

Ecosystems Services Approach Toward Assessing Benefits of Flood Planning

The Central Valley Flood Protection Project

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2017 ROADMAP

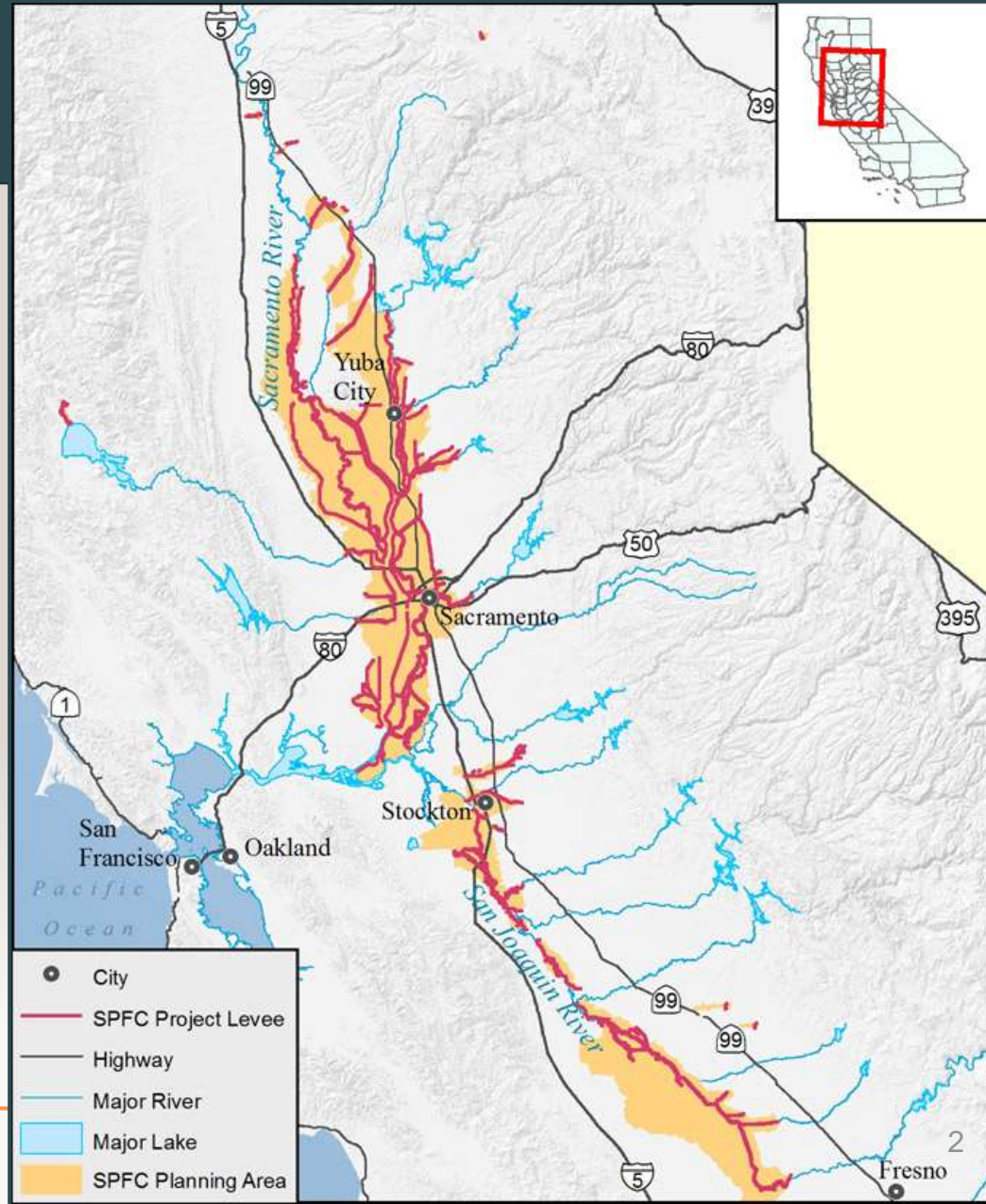


Overview

- CVFPP context
- Basin-Wide Feasibility Studies
 - Assessment Methods
 - Recommendations

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CVFPP Context: A Stressed System, the Need for Action

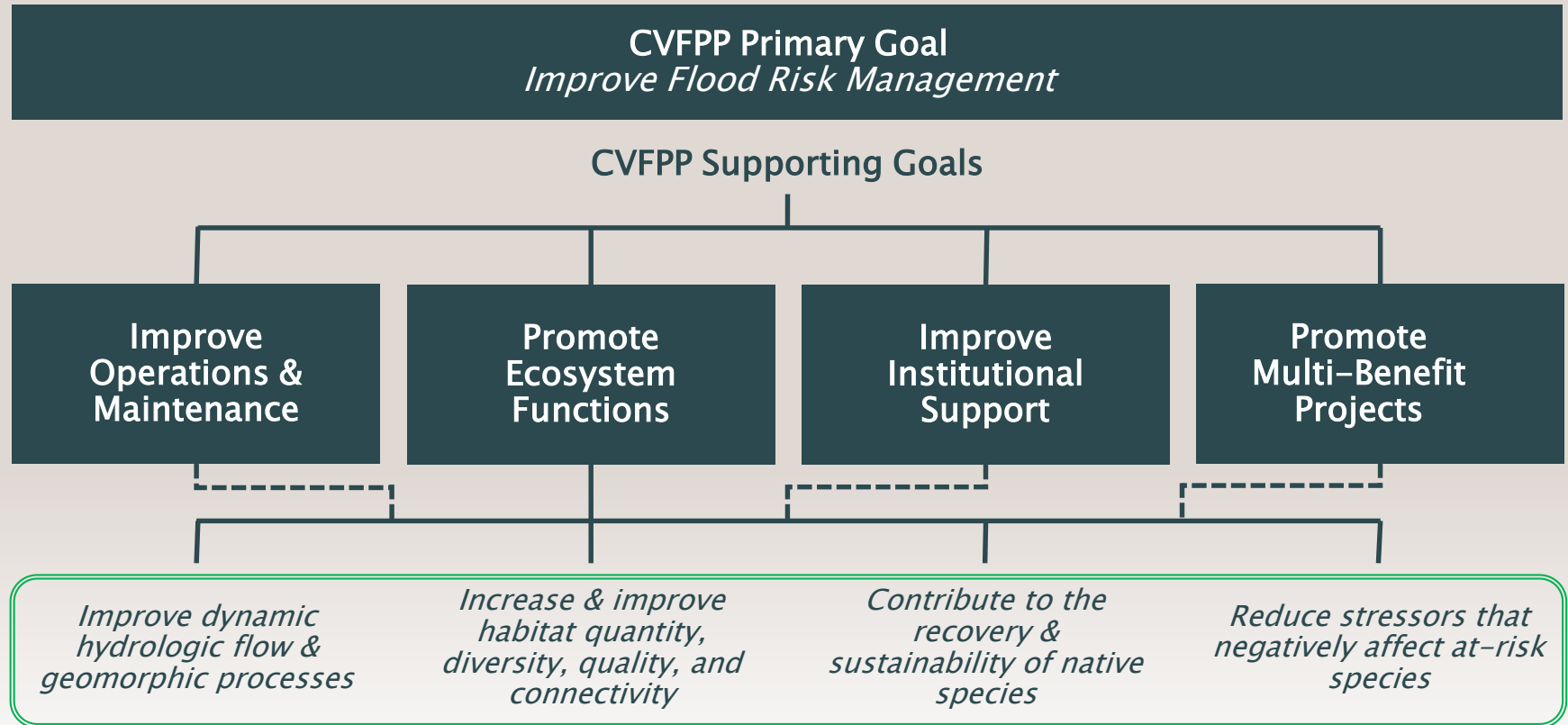
- Central Valley people, property and assets at risk
- Current flood risk management path unsustainable
- Lack of funding for capital works and for ongoing operations and maintenance of existing infrastructure
- In 2008, the Legislature enacted the Central Valley Flood Protection Act, which authorized and required development of the Central Valley Flood Protection Plan (CVFPP) to address these issues



State of California

Central Valley Flood Protection Plan (CVFPP)

Benefitting Floodplain and Riverine Ecosystems is a CVFPP Goal



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CVFPP Seeks to Provide a Range of Benefits



Flood risk
management



Ecosystem
Restoration

Water supply and
water quality



Recreation and
open space



Hydropower



Navigation

Commercial
fisheries



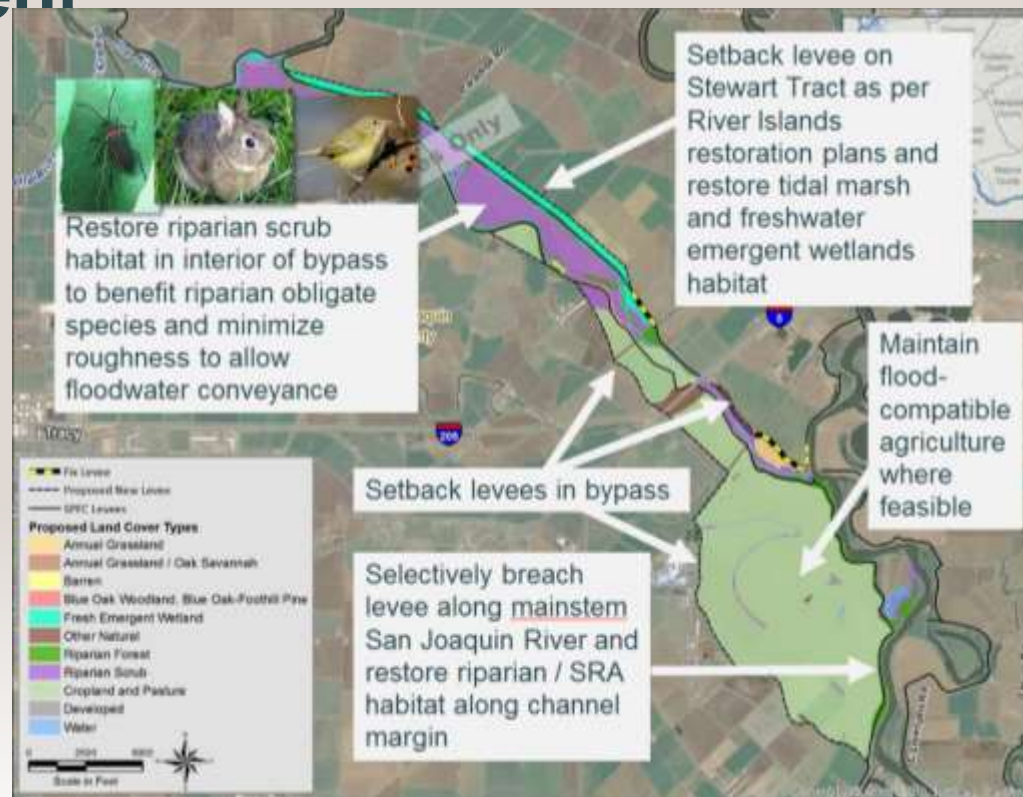
Social and regional
economic effects



Basin-Wide Feasibility Studies

Ecosystem Restoration Concepts Consistent with Flood management

- Bypass improvements
- Levee setbacks
- Transitory storage areas

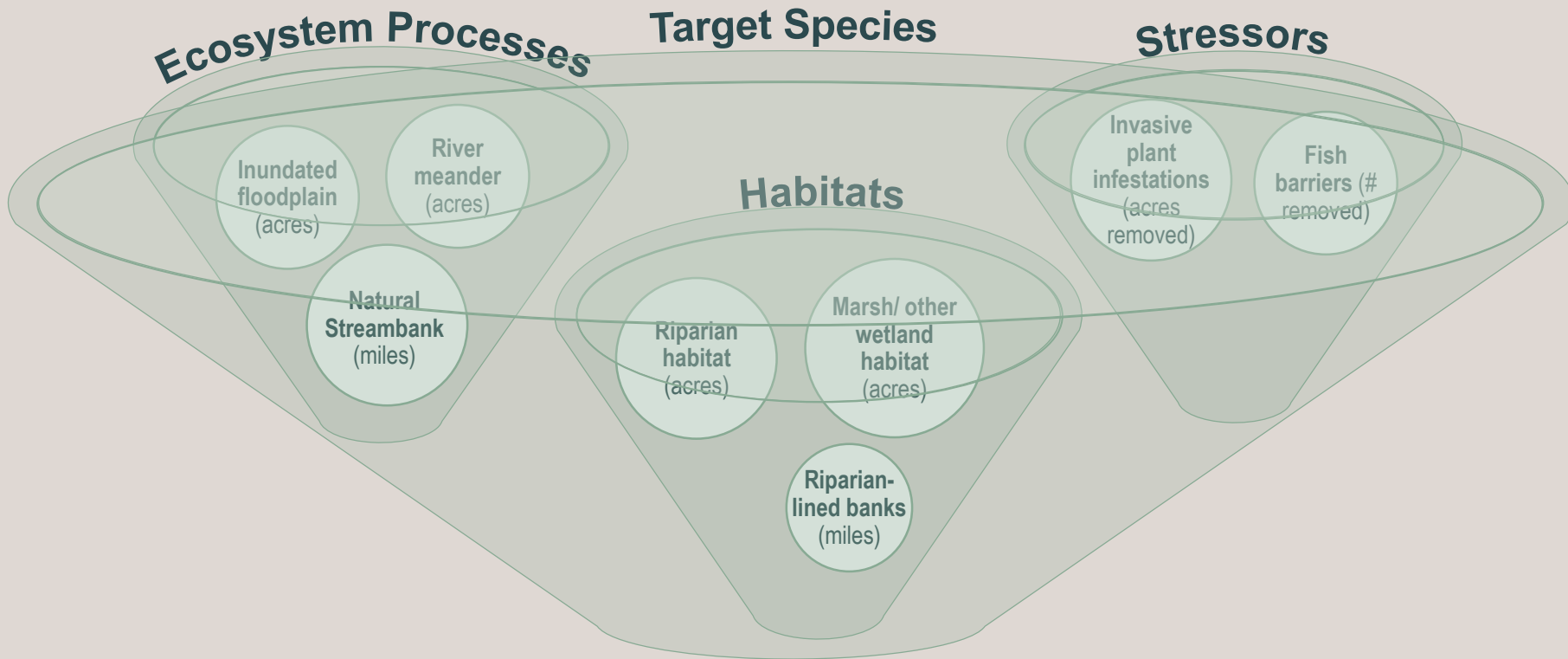


Ecosystem Restoration Benefit Assessment Methods - Key influences

- Conservation Strategy
 - Defines the objectives for managing the ecosystem in the public interest
- Habitat Equivalency Analysis (HEA)
 - Provides the framework and guidance for quantifying gains and losses in ecosystem services
- California Rapid Assessment Method (CRAM)
 - Basis for the ecological metrics for quantifying the gains and losses in ecosystem services

Methods

Conservation Strategy Goals and Metrics



Methods - Key concepts

- Functions vary with hydrologic process:
floodplain inundation

Riparian plantation



Riparian inundation



Methods - Key concepts

- Functions vary with geomorphic process:
river meander

Reveted river



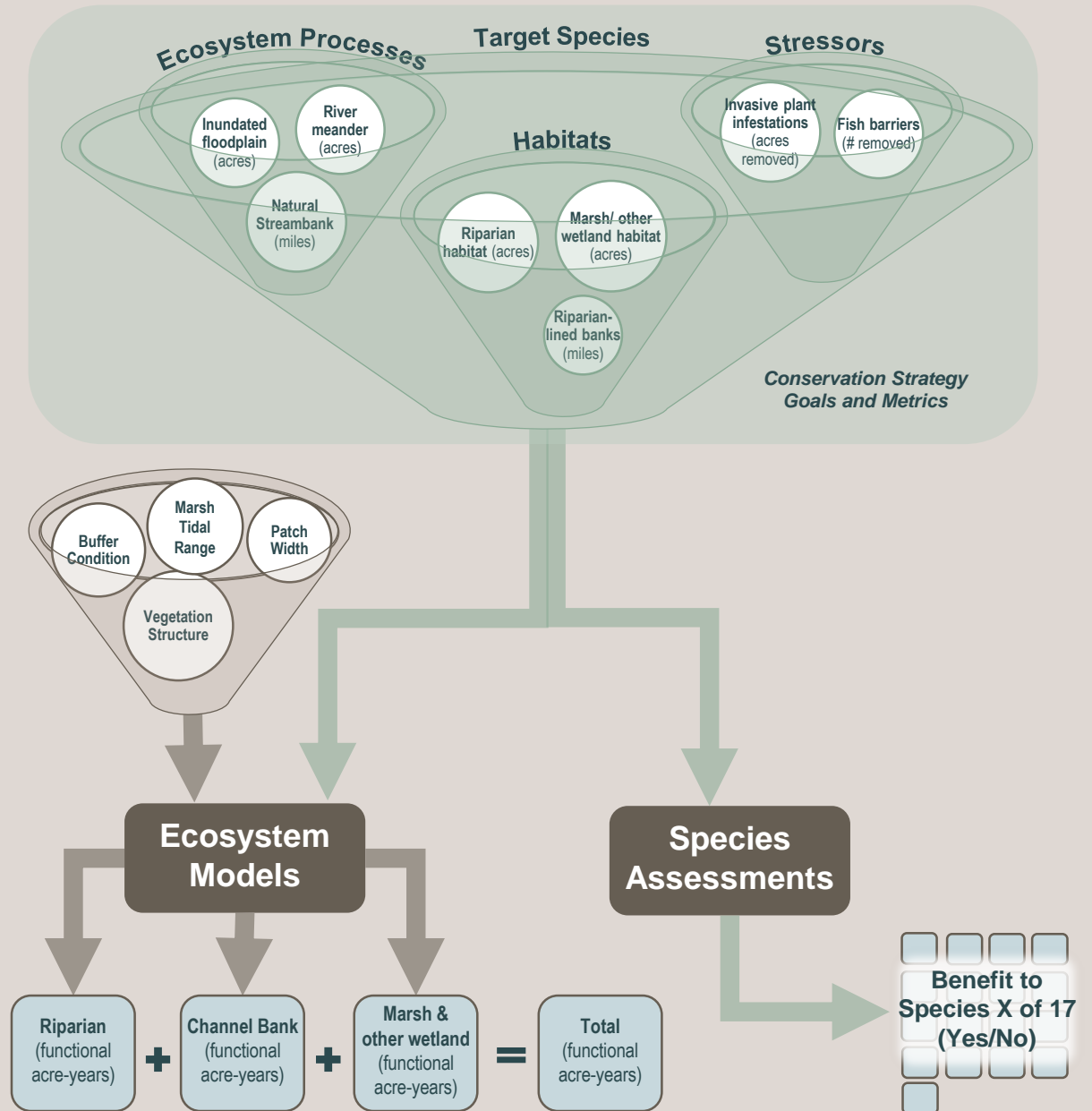
Meandering river



Methods

Ecosystem (Habitat) Models

- Riparian
- Marsh & other wetland
- Channel bank



Methods

Structure for all models

Functional
Acres

$$= f [Acreage \times (Process + Structure + Landscape + R)]$$



Methods

Variables

1. Ecosystem Process Variables

- Floodplain inundation (Expected Annual Habitat)
- Meander potential, presence vs. absence
- Tidal range

2. Structure Variables

- Width
- Vegetation structure development
- Invasive plant dominance
- Crop type
- Shading vegetation type

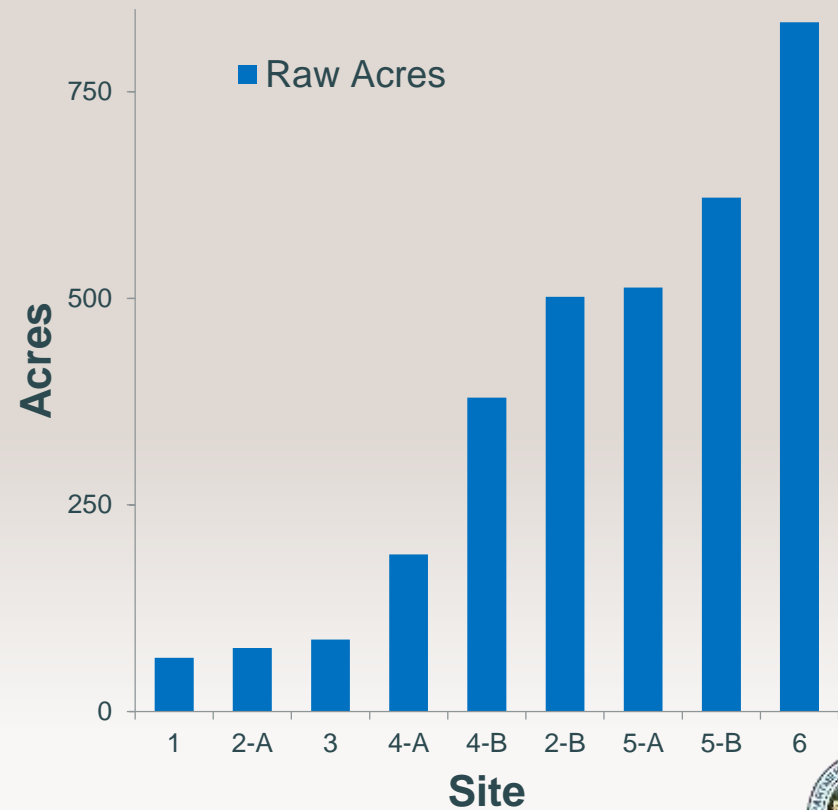
3. Landscape Variable - buffer condition

4. Remainder Variable - residual value

Results

Raw Acres vs. Fully Functional Acres

*Net increase in Riparian
Scrub/Woodland Acreage*



2017 ROADMAP

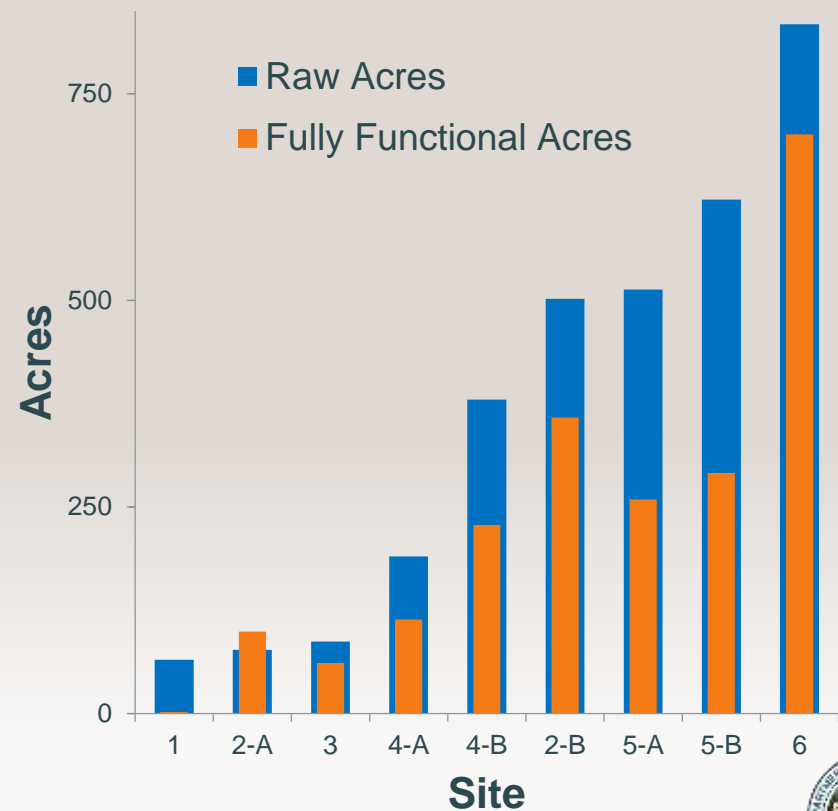


Results

Raw Acres vs. Fully Functional Acres

- Ecological processes (inundation, meander potential) contribute to functionality

*Net increase in Riparian
Scrub/Woodland Acreage & Function*



Recommended Applications

- Assess cost/benefit of restoration
- Refine or optimize the restoration concepts
- Potential yardstick for compliance or effectiveness monitoring
- Assess the potential for a Conservation Strategy target species to use a location
- Identify target species with unmet conservation needs

The Path Forward

- Need to change how we think about flood risk management
- 2017 Update will refine the 2012 CVFPP and provides a holistic path forward to a different approach
- The refined approach enables the State to integrate and prioritize investments in multi-benefit flood risk reduction projects
- CVFPP will take 30 years to implement at a cost of approximately \$20 Billion



References and Resources

Primary References

- Central Valley Flood System Conservation Strategy (DWR, 2015)
- Handbook for Assessing Value of State Flood Management Investments (DWR, 2014)
- California Rapid Assessment Method (California Wetland Monitoring Workgroup, 2013)

Other Resources

- Habitat Equivalency Analysis: An Overview (NOAA, 2006)
- Application of Habitat Equivalency Analysis to USACE Projects (Ray, 2009)