $137.7 | to | $165.2 | $27.5 | to | $33.0 | $165.2 | to | $198.3 |
| **Identified Urban Improvements Subtotal** | $4,277.0 | to | $5,097.0 | $357.0 | to | $427.0 | $4,632.0 | to | $5,523.0 |
| **Non-SPFC Urban Levee Improvements**[12] | | | | | | | | | |

| REGION | Estimated Project Cost[11] | | | Risk Assessment, Feasibility, Engineering, and Permitting ~~(20%)~~[13] | | | Range of Estimated Total Cost over Program Duration | | |
|---|---|---|---|---|---|---|---|---|---|
| | Low | | High | Low | | High | Low | | High |
| 1 Upper Sacramento Region | $0.0 | | $0.0 | $0.0 | | $0.0 | $0.0 | | $0.0 |
| 2 Mid-Sacramento Region | $0.0 | | $0.0 | $0.0 | | $0.0 | $0.0 | | $0.0 |
| 3 Feather River Region | $0.0 | | $0.0 | $0.0 | | $0.0 | $0.0 | | $0.0 |
| 4 Lower Sacramento Region | $240.0 | | $320.0 | $48.0 | | $64.0 | $288.0 | | $384.0 |
| 5 Delta North Region | $120.0 | | $160.0 | $24.0 | | $32.0 | $144.0 | | $192.0 |
| 6 Delta South Region | $0.0 | | $0.0 | $0.0 | | $0.0 | $0.0 | | $0.0 |
| 7 Lower San Joaquin Region | $360.0 | | $480.0 | $72.0 | | $96.0 | $432.0 | | $576.0 |
| 8 Mid-San Joaquin Region | $0.0 | | $0.0 | $0.0 | | $0.0 | $0.0 | | $0.0 |
| 9 Upper San Joaquin Region | $0.0 | | $0.0 | $0.0 | | $0.0 | $0.0 | | $0.0 |
| **Non-SPFC Urban Levee Improvements Subtotal** | **$720.0** | | **$960.0** | **$144.0** | | **$192.0** | **$864.0** | | **$1,152.0** |
| **Urban Improvements Total** | **$4,997.0** | **to** | **$5,817.0** | **$501.0** | **to** | **$571.0** | **$5,496.0** | **to** | **$6,675.0** |

~~Assumptions:~~

Notes:

All cost estimates are based on 2011 costs rounded to nearest $million.

The Protect High Risk Communities Approach is one of three preliminary approaches initially considered for the CVFPP.

Assumptions:

11 ~~Estimated Project Costs:~~ Urban Flood Protection Projects would provide a 200-year level of protection for urban areas. Project-specific costs were collected from ongoing feasibility studies or other information provided by local flood and other agencies. ~~Costs provided by Project Management Office based on input from local agencies.~~

Folsom ~~Enlargement~~ Dam Raise is an authorized project to provide flood protection for the City of Sacramento

12 Non-SPFC Urban Levee ~~Improvements~~ Improvement costs estimated at $6 to $8 million per mile for approximately 120 miles of Non-SPFC Urban Levees because no levee evaluation data ~~is~~ are available at this time. These improvement costs are~~a~~ less than other improvement cost estimates because these levees are generally on smaller tributary streams and as a result are smaller than other levees, and certain improvements projects have already been completed.

13 Risk Assessment, Feasibility, Engineering, and Permitting ~~(20%) R~~ ranges by project from 0% to 20% depending on level of project development

## 100. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, pages 6-13 to 6-14, Table 6-7

Table 6-7 "Rural-Agricultural Improvement Costs for the Protect High Risk Communities Approach" is replaced by the revised version as follows:

| REGION | Small Community Improvement ~~13~~14 | Non-Urban - Design Capacity Improvements ~~14~~15 | Rural Setback Levees ~~15~~16 | Site-Specific Rural Agricultural Improvement ~~16~~17 | | | Estimated Total Costs | | Risk Assessment, Feasibility, Engineering, and Permitting (25%) | | Range of Estimated Total Cost over Program Duration | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Levee Improvement to Provide 100-Year Protection for Small Communities | | | Miles of Rural Levees | Levee Improvements | Known and Identified Erosion Repairs | Low | High | Low | High | ($) | |
| 1 - Upper Sacramento Region | $77.0 | $0.0 | $0.0 | ~~7~~10 | $0.0 to $0.0 | $0.0 | $77.0 to $89.0 | | $19.0 to $23.0 | | **$93.0 to $112.0** | |
| 2 - Mid-Sacramento Region | $190.0 | $0.0 | $0.0 | ~~30~~10 | $0.0 to $0.0 | $0.0 | $190.0 to $228.0 | | $48.0 to $57.0 | | **$238.0 to $285.0** | |
| 3 - Feather River Region | $319.0 | $0.0 | $0.0 | ~~16~~20 | $0.0 to $0.0 | $0.0 | $319.0 to $383.0 | | $80.0 to $96.0 | | **$399.0 to $479.0** | |
| 4 - Lower Sacramento Region | $0.0 | $0.0 | $0.0 | ~~4~~30 | $0.0 to $0.0 | $0.0 | $0.0 to $0.0 | | $0.0 to $0.0 | | **$0.0 to $0.0** | |
| 5 - Delta North Region | $293.0 | $0.0 | $0.0 | ~~25~~20 | $0.0 to $0.0 | $0.0 | $293.0 to $352.0 | | $74.0 to $88.0 | | **$367.0 to $440.0** | |
| 6 - Delta South Region | $0.0 | $0.0 | $0.0 | ~~5~~40 | $0.0 to $0.0 | $0.0 | $0.0 to $0.0 | | $0.0 to $0.0 | | **$0.0 to $0.0** | |
| 7 - Lower San Joaquin Region | $0.0 | $0.0 | $0.0 | ~~3~~80 | $0.0 to $0.0 | $0.0 | $0.0 to $0.0 | | $0.0 to $0.0 | | **$0.0 to $0.0** | |
| 8 - Mid - San Joaquin Region | $3.0 | $0.0 | $0.0 | ~~5~~10 | $0.0 to $0.0 | $0.0 | $3.0 to $4.0 | | $1.0 to $1.0 | | **$4.0 to $5.0** | |
| 9 - Upper San Joaquin Region | $121.0 | $0.0 | $0.0 | ~~22~~80 | $0.0 to $0.0 | $0.0 | $121.0 to $146.0 | | $31.0 to $37.0 | | **$152.0 to $183.0** | |
| **Total** | **$1,003.0** | **$0.0** | **$0.0** | **~~1,200~~0** | **$0.0 to $0.0** | **$0.0** | **$1,003.0 to $1,202.0** | | **$250.0 to $301.0** | | **$1,253.0 to $1,504.0** | |

Note~~s~~:

All cost estimates are based on 2011 costs rounded to nearest $million.

The Protect High Risk Communities Approach is one of three preliminary approaches initially considered for the CVFPP.

Assumptions:

~~13~~14 Small Community Improvements:

Attachment 8J, Appendix D, provides detailed information about small community improvements.

Provides 100-year level of protection for small communities within the SPFC that are not protected by other systemwide and/or urban improvements. Cost of implementation is less than $30,000 per person protected (about $100,000 per house).

Non-structural measures will be taken when the cost of protection exceeds $100,000 per house (see Residual Risk Management)

Total population in protected small communities is estimated at 47,000 people, and requires about 120 miles of new or improved levees. All levee improvements to protect small communities for

this approach are included in this cost element.
Assumed construction costs include a combination of levee improvements and construction of new levees for each individual community.
Small communities protected by Region are listed below:

1- Upper Sacramento: Durham, Gerber-Las Flores
2 - Mid-Sacramento: Knights Landing, Meridian, Colusa, Glenn, Grimes, Butte City, Robbins, Princeton
3- Feather River: Verona, Biggs, Wheatland, Gridley, Live Oak, Nicolaus, Sutter, Tierra Buena
4- None
5- Delta North: Rio Vista, Clarksburg, Courtland, Hood, Walnut Grove, Isleton
6- None
7- None
8 - Mid-San Joaquin: Grayson
9 - Upper San Joaquin: Firebaugh, Dos Palos, South Dos Palos

Non-Urban - Design Capacity Improvements: Not included in this approach

Rural Setback Levees: Not included in this approach

Site Specific Rural Agricultural Improvements: Not included in this approach

## 101. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, page 6-15 to 6-16, Table 6-8

Table 6-8 "Residual Risk Management Costs for the Protect High Risk Communities Approach" is replaced by the revised version as follows:

| REGION | Enhanced Flood Emergency Response | | | | | Enhanced Operation and Maintenance | | | | | Floodplain Management | | | | | Estimated Total Costs | | Risk Assessment, Feasibility, Engineering, and Permitting (25%) | Range of Estimated Total Cost over Program Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Additional Flood Information Collection and Sharing[1618] | All Weather Roads on Levee Crowns[1719] | Local Flood Emergency Response Planning[1820] | | Additional Forecasting and Notification[1921] | Identification and Repair of After Event Erosions[2022] | | Develop and Implement Enhanced O&M Programs and Regional Organizations[2123] | | Sacramento Channel and Levee Management and Bank Protection[2224] | Raising and Waterproofing Structures and Building Berms[2325] | | Purchasing and Relocating Homes in Floodplains[2426] | | Land Use and Floodplain Management Integration[2527] | | | | |
| | | | Number of Levee Flood Protection Zones | Cost | | Miles of Rural Levees | Cost of Repairs | Number of LFPZs | Cost of Repairs | | Potential Number of Homes | Costs | Potential Number of Homes | Costs | Costs | | | | |
| | | | | Low High | | | Low High | | Low High | Low High | | Low High | | Low High | Low High | Low | High | ($) | ($) |
| 1 Upper Sacramento Region | $30 | $0 | 10 | $5 to $6 | $10 | 71 | $27 to $36 | 10 | $4 to $6 | $12 to $15 | 0 | $0 to $0 | 0 | $0 to $0 | $7 to $10 | **$95** | **$113** | **$0 to $0** | **$95 to $113** |
| 2 Mid-Sacramento Region | $30 | $0 | 16 | $8 to $10 | $10 | 301 | $114 to $151 | 16 | $7 to $9 | $18 to $23 | 0 | $0 to $0 | 0 | $0 to $0 | $33 to $44 | **$220** | **$277** | **$0 to $0** | **$220 to $277** |
| 3 Feather River Region | $30 | $0 | 25 | $13 to $15 | $10 | 162 | $61 to $81 | 25 | $11 to $14 | $27 to $36 | 0 | $0 to $0 | 0 | $0 to $0 | $13 to $18 | **$165** | **$204** | **$0 to $0** | **$165 to $204** |
| 4 Lower Sacramento Region | $30 | $0 | 38 | $19 to $23 | $10 | 43 | $17 to $22 | 38 | $16 to $22 | $41 to $54 | 0 | $0 to $0 | 0 | $0 to $0 | $6 to $8 | **$139** | **$169** | **$0 to $0** | **$139 to $169** |
| 5 Delta North Region[20*] | $30 | $0 | 19 | $95 to $97 | $10 | 252 | $95 to $126 | 19 | $8 to $11 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $20 to $26 | **$258** | **$300** | **$0 to $0** | **$258 to $300** |
| 6 Delta South Region | $30 | $0 | 17 | $9 to $11 | $10 | 54 | $21 to $27 | 17 | $7 to $10 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $14 to $18 | **$91** | **$106** | **$0 to $0** | **$91 to $106** |
| 7 Lower San Joaquin Region | $30 | $0 | 37 | $19 to $23 | $10 | 38 | $15 to $19 | 37 | $16 to $21 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $3 to $4 | **$93** | **$107** | **$0 to $0** | **$93 to $107** |
| 8 Mid-San Joaquin Region | $30 | $0 | 19 | $10 to $12 | $10 | 51 | $20 to $26 | 19 | $8 to $11 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $6 to $8 | **$84** | **$97** | **$0 to $0** | **$84 to $97** |
| 9 Upper San Joaquin Region | $30 | $0 | 40 | $20 to $24 | $10 | 228 | $86 to $114 | 40 | $17 to $23 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $48 to $64 | **$211** | **$265** | **$0 to $0** | **$211 to $265** |
| **Total** | **$270** | **$0** | **221** | **$198 to $221** | **$90** | **1,200** | **$456 to $600** | **221** | **$94 to $125** | **$98 to $125** | 0 | **$0 to $0** | 0 | **$0 to $0** | **$150 to $200** | **$1,356** | **$1,638** | **$0 to $0** | **$1,356 to $1,638** |

Notes:

All cost estimates are based on 2011 costs rounded to nearest $million.

The Protect High Risk Communities Approach is one of three preliminary approaches initially considered for the CVFPP.

Residual Risk Management Assumptions:

[1618] Additional Flood Information Collection and Sharing:

Includes $30 million per region to improve:

Identification and notification of the flood hazards to residents

Effectively broadcasting real-time flood information to rural areas

Mapping evacuation routes and provide them to public

Additional flood monitoring stations in rural areas

All Weather Roads on Levee Crowns: ~~Purchasing and Relocating Homes in Floodplains:~~ Not included in this approach

Local Flood Emergency Response Planning:

Includes a one-time expenditure of $500,000 to $600,000 per Levee Flood Protection Zone to improve:

Assist local agencies to prepare flood emergency response plan
Train flood patrolling and flood fight
Conduct flood exercises with local entities
Develop communication tool and process for flood emergency response
*Includes $80 million for purchase of Delta Flood fight materials and $5 million for increased Delta Communications

Additional Forecasting and Notification:

Includes a one-time expenditure of $10,000,000 per Region to improve:

Improve timing and accuracy of flood forecasts

Develop additional forecasting points to effectively serve rural communities

Develop an effective way of distribution forecasts to rural areas
~~*Includes $80 million for purchase of Delta Flood fight materials and $5 million for increased Delta Communications capital investment in rural levees.~~

Identification and Repair of After Event Erosions:

Inspect the flood system after any major flood event to identify erosion sites. Repair erosion sites in a timely manner before they are expected to become a major remain project.
Costs are estimated to be approximately $20 million per year for 25 years and are distributed across regions proportionally based on number of rural levee miles.

Develop and Implement Enhanced O&Ms Programs and Regional Organizations:

Includes annual expenditures of $4,000,000 to $5,000,000 per year for 25 years, regionally distributed according to the number of Local Flood Protection Zones to:

Develop and implement an enhanced O&M programs and establish regional maintenance organizations.

Sacramento Channel and Levee Management and Bank Protection :

Channel and levee management program includes system capacity evaluation and remediations and Sacramento River Bank Protection. Assumes $4 to $5 million per year over next 25 years. Distribution of the cost between the various regions is preliminary and is subject to refinement. The State will assume responsibilities for O&M of the bypasses as well as the water side of the project levees in Sacramento River System

Raising and Waterproofing Structures and Building Berms: Not included in this approach

Purchasing and Relocating Homes in Floodplains: Not included in this approach

Land Use and Floodplain Management Integration :

Land use and floodplain management integration including preparing multi-hazard plans, multi-hazard plans, floodplain management plan, local general plan updates, etc.
Costs estimated to be up to $200 million, and were regionally distributed based on the number of houses in rural areas.

## 102. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, page 6-17 to 6-18, Table 6-9

Table 6-9 "System Improvement Costs for the Enhance Flood System Capacity Approach" is replaced by the revised version as follows:

| REGION | Land Acquisition [1] | | Agricultural Conservation Easement [2] | | Ecosystem Restoration and Enhancement [3] | | Levees | | | | Flood System and Fish Passage Structures [6] | Reservoir Operations | | Easements [9] | System Erosion and Bypass Sediment Removal Project [10] | Estimated Total Cost | Risk Assessment, Feasibility, Engineering, and Permitting (25%) | Range of Estimated Total Cost over Program Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | New Levee Construction [4] | | Improve Existing Levees [5] | | | Forecast-Coordinated Operations / Forecast-Based Operations [7] | New Reservoir Storage [8] | | | | | |
| | Acreage | Cost | Acreage (1,000) | Cost | Acreage | Cost | Length | Cost | Length | Cost | Cost | Cost | Cost | Cost | Cost | | | |
| | (acres) | Low High | Low High | Low High | (acres) | Low High | (miles) | Low High | (miles) | Low High | Low High | Low High | Low High | Low High | Low High | Low High | Low High | Low High |
| 1 Upper Sacramento Region | 0 | $0 to $0 | 5 to 10 | $18 to $42 | 0 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $60 to $90 | $9 to $12 | $0 to $0 | $165 to $213 | $0 to $0 | $252 to $357 | $63 to $90 | $315 to $447 |
| 2 Mid-Sacramento Region | 0 | $0 to $0 | 10 to 15 | $35 to $63 | 0 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $122 to $174 | $0 to $0 | $0 to $0 | $275 to $355 | $30 to $35 | $462 to $627 | $116 to $157 | $578 to $784 |
| 3 Feather River Region | 9000 | $87 to $98 | 15 to 25 | $79 to $150 | 3,300 | $165 to $198 | 31 | $671 to $793 | 15 | $210 to $270 | $135 to $190 | $9 to $12 | $200 to $300 | $140 to $172 | $0 to $0 | $1,696 to $2,183 | $424 to $546 | $2,120 to $2,729 |
| 4 Lower Sacramento Region | 18,900 | $256 to $284 | 5 to 10 | $32 to $70 | 4,900 | $258 to $307 | 21 | $462 to $546 | 2 | $28 to $36 | $230 to $280 | $5 to $6 | $0 to $0 | $0 to $0 | $30 to $40 | $1,301 to $1,569 | $326 to $393 | $1,627 to $1,962 |
| 5 Delta North Region | 7,900 | $72 to $83 | 5 to 10 | $21 to $49 | 2,000 | $94 to $114 | 19 | $407 to $481 | 0 | $0 to $0 | $0 to $0 | $9 to $12 | $0 to $0 | $0 to $0 | $0 to $0 | $603 to $739 | $151 to $185 | $754 to $924 |
| 6 Delta South Region | 1,000 | $9 to $11 | 10 to 15 | $42 to $74 | 300 | $14 to $17 | 8 | $165 to $195 | 7 | $91 to $117 | $20 to $25 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 | $341 to $439 | $86 to $110 | $427 to $549 |
| 7 Lower San Joaquin Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $0 to $0 | $5 to $6 | $0 to $0 | $0 to $0 | $0 to $0 | $5 to $6 | $2 to $2 | $7 to $8 |
| 8 Mid-San Joaquin Region | 0 | $0 to $0 | 10 to 15 | $39 to $69 | 0 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $0 to $0 | $9 to $12 | $400 to $600 | $174 to $222 | $0 to $0 | $622 to $903 | $156 to $226 | $778 to $1,129 |
| 9 Upper San Joaquin Region | 0 | $0 to $0 | 10 to 15 | $39 to $69 | 0 | $50 to $50 | 0 | $0 to $0 | 0 | $0 to $0 | $71 to $88 | $23 to $30 | $500 to $1,500 | $116 to $148 | $0 to $0 | $799 to $1,885 | $200 to $472 | $999 to $2,357 |
| Total | 36,800 | $424 to $476 | 70 to 115 | $305 to $586 | 10,500 | $581 to $686 | 79 | $1,705 to $2,015 | 24 | $329 to $423 | $638 to $847 | $69 to $90 | $1,100 to $2,400 | $870 to $1,110 | $60 to $75 | $6,081 to $8,708 | $1,521 to $2,177 | $7,605 to $10,889 |

~~NOTE:~~ Notes:

All cost estimates are based on 2011 costs rounded to the nearest $million.

The Enhance Flood System Capacity Approach is one of three preliminary approaches initially considered for the CVFPP.

System Improvement Assumptions:

[1] Land Acquisition: includes purchase of land (fee title)

Land Purchase Cost Assumptions by Region

| | | |
|---|---|---|
| 1 | Upper Sacramento | $10,000 to $12,000/acre |
| 2 | Mid-Sacramento | $10,000 to $12,000/acre |
| 3 | Feather River | $15,000 to $17,000/acre |
| 4 | Lower Sacramento | $18,000 to $20,000/acre |
| 5 | Delta North | $12,000 to $14,000/acre |
| 6 | Delta South | $12,000 to $14,000/acre |
| 7 | Lower San Joaquin | $15,000 to $17,000/acre |
| 8 | Mid-San Joaquin | $11,000 to $13,000/acre |
| 9 | Upper San Joaquin | $11,000 to $13,000/acre |

[2] Agricultural Conservation Easement: would preserve agricultural land uses with no provision for storage of flood flows within the easement

Agricultural Conservation Assumed 35% of Land Acquisition by Region

~~1 Upper Sacramento 35%~~
~~2 Mid-Sacramento 35%~~
~~3 Feather River 35%~~
~~4 Lower Sacramento 35%~~
~~5 Delta North 35%~~
~~6 Delta South 35%~~
~~7 Lower San Joaquin 35%~~
~~8 Mid - San Joaquin 35%~~
~~9 Upper San Joaquin 35%~~

[3] Ecosystem Restoration and Enhancement:

Assumes 25% of land purchased for bypasses will be developed for conservation and other 75% will be leased back to farmers for environmentally friendly agricultural practices such as corn, rice, and other grains, except for the Sutter Bypass Expansion, where environmental conservation is designated for 50 percent of lands acquired.

Environmental conservation cost includes development of or improvement to habitat, and is estimated at $35,000 to $45,000 per acre

~~Environmental Conservation Development by Region~~
~~1 Upper Sacramento $35,000 to $45,000/acre~~
~~2 Mid-Sacramento $35,000 to $45,000/acre~~
~~3 Feather River $35,000 to $45,000/acre~~
~~4 Lower Sacramento $35,000 to $45,000/acre~~
~~5 Delta North $35,000 to$45,000/acre~~
~~6 Delta South $35,000 to $45,000/acre~~
~~7 Lower San Joaquin $35,000 to $45,000/acre~~
~~8 Mid - San Joaquin $35,000 to $45,000/acre~~
~~9 Upper San Joaquin $35,000 to $45,000/acre~~

Also includes $50 million for Upper San Joaquin River Restoration Projects.

[4] New Levee Design and Construction:

$22 to $26 million/mile based on recent urban levee projects in the Central Valley.

[5] Improve Existing Levees:

$14 to $18 million/mile

[6] Flood System and Fish Passage Structures:

~~Not included in this approach.~~ Where available, facility-specific cost estimates were used. Otherwise, programmatic costs were approximated based on similar projects elsewhere in California

[7] F-CO / F-BO:

Includes up to 15 F-CO/F-BO in the Sacramento Basin (up to seven reservoirs) and the San Joaquin Basin (up to eight reservoirs), with $4.5 to $6 million per reservoir.

[8] New Reservoirs:

~~Not included in this approach.~~ Programmatic costs were approximated as unit costs to purchase new storage and mitigate impacts in flood storage or multipurpose facilities.

[9] Easements:

~~Not included in this approach.~~ Easements are assumed to be 60 percent of the cost to acquire the land plus project-specific costs of additional facilities needed to move water in/out of easements. Specific locations have not yet been identified

[10] System Erosion and Bypass Sediment Removal Project:

~~Not included in this approach.~~ Represents a one-time expenditure for sediment removal from bypasses and weirs to address deferred maintenance

## 103. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, page 6-19 to 6-20, Table 6-10

Table 6-10 "Urban Improvement Costs for the Enhance Flood System Capacity Approach" is replaced by the revised version as follows:

| REGION | Estimated Project Cost[11] | | | Risk Assessment, Feasibility, Engineering, and Permitting ~~(20%)~~[13] | | | Range of Estimated Total Cost over Program Duration | | |
|---|---|---|---|---|---|---|---|---|---|
| | Low | | High | Low | | High | Low | | High |
| **Upper Sacramento Region** | **$100** | **to** | **$120** | **$20** | **to** | **$24** | **$120** | **to** | **$144** |
| Chico Urban Levee Improvements | $100 | to | $120 | $20 | to | $24 | $120 | to | $144 |
| **Mid-Sacramento Region** | **$0** | **to** | **$0** | **$0** | **to** | **$0** | **$0** | **to** | **$0** |
| | $0 | to | $0 | $0 | to | $0 | $0 | to | $0 |
| **Feather River Region** | **$760** | **to** | **$891** | **$131** | **to** | **$157** | **$891** | **to** | **$1,048** |
| Sutter County Feasibility Study | $8.5 | to | $10.2 | $1.7 | to | $2 | $10.2 | to | $12.2 |
| Feather River West Levee SBFCA | $245 | to | $294 | $49 | to | $58.8 | $294 | to | $352.8 |
| LD1-EIP-Lower Feather River Setback Levee at Star Bend | $20.8 | to | $20.8 | $0 | to | $0 | $20.8 | to | $20.8 |
| Marysville Ring Levee Reconstruction | $161.9 | to | $194.3 | $32.4 | to | $38.9 | $194.3 | to | $233.1 |
| Yuba River Basin GRR | $15.4 | to | $18.5 | $3.1 | to | $3.7 | $18.5 | to | $22.2 |
| TRLIA-EIP Feather River Levee Improvement Project | $222 | to | $266.4 | $44.4 | to | $53.3 | $266.4 | to | $319.7 |
| TRLIA-EIP-Upper Yuba River Levee Improvement Project | $68 | to | $68 | $0 | to | $0 | $68 | to | $68 |
| RD 2103-EIP-Bear River North Levee Rehabilitation Project | $18.2 | to | $18.2 | $0 | to | $0 | $18.2 | to | $18.2 |
| **Lower Sacramento Region** | **$3,117** | **to** | **$3,726** | **$145** | **to** | **$173** | **$3,261** | **to** | **$3,899** |
| American River Common Features Project/GRR | $12.8 | to | $15.4 | $2.6 | to | $3.1 | $15.4 | to | $18.4 |
| American River Common Features-WRDA96/99 Projects/Remaining Sites | $282 | to | $338.4 | $0 | to | $0 | $282 | to | $338.4 |
| Folsom Dam Modifications-Joint Federal Project (Gated Auxiliary Spillway) | $800 | to | $1,000 | $0 | to | $0 | $800 | to | $1,000 |
| Folsom Dam Raise, Bridge Element Study and Implementation | $130 | to | $140 | $0 | to | $0 | $130 | to | $140 |
| Folsom Dam Raise - Reservoir Enlargement | $125 | to | $130 | $0 | to | $0 | $125 | to | $130 |
| South Sacramento County Streams | $104 | to | $124.8 | $0 | to | $0 | $104 | to | $124.8 |
| SAFCA-EIP-NCC Natomas Levee Improvement Project | $70 | to | $84 | $0 | to | $0 | $70 | to | $84 |
| SAFCA-NLIP,CO Natomas Levee Improvement Project | $310 | to | $372 | $0 | to | $0 | $310 | to | $372 |
| Natomas Basin Design and Construction (Future) | $385 | to | $462 | $0 | to | $0 | $385 | to | $462 |
| Magpie Creek Project (Future) | $9.8 | to | $11.8 | $2 | to | $2.4 | $11.8 | to | $14.1 |
| American River South and Sacramento River Future Improvements | $500 | to | $600 | $100 | to | $120 | $600 | to | $720 |
| Slip Repair | $53 | to | $63.6 | $10.6 | to | $12.7 | $63.6 | to | $76.4 |
| WSAFCA-EIP-CO West Sacramento | $105 | to | $126 | $21 | to | $25.2 | $126 | to | $151.2 |
| West Sacramento Project GGR | $10 | to | $12 | $2 | to | $2.4 | $12 | to | $14.4 |
| Woodland/ Lower Cache Creek Feasibility Study and Implementation | $190 | to | $210 | $0 | to | $0 | $190 | to | $210 |
| Davis-Willow Slough | $30 | to | $36 | $6 | to | $7.2 | $36 | to | $43.2 |
| **Delta North Region** | **$0** | **to** | **$0** | **$0** | **to** | **$0** | **$0** | **to** | **$0** |
| | $0 | to | $0 | $0 | to | $0 | $0 | to | $0 |
| **Delta South Region** | **$0** | **to** | **$0** | **$0** | **to** | **$0** | **$0** | **to** | **$0** |
| | $0 | to | $0 | $0 | to | $0 | $0 | to | $0 |

**Table 6-10. Urban Improvement Costs for the Enhance Flood System Capacity Approach (contd.)**

| REGION | Estimated Project Cost[11] | | | Risk Assessment, Feasibility, Engineering, and Permitting~~(20%)~~[13] | | | Range of Estimated Total Cost over Program Duration | | |
|---|---|---|---|---|---|---|---|---|---|
| | Low | | High | Low | | High | Low | | High |
| **Lower San Joaquin Region** | **$162** | **to** | **$194** | **$33** | **to** | **$39** | **$194** | **to** | **$233** |
| Lower San Joaquin Feasibility Study | $15.4 | to | $18.5 | $3.1 | to | $3.7 | $18.5 | to | $22.2 |
| RD 17-EIP-100-Year Levee Seepage Area Project | $76 | to | $91.2 | $15.2 | to | $18.2 | $91.2 | to | $109.4 |
| Mormon Slough Bypass/ Stockton Diverter Canal | $40 | to | $48 | $8 | to | $9.6 | $48 | to | $57.6 |
| Smith Canal Closure Structure (EIP Project) | $30 | to | $36 | $6 | to | $7.2 | $36 | to | $43.2 |
| **Mid-San Joaquin Region** | **$0** | **to** | **$0** | **$0** | **to** | **$0** | **$0** | **to** | **$0** |
| | $0 | to | $0 | $0 | to | $0 | $0 | to | $0 |
| **Upper San Joaquin Region** | **$138** | **to** | **$166** | **$28** | **to** | **$34** | **$166** | **to** | **$199** |
| Merced County Streams Group (Bear Creek Unit) | $137.7 | to | $165.2 | $27.5 | to | $33 | $165.2 | to | $198.3 |
| **Identified Urban Improvements Subtotal** | **$4,277** | **to** | **$5,097** | **$357** | **to** | **$427** | **$4,632** | **to** | **$5,523** |

**Non-SPFC Urban Levee Improvements[12]**

| REGION | Estimated Project Cost[11] | | | Risk Assessment, Feasibility, Engineering, and Permitting~~(20%)~~[13] | | | Range of Estimated Total Cost over Program Duration | | |
|---|---|---|---|---|---|---|---|---|---|
| | Low | | High | Low | | High | Low | | High |
| 1 Upper Sacramento Region | $0 | | $0 | $0 | | $0 | $0 | | $0 |
| 2 Mid-Sacramento Region | $0 | | $0 | $0 | | $0 | $0 | | $0 |
| 3 Feather River Region | $0 | | $0 | $0 | | $0 | $0 | | $0 |
| 4 Lower Sacramento Region | $240 | | $320 | $48 | | $64 | $288 | | $384 |
| 5 Delta North Region | $120 | | $160 | $24 | | $32 | $144 | | $192 |
| 6 Delta South Region | $0 | | $0 | $0 | | $0 | $0 | | $0 |
| 7 Lower San Joaquin Region | $360 | | $480 | $72 | | $96 | $432 | | $576 |
| 8 Mid-San Joaquin Region | $0 | | $0 | $0 | | $0 | $0 | | $0 |
| 9 Upper San Joaquin Region | $0 | | $0 | $0 | | $0 | $0 | | $0 |
| **Non-SPFC Urban Levee Improvements Subtotal** | **$720** | | **$960** | **$144** | | **$192** | **$864** | | **$1,152** |
| **Urban Improvements Total** | **$4,997** | **to** | **$5,817** | **$501** | **to** | **$571** | **$5,496** | **to** | **$6,675** |

Notes:
All cost estimates are based on 2011 costs rounded to nearest $million.
The Enhance Flood System Capacity Approach is one of three preliminary approaches initially considered for the CVFPP.
Assumptions:

[11] Estimated Project Costs:
Urban Flood Protection Projects would provide a 200-year level of protection for urban areas. Project-specific costs were collected from ongoing feasibility studies or other information provided by local flood and other agencies~~Costs provided by Project Management Office based on input from local agencies~~. Folsom ~~Enlargement~~ Dam Raise is an authorized project to provide flood protection for the City of Sacramento.

[12] Non-SPFC Urban Levee ~~Improvements~~ Improvement costs estimated at $6 to $8 million per mile for approximately 120 miles of Non-SPFC Urban Levees because no levee evaluation data ~~is~~ are available at this time. These improvement costs are~~a~~ less than other improvement cost estimates because these levees are generally on smaller tributary streams and as a result are smaller than other levees, and certain improvements projects have already been completed.

[13] Risk Assessment, Feasibility, Engineering, and Permitting ~~(20%):~~
Ranges by project from 0% to 20% depending on level of project development

## 104. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, page 6-21 to 6-22, Table 6-11

Table 6-11 "Rural-Agricultural Improvement Costs for the Enhance Flood System Capacity Approach" is replaced by the revised version as follows:

| REGION | Small Community Improvement ~~13~~ 14 | Non-Urban - Design Capacity Improvements ~~14~~ 15 | Rural Setback Levees ~~15~~ 16 | | | Site-Specific Rural Agricultural Improvement ~~16~~ 17 | | | Estimated Total Costs ~~17~~ 18 | | Risk Assessment, Feasibility, Engineering, and Permitting (25%) | | Range of Estimated Total Cost over Program Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Levee Improvement to Provide 100-Year Protection for Small Communities | | Low | | High | Miles of Rural Levees | Levee Improvements | Known and Identified Erosion Repairs | Low | High | Low | High | ($) |
| **1 Upper Sacramento Region** | $0 | $408 | $0 | to | $0 | ~~7~~10 | $0 to $0 | $0 | $408 | to $510 | $102 | to $128 | **$510 to $638** |
| **2 Mid-Sacramento Region** | $95 | $2,577 | $1,733 | to | $2,426 | ~~30~~10 | $0 to $0 | $0 | $4,405 | to $5,743 | $1,102 | to $1,436 | **$5,508 to $7,179** |
| **3 Feather River Region** | $33 | $1,630 | $603 | to | $844 | ~~16~~20 | $0 to $0 | $0 | $2,267 | to $2,915 | $567 | to $729 | **$2,834 to $3,644** |
| **4 Lower Sacramento Region** | $0 | $1,147 | $0 | to | $0 | ~~4~~30 | $0 to $0 | $0 | $1,147 | to $1,434 | $287 | to $359 | **$1,434 to $1,793** |
| **5 Delta North Region** | $200 | $3,111 | $0 | to | $0 | ~~25~~20 | $0 to $0 | $0 | $3,311 | to $4,089 | $828 | to $1,023 | **$4,139 to $5,112** |
| **6 Delta South Region** | $0 | $503 | $0 | to | $0 | ~~5~~40 | $0 to $0 | $0 | $503 | to $629 | $126 | to $158 | **$629 to $787** |
| **7 Lower San Joaquin Region** | $0 | $272 | $0 | to | $0 | ~~3~~80 | $0 to $0 | $0 | $272 | to $340 | $68 | to $85 | **$340 to $425** |
| **8 Mid-San Joaquin Region** | $2 | $378 | $716 | to | $1,002 | ~~5~~10 | $0 to $0 | $0 | $1,096 | to $1,477 | $274 | to $370 | **$1,370 to $1,847** |
| **9 Upper San Joaquin Region** | $15 | $1,043 | $0 | to | $0 | ~~22~~80 | $0 to $0 | $0 | $1,059 | to $1,320 | $265 | to $330 | **$1,324 to $1,650** |
| **Total** | **$345** | **$11,069** | **$3,052** | **to** | **$4,272** | **~~1,200~~0** | **$0 to $0** | **$0** | **$14,469** | **to $18,453** | **$3,618** | **to $4,614** | **$18,088 to $23,075** |

Notes:

All cost estimates are based on 2011 costs rounded to nearest $million.

The Enhance Flood System Capacity Approach is one of three preliminary approaches initially considered for the CVFPP.

Assumptions:

~~13~~14 Small Community Improvements:

Attachment 8J, Appendix D, provides detailed information about small community improvements.

Provides 100-year level of protection for small communities within the SPFC that are not protected by other systemwide and/or urban level improvements. Cost of implementation is less than $30,000 per person protected (about $100,000 per house).

Non-structural measures will be taken when the cost of protection exceeds $100,000 per house (see Residual Risk Management)

Total population in protected small communities is estimated at 47,000 people, and requires about 60 miles of new levees. The costs associated with the approximately 60 miles of levee improvements are included as part of NULE Design Capacity Improvements.
Assumed construction costs includes a combination of levee improvements and construction of new levees for each individual community.
Small communities protected by Region are listed below:

1 Upper Sacramento: Durham, Gerber-Las Flore
2 Mid-Sacramento: Knights Landing, Meridian, Colusa, Glenn, Grimes, Butte City, Robbins, Princeton
3 Feather River: Verona, Biggs, Wheatland, Gridley, Live Oak, Nicolaus, Sutter, Tierra Buena
4 None
5 Delta North: Rio Vista, Clarksburg, Courtland, Hood, Walnut Grove, Isleton
6 None
7 None
8 Mid-San Joaquin: Grayson
9 Upper San Joaquin: Firebaugh, Dos Palos, South Dos Palos

~~14~~15 Non-Urban - Design Capacity Improvements:
Estimates from NULE program for improvements to non-urban project levees ~~and related non-urban non-project levees~~ (see Attachment 8J, Appendix C) to address levee deficiencies such as under-seepage, through-seepage, stability, erosion, and freeboard.

The NULE improvements ~~are expected to~~ include Levee Crown Road All Weather resurfacings for all rural levees ~~(total 1200 miles) at cost of $50,000 per mile~~.

~~15~~16 Rural Setback Levees:
Includes updated levee setback costs for land purchase, old levee removal, fixing existing levees, and construction of new levees.
New lands introduced to the floodplain by the setback levee will be subjected to future riparian processes to provide ecosystem restoration.

~~16~~17 Site-Specific Rural Agricultural Improvements:
Not included in this approach

~~17~~18 High estimate includes 25% increase for Non-Urban Design Capacity Improvements to account for upper cost estimate range.

## 105. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, page 6-23 to 6-24, Table 6-12

Table 6-12 "Residual Risk Management Costs for the Enhance Flood System Capacity Approach" is replaced by the revised version as follows:

| REGION | Enhanced Flood Emergency Response | | | | | Enhanced Operation and Maintenance | | | | | Floodplain Management | | | | | Estimated Total Costs | Risk Assessment, Feasibility, Engineering, and Permitting (25%) | Range of Estimated Total Cost over Program Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Additional Flood Information Collection and Sharing[16 19] | All Weather Roads on Levee Crowns[17 20] | Local Flood Emergency Response Planning[18 21] | | Additional Forecasting and Notification[19 22] | Identification and Repair of After Event Erosions[20 23] | | Develop and Implement Enhanced O&M Programs and Regional Organizations[21 24] | | Sacramento Channel and Levee Management and Bank Protection[22 25] | Raising and Waterproofing Structures and Building Berms[23 26] | | Purchasing and Relocating Homes in Floodplains[24 27] | | Land Use and Floodplain Management Integration[25 28] | | | |
| | | | Number of Levee Flood Protection Zones | Cost | | Miles of Rural Levees | Cost of Repairs | Number of LFPZs | Cost of Repairs | | Potential Number of Homes | Costs | Potential Number of Homes | Costs | Costs | | | |
| | | | | Low High | | | Low High | | Low High | Low High | | Low High | | Low High | Low High | Low High | ($) | ($) |
| 1 Upper Sacramento Region | $8 | $0 | 10 | $5 to $6 | $0 | 71 | $7 to $9 | 10 | $4 to $6 | $12 to $15 | 0 | $0 to $0 | ~~150~~0 | $0 to $0 | $3.8 to $5 | **$40 to $49** | **$0 to $0** | **$40 to $49** |
| 2 Mid-Sacramento Region | $8 | $0 | 16 | $8 to $10 | $0 | 301 | $29 to $38 | 16 | $7 to $9 | $49 to $65 | 0 | $0 to $0 | ~~660~~0 | $0 to $0 | $16.5 to $22 | **$117 to $152** | **$0 to $0** | **$117 to $152** |
| 3 Feather River Region | $8 | $0 | 25 | $13 to $15 | $0 | 162 | $16 to $21 | 25 | $11 to $14 | $ 2 7 to $35 | 0 | $0 to $0 | ~~270~~0 | $0 to $0 | $6.8 to $9 | **$81 to $102** | **$0 to $0** | **$81 to $102** |
| 4 Lower Sacramento Region | $8 | $0 | 38 | $19 to $23 | $0 | 43 | $5 to $6 | 38 | $16 to $22 | $8 to $10 | 0 | $0 to $0 | ~~120~~0 | $0 to $0 | $3 to $4 | **$59 to $72** | **$0 to $0** | **$59 to $72** |
| 5 Delta North Region* | $8 | $0 | 19 | $95 to $97 | $0 | 252 | $24 to $320 | 19 | $8 to $11 | $0 to $0 | 0 | $0 to $0 | ~~390~~0 | $0 to $0 | $9.8 to $13 | **$145 to $161** | **$0 to $0** | **$145 to $161** |
| 6 Delta South Region | $8 | $0 | 17 | $9 to $11 | $0 | 54 | $6 to $7 | 17 | $7 to $10 | $0 to $0 | 0 | $0 to $0 | ~~270~~0 | $0 to $0 | $6.8 to $9 | **$37 to $45** | **$0 to $0** | **$37 to $45** |
| 7 Lower San Joaquin Region | $8 | $0 | 37 | $19 to $23 | $0 | 38 | $4 to $5 | 37 | $16 to $21 | $0 to $0 | 0 | $0 to $0 | ~~60~~0 | $0 to $0 | $1.5 to $2 | **$48 to $59** | **$0 to $0** | **$48 to $59** |
| 8 Mid-San Joaquin Region | $8 | $0 | 19 | $10 to $12 | $0 | 51 | $6 to $7 | 19 | $8 to $11 | $0 to $0 | 0 | $0 to $0 | ~~120~~0 | $0 to $0 | $3 to $4 | **$35 to $42** | **$0 to $0** | **$35 to $42** |
| 9 Upper San Joaquin Region | $8 | $0 | 40 | $20 to $24 | $0 | 228 | $22 to $29 | 40 | $17 to $23 | $0 to $0 | 0 | $0 to $0 | ~~960~~0 | $0 to $0 | $24 to $32 | **$91 to $116** | **$0 to $0** | **$91 to $116** |
| **Total** | **$72** | **$0** | **221** | **$198 to $221** | **$0** | **1,200** | **$119 to $150** | **221** | **$94 to $125** | **$96 to $125** | 0 | **$0 to $0** | ~~3,000~~0 | **$0 to $0** | **$75 to $100** | **$653 to $798** | **$0 to $0** | **$653 to $798** |

Notes:

All cost estimates are based on 2011 costs rounded to the nearest $million.

The Enhance Flood System Capacity Approach is one of three preliminary approaches initially considered for the CVFPP.

Residual Risk Management Assumptions:

~~16~~ 19 Additional Flood Information Collection and Sharing:

Includes $8 million per region to improve:

Identification and notification of the flood hazards to residents

Effectively broadcasting real-time flood information to rural areas
Mapping evacuation routes and provide them to public
Additional flood monitoring stations in rural areas

~~17~~ 20 All Weather Roads on Levee Crowns:
Improvement~~s expected to~~would be made as part of ~~ULE and~~ NULE ~~levee Improvements~~ Program and costs are included in the non-urban design capacity component of the rural-agricultural improvement element.

~~18~~ 21 Local Flood Emergency Response Planning:
Includes a one-time expenditure of $500,000 to $600,000 per Levee Flood Protection Zone to improve:
Assist local agencies to prepare flood emergency response plan
Train flood patrolling and flood fight
Conduct flood exercises with local entities
Develop communication tool and process for flood emergency response
*Includes $80 million for purchase of Delta Flood fight materials and $5 million for increased Delta Communications

~~19~~ 22 Additional Forecasting and Notification:
Forecasting and Notification will continue to operate at its current level. No enhancements are included for this approach.

~~20~~ 23 Identification and Repair of After Event Erosions:
Inspect the flood system after any major flood event to identify erosion sites. Repair erosion sites in a timely manner before they are expected to become a major remain project.
Costs are estimated to be approximately $5 million per year for 25 years and are distributed across regions proportionally based on number of rural levee miles.

~~21~~ 24 Develop and Implement Enhanced O&Ms:
Includes annual expenditures of $4,000,000 to $5,000,000 per year for 25 years, regionally distributed according to the number of Local Flood Protection Zones to:
Develop and implement an enhanced O&M program and establish regional maintenance organizations.

~~22~~ 25 Sacramento Channel and Levee Management and Bank Protection:
Channel and levee management program includes system capacity evaluation and remediation's and Sacramento River Bank Protection. Assumes $4 to $5 million per year over next 25 years.
Distribution of the cost between the various regions is preliminary and is subject to refinement ~~distributed according to the number of rural levee miles per region~~. The State will assume responsibilities for O&M of the bypasses as well as the water side of the project levees in Sacramento River System

~~23~~ 26 Raising and Waterproofing Structures and Building Berms:
Not included in this approach

~~24~~ 27 Purchasing and Relocating Homes in Floodplains:
Not included in this approach

~~25~~ 28 Land Use and Floodplain Management Integration:
Land use and floodplain management integration including preparing multi-hazard plans, multi-hazard plans, floodplain management plan, local general plan updates, etc.
Costs estimated to be up to $100 million, and were regionally distributed based on the number of houses in rural areas.

## 106. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, pages 6-25 to 6-26, Table 6-13

Table 6-13 "System Improvement Costs for the State Systemwide Investment Approach" is replaced by the revised version as follows:

| REGION | Land Acquisition[1] | | Agricultural Conservation Easement[2] | | Ecosystem Restoration and Enhancement[3] | | LEVEES: New Levee Construction[4] | | LEVEES: Improve Existing Levees[5] | | Flood System and Fish Passage Structures[6] | Reservoir Operations: Forecast-Coordinated Operations / Forecast-Based Operations[7] | Reservoir Operations: New Reservoir Storage[8] | Easements[9] | System Erosion and Bypass Sediment Removal Project[10] | Estimated Total Cost | Risk Assessment, Feasibility, Engineering, and Permitting (25%) | Range of Estimated Total Cost over Program Duration |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Acreage | Cost | Acreage (1,000) | Cost | Acreage | Cost | Length | Cost | Length | Cost | Cost | Cost | Cost | Cost | Cost | | | |
| | (acres) | Low High | Low High | Low High | (acres) | Low High | (miles) | Low High | (miles) | Low High | Low High | Low High | Low High | Low High | Low High | Low High | Low High | Low High |
| 1 Upper Sacramento Region | 0 | $0 to $0 | 5 to 10 | $18 to $42 | 0 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $60 to $90 | $9 to $12 | $0 to $0 | $0 to $0 | $0 to $0 | **$87 to $144** | **$22 to $36** | **$109 to $180** |
| 2 Mid-Sacramento Region | 0 | $0 to $0 | 10 to 15 | $35 to $63 | 0 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $122 to $174 | $0 to $0 | $0 to $0 | $0 to $0 | $30 to $35 | **$187 to $272** | **$47 to $68** | **$234 to $340** |
| 3 Feather River Region | 9,000 | $87 to $98 | 15 to 25 | $79 to $150 | 3,300 | $165 to $198 | 31 | $671 to $793 | 15 | $210 to $270 | $135 to $190 | $9 to $12 | $0 to $0 | $0 to $0 | $0 to $0 | **$1,356 to $1,711** | **$339 to $428** | **$1,695 to $2,139** |
| 4 Lower Sacramento Region | 18,900 | $256 to $284 | 5 to 10 | $32 to $70 | 4,900 | $258 to $307 | 21 | $462 to $546 | 2 | $28 to $36 | $230 to $280 | $5 to $6 | $0 to $0 | $0 to $0 | $30 to $40 | **$1,301 to $1,569** | **$326 to $393** | **$1,627 to $1,962** |
| 5 Delta North Region | 7,900 | $72 to $83 | 5 to 10 | $21 to $49 | 2,000 | $94 to $114 | 19 | $407 to $481 | 0 | $0 to $0 | $0 to $0 | $9 to $12 | $0 to $0 | $0 to $0 | $0 to $0 | **$603 to $739** | **$151 to $185** | **$754 to $924** |
| 6 Delta South Region | 1,000 | $9 to $11 | 10 to 15 | $42 to $74 | 300 | $14 to $17 | 8 | $165 to $195 | 7 | $91 to $117 | $20 to $25 | $0 to $0 | $0 to $0 | $0 to $0 | $0 to $0 | **$341 to $439** | **$86 to $110** | **$427 to $549** |
| 7 Lower San Joaquin Region | 0 | $0 to $0 | 0 to 0 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $0 to $0 | $5 to $6 | $0 to $0 | $0 to $0 | $0 to $0 | **$5 to $6** | **$2 to $2** | **$7 to $8** |
| 8 Mid-San Joaquin Region | 0 | $0 to $0 | 10 to 15 | $39 to $69 | 0 | $0 to $0 | 0 | $0 to $0 | 0 | $0 to $0 | $0 to $0 | $9 to $12 | $0 to $0 | $0 to $0 | $0 to $0 | **$48 to $81** | **$12 to $21** | **$60 to $102** |
| 9 Upper San Joaquin Region | 0 | $0 to $0 | 10 to 15 | $39 to $69 | 0 | $50 to $50 | 0 | $0 to $0 | 0 | $0 to $0 | $71 to $88 | $23 to $30 | $0 to $0 | $0 to $0 | $0 to $0 | **$183 to $237** | **$46 to $60** | **$229 to $297** |
| **Total** | 36,800 | $424 to $476 | 70 to 115 | $305 to $586 | 10,500 | $581 to $686 | 79 | $1,705 to $2,015 | 24 | $329 to $423 | $638 to $847 | $69 to $90 | $0 to $0 | $0 to $0 | $60 to $75 | **$4,111 to $5,198** | **$1,028 to $1,300** | **$5,142 to $6,501** |

~~NOTE:~~ Notes:

All cost estimates are based on 2011 costs rounded to nearest $million.

The State Systemwide Investment Approach is the State's preferred approach for the CVFPP.

System Improvement Assumptions:

[1] Land Acquisition: includes purchase of land (fee title)

Land Purchase Cost Assumptions by Region

| | |
|---|---|
| 1 - Upper Sacramento | $10,000 to $12,000/acre |
| 2 - Mid-Sacramento | $10,000 to $12,000/acre |
| 3 - Feather River | $15,000 to $17,000/acre |
| 4 - Lower Sacramento | $18,000 to $20,000/acre |
| 5 - Delta North | $12,000 to $14,000/acre |
| 6 - Delta South | $12,000 to $14,000/acre |
| 7 - Lower San Joaquin | $15,000 to $17,000/acre |
| 8 - Mid - San Joaquin | $11,000 to $13,000/acre |
| 9 - Upper San Joaquin | $11,000 to $13,000/acre |

[2] Agricultural Conservation Easement: would preserve agricultural land uses with no provision for storage of flood flows within the easement

Agricultural Conservation Assumed 35% of Land Acquisition by Region

~~1 - Upper Sacramento 35%~~
~~2 - Mid-Sacramento 35%~~
~~3 - Feather River 35%~~
~~4 - Lower Sacramento 35%~~
~~5 - Delta North 35%~~
~~6 - Delta South 35%~~
~~7 - Lower San Joaquin 35%~~
~~8 - Mid - San Joaquin 35%~~
~~9 - Upper San Joaquin 35%~~

[3] Ecosystem Restoration and Enhancement:

Assumes 25% of land purchased for bypasses will be developed for conservation and other 75% will be leased back to farmers for environmentally friendly agricultural practices such as corn, rice, and other grains, except for the Sutter Bypass Expansion, where environmental conservation is designated for 50 percent of lands acquired.

Environmental conservation cost includes development of or improvement to habitat, and is estimated at $35,000 to $45,000 per acre.

~~Environmental Conservation Development by Region~~
~~1 - Upper Sacramento $35,000 to $45,000/acre~~
~~2 - Mid-Sacramento $35,000 to $45,000/acre~~
~~3 - Feather River $35,000 to $45,000/acre~~
~~4 - Lower Sacramento $35,000 to $45,000/acre~~
~~5 - Delta North $35,000 to$45,000/acre~~
~~6 - Delta South $35,000 to $45,000/acre~~
~~7 - Lower San Joaquin $35,000 to $45,000/acre~~
~~8 - Mid - San Joaquin $35,000 to $45,000/acre~~
~~9 - Upper San Joaquin $35,000 to $45,000/acre~~

Also i~~I~~ncludes $50 million for Upper San Joaquin River Restoration Projects.

[4] New Levee Design and Construction:

$22 to $26 million/mile based on recent urban levee projects in the Central Valley.

[5] Improve Existing Levees:

$14 to $18 million/mile

[6] Flood System and Fish Passage Structures:

Not included in this approach

[7] F-CO / F-BO:

Includes up to 15 F-CO/F-BO in the Sacramento Basin (up to seven reservoirs) and the San Joaquin Basin (up to eight reservoirs), with $4.5 to $6.0 million per reservoir

[8] New Reservoirs:

Not included in this approach

[9] Easements:

Not included in this approach

[10] System Erosion and Bypass Sediment Removal Project:

~~Not included in this approach~~ Represents a one-time expenditure for sediment removal from bypasses and weirs to address deferred maintenance

## 107. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, page 6-27 to 6-28, Table 6-14

Table 6-14 "Urban Improvement Costs for the State Systemwide Investment Approach" is replaced by the revised version as follows:

| REGION | Estimated Project Cost [11] | | | Risk Assessment, Feasibility, Engineering, and Permitting (20%) [13] | | | Range of Estimated Total Cost over Program Duration | | |
|---|---|---|---|---|---|---|---|---|---|
| | Low | | High | Low | | High | Low | | High |
| **Upper Sacramento Region** | **$100.0** | **to** | **$120.0** | **$20.0** | **to** | **$24.0** | **$120.0** | **to** | **$144.0** |
| Chico Urban Levee Improvements | $100.0 | to | $120.0 | $20.0 | to | $24.0 | $120.0 | to | $144.0 |
| **Mid-Sacramento Region** | **$0.0** | **to** | **$0.0** | **$0.0** | **to** | **$0.0** | **$0.0** | **to** | **$0.0** |
| | $0.0 | to | $0.0 | $0.0 | to | $0.0 | $0.0 | to | $0.0 |
| **Feather River Region** | **$760.0** | **to** | **$891.0** | **$131.0** | **to** | **$157.0** | **$891.0** | **to** | **$1,048.0** |
| Sutter County Feasibility Study | $8.5 | to | $10.2 | $1.7 | to | $2.0 | $10.2 | to | $12.2 |
| Feather River West Levee SBFCA | $245.0 | to | $294.0 | $49.0 | to | $58.8 | $294.0 | to | $352.8 |
| LD1-EIP-Lower Feather River Setback Levee at Star Bend | $20.8 | to | $20.8 | $0.0 | to | $0.0 | $20.8 | to | $20.8 |
| Marysville Ring Levee Reconstruction | $161.9 | to | $194.3 | $32.4 | to | $38.9 | $194.3 | to | $233.1 |
| Yuba River Basin GRR | $15.4 | to | $18.5 | $3.1 | to | $3.7 | $18.5 | to | $22.2 |
| TRLIA-EIP Feather River Levee Improvement Project | $222.0 | to | $266.4 | $44.4 | to | $53.3 | $266.4 | to | $319.7 |
| TRLIA-EIP-Upper Yuba River Levee Improvement Project | $68.0 | to | $68.0 | $0.0 | to | $0.0 | $68.0 | to | $68.0 |
| RD 2103-EIP-Bear River North Levee Rehabilitation Project | $18.2 | to | $18.2 | $0.0 | to | $0.0 | $18.2 | to | $18.2 |
| **Lower Sacramento Region** | **$3,117.0** | **to** | **$3,726.0** | **$145.0** | **to** | **$173.0** | **$3,261.0** | **to** | **$3,899.0** |
| American River Common Features Project/GRR | $12.8 | to | $15.4 | $2.6 | to | $3.1 | $15.4 | to | $18.4 |
| American River Common Features-WRDA96/99 Projects/Remaining Sites | $282.0 | to | $338.4 | $0.0 | to | $0.0 | $282.0 | to | $338.4 |
| Folsom Dam Modifications-Joint Federal Project (Gated Auxiliary Spillway) | $800.0 | to | $1,000.0 | $0.0 | to | $0.0 | $800.0 | to | $1,000.0 |
| Folsom Dam Raise, Bridge Element Study and Implementation | $130.0 | to | $140.0 | $0.0 | to | $0.0 | $130.0 | to | $140.0 |
| Folsom Dam Raise - Reservoir Enlargement | $125.0 | to | $130.0 | $0.0 | to | $0.0 | $125.0 | to | $130.0 |
| South Sacramento County Streams | $104.0 | to | $124.8 | $0.0 | to | $0.0 | $104.0 | to | $124.8 |
| SAFCA-EIP-NCC Natomas Levee Improvement Project | $70.0 | to | $84.0 | $0.0 | to | $0.0 | $70.0 | to | $84.0 |
| SAFCA-NLIP,CO Natomas Levee Improvement Project | $310.0 | to | $372.0 | $0.0 | to | $0.0 | $310.0 | to | $372.0 |
| Natomas Basin Design and Construction (Future) | $385.0 | to | $462.0 | $0.0 | to | $0.0 | $385.0 | to | $462.0 |
| Magpie Creek Project (Future) | $9.8 | to | $11.8 | $2.0 | to | $2.4 | $11.8 | to | $14.1 |
| American River South and Sacramento River Future Improvements | $500.0 | to | $600.0 | $100.0 | to | $120.0 | $600.0 | to | $720.0 |
| Slip Repair | $53.0 | to | $63.6 | $10.6 | to | $12.7 | $63.6 | to | $76.4 |
| WSAFCA-EIP-CO West Sacramento | $105.0 | to | $126.0 | $21.0 | to | $25.2 | $126.0 | to | $151.2 |
| West Sacramento Project GGR | $10.0 | to | $12.0 | $2.0 | to | $2.4 | $12.0 | to | $14.4 |
| Woodland/ Lower Cache Creek Feasibility Study and Implementation | $190.0 | to | $210.0 | $0.0 | to | $0.0 | $190.0 | to | $210.0 |
| Davis-Willow Slough | $30.0 | to | $36.0 | $6.0 | to | $7.2 | $36.0 | to | $43.2 |
| **Delta North Region** | **$0.0** | **to** | **$0.0** | **$0.0** | **to** | **$0.0** | **$0.0** | **to** | **$0.0** |
| | $0.0 | to | $0.0 | $0.0 | to | $0.0 | $0.0 | to | $0.0 |
| **Delta South Region** | **$0.0** | **to** | **$0.0** | **$0.0** | **to** | **$0.0** | **$0.0** | **to** | **$0.0** |
| | $0.0 | to | $0.0 | $0.0 | to | $0.0 | $0.0 | to | $0.0 |

## Table 6-14. Urban Improvement Costs for the State Systemwide Investment Approach (Continued)

| REGION | Estimated Project Cost [11] | | | Risk Assessment, Feasibility, Engineering, and Permitting (20%) [13] | | | Range of Estimated Total Cost over Program Duration | | |
|---|---|---|---|---|---|---|---|---|---|
| | Low | | High | Low | | High | Low | | High |
| **Lower San Joaquin Region** | **$162.0** | **to** | **$194.0** | **$33.0** | **to** | **$39.0** | **$194.0** | **to** | **$233.0** |
| Lower San Joaquin Feasibility Study | $15.4 | to | $18.5 | $3.1 | to | $3.7 | $18.5 | to | $22.2 |
| RD 17-EIP-100-Year Levee Seepage Area Project | $76.0 | to | $91.2 | $15.2 | to | $18.2 | $91.2 | to | $109.4 |
| Mormon Slough Bypass/ Stockton Diverter Canal | $40.0 | to | $48.0 | $8.0 | to | $9.6 | $48.0 | to | $57.6 |
| Smith Canal Closure Structure (EIP Project) | $30.0 | to | $36.0 | $6.0 | to | $7.2 | $36.0 | to | $43.2 |
| **Mid - San Joaquin Region** | **$0.0** | **to** | **$0.0** | **$0.0** | **to** | **$0.0** | **$0.0** | **to** | **$0.0** |
| | $0.0 | to | $0.0 | $0.0 | to | $0.0 | $0.0 | to | $0.0 |
| **Upper San Joaquin Region** | **$138.0** | **to** | **$166.0** | **$28.0** | **to** | **$34.0** | **$166.0** | **to** | **$199.0** |
| Merced County Streams Group (Bear Creek Unit) | $137.7 | to | $165.2 | $27.5 | to | $33.0 | $165.2 | to | $198.3 |
| **Identified Urban Improvements Subtotal** | **$4,277.0** | **to** | **$5,097.0** | **$357.0** | **to** | **$427.0** | **$4,632.0** | **to** | **$5,523.0** |

**Non-SPFC Urban Levee Improvements** [12]

| REGION | Estimated Project Cost [11] | | | Risk Assessment, Feasibility, Engineering, and Permitting (20%) [13] | | | Range of Estimated Total Cost over Program Duration | | |
|---|---|---|---|---|---|---|---|---|---|
| | Low | | High | Low | | High | Low | | High |
| 1 - Upper Sacramento Region | $0.0 | | $0.0 | $0.0 | | $0.0 | $0.0 | | $0.0 |
| 2 - Mid-Sacramento Region | $0.0 | | $0.0 | $0.0 | | $0.0 | $0.0 | | $0.0 |
| 3 - Feather River Region | $0.0 | | $0.0 | $0.0 | | $0.0 | $0.0 | | $0.0 |
| 4 - Lower Sacramento Region | $240.0 | | $320.0 | $48.0 | | $64.0 | $288.0 | | $384.0 |
| 5 - Delta North Region | $120.0 | | $160.0 | $24.0 | | $32.0 | $144.0 | | $192.0 |
| 6 - Delta South Region | $0.0 | | $0.0 | $0.0 | | $0.0 | $0.0 | | $0.0 |
| 7 - Lower San Joaquin Region | $360.0 | | $480.0 | $72.0 | | $96.0 | $432.0 | | $576.0 |
| 8 - Mid - San Joaquin Region | $0.0 | | $0.0 | $0.0 | | $0.0 | $0.0 | | $0.0 |
| 9 - Upper San Joaquin Region | $0.0 | | $0.0 | $0.0 | | $0.0 | $0.0 | | $0.0 |
| **Non-SPFC Urban Levee Improvements Subtotal** | **$720.0** | | **$960.0** | **$144.0** | | **$192.0** | **$864.0** | | **$1,152.0** |
| **Urban Improvements Total** | **$4,997.0** | **to** | **$5,817.0** | **$501.0** | **to** | **$571.0** | **$5,496.0** | **to** | **$6,675.0** |

~~Assumptions:~~

~~NOTE:~~ Notes: All cost estimates are based on 2011 costs rounded to nearest $million.

The State Systemwide Investment Approach is the State's preferred approach for the CVFPP.

Assumptions:

[11] Estimated Project Costs:
Urban Flood Protection Projects would provide a 200-year level of protection for urban areas. Project-specific costs were collected from ongoing feasibility studies or other information provided by local flood and other agencies ~~Costs provided by Project Management Office based on input from local agencies~~. Folsom ~~Enlargement~~ Dam Raise is an authorized project to provide flood protection for the City of Sacramento

[12] Non-SPFC Urban Levee ~~Improvements~~ Improvement costs estimated at $6 to $8 million per mile for approximately 120 miles of Non-SPFC Urban Levees because no levee evaluation data ~~is~~ are available at this time. These improvement costs are~~a~~ less than other improvement cost estimates because these levees are generally on smaller tributary streams and as a result are smaller than other levees, and certain improvements projects have already been completed.

[13] Risk Assessment, Feasibility, Engineering, and Permitting ~~(20%)~~
Ranges by project from 0% to 20% depending on level of project development

## 108. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, page 6-29 to 6-30, Table 6-15

Table 6-15 "Rural-Agricultural Improvement Costs for the State Systemwide Investment Approach" is replaced by the revised version as follows:

| REGION | Small Community Improvement [14] | Non-Urban - Design Capacity Improvements [15] | Rural Setback Levees [16] | Site-Specific Rural Agricultural Improvement [17] | | | Estimated Total Costs | | Risk Assessment, Feasibility, Engineering, and Permitting (25%) | | Range of Estimated Total Cost over Program Duration | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Levee Improvement to Provide 100-Year Protection for Small Communities | | | Miles of Rural Levees | Levee Improvements | Known and Identified Erosion Repairs | | | | | | |
| | | | | | Low to High | | Low | High | Low | High | ($) | |
| **1 - Upper Sacramento Region** | $74.0 | $0.0 | $0.0 | 71 | $46.0 to $57.0 | $3.0 | $123.0 | $134.0 | $31.0 | $34.0 | **$154.0** | **$168.0** |
| **2 - Mid-Sacramento Region** | $107.0 | $0.0 | $0.0 | 301 | $62.0 to $77.0 | $119.0 | $288.0 | $303.0 | $72.0 | $76.0 | **$360.0** | **$379.0** |
| **3 - Feather River Region** | $173.0 | $0.0 | $0.0 | 162 | $24.0 to $30.0 | $28.0 | $225.0 | $231.0 | $57.0 | $58.0 | **$282.0** | **$289.0** |
| **4 - Lower Sacramento Region** | $0.0 | $0.0 | $0.0 | 43 | $37.0 to $46.0 | $24.0 | $61.0 | $70.0 | $16.0 | $18.0 | **$77.0** | **$88.0** |
| **5 - Delta North Region** | $77.0 | $0.0 | $0.0 | 252 | $93.0 to $117.0 | $313.0 | $483.0 | $507.0 | $121.0 | $127.0 | **$604.0** | **$634.0** |
| **6 - Delta South Region** | $0.0 | $0.0 | $0.0 | 54 | $18.0 to $22.0 | $19.0 | $37.0 | $41.0 | $10.0 | $11.0 | **$47.0** | **$52.0** |
| **7 - Lower San Joaquin Region** | $0.0 | $0.0 | $0.0 | 38 | $8.0 to $10.0 | $5.0 | $13.0 | $15.0 | $4.0 | $4.0 | **$17.0** | **$19.0** |
| **8 - Mid-San Joaquin Region** | $3.0 | $0.0 | $0.0 | 51 | $25.0 to $31.0 | $10.0 | $38.0 | $44.0 | $10.0 | $11.0 | **$48.0** | **$55.0** |
| **9 - Upper San Joaquin Region** | $121.0 | $0.0 | $0.0 | 228 | $19.0 to $24.0 | $6.0 | $146.0 | $151.0 | $37.0 | $38.0 | **$183.0** | **$189.0** |
| **Total** | **$555.0** | **$0.0** | **$0.0** | **1,200** | **$332.0 to $414.0** | **$523.0** | **$1,410.0** | **$1,492.0** | **$353.0** | **$373.0** | **$1,772.0** | **$1,873.0** |

~~NOTE:~~ Notes:

All cost estimates are based on 2011 costs rounded to nearest $million.
The State Systemwide Investment Approach is the State's preferred approach for the CVFPP.
Assumptions:
[14] Small Community Improvements:
Attachment 8J, Appendix D, provides detailed information about small community improvements.
Provides 100-year level of protection for small communities within the SPFC that are not protected by other systemwide and/or urban level improvements. Cost of implementation is less than $30,000 per person protected (about $100,000 per house).
Non-structural measures will be taken when the cost of protection exceeds $100,000 per house (see Residual Risk Management)
Total population in protected small communities is estimated at 47,000 people, and requires about 60 miles of new levees. The costs associated with the approximately 60 miles

of levee improvements are included as part of NULE Design Capacity Improvements.
Assumed construction costs include a combination of levee improvements and construction of new levees for each individual community.
Small communities protected by Region are listed below:
1- Upper Sacramento: Durham, Gerber-Las Flores
2- Mid-Sacramento: Knights Landing, Meridian, Colusa, Glenn, Grimes, Butte City, Robbins, Princeton
3- Feather River: Verona, Biggs, Wheatland, Gridley, Live Oak, Nicolaus, Sutter, Tierra Buena
4- None
5- Delta North: Rio Vista, Clarksburg, Courtland, Hood, Walnut Grove, Isleton
6- None
7- None
8 - Mid-San Joaquin: Grayson
9 - Upper San Joaquin: Firebaugh, Dos Palos, South Dos Palos

[15] Non-Urban - Design Capacity Improvements:
Not included in this approach. ~~Estimates from NULE program for improvements to non-urban project levees and related non-urban non-project levees.~~
~~The NULE improvements are expected to include Levee Crown Road All Weather resurfacings for all rural levees (total 1200 miles) at cost of $50,000 per mile.~~

[16] Rural Setback Levees:
Not included in this approach. ~~Includes updated levee setback costs (9/29) for land purchase, old levee removal, fixing existing levees, and construction of new levees. New lands introduced to the floodplain by the setback levee will be subjected to future riparian processes to provide ecosystem restoration.~~

[17] Site-Specific Rural Agricultural Improvements:
~~Not included in this approach~~ Site-specific repair needs were identified in 2011 levee inspections and include erosion repairs and freeboard improvements.

## 109. Attachment 8J, Appendix A – CVFPP Cost Estimates Methodology, page 6-31 to 6-32, Table 6-16

Table 6-15 "Residual Risk Management Costs for the State Systemwide Investment Approach" is replaced by the revised version as follows:

| REGION | Enhanced Flood Emergency Response | | | | | Enhanced Operation and Maintenance | | | | | Floodplain Management | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Additional Flood Information Collection and Sharing[16][18] | All Weather Roads on Levee Crowns[17][19] | Local Flood Emergency Response Planning[18][20] | | Additional Forecasting and Notification[19][21] | Identification and Repair of After Event Erosions[20][21] | | Develop and Implement Enhanced O&M Programs and Regional Organizations[21–23] | | Sacramento Channel and Levee Management and Bank Protection[22][24] | Raising and Waterproofing Structures and Building Berms[23][25] | | Purchasing and Relocating Homes in Floodplains[24][26] | | Land Use and Floodplain Management Integration[25–27] | | Estimated Total Costs | Risk Assessment, Feasibility, Engineering, and Permitting (25%) | Range of Estimated Total Cost over Program Duration |
| | | | Number of Levee Flood Protection Zones | Cost | | Miles of Rural Levees | Cost of Repairs | Number of LFPZs | Cost of Repairs | | Potential Number of Homes | Costs | Potential Number of Homes | Costs | Costs | | | | |
| | | | | Low High | | | Low High | | Low High | Low High | | Low High | | Low High | Low High | | Low High | ($) | ($) |
| 1 Upper Sacramento Region | $15 | $4 | 10 | $5 to $6 | $10 | 71 | $14 to $18 | 10 | $5 to $6 | $12 to $15 | 150 | $11.3 to $15 | 150 | $11.3 to $15 | $7.5 to $10 | | **$95 to $114** | **$0 to $0** | **$95 to $114** |
| 2 Mid-Sacramento Region | $15 | $14 | 16 | $8 to $10 | $10 | 301 | $57 to $76 | 16 | $7 to $9 | $18 to $23 | 660 | $49.5 to $66 | 660 | $49.5 to $66 | $33 to $44 | | **$261 to $333** | **$0 to $0** | **$261 to $333** |
| 3 Feather River Region | $15 | $9 | 25 | $13 to $15 | $10 | 162 | $31 to $41 | 25 | $11 to $14.1 | $ 2 7 to $36 | 270 | $20.3 to $27 | 270 | $20.3 to $27 | $13.5 to $18 | | **$170 to $212** | **$0 to $0** | **$170 to $212** |
| 4 Lower Sacramento Region | $15 | $3 | 38 | $19 to $23 | $10 | 43 | $9 to $11 | 38 | $17 to $21.5 | $41 to $54 | 120 | $9 to $12 | 120 | $9 to $12 | $6 to $8 | | **$138 to $169** | **$0 to $0** | **$138 to $169** |
| 5 Delta North Region* | $15 | $11 | 19 | $95 to $97 | $10 | 252 | $48 to $63 | 19 | $9 to $10.7 | $0 to $0 | 390 | $29.3 to $39 | 390 | $29.3 to $39 | $19.5 to $26 | | **$266 to $311** | **$0 to $0** | **$266 to $311** |
| 6 Delta South Region | $15 | $3 | 17 | $9 to $11 | $10 | 54 | $11 to $14 | 17 | $8 to $9.6 | $0 to $0 | 270 | $20.3 to $27 | 270 | $20.3 to $27 | $13.5 to $18 | | **$110 to $135** | **$0 to $0** | **$110 to $135** |
| 7 Lower San Joaquin Region | $15 | $2 | 37 | $19 to $23 | $10 | 38 | $8 to $10 | 37 | $16 to $20.9 | $0 to $0 | 60 | $4.5 to $6 | 60 | $4.5 to $6 | $3 to $4 | | **$82 to $97** | **$0 to $0** | **$82 to $97** |
| 8 Mid-San Joaquin Region | $15 | $3 | 19 | $10 to $12 | $10 | 51 | $10 to $13 | 19 | $9 to $10.7 | $0 to $0 | 120 | $9 to $12 | 120 | $9 to $12 | $6 to $8 | | **$81 to $96** | **$0 to $0** | **$81 to $96** |
| 9 Upper San Joaquin Region | $15 | $11 | 40 | $20 to $24 | $10 | 228 | $43 to $57 | 40 | $17 to $22.6 | $0 to $0 | 960 | $72 to $96 | 960 | $72 to $96 | $48 to $64 | | **$308 to $396** | **$0 to $0** | **$308 to $396** |
| **Total** | **$135** | **$60** | **221** | **$198 to $221** | **$90** | **1,200** | **$231 to $300** | **221** | **$99 to $125** | **$98 to $125** | 3,000 | **$225 to $300** | 3,000 | **$225 to $300** | **$150 to $200** | | **$1,511 to $1,863** | **$0 to $0** | **$1,511 to $1,863** |

Notes:

All cost estimates are based on 2011 costs rounded to nearest $million.

The State Systemwide Investment Approach is the State's preferred approach for the CVFPP.

Residual Risk Management Assumptions:

[18] Additional Flood Information Collection and Sharing:

Includes $15 million per region to improve:
- Identification and notification of the flood hazards to residents
- Effectively broadcasting real-time flood information to rural areas
- Mapping evacuation routes and provide them to public
- Additional flood monitoring stations in rural areas

[19] All Weather Roads on Levee Crowns:
Includes Levee Crown Road All Weather resurfacings for all rural levees (total 1200 miles) at cost of $50,000 per mile

[20] Local Flood Emergency Response Planning:
Includes a one-time expenditure of $500,000 to $600,000 per Levee Flood Protection Zone to improve:
- Assist local agencies to prepare flood emergency response plan
- Train flood patrolling and flood fight
- Conduct flood exercises with local entities
- Develop communication tool and process for flood emergency response
- *Includes $80 million for purchase of Delta Flood fight materials and $5 million for increased Delta Communications

[21] Additional Forecasting and Notification:
Includes a one-time expenditure of $10,000,000 per Region to improve:
- Improve timing and accuracy of flood forecasts
- Develop additional forecasting points to effectively serve rural communities
- Develop an effective way of distribution forecasts to rural areas

[22] Identification and Repair of After Event Erosions:
Inspect the flood system after any major flood event to identify erosion sites. Repair erosion sites in a timely manner before they are expected to become a major remain project.
Costs are estimated to be approximately $10 million per year for 25 years and are distributed across regions proportionally based on number of rural levee miles.

[23] Develop and Implement Enhanced O&M Programs and Regional Organizations:
Includes annual expenditures of $4,000,000 to $5,000,000 per year for 25 years, regionally distributed according to the number of Local Flood Protection Zones to:
- Develop and implement an enhanced O&M program and establish regional maintenance organizations.

[24] Sacramento Channel and Levee Management and Bank Protection:
Channel and levee management program includes system capacity evaluation and remediation's and Sacramento River Bank Protection. Assumes $4,000,000 to $5,000,000 per year over next 25 years.
Distribution of the cost between the various regions is preliminary and is subject to refinement ~~.distributed according to the number of rural levee miles per region.~~ The State will assume responsibilities for O&M of the bypasses as well as the water side of the project levees in Sacramento River System

[25] Raising and Waterproofing Structures and Building Berms:
Includes removing or raising structures within floodplains within rural areas.
Estimated in include about 3,000 homes
Costs estimated at $75,000 to $100,000 per house
A grant program to flood proof structures in rural floodplains (up to $100,000 per house and up to3,000 houses: totals up to $300 million)
Regional distribution of costs is proportional to the number of houses in the rural areas.

[26] Purchasing and Relocating Homes in Floodplains:
Purchasing of houses in high risk areas of rural floodplains (up to $100,000 per house and up to 3,000 houses (totals $300 million)
Regional distribution of costs is proportional to the number of houses in the rural areas.

[27] Land Use and Floodplain Management Integration:
Land use and floodplain management integration including preparing multi-hazard plans, multi-hazard plans, floodplain management plan, local general plan updates, etc.
Costs estimated to be up to $200 million, and were regionally distributed based on the number of houses in rural areas.

**110. Attachment 8J, Appendix D – Protection of Small Communities, page D-1, first paragraph**

This appendix documents the conceptual design and cost estimates for providing 100-year level of flood protection for small communities within the Systemwide Planning Area through physical modifications to the flood protection system (remediation of existing levees or new levees). ~~Protection approaches 100-year level for structural remediation of existing levees or new levees. However, local drainage issues were not analyzed for 100-year protection and costs and other non-structural improvements may be required to provide 100-year level of protection. Small-community cost estimates are incorporated into the overall total costs described in Appendix A.~~ Engineering solutions adopted for each community implement physical modifications based on information from the Non-Urban Levee Evaluation Program (Attachment 8J, Appendix C) and most recent floodplain inundation modeling data available. These engineering solutions were not generated through detailed alternative analysis that considers site-specific details, and should only be considered as one potential option for community flood protection. It should also be noted that the cost estimates for providing 100-year level of protection do not consider interior drainage. It is expected that more detailed analyses for community flood protection with local guidance and input will be conducted through regional planning and project-specific feasibility studies following the 2012 CVFPP. Conceptual cost estimates for small-community protection are incorporated into the cost estimates of Protect High Risk Communities, Enhance Flood System Capacity, and the State Systemwide Investment approaches (refer to Attachment 8J, Appendix A).

**111. Attachment 8J, Appendix D – Protection of Small Communities, page D-1, third paragraph**

As a part of the Protect High Risk Communities Approach, small communities were identified using the following data sources:

**112. Attachment 8J, Appendix D – Protection of Small Communities, page D-2, second sentence of second paragraph**

Add a hyphen as follows:

The first step was to identify existing project and non-project levee sections surrounding the community identified in Geotechnical Assessment Reports (GAR) for the South and North Non-Urban Levee Evaluations (NULE) Project study areas (April 2010).

**113. Attachment 8J, Appendix D – Protection of Small Communities, page D-2, fourth sentence of second paragraph**

Add a hyphen as follows:

Additional non-project levees not covered in the NULE GARs were identified in existing geographic information system (GIS) mapping.

**114. Attachment 8J, Appendix D – Protection of Small Communities, page D-6, first sentence of second paragraph**

The DWR Urban Levee Design Criteria (ULDC)[1] ~~were~~ was used, as appropriate to levee location and function, in the conceptual design of new levees for this study.

**115. Attachment 8J, Appendix D – Protection of Small Communities, page D-8, second sentence of third paragraph**

The average height method considered the level of inundation from simulated FLO-2D modeling for various lengths of the proposed horizontal alignments and average~~d~~s them.

**116. Attachment 8J, Appendix D – Protection of Small Communities, page D-8, last sentence of last paragraph**

These line items include (as a percentage of civil construction costs) unallocated items, mobilization and demobilization, environmental mitigation (and as a percentage of total costs), escalation, contingency, engineering design, permitting and legal, engineering services during construction, and construction management.

**117. Attachment 8J, Appendix D – Table D-3, pages D-10 and D-11**

Table D-3 “Summary of Small Community Characteristics and Cost Estimates” is replaced by the revised version in the following page.

**Table D-3. Summary of Small Community Characteristics and Cost Estimates**

| | Community Name | 2007 Total Population | Flood Threat Level[1] | First Cost | Total Owners Cost | Total Levee Miles | Type of Levee Improvement | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Fix Existing Levee | New Levee | Cost Curve Applied[2] |
| Protected by SPFC | Knights Landing | 1,776 | A | $30,689,566 | $7,408,413 | 2.81 | | ■ | |
| | Grayson | 1,172 | A | $2,929,545 | $792,909 | 0.70 | ■ | ■ | |
| | Isleton | 831 | A | $45,893,744 | $16,136,223 | 5.06 | | ■ | |
| | Walnut Grove | 811 | A | $69,176,968 | $23,085,452 | 10.40 | | ■ | |
| | Meridian | 756 | A | $18,790,261 | $6,711,266 | 1.85 | ■ | ■ | |
| | Courtland | 695 | A | ~~$70,076,277~~ $13,572,900 | ~~$13,696,872~~ $4,678,733 | 8.62 | ■ | ■ | |
| | Robbins | 367 | A | $30,768,589 | $12,669,419 | 2.25 | | ■ | |
| | Hood | 212 | A | $30,169,271 | $11,427,562 | 1.77 | | ■ | |
| | Firebaugh | 6,178 | B | $30,918,288 | $9,302,383 | 7.73 | ■ | ■ | |
| | Colusa | 5,574 | B | $54,053,821 | $12,044,135 | 5.25 | ■ | ■ | |
| | Durham | 5,445 | B | $50,000,000 | $30,355,093 | 13.69 | ■ | | |
| | Rio Vista | 5,255 | B | ~~$42,476,797~~ $32,730,207 | ~~$10,157,545~~ $8,569,092 | - | | | ■ |
| | Wheatland | 2,476 | B | $173,483,949 | $33,658,506 | 15.95 | ■ | | |
| | Gerber-Las Flores | 1,524 | B | $23,420,910 | $2,449,337 | 3.95 | ■ | | |
| | Glenn | 1,436 | B | $11,575,248 | $4,766,279 | 1.92 | | ■ | |
| | Clarksburg | 1,401 | B | $33,583,420 | $8,493,592 | 3.36 | | ■ | |
| | Tranquility | 849 | B | ~~$42,476,797~~ $32,730,207 | ~~$10,157,545~~ $8,569,092 | - | | | ■ |
| | Verona | 585 | B | ~~$42,476,797~~ $32,730,207 | ~~$10,157,545~~ $8,569,092 | - | | | ■ |
| | Grimes | 516 | B | $6,259,914 | $1,120,875 | 1.38 | ■ | ■ | |
| | Princeton | 489 | B | $42,476,797 | $10,157,545 | - | | | ■ |
| | Butte City | 291 | B | $6,217,933 | $1,811,935 | 1.47 | ■ | ■ | |
| | Dos Palos/ South Dos Palos | 6,706 | C | $89,885,219 | $19,889,529 | 22.95 | ■ | ? | ? |

**Table D-3. Summary of Small Community Characteristics and Cost Estimates (contd.)**

| | Community Name | 2007 Total Population | Flood Threat Level[1] | First Cost | Total Owners Cost | Total Levee Miles | Type of Levee Improvement | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Fix Existing Levee | New Levee | Cost Curve Applied[2] |
| Protected by SPFC | Biggs | 1,959 | C | $90,323,215 | $21,252,521 | 9.22 | ■ | □ | □ |
| | Upper Lake | 963 | C | $75,217,182 | $15,027,239 | 5.28 | ■ | □ | □ |
| Not Protected by SPFC[3] | Nicolaus | 211 | A | $46,537,135 | $14,035,214 | 4.29 | ■ | ■ | □ |
| | Friant | 530 | A | $41,373,898 | $17,036,311 | 1.38 | □ | ■ | □ |
| | Mendota | 8,558 | B | $38,382,737 | $15,804,656 | 6.45 | □ | ■ | □ |
| | Bethel Island | 2,624 | B | ~~$42,476,797~~ $32,730,207 | ~~$10,157,545~~ $8,569,092 | - | □ | □ | ■ |
| | Chester | 2,366 | B | ~~$42,476,797~~ $32,730,207 | ~~$10,157,545~~ $8,569,092 | - | □ | □ | ■ |
| | Los Molinos | 2,068 | B | ~~$42,476,797~~ $32,730,207 | ~~$10,157,545~~ $8,569,092 | - | □ | □ | ■ |
| | Hamilton City | 1,885 | B | $58,407,219 | $24,050,031 | 3.15 | □ | ■ | □ |
| | Thornton | 1,467 | B | ~~$42,476,797~~ $32,730,207 | ~~$10,157,545~~ $8,569,092 | - | □ | □ | ■ |
| | Tehama | 443 | B | $20,597,310 | $3,048,821 | 3.86 | ■ | □ | □ |
| | Byron | 1,040 | C | ~~$42,476,797~~ $32,730,207 | ~~$10,157,545~~ $8,569,092 | - | □ | □ | ■ |
| | Knightsen | 913 | C | ~~$42,476,797~~ $32,730,207 | ~~$10,157,545~~ $8,569,092 | - | □ | □ | ■ |

Notes:

1 A = flood frequency > 1% per year, flooding depths > 3 feet.; B = flood frequency > 1% per year, flooding depths < 3 feet, < 2 miles from flood source; C = flood

frequency > 1% per year, flooding depths < 3 feet, > 2 miles from flood source.
2 Costs for communities lacking specific flood location and flood depth data were estimated parametrically based on communities of similar size and threat level.
3 Non-SPFC costs are not included in the SSIA of the CVFMP. Communities were assessed 100-year protection costs, but are not part of the proposed SPFC total costs.
Key:
Shading =
□ = No
■ = Yes
- =
SPFC = State Plan of Flood Control

**118. Attachment 8J, Appendix D – Protection of Small Communities, page D-12, last two sentences of last paragraph**

The least-cost alternative, as shown in the RACER, was used for each segment ~~giving a total capital cost of $10.1 million for Option 1. This cost does not include costs associated with raising all of Levee Segment 162~~. Refer to Table D-3 for cost estimates for this community.

**119. Attachment 8J, Appendix D – Protection of Small Communities, page D-14, last sentence of first paragraph**

~~The total capital cost for Option 2, not including the costs associated with raising the portion of Levee Segment 162, was estimated to be $26.4 million.~~ Refer to Table D-3 for cost estimates for this community.

**120. Attachment 8J, Appendix D – Protection of Small Communities, page D-15, last sentence of first paragraph**

~~The total cost for construction, including reconstruction-in-place repairs, was estimated to be $2.7 million.~~ Refer to Table D-3 for cost estimates for this community.

**121. Attachment 8J, Appendix D – Protection of Small Communities, page D-17, sixth sentence of second paragraph**

Segment 40 showed under-seepage issues in the area, and the length of the portion was more than the total length of repair for the cost of remediation that included under-seepage; therefore, the under-seepage cost alternative for the entire segment was used, as shown in the RACER (DWR 2011)~~, was used~~.

**122. Attachment 8J, Appendix D – Protection of Small Communities, page D-17, last sentence of second paragraph**

~~The total capital cost for Isleton, not including the costs associated with raising the portion of Levee Segment 378, was estimated to be $34.9 million.~~ Refer to Table D-3 for cost estimates for this community.

**123. Attachment 8J, Appendix D – Protection of Small Communities, page D-19, last two sentences of second paragraph**

~~The total capital cost for Walnut Grove was estimated to be $40.6 million.~~ Refer to Table D-3 for cost estimates for this community. ~~This~~These costs do~~es~~ not include costs associated with raising the portion of Levee Segment 384 or other levee raises~~, which were not assessed at this time because data from the UNET model are pending~~.

**124. Attachment 8J, Appendix D – Protection of Small Communities, page D-21, last sentence of third paragraph**

~~Total cost for construction, including reconstruction-in-place repairs, was estimated to be $12.4 million.~~ Refer to Table D-3 for cost estimates for this community.

**125. Attachment 8J, Appendix D – Protection of Small Communities, page D-23, all paragraphs**

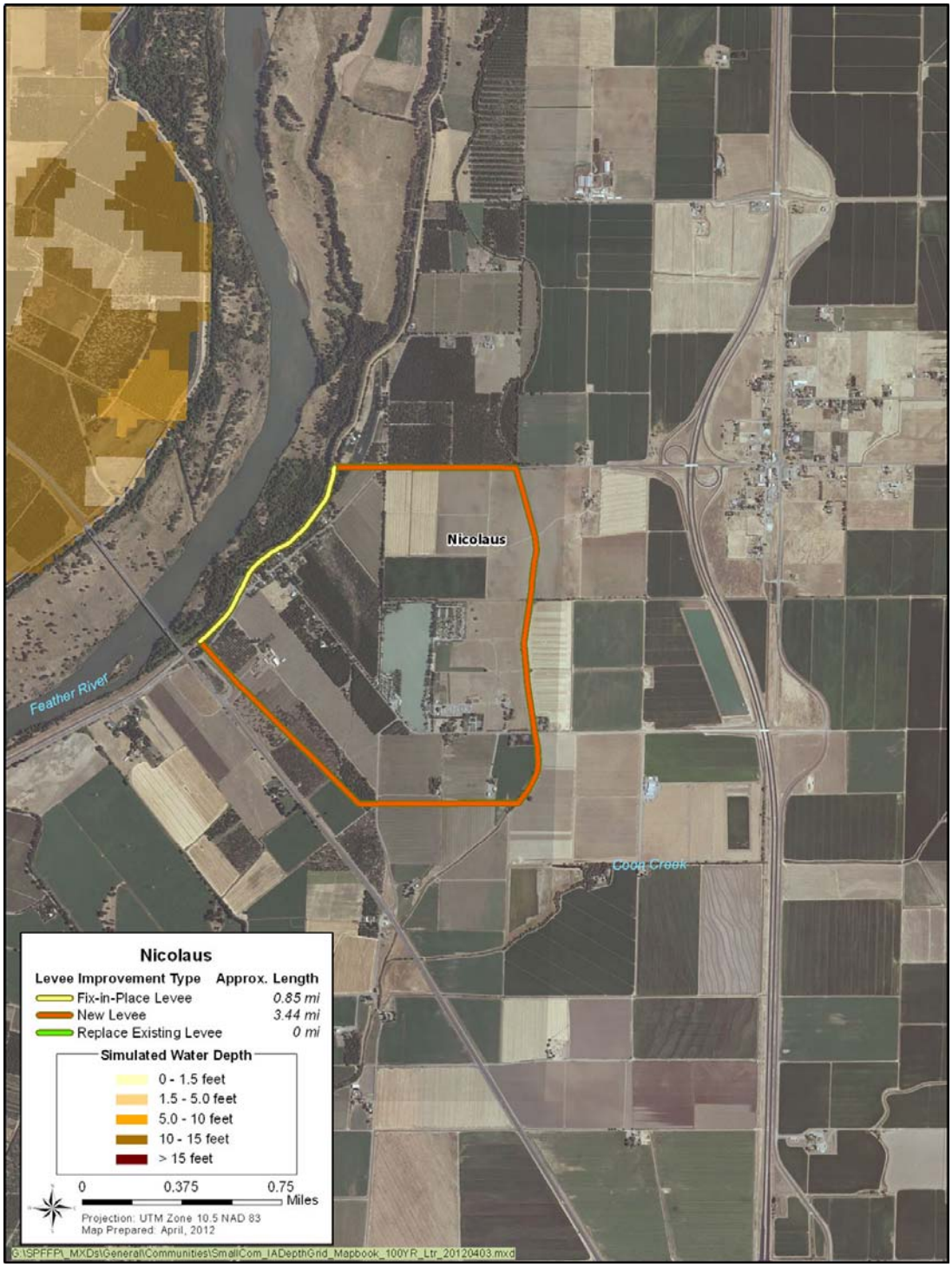
Nicolaus is an unincorporated town and area in Sutter County along California State Route 99, about 0.1 miles south of the Feather River. Floodplain inundation maps from the Comprehensive Study (USACE, 2002) did not include a 1 percent AEP flood inundation map for the areas around Nicolaus ~~FLO-2D hydraulic modeling results overlaid on an aerial photograph of Nicolaus showed no inundation during a 1 percent AEP flood in the town~~ (see Figure D-8).

~~Because no inundation was shown, constructing a new levee was not an option. Therefore, the conceptual design is a reconstruction-in-place alternative repairing all of Levee Segment 247, as described in the NULE GAR (DWR 2010). This option would provide protection to an area beyond the town (Figure D-8). The least-cost alternative, as shown in the RACER (DWR 2011), was used for Segment 247, giving a total capital cost of $1.9 million. This cost does not include expenses associated with levee raises, which were not assessed at this time because data from the UNET model are pending.~~

Estimates for potential inundation depths were developed using information from lower AEP flood events. Figure D-8 shows the adopted engineering solution for Nicolaus. The conceptual design consists of a reconstruction-in-place alternative repairing a portion of Levee Segment 247, as described in the NULE GAR (DWR 2010) with a new ring levee. Refer to Table D-3 for cost estimates for this community.

**126. Attachment 8J, Appendix D – Figure D-8, page D-24**

Figure D-8 "Nicolaus Levees Approach" is replaced by the revised version in the following page.



**127. Attachment 8J, Appendix D – Protection of Small Communities, page D-25, all paragraphs**

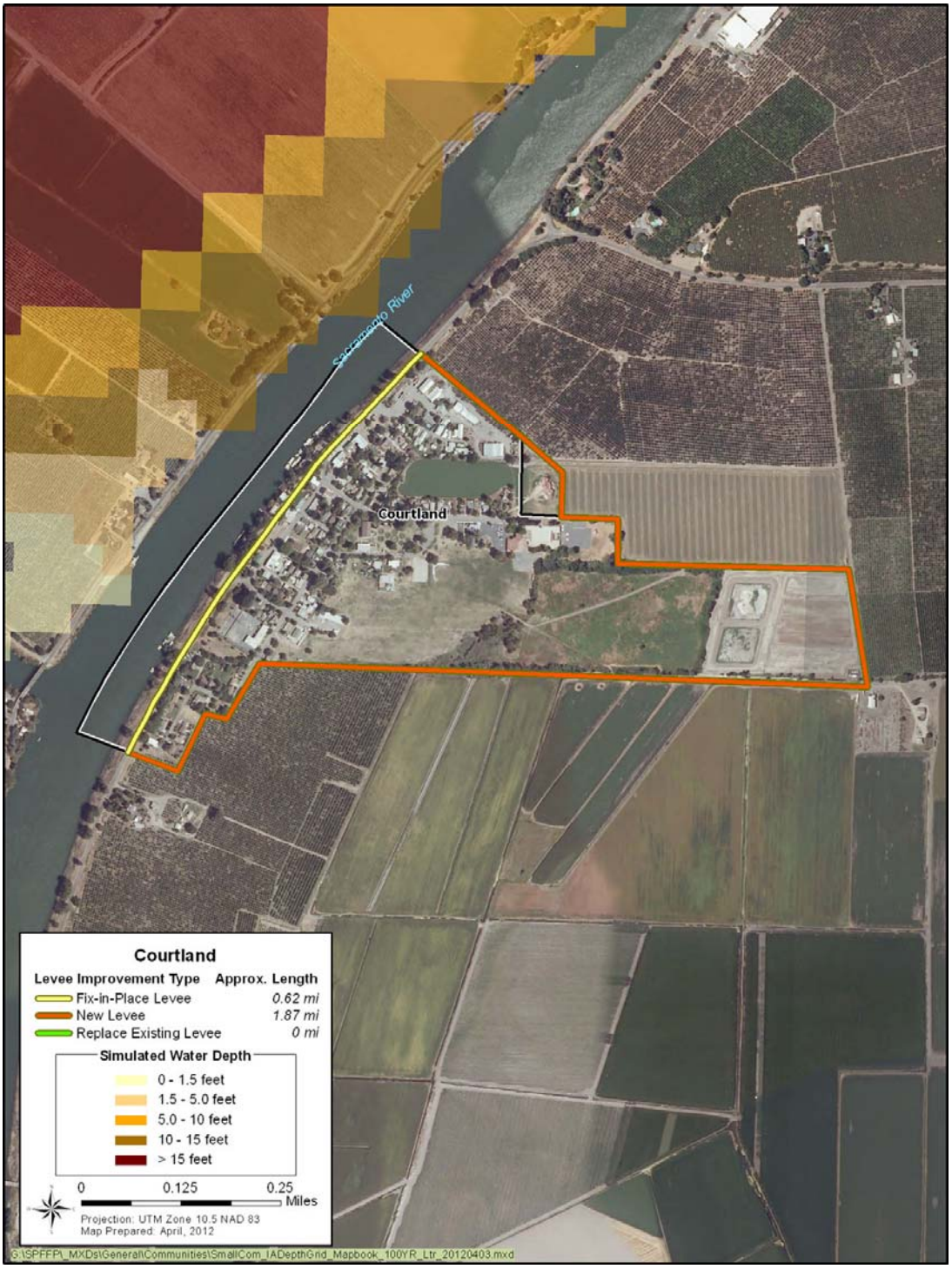
Courtland is an unincorporated community in Sacramento County located along the left bank of the Sacramento River along California State Route 160, 17 miles south-southwest of Sacramento. Floodplain inundation maps from the Comprehensive Study (USACE, 2002) did not include a 1 percent AEP flood inundation map for the areas around Courtland ~~FLO-2D hydraulic modeling results overlaid on an aerial photograph of Courtland showed no inundation during a 1 percent AEP flood in the community~~ (see Figure D-9).

~~Because no inundation was shown, constructing a new levee was not an option. Therefore, the conceptual design is a reconstruction-in-place alternative repairing all of Levee Segments 126 and 131, as described in the NULE GAR (DWR 2010). This option would provide protection to an area beyond the community (Figure D-9). The least-cost alternative, as shown in the RACER (DWR 2011), was used for each segment, giving a total capital cost of $12.6 million. This cost does not include expenses associated with levee raises, which were not assessed at this time because data from the UNET model are pending.~~

Estimates for potential inundation depths were developed using information from lower AEP flood events. Figure D-8 shows the adopted engineering solution for Cortland, which consists of fix-in-place of existing SPFC levee and new ring levee. The fix in-place component includes reconstruction in place of a portion of Levee Segment 131, as described in the NULE GAR (DWR 2010). Refer to Table D-3 for cost estimates for this community.

**128. Attachment 8J, Appendix D – Figure D-9, page D-26**

Figure D-9 "Courtland Levees Approach" is replaced by the revised version in the following page.



**129. Attachment 8J, Appendix D – Protection of Small Communities, page D-27, last sentence of second paragraph**

~~, and the total cost for construction was estimated to be $16.5 million.~~ Refer to Table D-3 for cost estimates for this community.

**130. Attachment 8J, Appendix D – Protection of Small Communities, page D-29, last two sentences of second paragraph**

~~The total capital cost for Hood was estimated to be $19.9 million. This cost does not include expenses associated with levee raises, which were not assessed at this time because data from the UNET model are pending.~~ Refer to Table D-3 for cost estimates for this community.

**131. Attachment 8J, Appendix D – Protection of Small Communities, page D-31, last sentence of third paragraph**

~~The total cost for construction, including reconstruction-in-place repairs, was estimated at $22.6 million.~~ Refer to Table D-3 for cost estimates for this community.

**132. Attachment 8J, Appendix D – Protection of Small Communities, page D-35, last sentence of third paragraph**

~~The total cost for construction, including reconstruction-in-place repairs, both training levees, and both ring levees, was estimated at $8.8 million.~~ Refer to Table D-3 for cost estimates for this community.

**133. Attachment 8J, Appendix D – Protection of Small Communities, page D-38, last sentence of first paragraph**

~~The total cost for construction, including reconstruction-in-place repairs, was estimated to be $45.3 million.~~ Refer to Table D-3 for cost estimates for this community.

**134. Attachment 8J, Appendix D – Protection of Small Communities, page D-40, last two sentences of second paragraph**

The least-cost alternative, as shown in the RACER (DWR 2011), was used for each segment.~~,~~ ~~giving a total capital cost of $29.2 million. This cost does not include expenses associated with levee raises, which were not assessed at this time because data from the UNET model are pending.~~ Refer to Table D-3 for cost estimates for this community.

**135. Attachment 8J, Appendix D – Protection of Small Communities, page D-42, third, fourth, and fifth sentences of second paragraph**

The GAR identified deficiencies in Segments 138 and 154 to repair the left bank of Dry Creek. ~~The cost to repair the left bank of Dry Creek, identified in the GAR as Segment 138, was estimated to be $0.5 million. The cost to repair the left bank of Dry Creek, identified in the GAR as Segment 154, was estimated to be $0.4 million. Therefore, the total cost to remediate the entire length of each segment was estimated to be $0.9 million~~. Refer to Table D-3 for cost estimates for this community.

**136. Attachment 8J, Appendix D – Protection of Small Communities, page D-44, last sentence of second paragraph**

~~The total cost estimate for Glenn is $8.6 million.~~ Refer to Table D-3 for cost estimates for this community.

**137. Attachment 8J, Appendix D – Protection of Small Communities, page D-46, last two sentences of second paragraph**

~~The total capital cost for Clarksburg was estimated to be $13.7 million. This cost does not include costs associated with levee raises, which were not assessed at this time because data from the UNET model are pending.~~ Refer to Table D-3 for cost estimates for this community.

**138. Attachment 8J, Appendix D – Protection of Small Communities, page D-48, third sentence of second paragraph**

The ~~cost to repair the~~ right bank of Elder Creek is~~,~~ identified in the GAR as Segment 59~~was estimated to be $3.8 million~~. Refer to Table D-3 for cost estimates for this community.

**139. Attachment 8J, Appendix D – Protection of Small Communities, page D-50, last sentence of third paragraph**

~~The total cost for construction, including reconstruction-in-place repairs, was estimated to be $7.0 million.~~ Refer to Table D-3 for cost estimates for this community.

**140. Attachment 8J, Appendix D – Protection of Small Communities, page D-52, last sentence of third paragraph**

~~The total cost for construction, including reconstruction-in-place repairs, was estimated to be $6.1 million.~~ Refer to Table D-3 for cost estimates for this community.

**141. Attachment 8J, Appendix D – Protection of Small Communities, page D-54, last sentence of second paragraph**

~~The total capital cost for Mendota was estimated to be $12.7 million.~~ Refer to Table D-3 for cost estimates for this community.

**142. Attachment 8J, Appendix D – Protection of Small Communities, page D-56, third and fourth sentences of first paragraph**

Because of the lack of input data, the following communities were not assessed: Palermo, Princeton, Bethel Island, Verona, Thornton, Chester, Los Molinos, Rio Vista, Tranquility, and Gerber-Las Flores. ~~The community of Palermo is a special case because it will be assessed as a part of Oroville in Group B.~~ Costs for these communities were estimated parametrically based on communities of similar sizes and flood threat level. Refer to Table D-3 for cost estimates for this community.

**143. Attachment 8J, Appendix D – Protection of Small Communities, page D-58, last sentence of second paragraph**

~~However, Segment 110 was categorized as low for all levee condition categories, meaning no repairs were recommended and no remediation costs were identified.~~ Cost estimates for this community is included in Table D-3.

**144. Attachment 8J, Appendix D – Protection of Small Communities, page D-58, third, fourth and fifth sentences of fourth paragraph**

The ~~cost to repair the~~ left bank of Middle Creek (Reaches 1 and 2)~~,~~ is identified in the GAR as Segment 81~~, was estimated to be $8.3 million~~. The ~~cost to repair the~~ left bank of Alley Creek~~,~~ is identified in the GAR as Segment 267~~, was estimated to be $2.8 million~~. ~~Therefore, the total cost to remediate the entire length of each segment was estimated to be $11.1 million.~~ Refer to Table D-3 for cost estimates for this community.

**145. Attachment 8J, Appendix D – Protection of Small Communities, page D-60, last sentence**

Add a sentence to the end of the paragraph as follows:

Costs for these communities were estimated parametrically based on communities of similar sizes and flood threat level. Refer to Table D-3 for cost estimates for this community.

**146. Attachment 8J, Appendix D – Protection of Small Communities, page D-61**

Insert additional reference:

USACE. *See* U.S. Army Corps of Engineers.

U.S. Army Corps of Engineers (USACE). 2002. Sacramento and San Joaquin River Basins Comprehensive Study. Sacramento, California.

**147. Attachment 8J, Appendix E – Flood Corridor Expansion, page E-1, Flood Corridor Expansion, first paragraph**

This appendix documents conceptual design and cost estimates for flood corridor expansion features, including levee setbacks. As shown in the Draft 2012 CVFPP Attachment 8J, Table 3-3, the levee setback features described in this appendix are included as part of the Enhance Flood System Capacity Approach, one of the three preliminary approaches considered. However, they are not included in the other preliminary approaches or the preferred State Systemwide Investment Approach.

**148. Attachment 8J, Appendix E – Flood Corridor Expansion, page E-2, Improve Institutional Support, fourth sentence of first paragraph**

Also, recent projects have been able to demonstrate additional ~~financial~~ economic benefits from new or preserved wildlife habitats created by levee setbacks.

**149. Attachment 8J, Appendix E – Flood Corridor Expansion, page E-6, last paragraph**

Using the Flood Inundation Potential (FIP) maps, setback levees were located to follow existing contours and avoid removing and replacing major infrastructure such as roads, canals, bridges, and residential and agricultural/industrial developments. Preliminary locations ~~estimated~~ were identified and design concepts developed for setback levees ~~setbacks~~ for the purpose of developing a cost component for the Enhance Flood System Capacity Approach, one of the three preliminary approaches considered for the CVFPP. The preliminary setback levee locations are shown in Figures E-3 and E-4.

It should be noted that rural setback levees are not included in the preferred State Systemwide Investment Approach. However, if these features are recommended for implementation in the future, setback levee locations would be subject to change based on additional information about geotechnical conditions, existing utilities, and other factors that have not yet been evaluated or considered.

**150. Attachment 8J, Appendix E – Flood Corridor Expansion, page E-7, title of Figure E-3**

Revise title as follows:

Preliminary Setback Levee Conceptual Projects ~~Locations~~Included In Enhance Flood System Capacity Approach, Sacramento River

**151. Attachment 8J, Appendix E – Flood Corridor Expansion, page E-8, title of Figure E-4**

Revise title as follows:

~~Map~~Preliminary Setback Levee Conceptual Projects ~~Locations~~Included In Enhance Flood System Capacity Approach, Sacramento River

**152. Attachment 8J, Appendix E – Flood Corridor Expansion, page E-10, title of Table E-2**

Revise title as follows:

Conceptual Setback Levee Projects and Quantities

**153. Attachment 8J, Appendix E – Flood Corridor Expansion, page E-10, first sentence of second paragraph**

Rural setback levees are not included in the State Systemwide Investment Approach. However, i~~I~~f these projects were to move forward toward implementation, they would require a feasibility-level analysis of alternatives.

**154. Attachment 8J, Appendix E – Flood Corridor Expansion, page E-11, Table E-3**

Revise title as follows:

Summary of Conceptual Setback Levee Costs

Add a note to the bottom of the table as follows:

The cost components in this table are included in only one CVFPP approach: the Enhance Flood System Capacity Approach, one of three preliminary approaches considered but not recommended for implementation.

**155. Attachment 8J, Appendix E – Flood Corridor Expansion, page E-12, title of Figure E-5**

Revise title as follows:

MSAC1 Conceptual Setback ~~Area~~Project Considered in Enhance Flood System Capacity Approach, Sacramento River

**156. Attachment 8J, Appendix E – Flood Corridor Expansion, page E-13, title of Figure E-6**

Revise title as follows:

MSAC2 Conceptual Setback ~~Area~~Project Considered in Enhance Flood System Capacity Approach, Sacramento River

**157. Attachment 8J, Appendix E – Flood Corridor Expansion, page E-14, title of Figure E-7**

Revise title as follows:

MSAC3 Conceptual Setback ~~Area~~Project Considered in Enhance Flood System Capacity Approach, Sacramento River

**158. Attachment 8J, Appendix E – Flood Corridor Expansion, page E-15, title of Figure E-8**

Revise title as follows:

FTR1 Conceptual Setback ~~Area~~Project Considered in Enhance Flood System Capacity Approach, Feather River

**159. Attachment 8J, Appendix E – Flood Corridor Expansion, page E-16, title of Figure E-9**

Revise title as follows:

LSJ1& LSJ2 Conceptual Setback ~~Area~~Project Considered in Enhance Flood System Capacity Approach, San Joaquin River

**160. Attachment 8J, Appendix E – Flood Corridor Expansion, page E-17, title of Figure E-10**

Revise title as follows:

MSJ1 Conceptual Setback ~~Area~~Project Considered in Enhance Flood System Capacity Approach, San Joaquin River

**161. Attachment 8J, Appendix E – Flood Corridor Expansion, page E-18, title of Figure E-11**

Revise title as follows:

USJ1 Conceptual Setback ~~Area~~Project Considered in Enhance Flood System Capacity Approach, San Joaquin River

**162. Attachment 8J, Appendix E – Flood Corridor Expansion, page E-19, title of Figure E-12**

Revise title as follows:

USJ2 Conceptual Setback ~~Area~~Project Considered in Enhance Flood System Capacity Approach, San Joaquin River

**163. Attachment 8L – Groundwater Recharge Opportunities Analysis, Section 3.0, page 3-2, Figure 3-1**

*Source: Groundwater and Surface Water in Southern California: A Guide to Conjunctive Use (Association of Groundwater Agencies, ~~2002~~2000)*

**164. Attachment 8L – Groundwater Recharge Opportunities Analysis, Section 4.3, page 4-5, second bullet**

**Farmington Groundwater Recharge Program** – One example of a project with federal partnership is the Farmington Groundwater Recharge Program that began in 2001. USACE has partnered with Stockton East Water District to store up to 35,000 acre-feet per year of flood flows in local aquifers via direct recharge methods. This recharge water is intended to help arrest the overdraft condition of the Eastern San Joaquin Groundwater Basin and increase water supply reliability to the region (http://www.farmingtonprogram.org/) (see Farmington in Figure 4-2).