San Joaquin River Basin-Wide Feasibility Study

Public Workshop

San Luis National Wildlife Refuge Complex
7376 S. Wolfsen Road
Los Banos, CA 93635

Friday, May 13, 2016
10 a.m. – 1 p.m.

Welcome

Workshop Objectives

- Develop shared understanding among San Joaquin River Basin stakeholders regarding:
  - Basin-wide feasibility study (BWFS) planning process
  - Tentative recommended plan
  - Findings/recommendations
- Develop shared understanding of role of San Joaquin River BWFS within the 2017 CVFPP Update
- Collect stakeholder input on tentative recommended plan and findings/recommendations

Today's Agenda

1. Welcome, Opening Remarks
2. Public Comments
3. 2017 CVFPP Update
4. San Joaquin River Basin-Wide Feasibility Study
5. Break (5 min.)
6. San Joaquin River Basin-Wide Feasibility Study Continued
7. Closing Statements

Workshop Ground Rules

- Honor the agenda
- Speak to the focus and objectives of workshop
- Everyone is encouraged to participate
- Respectful interaction
- Turn cell phones off/silent

2017 Central Valley Flood Protection Plan Update

Presented by:

Michael Mierzwa, P.E.
California Department of Water Resources
Michael.Mierzwa@water.ca.gov

Presentation Overview

- **2017 CVFPP Update Scope & Content**
- **Project Scale Plans vs. System Scale Plans**
  - Planning an Approach to Effective Implementation
  - Louisiana Coast and Central Valley Planning
- **2017 CVFPP Update Major Supporting Efforts**

Scope & Content

- Refines and updates the State Systemwide Investment Approach (SSIA) described in 2012 CVFPP
- Additional specificity about recommended near and longer-term investment and financing approach

Factors for Managing Flood Risk

- **Hazard**
  What can cause harm?
- **Performance**
  How will the system react?
- **Exposure**
  Who and what can be harmed?
- **Vulnerability**
  How susceptible to harm?
- **Consequence**
  How much harm?

'Risk' is the likelihood and severity of adverse consequences.

2017 CVFPP Update Chapters	2012 CVFPP Sections
Chapter 1: Setting Context	*Section 1:* Responding to the Need for Improved Flood Management in the Central Valley
Chapter 2: Converging on Solutions to Improve System Management	*Section 1:* Responding to the Need for Improved Flood Management in the Central Valley *Section 2:* Preliminary Approaches
Chapter 3: Outlining Strategies to Improve System Management	*Section 2:* Preliminary Approaches *Section 3:* State Systemwide Investment Approach
Chapter 4: CVFPP Implementation	*Section 4:* Implementing and Managing the State Systemwide Investment Approach
New *Chapter 5:* Financing and Tracking Outcomes	*Section 4.7:* Financing Strategy for Implementing the State Systemwide Investment Approach

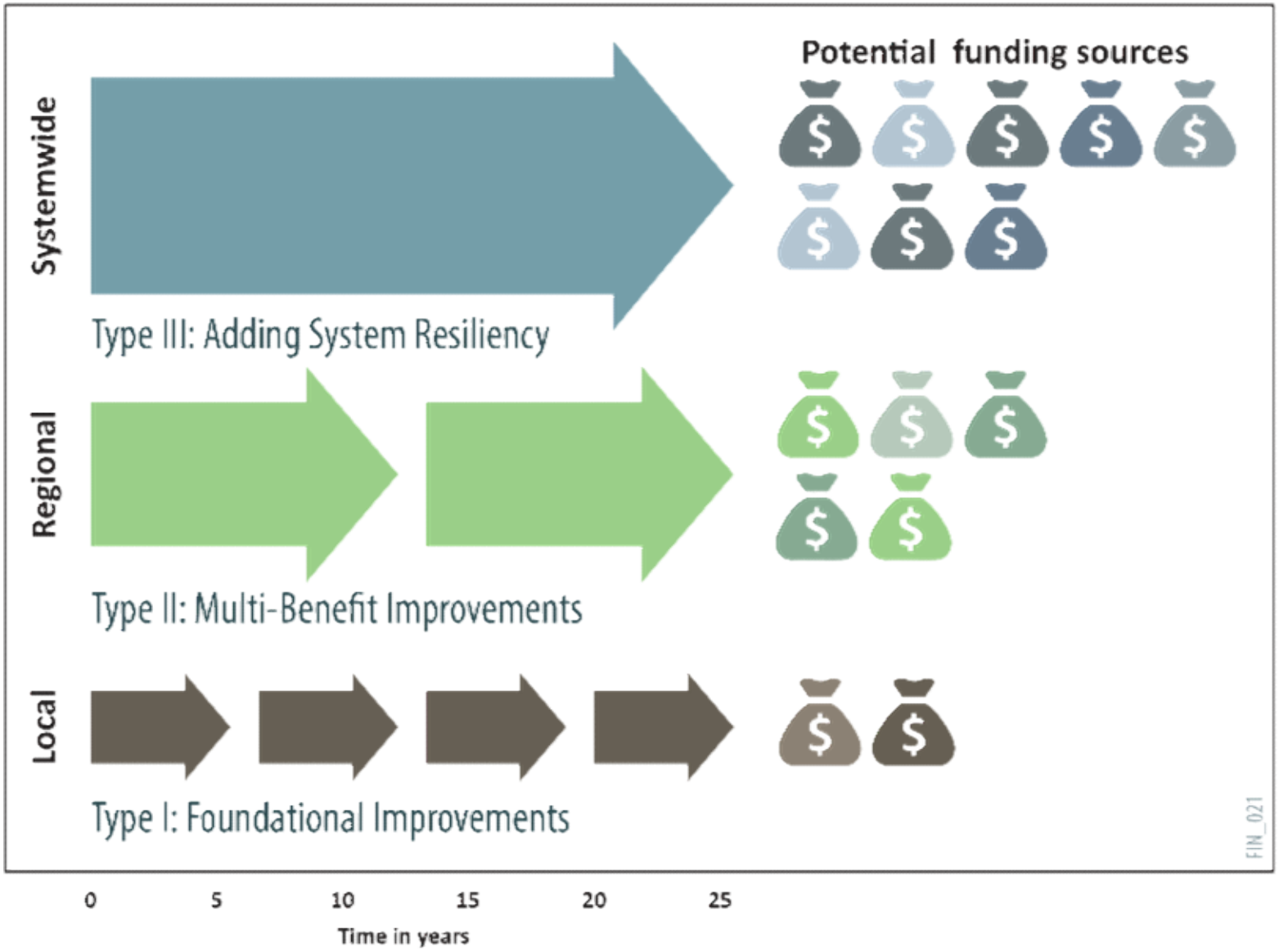
Chapter 5: Financing & Tracking Outcomes

- 1994's "Sharing the Challenge: Floodplain Management Into the 21st Century" (aka Galloway) Report articulated high level "society goals"

- Compare actual outcomes with CVFPP goals and intent (intended outcomes)

- Continual evolution toward more effective investments

Providing Resiliency through Parallel Efforts Focused on Implementation



Converging on Solutions for Improving Flood Management

COLLECTION
OF POTENTIAL CVFPP MANAGEMENT ACTIONS
- CVFPP Planning Elements
- Related Planning Elements

CONVERGENCE

ASSESS
PROPOSED MANAGEMENT ACTIONS

SELECTION
OF ACTIONS WITH POTENTIAL STATE INTEREST

DEVELOP
AND EVALUATE PORTFOLIOS

INTENDED OUTCOMES

ACCOUNTABILITY

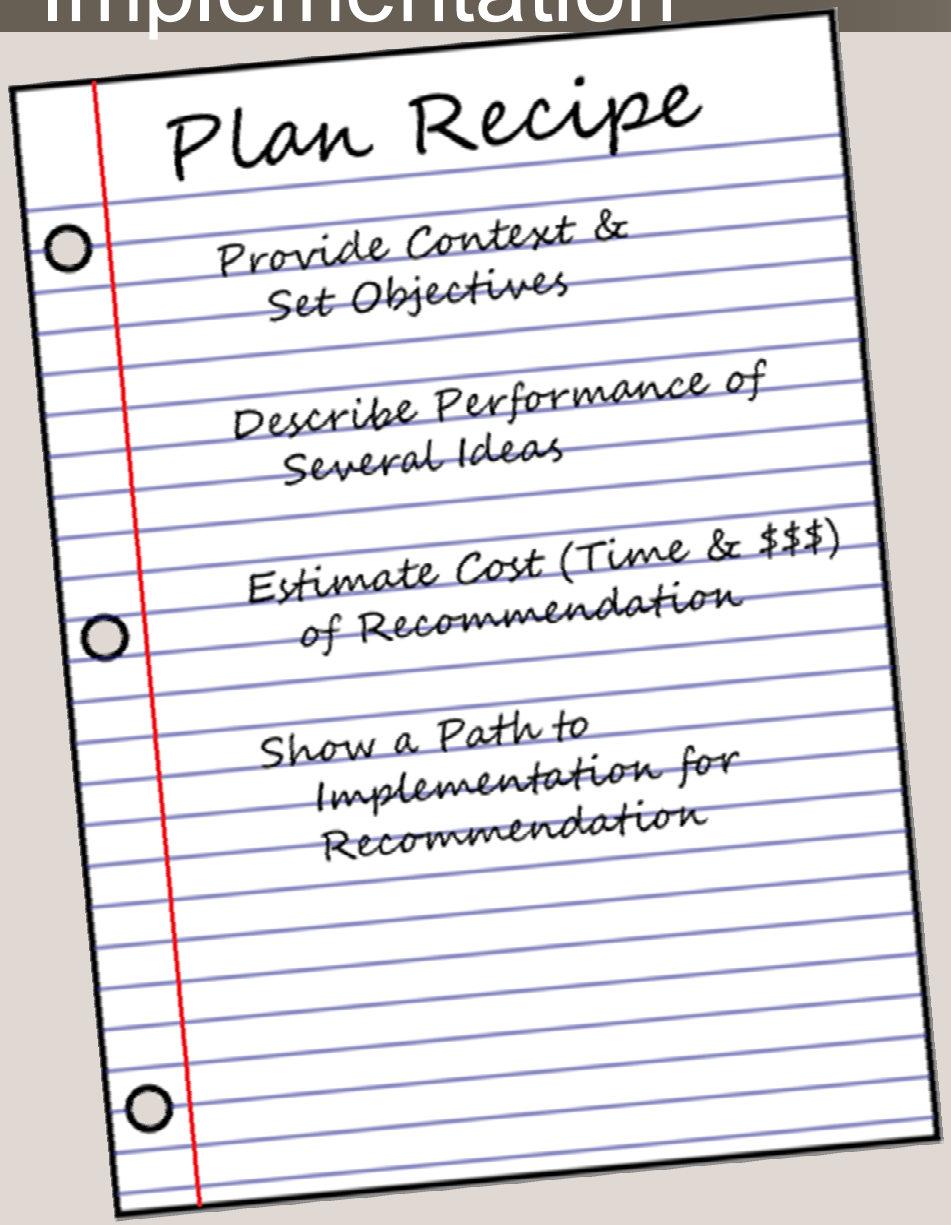
IMPLEMENT

ACHIEVED OUTCOMES

MONITORING AND TRACKING
CVFPP 2022

CHAPTER 2 CHAPTER 3 CHAPTER 4 CHAPTER 5

Planning is an Approach to Effective Implementation



Types of Plans

Policy Recommendations

- Governance (Roles/Responsibilities)
- Regulatory

Strategic

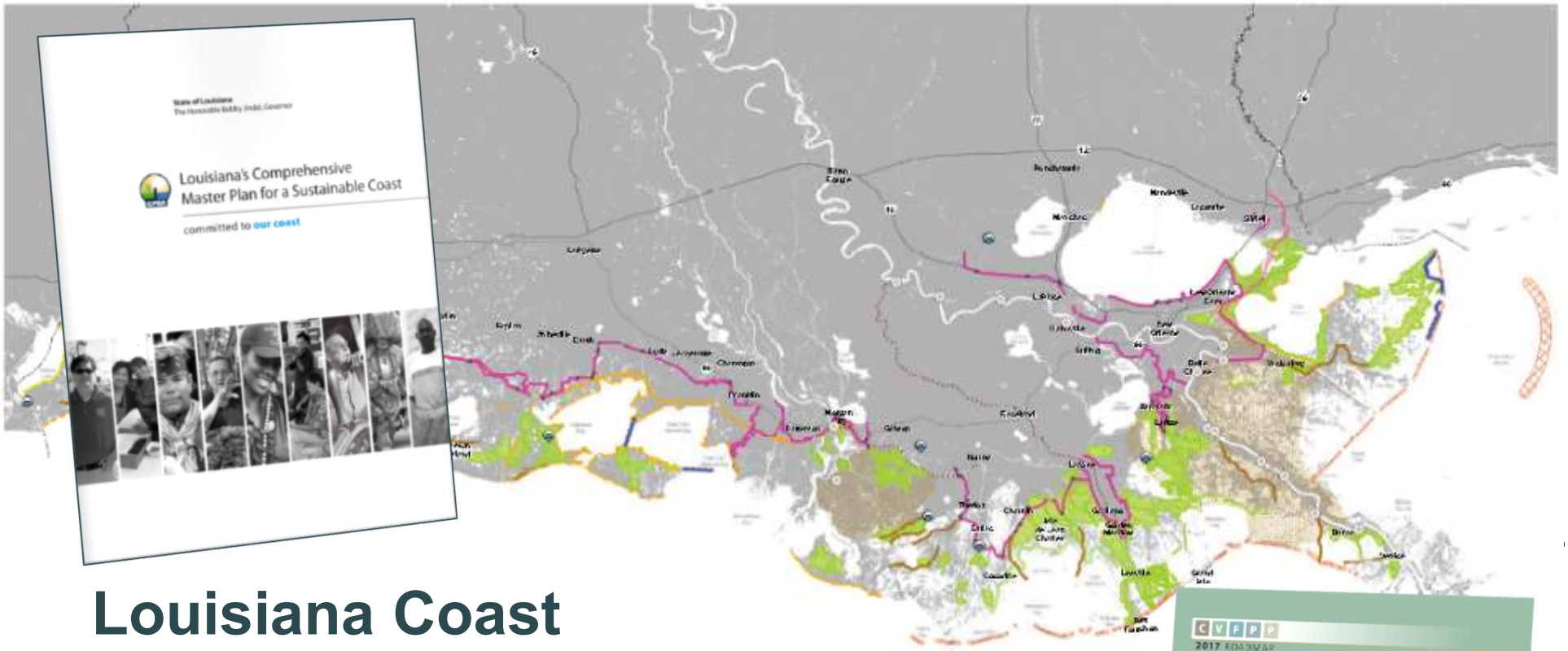
- Resource Prioritization (Budget/Staff)
- System Investment

Tactical

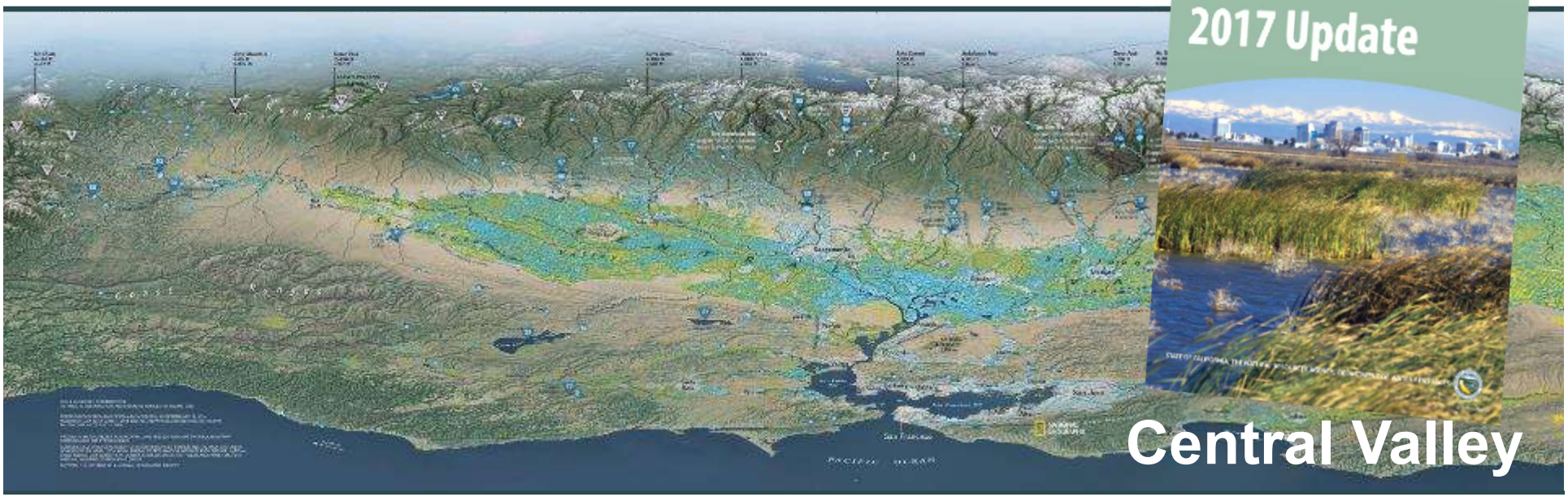
- Project Investment
- Engagement

Technical

- Meeting Facilitation



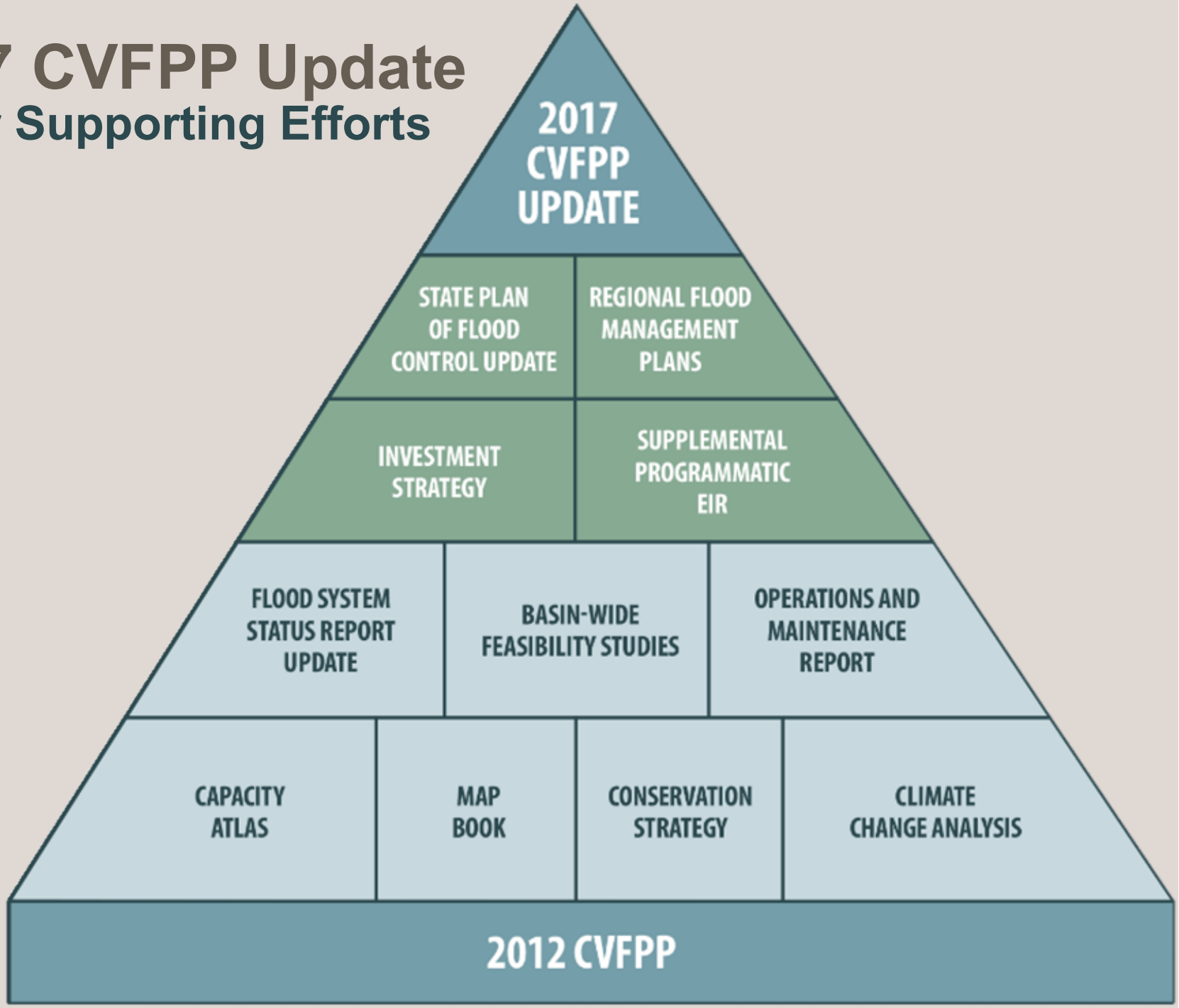
Louisiana Coast



Central Valley

2017 CVFPP Update

Major Supporting Efforts



“The principles of floodplain management are now well known. There’s no silver bullet. What you need is people willing to come to grips with the problem honestly.”

– Brig. Gen. Gerald Galloway , USACE

Key Flood System Stressors

- Hydrologic Variability (Upstream Timing and Duration, Downstream Backwater / Tide)
- Population Density / Exposure and Population Growth
- Land Use (Subsidence, Agricultural Activities – Irrigation and Drainage)
- Sedimentation & Erosion
- Financing Constraints (Ability to Pay, Willingness to Pay)

Relationship Between CVFPP & Basin-Wide Feasibility Studies

- 2017 CVFPP Update will include a portfolio of management actions with potential to deliver measureable benefits
  - Rooted in an "outcome-based" planning approach
  - Informed by the Basin-Wide Feasibility Studies, regional flood management plans, Conservation Strategy
    - For example: recommended actions in San Joaquin BWFS will help identify larger system-scale actions included in portfolio

Key Points

- System best managed when a balanced portfolio of actions is used to achieve results
- Complex system-scale planning relies on a layered approach of planning and design work to refine potential actions
- The San Joaquin River Basin-Wide Feasibility Study is just one of many efforts underway to inform the 2017 CVFPP Update

San Joaquin River Basin-Wide Feasibility Study

Presented by:
Eric Tsai
California Department of Water Resources
Eric.Tsai@water.ca.gov

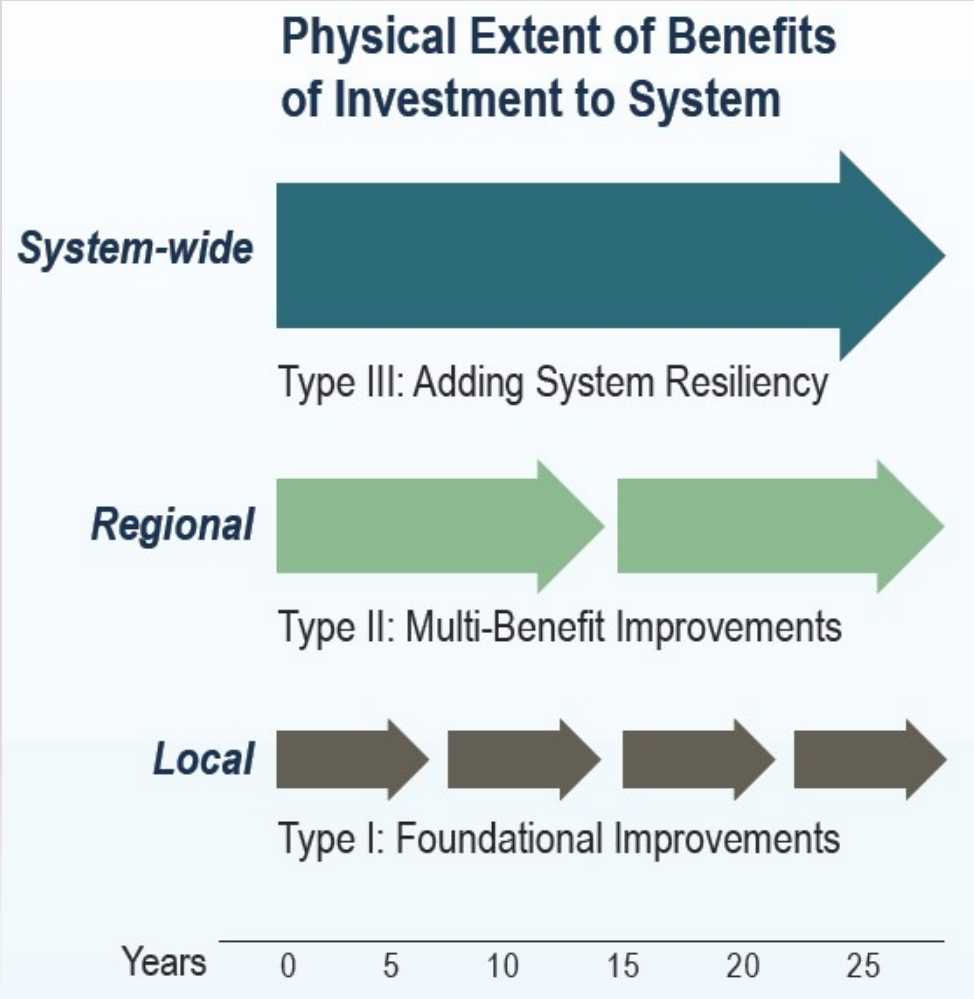
Anna Fock
California Department of Water Resources
Anna.Fock@water.ca.gov

BWFS Presentation Overview

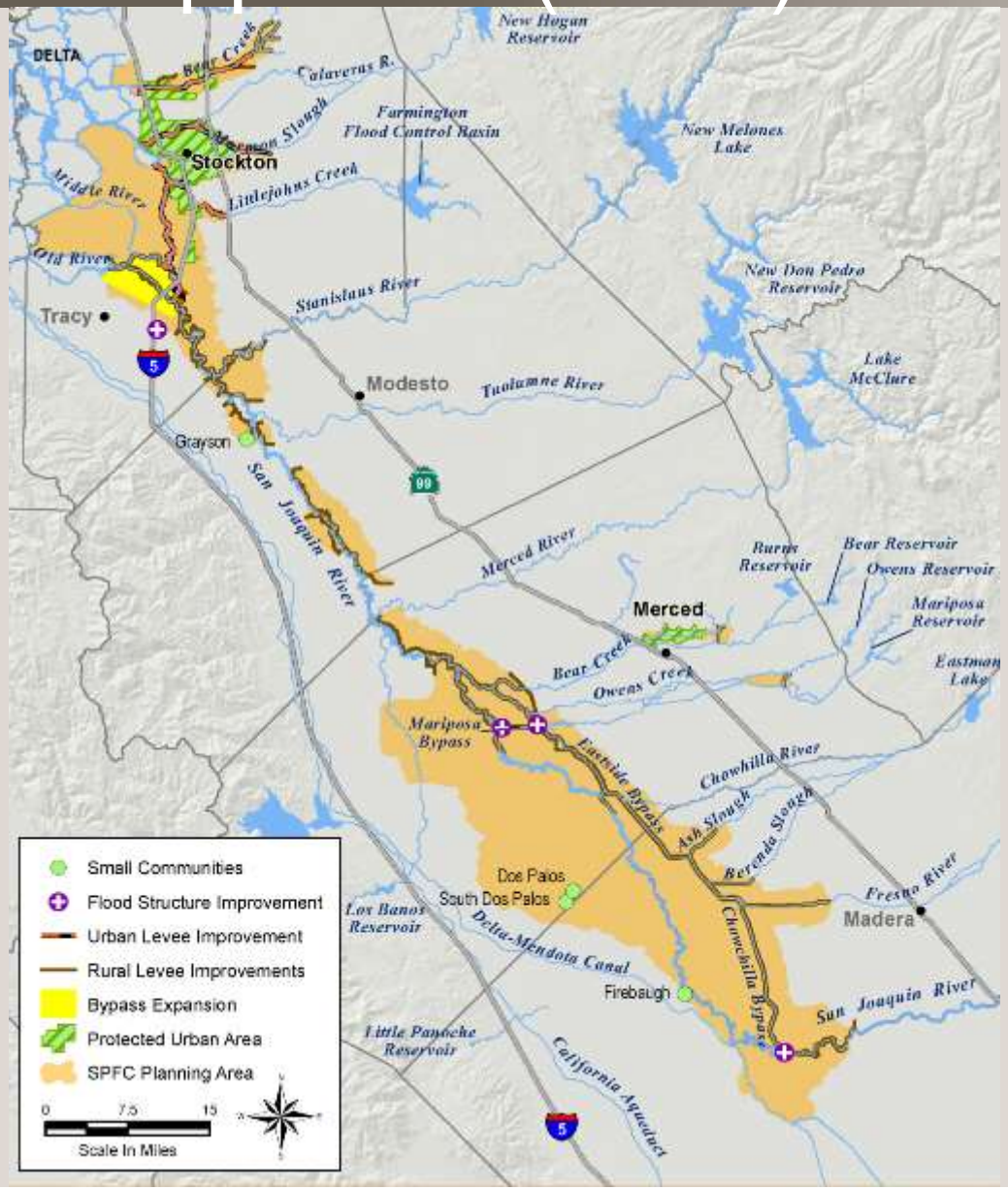
- **BWFS Overview**
  - Purpose and Scope, Problems and Objectives
  - Planning Process
- **Elements Studied**
  - Element Performance Findings
  - Conceptual System Configurations and Findings
- **Tentative Recommended Plan**
- **Stakeholder Engagement**
- **Key Findings**
- **Next Steps**

BWFS Purpose and Planning Principles

- Refine scale and location of major system elements
- Inform potential State interest in regional-scale elements
- Integrate environmental conservation

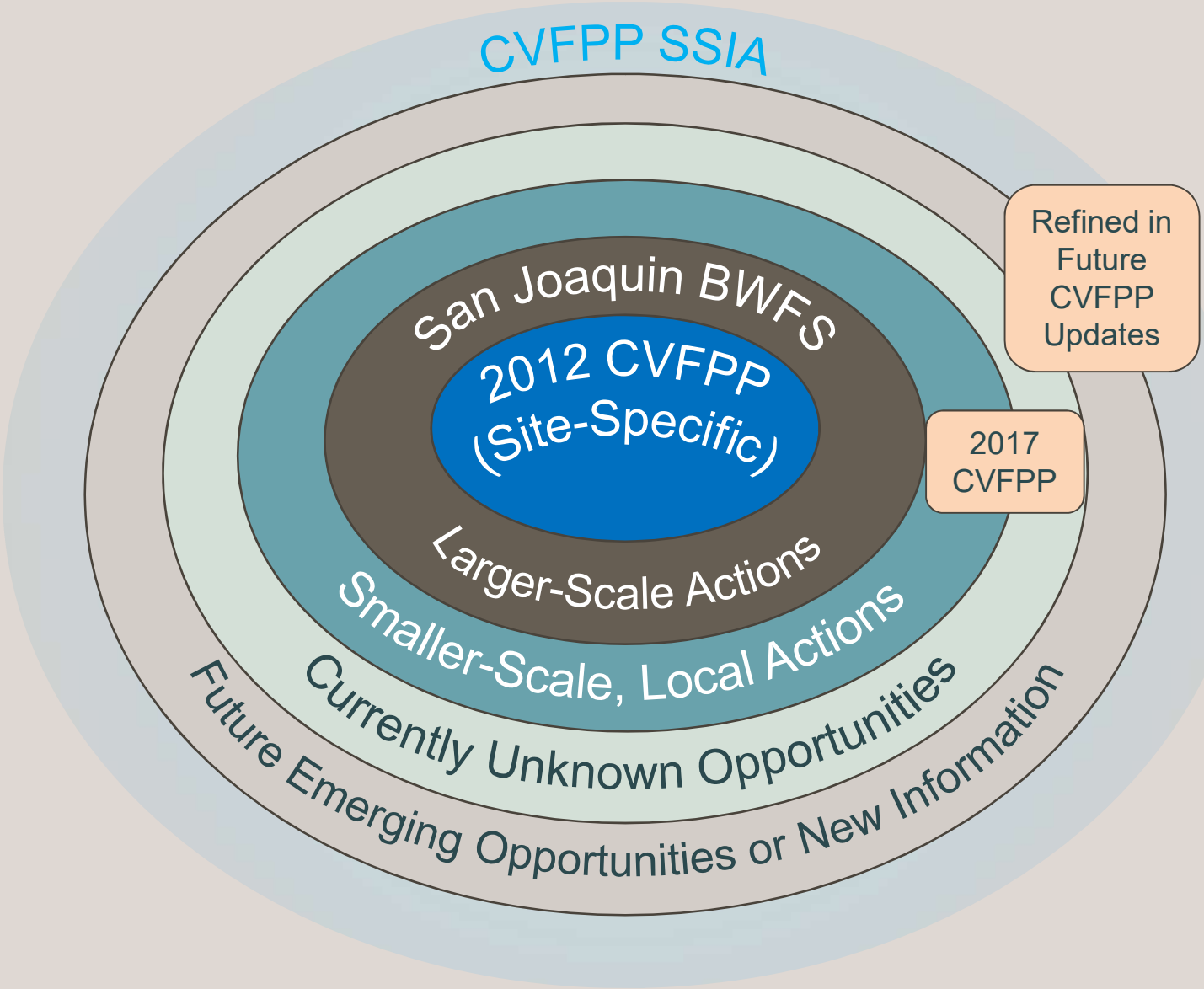


2012 CVFPP State Systemwide Investment Approach (SSIA)



2012 CVFPP SSIA and CVFPP Updates

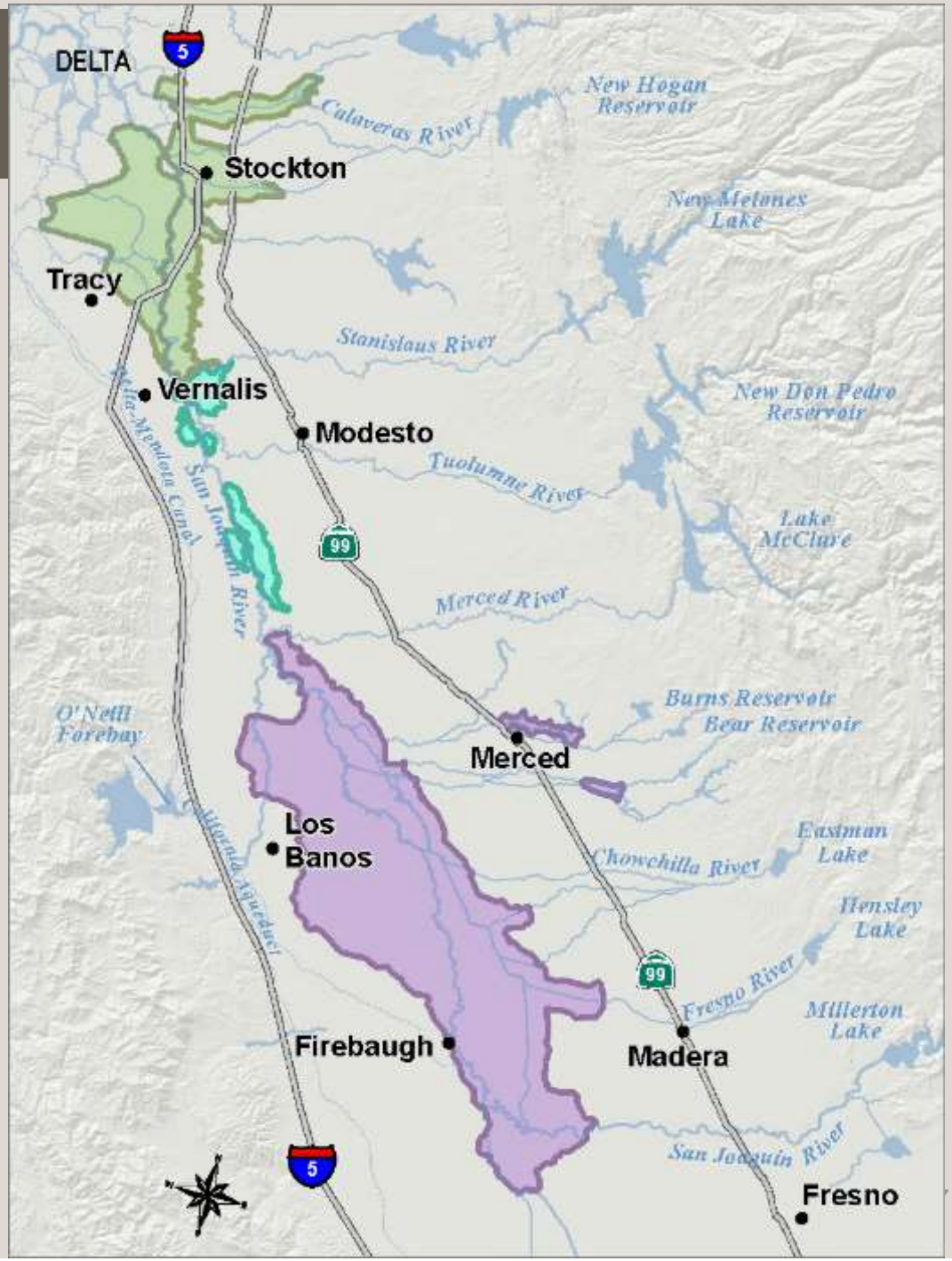
2012 CVFPP and CVFPP Updates



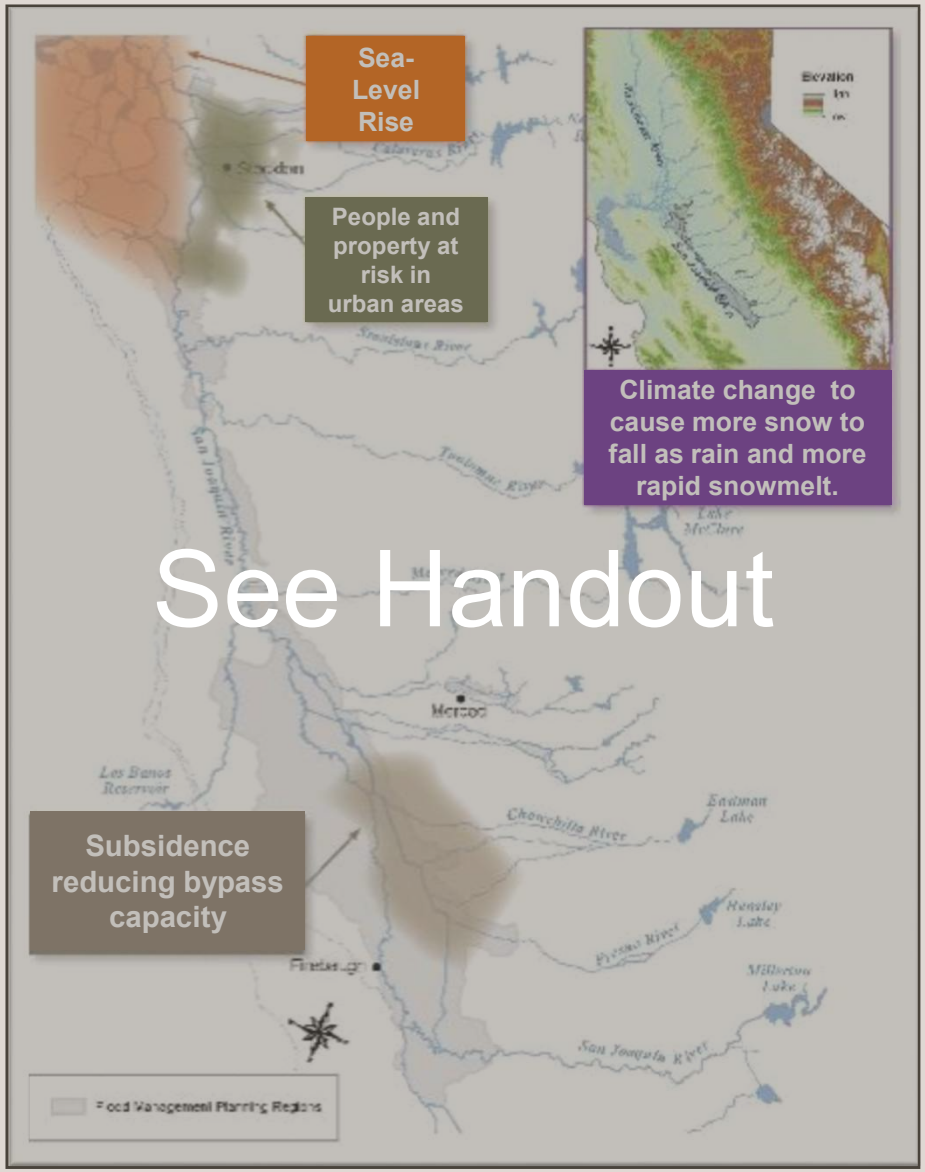
SJ BWFS Scope

Flood Management Planning Region

- Lower San Joaquin River / Delta South
- Mid-San Joaquin River
- Upper San Joaquin River



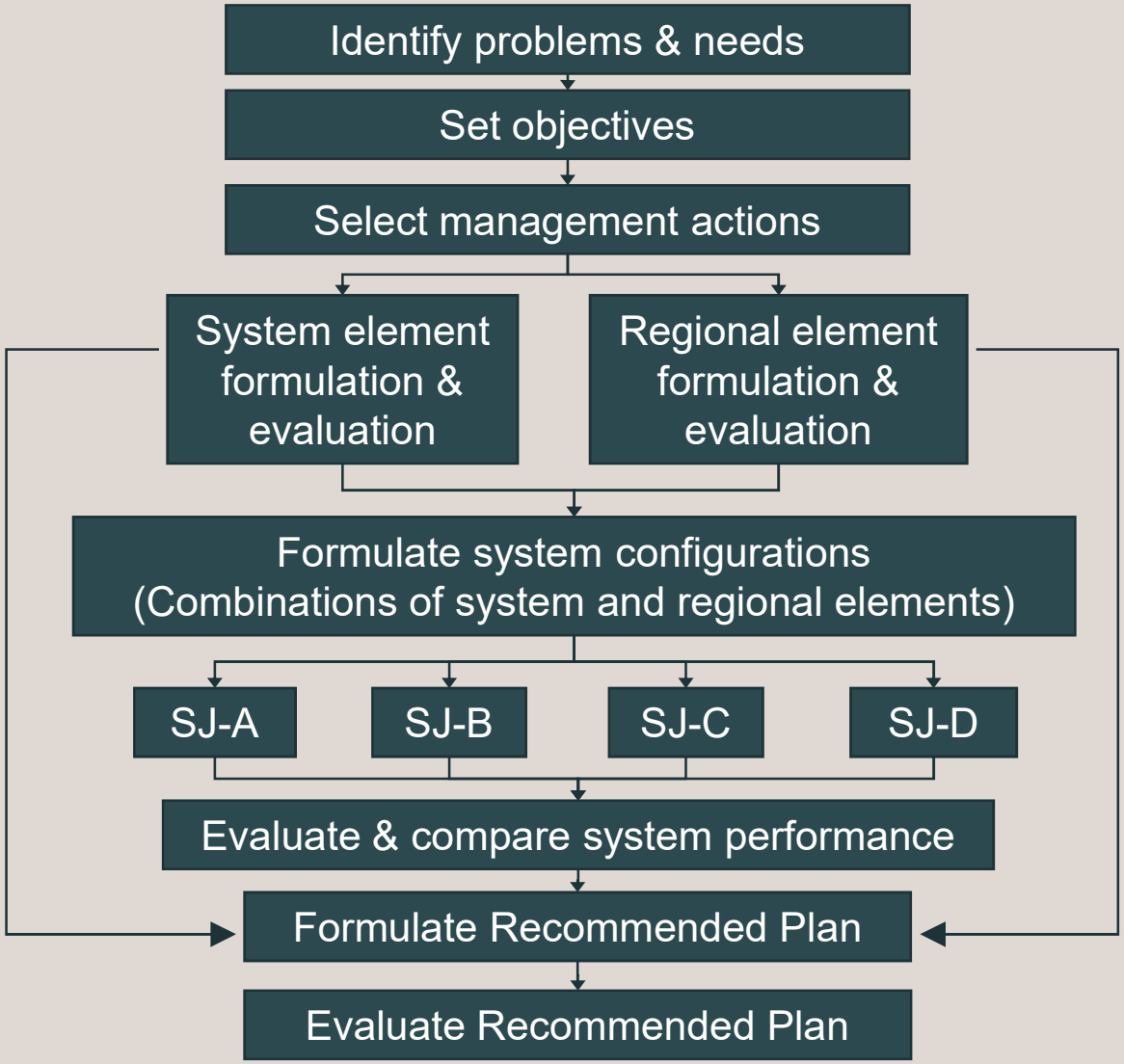
Resource Problems



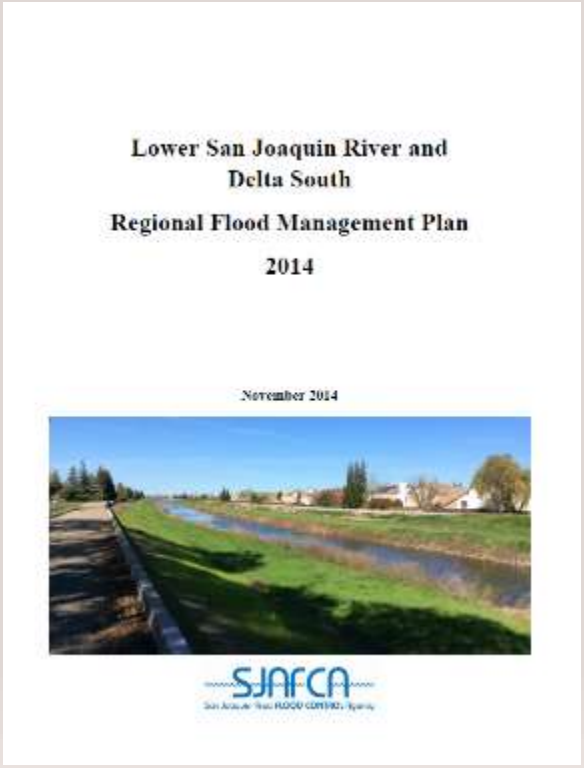
Goals and Objectives

Goals	Objectives
Improve Flood Risk Management	• Reduce flood damages and life loss from flood events • Reduce stages in urban, small-community, and rural areas • Achieve and maintain 200-year level of protection for urban areas • Achieve and maintain 100-year level of protection for small communities
Promote Ecosystem Functions	• Improve dynamic hydrologic and geomorphic processes • Increase and improve quantity, diversity, quality, and connectivity of riverine aquatic and floodplain habitats • Reduce stressors related to the development and operation of the SPFC that negatively affect at-risk species
Promote Multi-Benefit Projects	• Improve Water Supply, Recreation, Open Space, Commercial Fisheries, Navigation, Hydropower

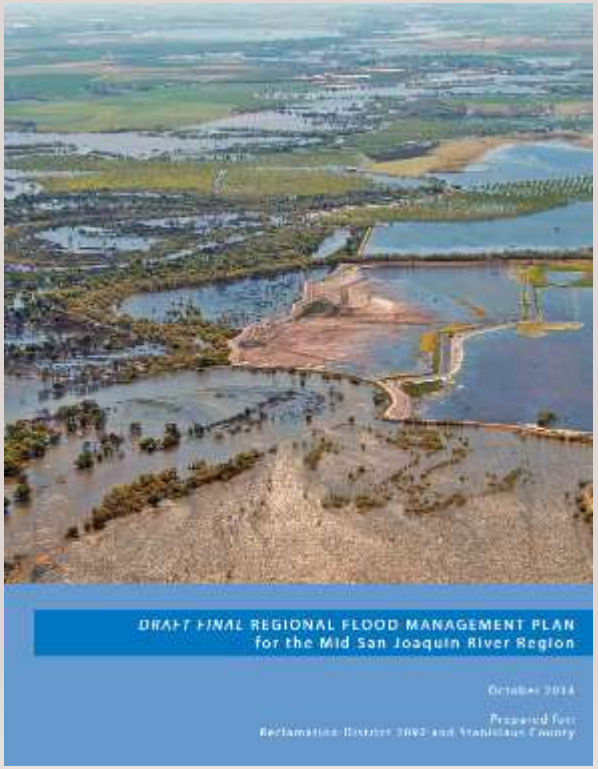
Plan Formulation Process



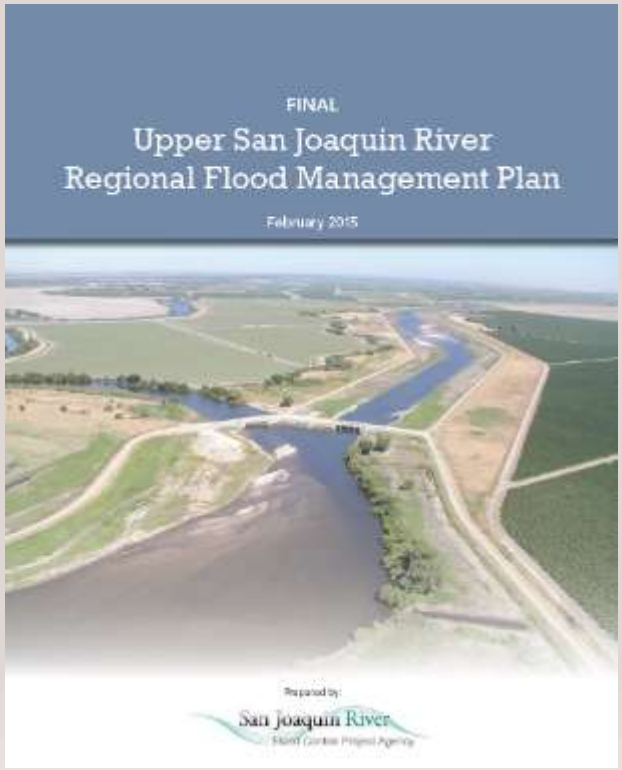
Regional Flood Management Planning (RFMP) Integration



Lower San Joaquin/Delta South RFMP

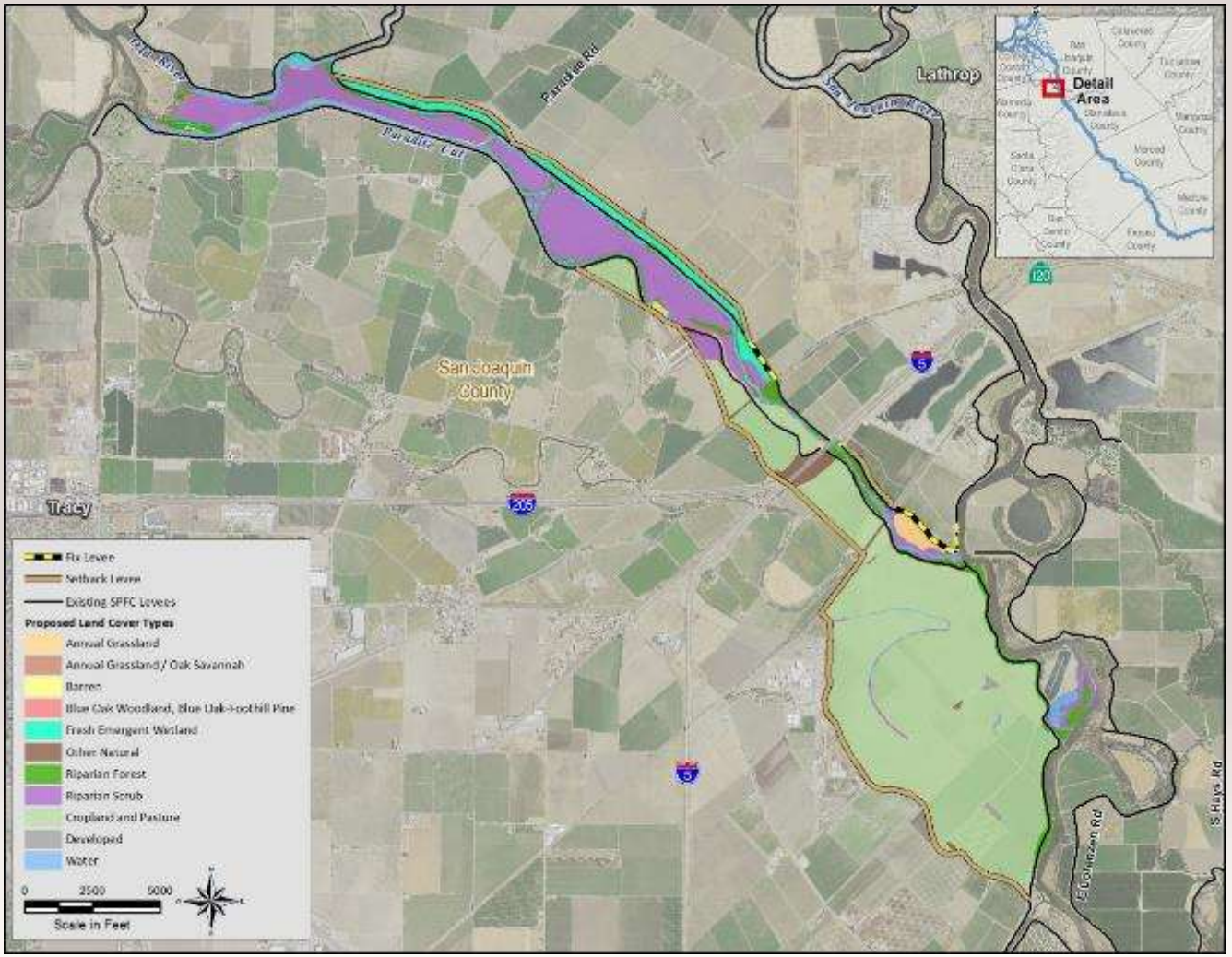


Mid San Joaquin RFMP



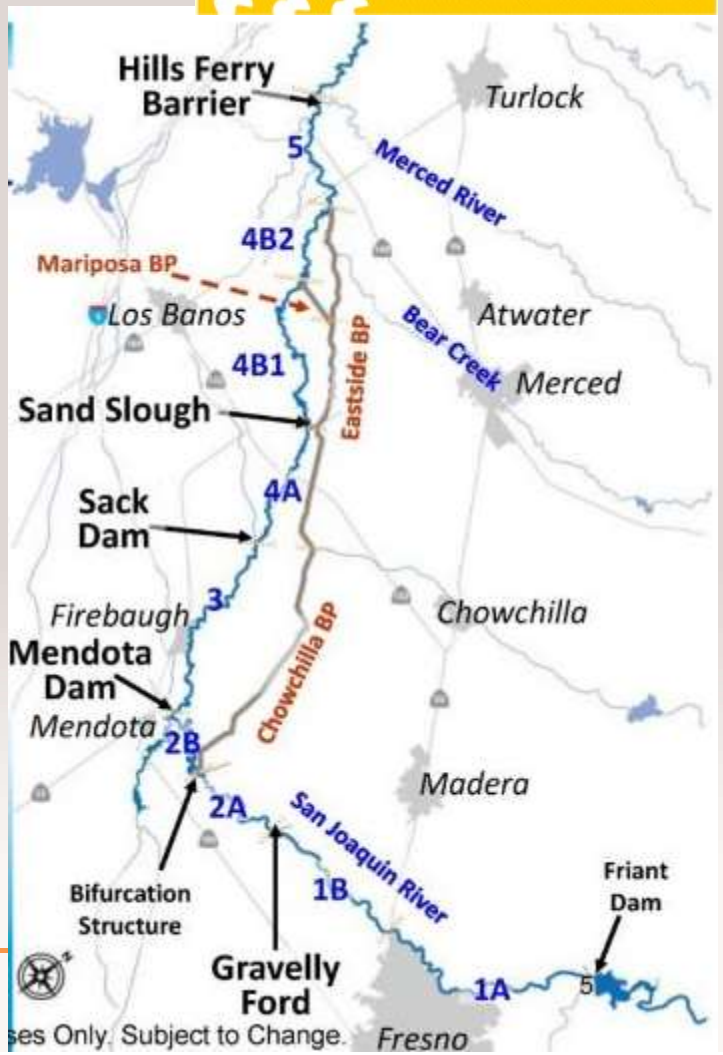
Upper San Joaquin RFMP

Conservation Strategy Integration



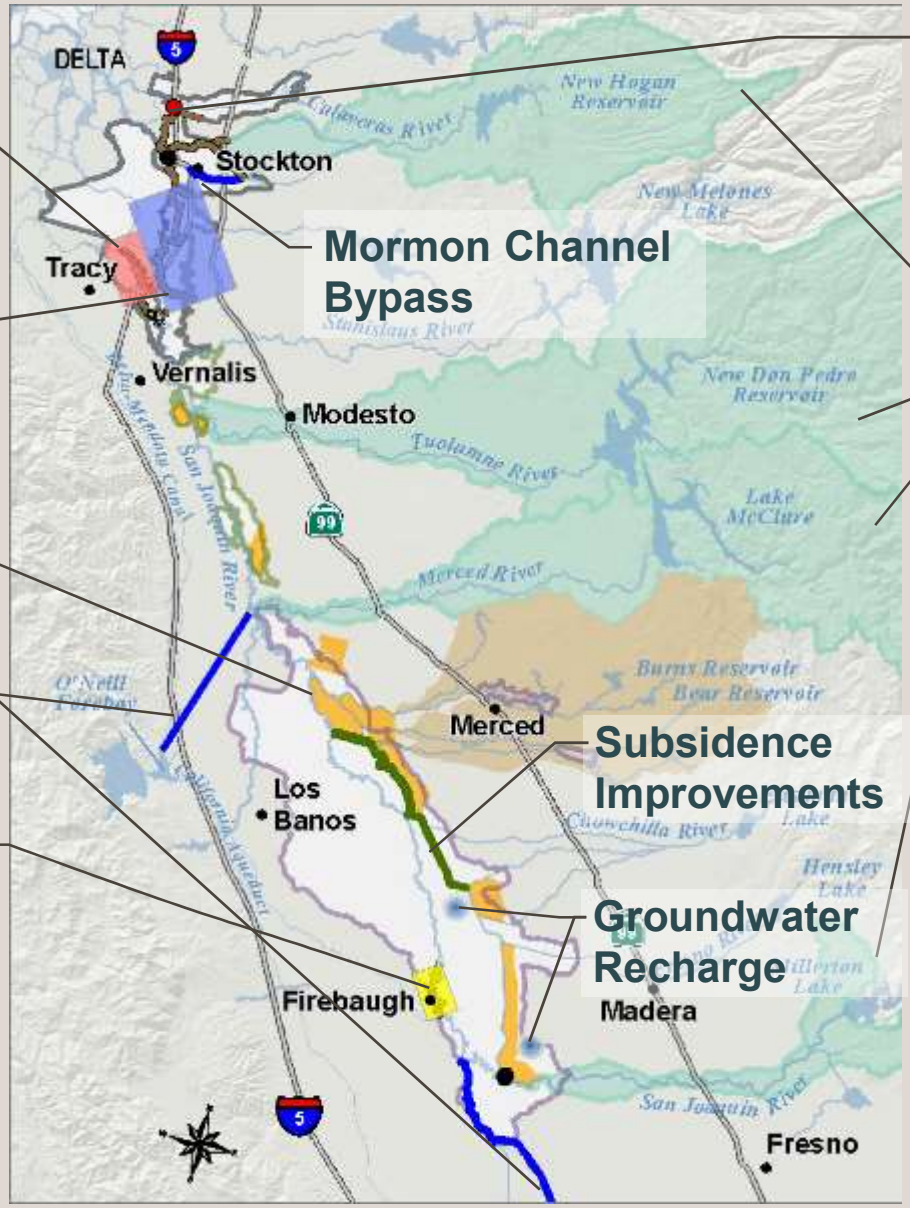
San Joaquin River Restoration Program Integration Approach

- Major planning process in the upper San Joaquin region
- Focus actions with a flood nexus
- Actively collaborate on win-win multi-benefit actions
- Look for opportunities to align future efforts



Questions and Discussion

Elements Studied



Paradise Cut Bypass

RD 17 Levee Improvements

Transitory Storage

Conveyance Improvements

Firebaugh Multi-Benefit Levee Improvements

Stockton Levee Improvements

Mormon Channel Bypass

Reservoir Management

- Increase objective releases
- FIO pre-release
- FCO for Vernalis
- Reservoir reoperation /Additional flood storage

Subsidence Improvements

Groundwater Recharge

Element Performance Summary

Draft San Joaquin River Basin-wide Feasibility Study Performance Matrix (Not for Distribution. 2016/05/03)

Elements		H&H Performance				Public Safety	Economic Stability	Ecosystem Vitality	Enriched Experience	Costs
		Systemwide			Local					
		Lower SJ Vernalis	Mid SJ Newman	Upper SJ Sand Slough	Varied					($ Million)
System Elements										
	Paradise Cut (Option A, Base Case)	N/C	N/C	N/C	Low	✓	✓	✓✓✓	✓✓	$99
	Paradise Cut (Option M, Ag Focus)	Medium	N/C	N/C	High	✓✓	✓	✓✓✓	✓✓	$309
	Paradise Cut (Option M, Riparian Focus)	Medium	N/C	N/C	High	✓✓	✓	✓✓✓	✓✓	$323
	5,000-cfs Newman Diversion to O'Neil Forebay	Low	Medium	N/C	Medium	✓	✓			$2,600
	1,000-cfs Mendota Pool Diversion	N/C	N/C	Low	Medium	✓✓	✓			$1,512
Reservoir Management										
	Joint FCO for Vernalis 46,000-cfs Objective	Low/Low	Low/Low	Low/Low	Med/Med	✓	✓			N/A
Calaveras River Watershed										
	Additional Flood Storage: 42 TAF	N/C	N/C	N/C	High	✓✓✓	✓✓✓			$42
Tuolumne River Watershed										
	Objective Release: 9K to 15K cfs	Low	N/C	N/C	High	✓✓	✓✓	✓		$264
	Objective Release: 9K to 20K cfs	Low	N/C	N/C	High	✓✓	✓✓	✓		$264
	Objective Release: 9K to 25K cfs	Low	N/C	N/C	High	✓✓	✓✓	✓		$264
	Pre-release: 50 TAF	Low	N/C	N/C	High	✓	✓			N/A
	Pre-release: 100 TAF	Low	N/C	N/C	High	✓	✓			N/A
	Additional Flood Storage: 50 TAF	Low	N/C	N/C	High	✓✓	✓✓			$39
	Additional Flood Storage: 100 TAF	Low	N/C	N/C	High	✓✓	✓✓			$77
	Additional Flood Storage: 200 TAF	Medium	N/C	N/C	High	✓✓	✓✓			$155
Merced River Watershed										
	Objective Release: 6K to 10K cfs	Low	Low	N/C	High/High					N/A
	Objective Release: 6K to 15K cfs	Low	Low	N/C	High/High					N/A
	Objective Release: 6K to 20K cfs	Low	Medium	N/C	High/Med					N/A
	Pre-release: 25 TAF	N/C	N/C	N/C	Low	✓	✓			N/A
	Pre-release: 50 TAF	N/C	N/C	N/C	Low	✓	✓			N/A
	Additional Flood Storage: 25 TAF	N/C	N/C	N/C	Low	✓	✓			$21
	Additional Flood Storage: 50 TAF	N/C	N/C	N/C	Low	✓	✓			$42
	Additional Flood Storage: 100 TAF	N/C	N/C	N/C	Low	✓	✓			$84
	Additional Flood Storage: 200 TAF	N/C	N/C	N/C	Medium	✓	✓			$169
	Montgomery Reservoir 150 TAF	N/C	N/C	N/C	Medium	✓	✓			$530
	Enlarged Bear and Burns Reservoir: +85 TAF	N/C	N/C	N/C	N/C					N/A
	Black Rascal Creek Detention Basin: 1~3 TAF									N/A

See Handout

Questions and Discussion

5-Minute Break

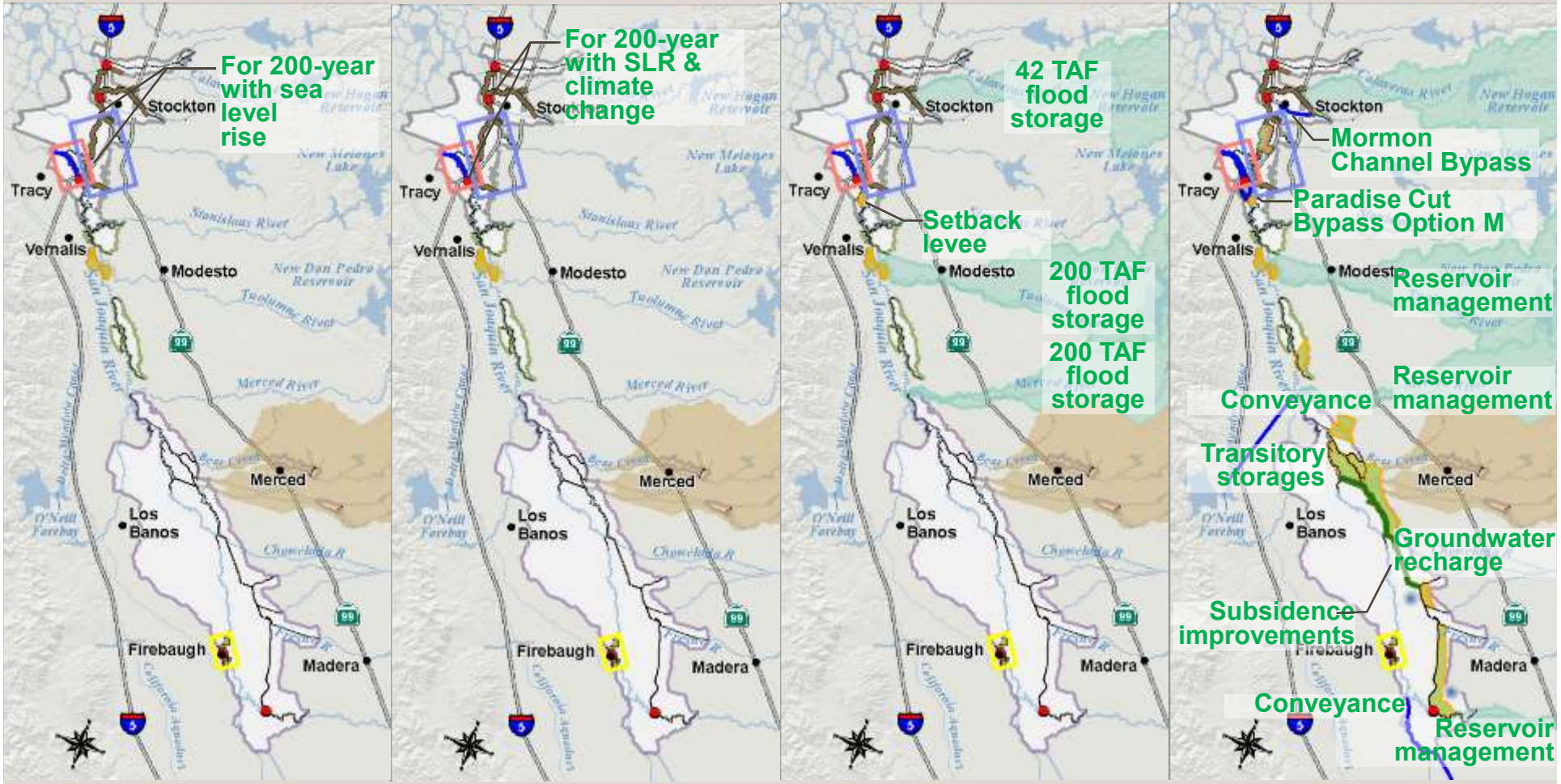
System Configurations

SJ-A
(2012 CVFPP SSIA)

SJ-B
(Raising Urban Levees for Resiliency)

SJ-C
(Flood Storage/ Reoperation)

SJ-D
(Large Scale Enhancement)



Configuration Performance Summary

San Joaquin River Basin-Wide Feasibility Study: Draft System Configuration Performance Summary (2016/05/03)

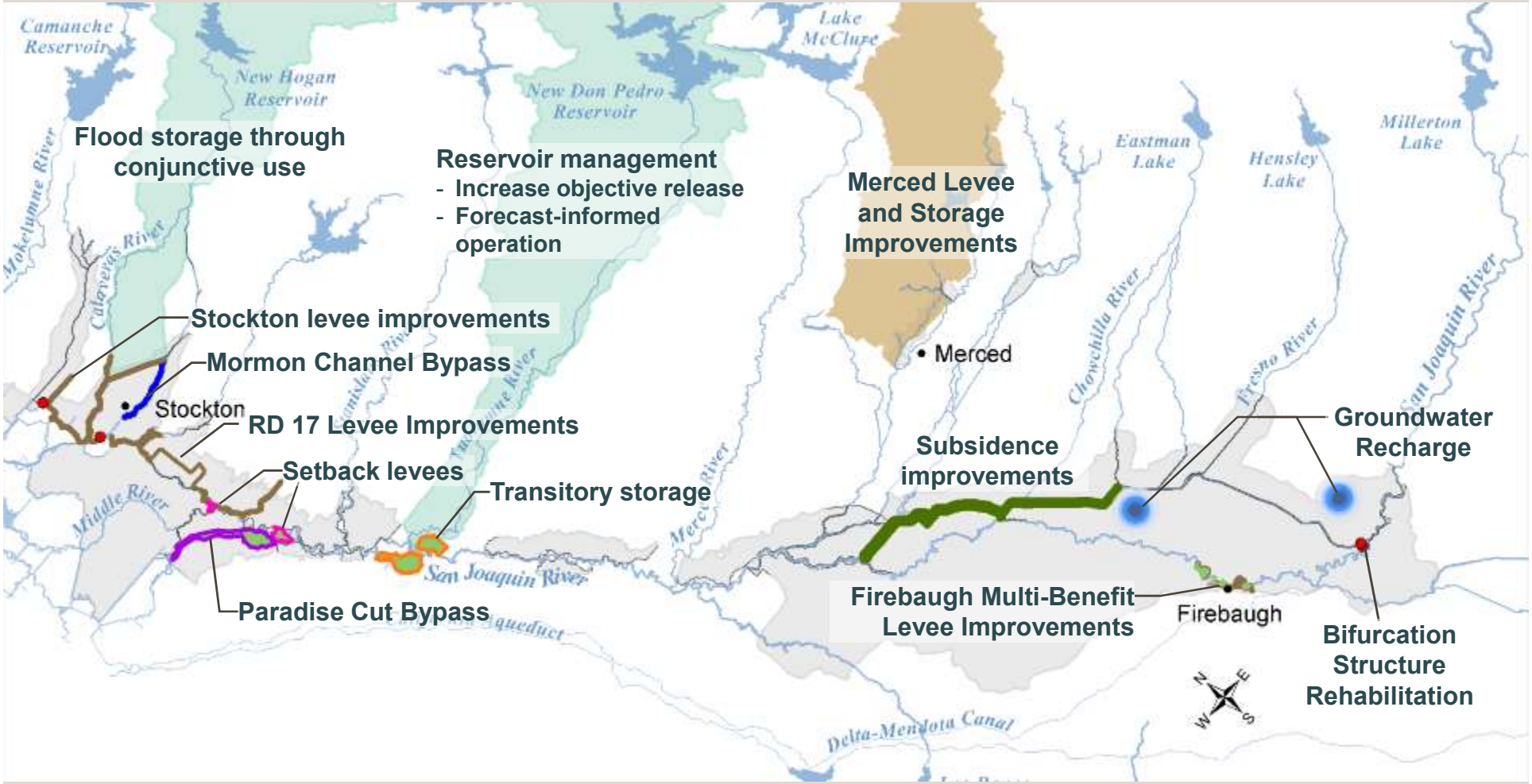
Goal	Foundational Goals	Objective Theme	Metric/Benefit Category	Metric	Baseline	SJ-A 2012 CVFPP SSIA	SJ-B Raising Urban Levees for Resiliency	SJ-C Upstream Storage	SJ-D All Elements	Recommended Plan
Improve Flood Risk Management	Public Safety	Improve Flood System Resiliency (Long-Term with Climate Change)	Urban areas with 200-year LOP	Number of urban impact areas that pass a flood event with climate change with a 2% or less probability of levee failure and have sufficient freeboard along the entire impact area	1 of 18	2 of 18	11 of 18	15 of 18	TBD	TBD
			Small communities with 100-year LOP	Number of small community impact areas that pass a 100-year flood event with climate change with a 2% or less probability of levee failure and have sufficient freeboard along the entire impact area	0 of 2	1 of 2	1 of 2	1 of 2	TBD	TBD
			Reduce stages in urban areas	Average Urban Stage Change (feet)	–	(0.26)	(0.8)	(1.65)	TBD	TBD
			Reduce stages in small communities	Average Small Community Stage Change (feet)	–	(0.52)	(0.52)	(0.32)	TBD	TBD
			Reduce stages in rural-agricultural areas	Average Rural-Agricultural Stage Change (feet)	-	(0.04)	(0.03)	(0.64)	TBD	TBD
			Flood damage reduction	Event-Specific Flood Damages for 200-year event with Climate Change ($ billion)	$16.93	$6.43	$1.99	$1.72	TBD	TBD
			Life loss reduction	Event-Specific Life Loss for 200-year event with climate change (estimated mortalities)	6,525	1,326	274	194	TBD	TBD
Promote Ecosystem Functions	Ecosystem Vitality	Processes	Inundated floodplain	Inundated Floodplain – total amount of land and EAH for 2-Year EAH (acres)	0	578	578	773	>816	773
			Riverine geomorphic processes	River Meander Potential – total amount (acres)	0	1,190	1,190	1,947	>2,466	2,466
		Habitat	SRA c[illegible]	[illegible]parian Lined Bank – total length [illegible]	0	1.6	1.6	2.4	>4.4	4.4
			Riparian & Ma[illegible]	[illegible] Habi[illegible] Amou[illegible]t in floodway (acres)	0	2,566	2,566	2,795	>27,355	2,853
		Stressors	Fish passage [illegible]	[illegible] Passage Barrier – [illegible] of high-flow [illegible]	0	0	0	0	0	0
			Invasive plants	Invasive Plant-Dominated Vegetation in Channel Maintenance Areas – total area (acres)	0	9	9	67	>93	67
Promote Multi-Benefit Projects	Economic Stability	Integrated Water Management	Water supply	Surface Water Benefit (TAF/year)	-	0	0	8	N/A	1
				Groundwater Benefit (TAF/year)	-	0-0.8	0-0.8	0-0.8	N/A	0-30
			Water quality	Improvement in Water Quality	-	Low	Low	Low	N/A	Low
			Navigation	Navigation Benefit	-	Low	Low	Low	N/A	Low
			Commercial fishery	Population Benefit	-	N/A	N/A	N/A	N/A	N/A
			Hydropower	Hydropower Benefit	–	None	None	None	N/A	None
		Ag. Stewardship	Agricultural impact	Ag. land conversion (percentage of total ag land in planning area)		0.7%	0.7%	0.7%	8.5%	0.7%
	Enriching Experiences	Integrate Water Management	Recreation	Potential Visitor use Days per Year	-	15,391	95,300-169,550	95,300-169,550	N/A	>95,300-169,550
			Open space	Residential Parcels within 0.5 mile of Configuration Boundary	-	1,759	5,619	5,619	N/A	>5,619
Cost Efficiency	Annual O&M and repair costs			$ million	$28	$28	$28	$28	$28	$28
	Total Capital Costs			$ billion	-	$0.9	$1.1	$1.4	>$8.7	$2.0
	Annualized Capital Cost (Interest Rate = 8%, 50 year planning period)			$ million	-	$58	$70	$115	>$582	$156

N/A = Not available
TBD = To be determined

WORKING DRAFT – Subject to Revision. Not for Distribution.

See Handout

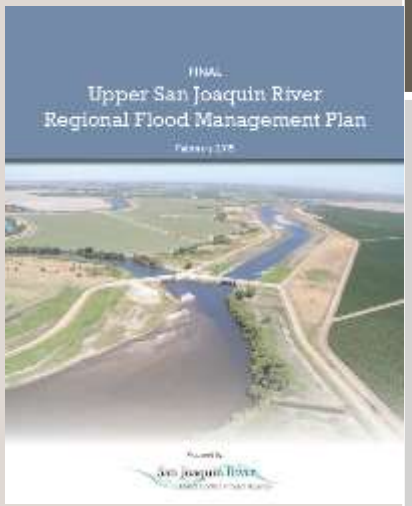
Tentative Recommended Plan



Tentative Recommended Plan Outcomes

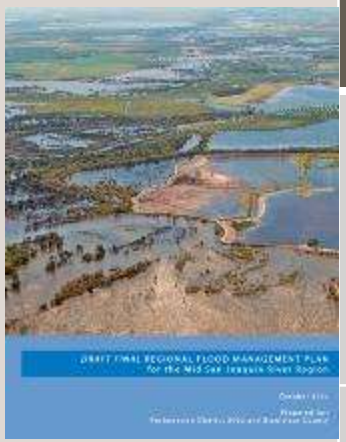
- **95%** life loss reduction from 200-year event with climate change
- **1-3 feet** stage reduction in urban and rural areas
- Flood protection for disadvantaged small communities like Firebaugh
- Almost **3,000 acres** of riparian and wetland habitats
- **Almost 800 acres** of inundated floodplain habitat
- Up to **30,000 acre feet** of water supply/year
- **100,000+** potential recreation visitor use days/year

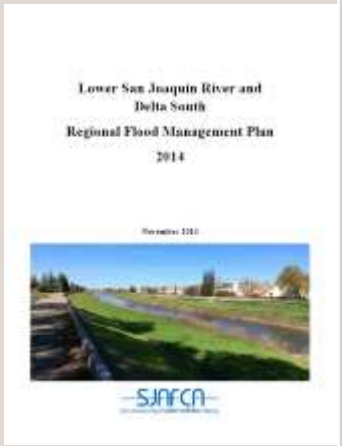
Alignment with RFMPs



Region	Key Regional Priorities	BWFS Tentative Recommended Plan
Upper San Joaquin	Small Community Level of Protection for Firebaugh	✓
	Urban Level of Protection for Merced	✓
	Groundwater Recharge	✓
	Subsidence Improvements	✓
	Hydraulic Structure Improvements	✓

Alignment with RFMPs

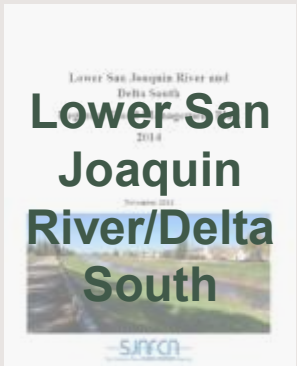


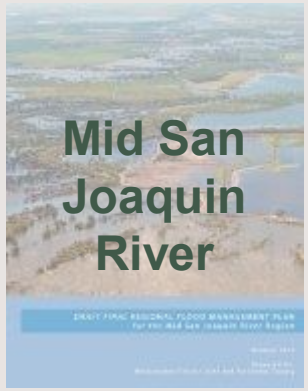


Region	Key Regional Priorities	BWFS Tentative Recommended Plan
Mid-San Joaquin	Multi-Benefit Transitory Storage	✓
	Improve Upstream Reservoir Operations	✓
Lower San Joaquin/ Delta South	Urban Level of Protection for Stockton, Lathrop/Manteca	✓
	Calaveras River Watershed Reservoir Operations/Flood Storage	✓
	Multi-benefit Bypasses for Resiliency	✓
	Multi-benefit Projects Near Vernalis Corridor	✓

Stakeholder Engagement

Regional Flood Management Planning





Federal Agencies

U.S. Army Corps of Engineers

U.S. Department of the Interior
Bureau of Reclamation

Reservoir Operators

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Audubon

Trout Unlimited

NRDC
The Earth's Best Defense

Central Valley Flood Protection Board

Central Valley Flood Protection Board
Public Safety
With Flood Protection
State of California

Key Findings

- San Joaquin River Basin resource problems are likely to get worse in the future with climate change, sea-level rise and subsidence.

- A diverse portfolio of management actions is needed to provide flood system resiliency and achieve CVFPP goals. Potential synergies across actions require systems approach.

- Paradise Cut bypass expansion can provide significant stage reduction and ecosystem restoration benefits

Key Findings

- Stockton has largest flood risk in entire basin. Levee improvements, floodwalls and closure structures likely most effective actions to address highest risk areas.

- Significant multi-benefit opportunities exist to restore floodplain and riparian habitats along San Joaquin River corridor. Opportunities tempered by hydrologic alterations and limitations that result in limited floodplain inundation.

- Floodplain transitory storage can provide wise use of the floodplain because of its ability to provide nonstructural risk reduction and important ecosystem restoration benefits.

Key Findings

- Tuolumne River watershed is the most promising watershed for potential reservoir management actions.
- A small amount of additional flood storage could significantly reduce stages for large flood events along Calaveras River.
- Groundwater recharge has limited potential to reduce flood stages, but can play a role in mitigating future subsidence.
- In Firebaugh, multi-benefit opportunities exist and are much more likely to achieve potential State interest than single-purpose flood improvements.

Next Steps

- San Joaquin River BWFS Report Stakeholder Draft - Late Summer/Early Fall 2016
- San Joaquin River BWFS Report Revised Draft – Date TBD
- BWFS recommendations/findings integrated with 2017 CVFPP Update
- Further coordination/refinement through 2017 CVFPP Update

Questions and Discussion

Closing Comments