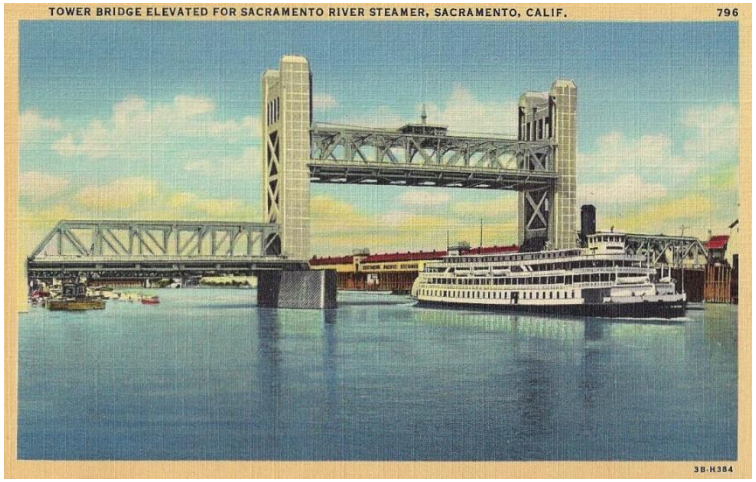
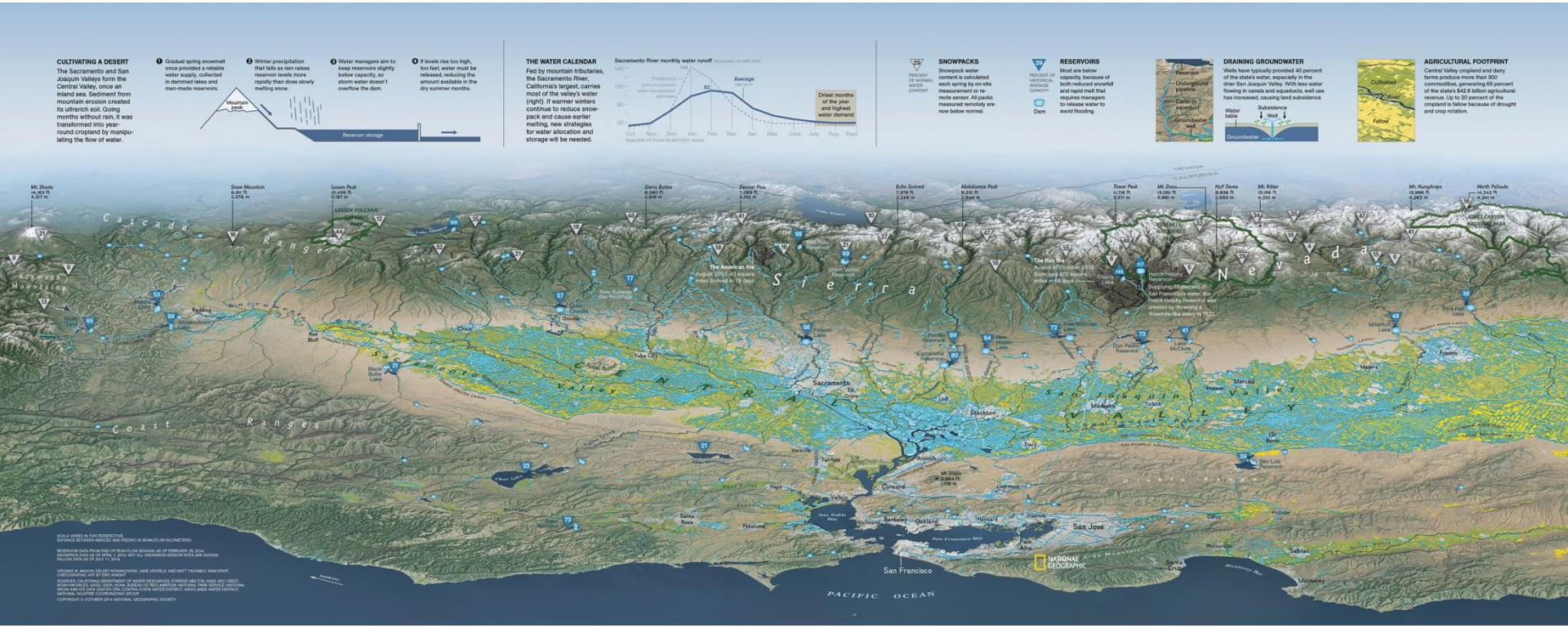
Case Study:
Central Valley Flood Protection Plan



CA Water Plan Update 2018
Plenary Meeting

October 25, 2016

A Different View of the Central Valley



California's Central Valley landscape is still predominately agricultural in character.

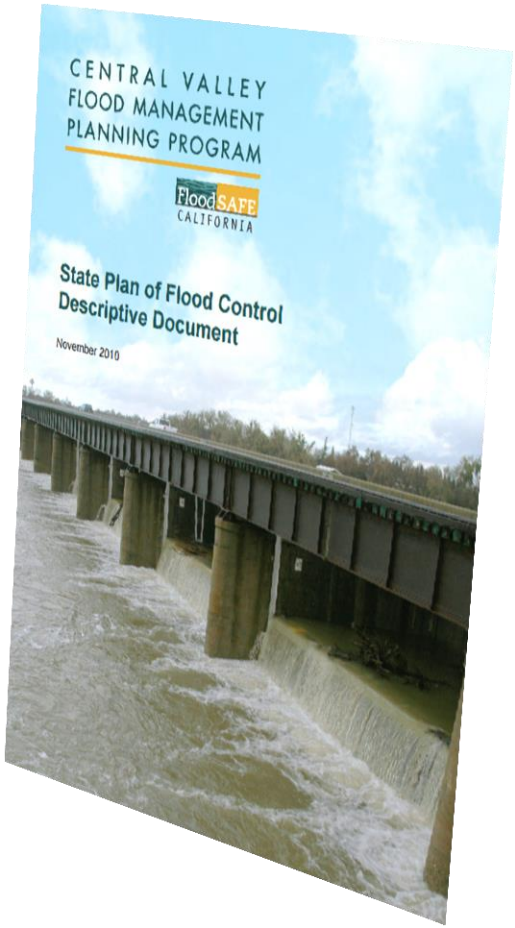
Source: National Geographic Magazine, Oct. 2014: Used with permission.

State Plan of Flood Control (SPFC)

- In 1953 and 1955 the State provided legal assurances to the Federal Government that it would operate and maintain 1,600 miles of levees and various other structures in the San Joaquin and Sacramento River Basins

- Massive floods in 1986 (and again in 1997) overwhelmed the system and over a decade later all State tax payers have been paying for damages caused by the floods

- In 2008, the Central Valley Flood Protection Act renamed this system as the State Plan of Flood Control (SPFC) and directed DWR and the Central Valley Flood Protection Board to develop a long-term, strategic investment plan to improve the SPFC and reduce flood risks



Roles & Types of Plans

Plan Recipe

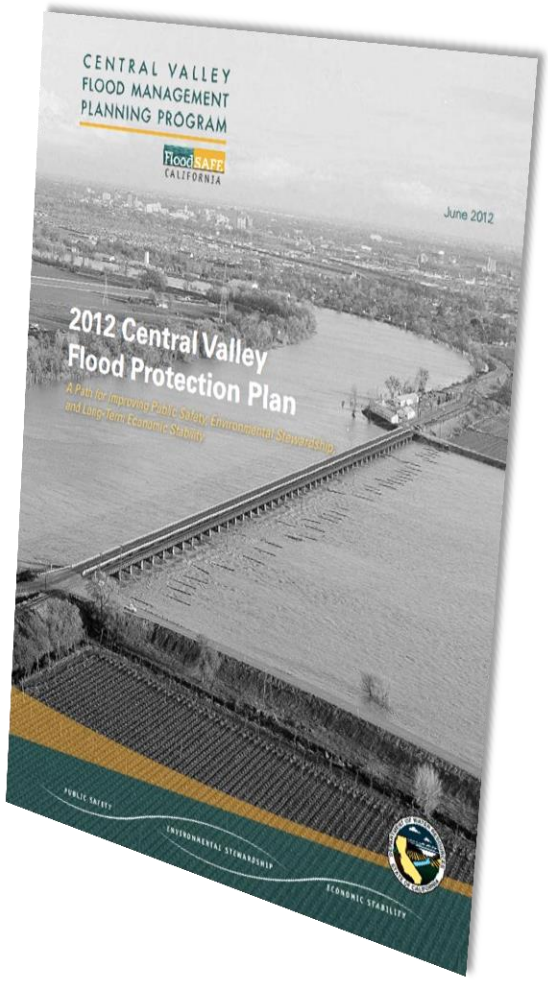
- Provide Context & Set Objectives
- Describe Performance of Several Ideas
- Estimate Cost (Time & $$$) of Recommendation
- Show a Path to Implementation for Recommendation

Types of Plans

- Policy Recommendations
  - ✓ Governance (Roles & Responsibilities)
  - ✓ Regulatory
- Strategic (Leadership)
  - ✓ Resource Prioritization (Budget & Staff)
  - ✓ System Investment
- Tactical (Directing Action)
  - ✓ Project Investment
  - ✓ Engagement
- Technical
  - ✓ Meeting Facilitation

Central Valley Flood Protection Plan

- Strategic blueprint to improve flood risk management in Sacramento/San Joaquin river basins
- Provides recommendations to guide near- and long-term state activities within State Plan of Flood Control (SPFC) floodplains
- A programmatic plan, not a funding or permitting decision
- Dynamic plan, updated in five year cycles – first “Update” in 2017



Levels of Study

Implementation of action must move through increasingly more detailed levels of action

- Conceptual
- Appraisal
- Feasibility
- Site-Specific
- Design
- Plans & Specifications

Summary of Levels of Study

Concept-Level studies present preliminary information for review to promote discussion of a proposed project. They generally focus on a single project concept and do not include alternatives analysis or reach any conclusions about the ultimate feasibility or acceptability of a project. The purpose of concept-level studies is to inform participating agencies, stakeholders, and the public about the nature of potential benefits, types of facilities required, and issues that should be addressed in more detailed studies. *All existing Hetch Hetchy studies are at this level, at best.*

Appraisal-Level studies build on the conceptual-level studies and include a preliminary assessment of alternatives, and identification of sensitive environmental resources and legal and institutional constraints. The analyses conducted in appraisal studies are generally based upon the minimum information needed to determine if there are workable solutions or fatal flaws.

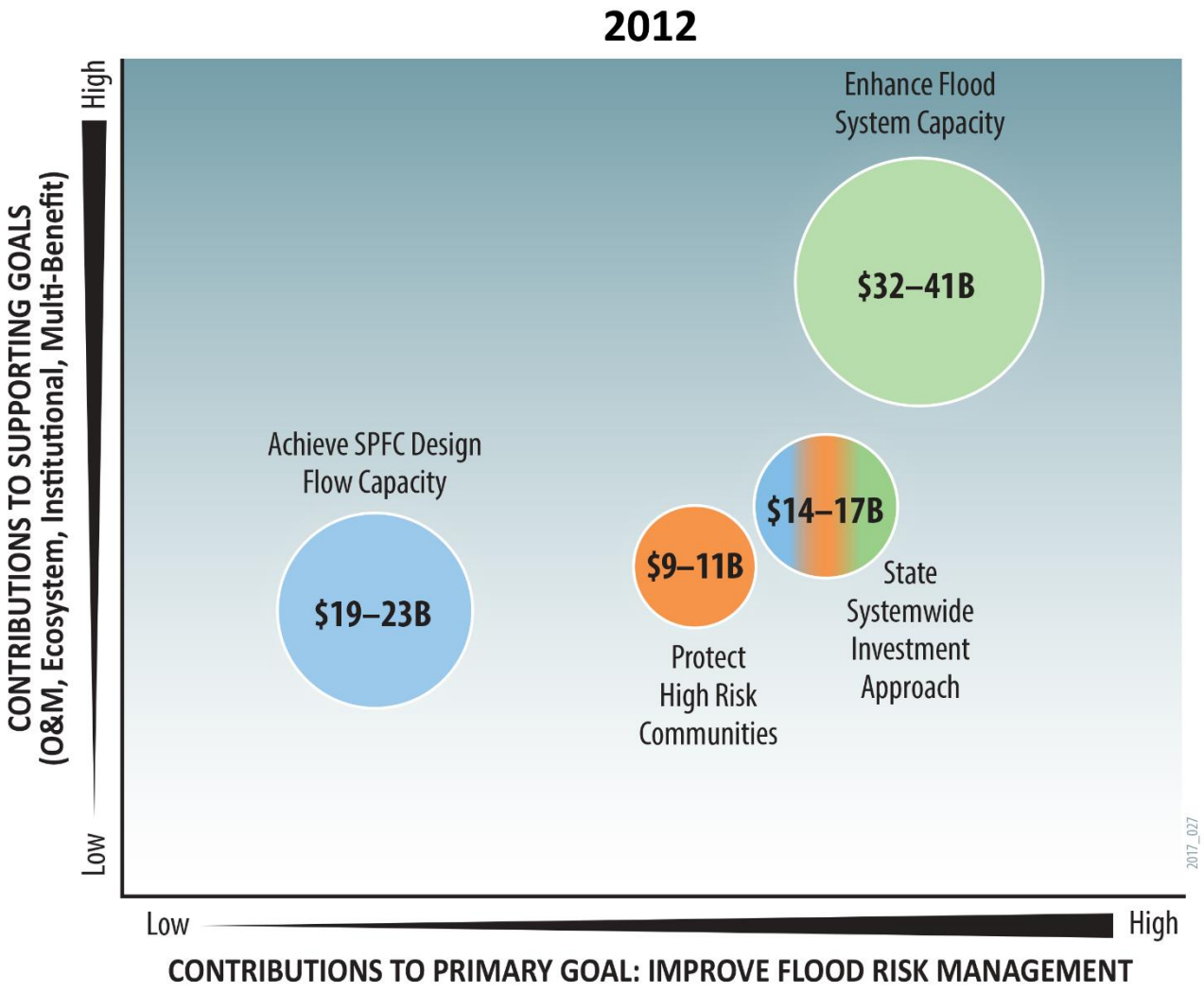
Feasibility-Level studies include additional data collection and analyses required to develop a full and reasonable range of alternatives. Feasibility studies provide enough information for decisionmakers to understand what potential risks are involved, and who are potential beneficiaries. The feasibility study process includes items such as: identification of present and future conditions; identification of problems and needs; evaluation of resource capabilities; formulation of alternative plans; analysis and comparison of alternatives and costs; and plan selection. An iterative process is used to arrive at a preferred plan that reasonably maximizes net benefits with acceptable environmental impacts. Feasibility studies are usually integrated with compliance under California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and other related environmental and cultural resources laws. Environmental documentation may be conducted at a programmatic-level or site-specific level.

Site-Specific studies are conducted to quantify resources at a defined geographical location. These studies typically consist of field investigations to identify features such as geological and hydrological conditions and cultural, archeological, or biological resources. Many of the site-specific studies are conducted during the feasibility study phase or as part of the NEPA/CEQA/environmental documentation and permit acquisition processes. Often, study protocols are established to assure that investigations are conducted to meet the requirements of a regulatory agency.

Design-Level studies or documents build on feasibility-level designs based on new or revised plans and information such as updated design practices and cost trends. Design-level studies also include more detailed cost estimates and detailed field investigations, such as subsurface soil explorations and topographic surveys.

Plans and Specifications are the detailed instructions to contractors on how to build the project.

Developing a State System-wide Investment Approach for the SPFC



Key Physical & Operational Recommendations in 2012 CVFPP

FLOOD MANAGEMENT ELEMENT	PROJECT LOCATION OR REQUIRED COMPONENTS	ACHIEVE SPFC DESIGN FLOW CAPACITY	PROTECT HIGH RISK COMMUNITIES	ENHANCE FLOOD SYSTEM CAPACITY		STATE SYSTEMWIDE INVESTMENT APPROACH
Urban Improvements						
Target 200-Year Level of Protection	Selected projects developed by local agencies, State, federal partners		YES	YES	→	YES
Target SPFC Design Capacity	Urban Levee Evaluations Project results	YES[2]				

CVFPP Table 3.2 Major Physical and Operational Elements of Preliminary Approaches and State Systemwide Investment Approach

Plan to Finance the CVFPP

Table 4-3. State Systemwide Investment Approach Range of Investments over Time ($ millions)

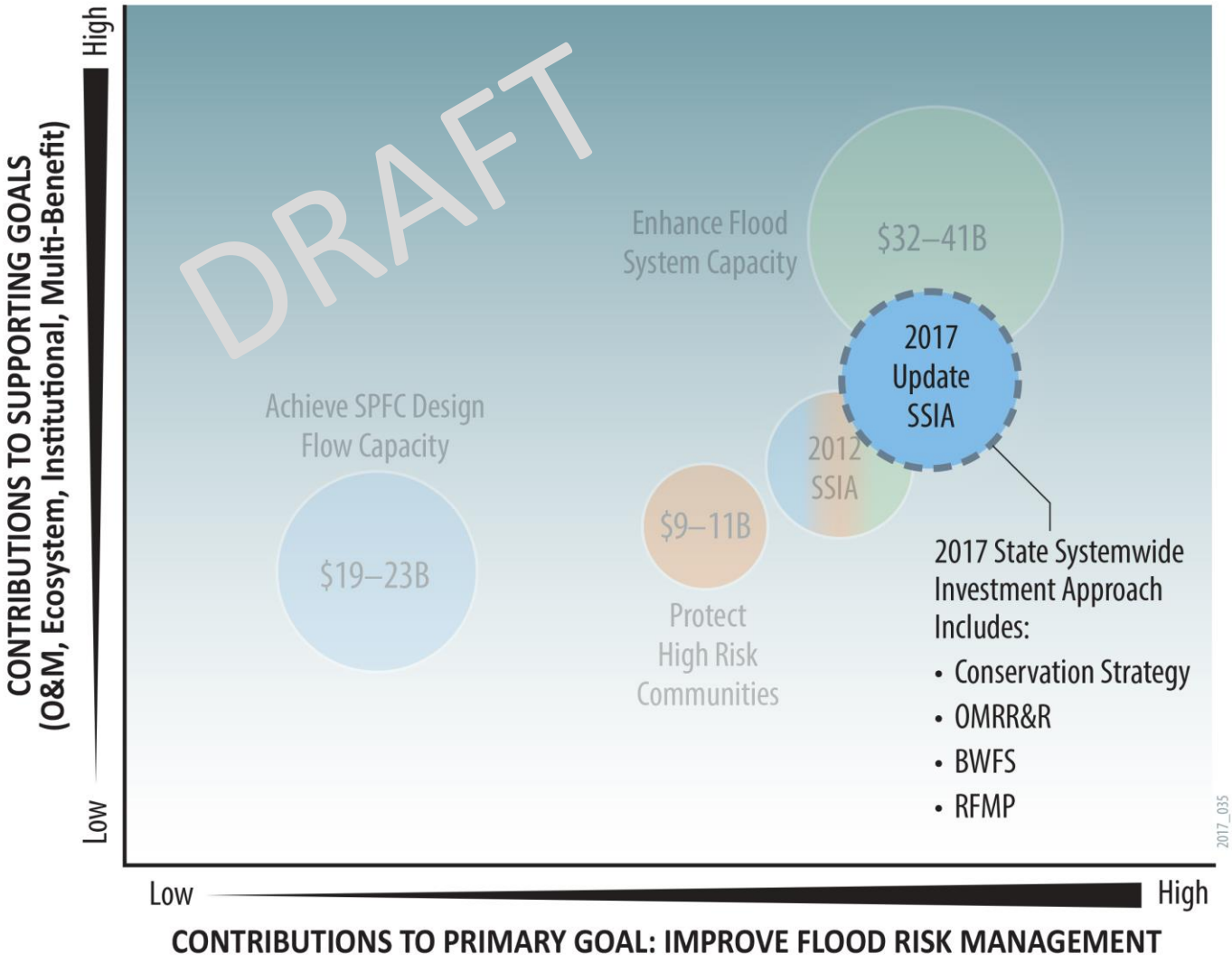
FLOOD MANAGEMENT PROGRAMS		FLOOD EMERGENCY RESPONSE		FLOOD SYSTEM OPERATIONS AND MAINTENANCE		FLOODPLAIN RISK MANAGEMENT		FLOOD SYSTEM ASSESSMENT, ENGINEERING, FEASIBILITY, AND PERMITTING		FLOOD RISK REDUCTION PROJECTS		TOTAL	
		Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
2007–2011	State	$64		$180		$99		$257		$1,032		$1,632	
	Federal[1]	–		–		–		$160		$620		$780	
	Local	–		–		–		$40		$450		$490	
	Subtotal	*$64*		*$180*		*$99*		*$457*		*$2,102*		*$2,902*	
2012–2017	State	$130	$140	$30	$60	$30	$40	$170	$200	$1,140	$1,300	$1,500	$1,730
	Federal	–		$20	$40	$70	$90	$230	$270	$1,190	$1,340	$1,500	$1,740
	Local	–		$10	$10	–		$50	$60	$140	$220	$190	$290
	Subtotal	*$130*	*$140*	*$60*	*$110*	*$100*	*$130*	*$450*	*$530*	*$2,470*	*$2,860*	*$3,210*	*$3,770*
2018 and Beyond	State	$290	$310	$20	$50	$60	$120	$270	$420	$2,630	$3,440	$3,270	$4,340
	Federal	–		$130	$160	$340	$450	$590	$740	$3,090	$4,020	$4,150	$5,370
	Local	–		$50	$60	–		$120	$150	$230	$320	$410	$530
	Subtotal	*$290*	*$310*	*$200*	*$270*	*$400*	*$570*	*$980*	*$1,310*	*$5,950*	*$7,780*	*$7,830*	*$10,240*
Total	State	$480	$510	$230	$290	$190	$260	$700	$880	$4,800	$5,770	$6,400	$7,700
	Federal	–		$150	$200	$410	$540	$980	$1,170	$4,900	$5,980	$6,430	$7,890
	Local	–		$60	$70	–		$210	$250	$820	$990	$1,090	$1,310
	Subtotal	*$480*	*$510*	*$440*	*$560*	*$600*	*$800*	*$1,890*	*$2,300*	*$10,520*	*$12,740*	*$13,920*	*$16,910*

[1] Federal and local project cost-shares for 2007 – to 2011 were estimated.

Key:
State = State of California

CVFPP Table 4-3. State Systemwide Investment Approach Range of Investments over Time ($ Millions)

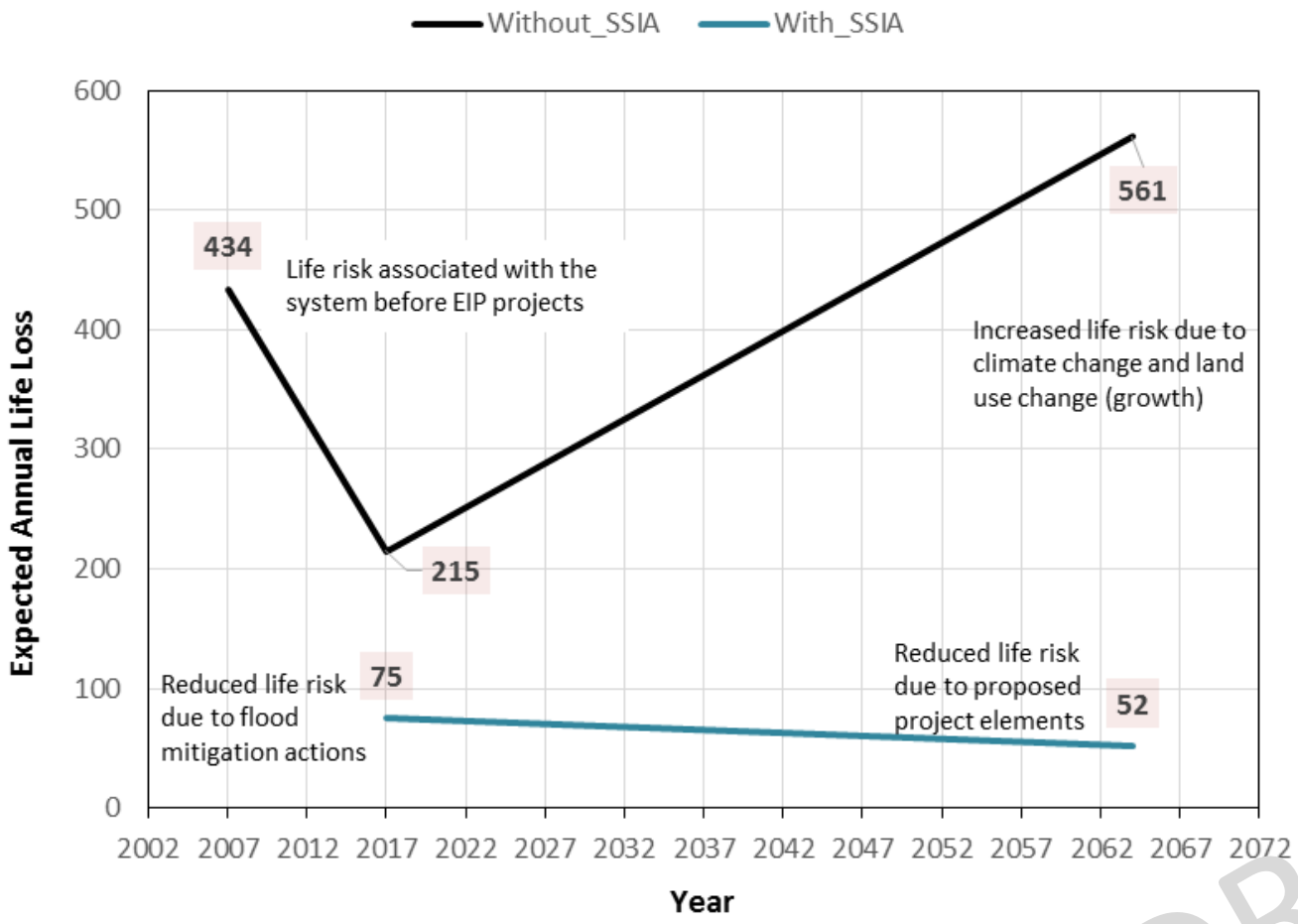
Refining the CVFPP for 2017



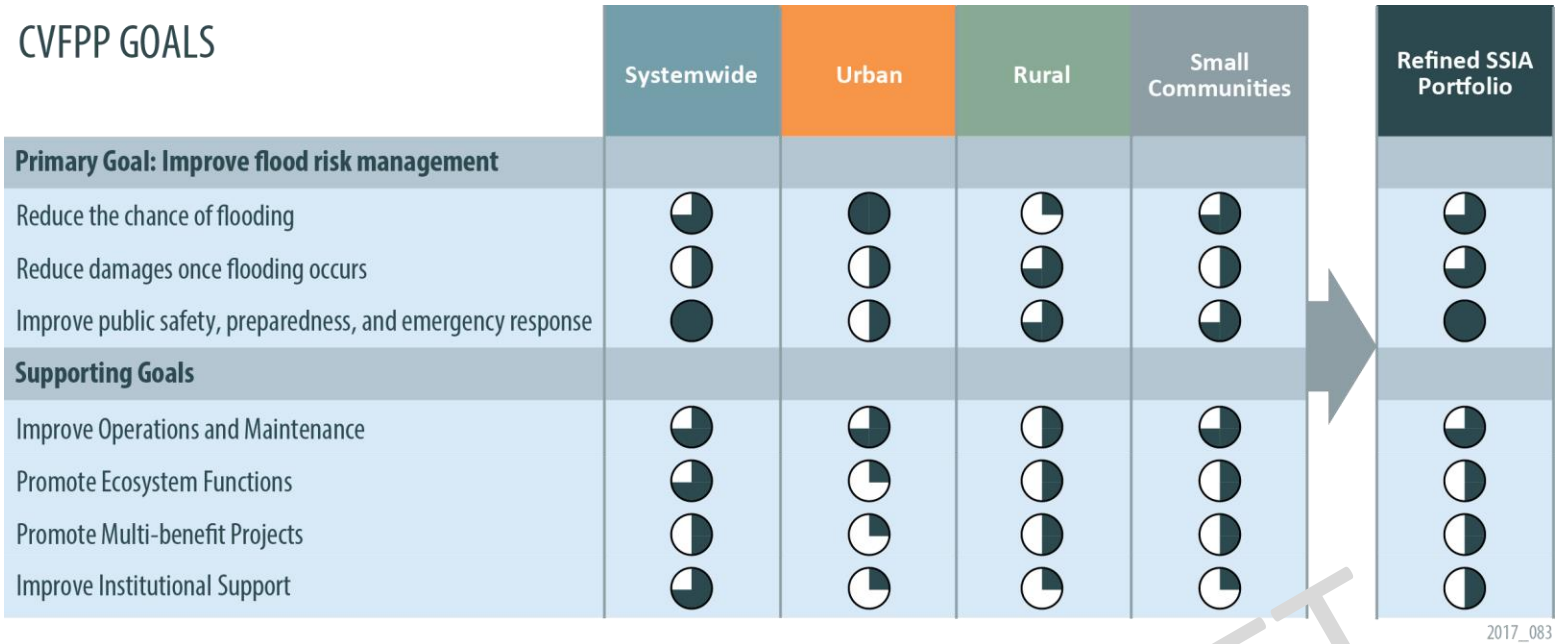
Establishing a Planning Horizon

- The CVFPP planning horizon is for the next 30 years, for investment planning purposes.
- The Plan evolves with each 5-year cycle.
- Modeling and technical analyses assess over a longer horizon (50 years+). This allows for:
  - Understanding the rate of change; and,
  - Assessment of resiliency over a 50-year lower bound design life.

Example of Detailed Assessment of Value



Comparing Performance of Proposed Actions in Different Settings



Improving Cost Estimates (Gaps) for 2017 Update to CVFPP

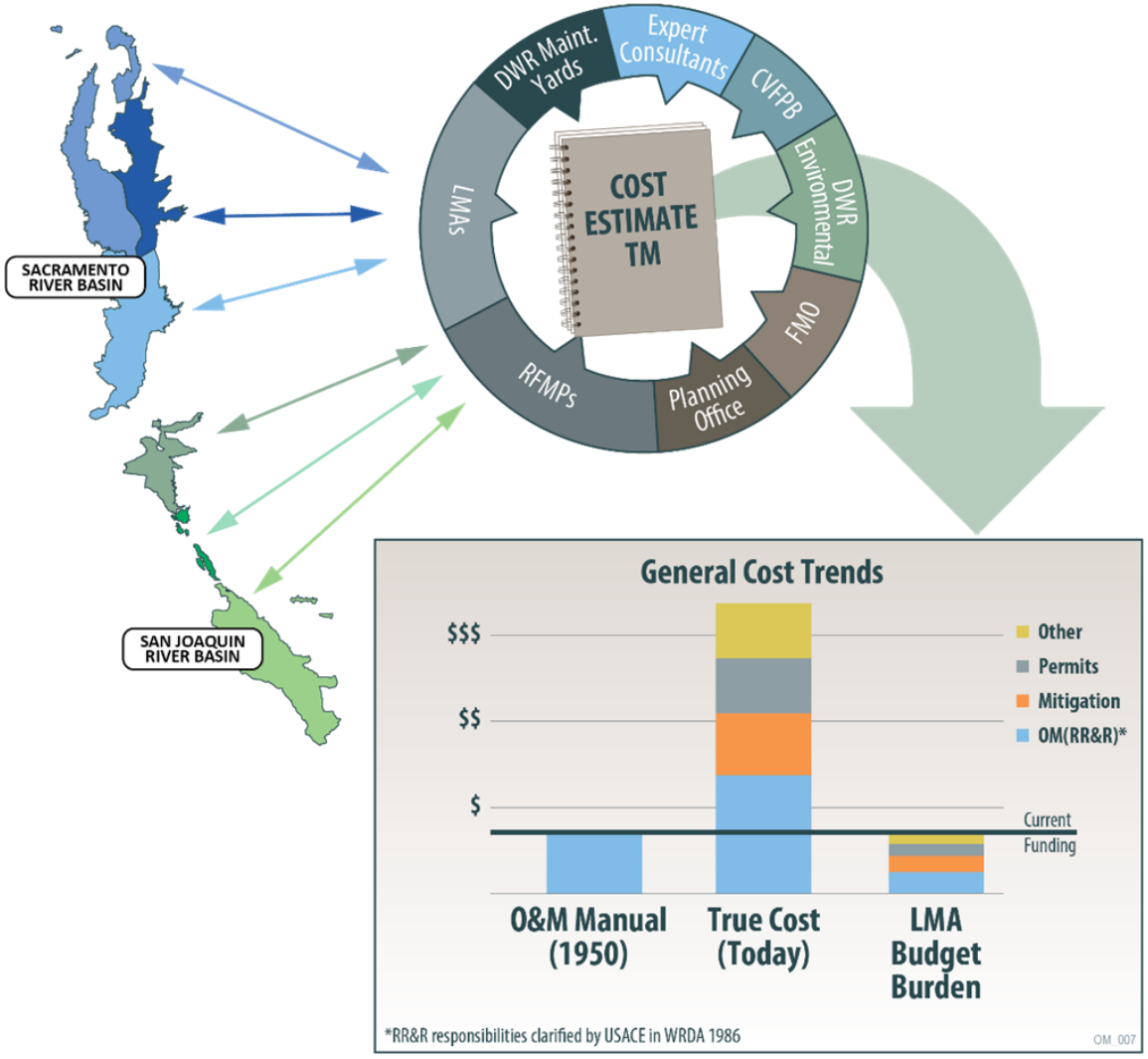
- 2012 CVFPP, AB 156 (Laird – Local Agency Reporting Bill), and USACE "simple" estimates are outdated and generally inaccurate
- Reasonable "true cost" estimates – identify all needs
- O&M and RR&R – very different categories
- Long-term (50 year+) evaluation
- Repeatable and defensible method
- Evaluate and Quantify the OMRR&R funding shortfall
- Account for and integrate environmental concerns
- Identify real-world permitting and mitigation costs

OMRR&R is about full life cycles

OPERATIONS, MAINTENANCE, REPAIR, REHABILITATION, AND REPLACEMENT	
	**Operations:** labor, facilities, inspections, emergency response activities
	**Maintenance:** routine vegetation management, rodent control, sediment removal, mechanical service
	**Repair and Rehabilitation:** minor and major repairs
	**Replacement:** end of life or catastrophic failure

OM_001

Identifying a Funding Gap in OMRR&R



$130M

What we *should be* spending annually

$30M

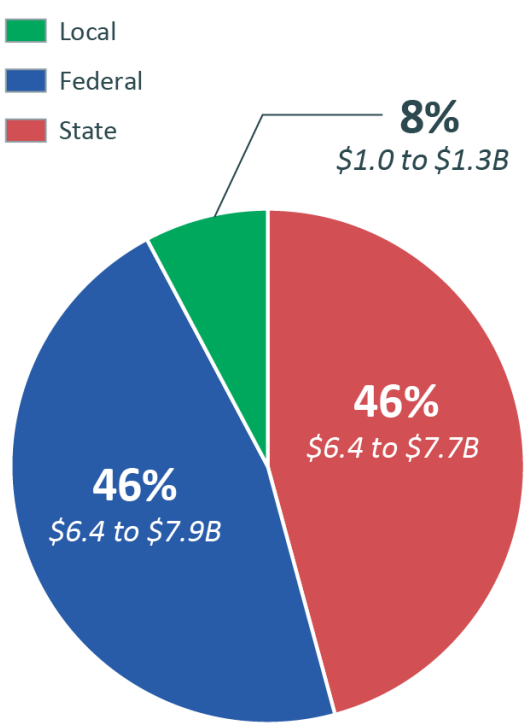
What we *are* spending annually

Updated Costs in 2017 Update to CVFPP

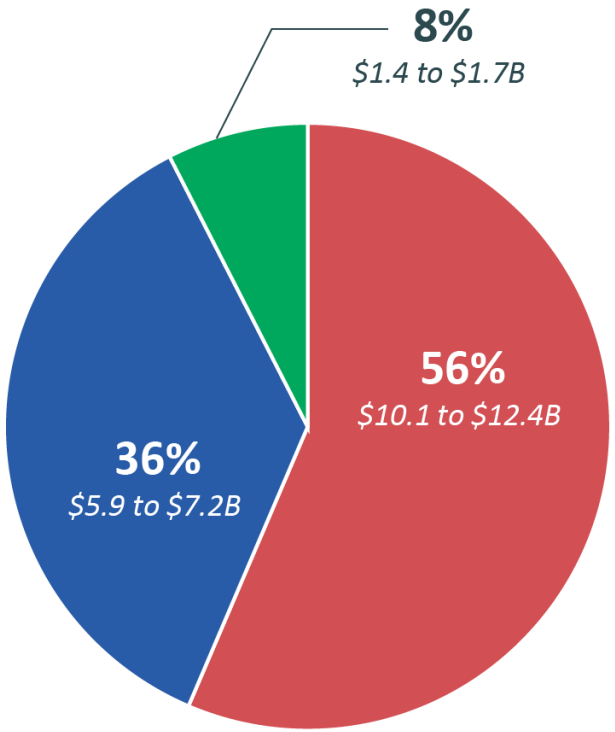
Area of Interest	Sacramento Basin		San Joaquin Basin		Total	
	Low ($M)	High ($M)	Low ($M)	High ($M)	Low ($M)	High ($M)
Systemwide	$5,660	$6,910	$2,130	$2,600	$7,790	$9,510
Urban	$3,570	$4,360	$1,210	$1,490	$4,780	$5,850
Rural	$1,860	$2,280	$1,090	$1,340	$2,950	$3,620
Small Community	$1,580	$1,930	$310	$370	$1,890	$2,300
Grand Total:	**$12,670**	**$15,480**	**$4,740**	**$5,800**	**$17,410**	**$21,280**

Note: Totals reflect annual ongoing investments converted to present value (2016 dollars) and summed with present value capital investment costs.

Cost Shares in 2017 Update to CVFPP



2012 CVFPP Total
$13.9 to $16.9B



2017 CVFPP Total
$17.4 to $21.3B

Roles & Types of Plans

Plan Recipe

- Provide Context & Set Objectives
- Describe Performance of Several Ideas
- Estimate Cost (Time & $$$) of Recommendation
- Show a Path to Implementation for Recommendation

Types of Plans

- Policy Recommendations
  - ✓ Governance (Roles & Responsibilities)
  - ✓ Regulatory
- Strategic (Leadership)
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- Tactical (Directing Action)
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  - ✓ Engagement
- Technical
  - ✓ Meeting Facilitation

Grouping of Major Policy Items in 2017 CVFPP

Land Use and Floodplain Management

Hydraulic and Ecosystem Baseline and Program Phasing

Operations and Maintenance of the Flood System

Residual Risk Management

Finance

Multi-Benefit Projects

Governance & Institutional Support

Coordination with Federal Agencies

Example of CVFPP Policy Items Related to Climate Change

Residual Risk Management

Perform climate change vulnerability assessment to identify anticipated physical extent that FEMA's SFHA may change during the design life of future State cost-shared investments

Land Use and Floodplain Management

Continue to work with Agriculture Floodplain Ordinance Task Force to identify & implement policies and actions that facilitate the wise use of floodplains and preservation of sustainable agriculture

Develop a Statewide Floodplain Management Strategic Plan for sound floodplain management & best practices, public education & awareness , floodplain mapping, and local assistance

CVFPP Supporting Efforts Input on Policy

Effectiveness of CVFPP Supporting Efforts to Address Flood Policy Issues

	Flood Policy Issues							
	Land Use & Floodplain Management	Residual Risk Management	Hydraulic/Ecosystem Baseline & Program Phasing	Operations and Maintenance of the Flood System	Multi-Benefit Projects	Governance & Institutional Support	Coordination with Federal Agencies	Finance
CVFPP Supporting Effort								
Basin-Wide Feasibility Studies	●		●		●		●	◒
Regional Flood Management Plans	●	●		◒	◒	◒	◒	◒
Conservation Strategy			●		●	◒	●	
Climate Change Analyses	◒	◒	●	◒				
OMRR&R Cost Evaluation TM		●		●	●	●	●	●
SPFC Descriptive Document Update		●		◒		◒	◒	
CVFPP Supplemental Programmatic EIR	◒		●					
Flood System Status Report Update	◒		◒	◒			◒	
BWFS Atlases			●				◒	
CVFPP Investment Strategy		●	●	●	◒		◒	●

Key:

● Supporting effort greatly informs overall efforts on this key issue

◒ Supporting effort somewhat informs overall efforts on this key issue

DWR Implementation Efforts Input on Policy

DWR Programs Affected by Flood Policy Issues

	Flood Policy Issues							
	Land Use & Floodplain Management	Residual Risk Management	Hydraulic/Ecosystem Baseline & Program Phasing	Operations and Maintenance of the Flood System	Multi-Benefit Projects	Governance & Institutional Support	Coordination with Federal Agencies	Finance
DWR Implementation Programs								
Flood Management Planning	●	◡	●	◡	●	●	●	●
Floodplain Risk Management	●	●			◡	●	●	
Flood System O&M	◡	●		●	●	●	◡	●
Rural Levee System Repair				●			◡	●
Flood Emergency Response	◡	●					●	●
Flood Projects:								
Urban Flood Risk Reduction	●	◡	◡	●	◡	●	●	●
Small Community Flood Risk Reduction	●	◡	●	●	●	●	◡	●
System Implementation Program	●	◡	●	●	●	●	●	●
Delta Special Projects	◡		◡	◡	●		◡	●

Key:

● Implementation program is greatly affected by this issue

◡ Implementation program is somewhat affected by this issue

Improving the SPFC Finance Plan

- Historical Expenditures
- Political Sentiment
- Cost Shares
- Benefits
- Liability
- Ability to Pay
- Willingness to Pay
- Magnitude & Scope
- Maintenance Needs
- Timing / Phasing

Table 4-5. Factors Influencing the Finance Plan

Factor	Influence
Historical expenditures	Historical expenditures provide the baseline for comparing future expenditures. The Investment Strategy compiled the historical expenditures for local, state, and federal agencies that contributed to flood management in the Central Valley.
Political sentiment	Some funding mechanisms require the support of voters, the California Legislature, or policy makers. Also, some proposed financing mechanisms will require new legislation to be established. The political viability of these mechanisms must be considered, because voters and policy makers have opposed some in the past.
Cost share agreements	Hundreds of projects have been cost-shared by USACE in California. In many cases, the USACE and DWR have an existing agreement on the cost shares for certain management actions. Also, many of the implementing programs (both State and federal) have cost share percentages in place.
Benefits	A common method for determining cost shares is to explore the benefits and where they accrue. Cost shares would be consistent with where the benefits accrue to beneficiaries.
State liability	As the risks of levee failure and corresponding damage increases, California's courts have generally exposed public agencies, and the State specifically, to enormous financial liability for flood damages. The November 2003 Paterno vs. State of California decision found that when a public entity operates a flood control system built by someone else, it accepts liability as if it had planned and built the system. This liability creates an incentive for the State to contribute to management actions that reduce that liability.
Ability to pay	According to economic principles, benefits typically accrue to beneficiaries in proportion to the payments for these benefits. However, in the case of certain goods and services, such as public benefits, the basis for the payment of these services is based on the principle of the ability to pay. For this plan, ability to pay will limit the cost-shares of the locals in the rural and small communities. Also, existing assessments by locals will consume some of the ability to pay for future improvements.
Willingness to pay	A number of factors may affect individuals' willingness to pay for a new assessment or tax, among them: their existing total effective tax rate, their income, the local unemployment rate, the amount/nature/purpose of the tax itself, and public opinion.
Magnitude and Scope	Management actions such as the Yolo Bypass Multi-benefit Improvements have unique timing due to their magnitude, scope and current progress. The finance plan acknowledges that some management actions are already underway in planning or preliminary design and considers this when recommending investment timing.
Maintenance Needs	The expectation of maintenance is much different now than it was when the State made assurances to USACE to maintain the SPFC. Assessment and evaluation of system has identified the importance for addressing deferred maintenance and having adequate capacity to take care of the existing system. This promotes the need to secure reliable funding for ongoing investments.

Example of State Financing Mechanisms

Table 4-6. Funding and Financing Mechanisms by State, Local, and Federal Means

Mechanism	Description	Applicable Management Actions	Level of Applicability	Inter-annual Reliability	Recommendations for Finance Plan
State					
Additional General Fund	The General Fund has traditionally funded some flood management. This mechanism would request an increase in those funds	All capital and ongoing management actions	High	Moderate	Key part of the near term approach
GO Bonds	General Obligation bonds would need to pass a State vote. This mechanism would require time to prepare and pass the vote, as well as two years before funds would be available after passage	Systemwide capital actions; Levee Improvements; Levee Setbacks; Bypasses; Floodplain Storage; Land Acquisitions and Easements; Habitat Restoration/Reconnection	High	High for bonds that have passed, Low over the long-term	Will continue to play a significant role in one time projects
Regulatory Fees	A mitigation fee, meant to discourage harmful behaviors	Habitat Restoration/Reconnection; Levee Setbacks; Bypasses; Floodplain Storage; Land Acquisitions and Easements	High	Low and dependent on harmful behaviors	Could be used to supplement funding for some ecosystem projects, minor role
Water Surcharge	An option that has been discussed for several years, a water surcharge on retail water sales would generate revenue for water projects. There would likely be a nexus to ecosystem projects.	Habitat Restoration/Reconnection; Levee Setbacks; Bypasses; Floodplain Storage; Land Acquisitions and Easements	Low (except for projects w/ecosystem benefits)	High	A long term source of funding for ecosystem efforts, but a minor role in the finance plan
River Basin Assessment	A river basin assessment would be a tool for integrated water management. Assessment revenue would be returned to the watershed, to be shared across the integrated water management activities. This assessment would cover the whole watershed and be shared by water agencies within the watershed.	All capital and ongoing management actions	Low (If implemented, assessment revenue would be spread across other water activities	High	A new funding source that could fund some projects in the longer term, but a minor role in the finance plan
State Flood Insurance Program	The State would augment/replace the NFIP program with a State led program. Beyond providing risk coverage, the program would be set up to invest in infrastructure that reduces risk. Another version of this could be a local basin wide insurance program.	Levee Improvements; Levee Setbacks; Bypasses; Floodplain Storage; Land Acquisitions and Easements	High	High	A new funding source that could fund projects in the longer term

- Potential NEW mechanisms include:
  - River Basin Assessment
  - State Flood Insurance Program
  - Sacramento and San Joaquin Drainage District

Interface with Update 2018 Finance Plan

1. Shared Intended Outcomes
2. **Policy and Actions Assessments**
3. Existing Funding
4. **Funding Gaps**
5. **State Roles and Partnerships**
6. Funding Demands
7. **Effective Funding Mechanisms**
8. Return on Investments

Key Points – Central Valley Flood Protection Plan

- System-scaled investment plans represent different levels of detail, making it necessary to focus more on outcomes of actions than individual projects
- There is a difference between an investment planning horizon versus a functional design life, but both must be considered
- System-scaled investment plans need to identify challenges to implementation and can use policy recommendations to aid with overall success
- A diverse portfolio of investment actions, policy recommendations, and financing mechanisms is necessary – there is no silver bullet