Assessing the Ecological Benefits of River and Floodplain Restoration

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Presentation Overview

Background

- Central Valley Flood Protection Plan (CVFPP) context

Assessment Rationale

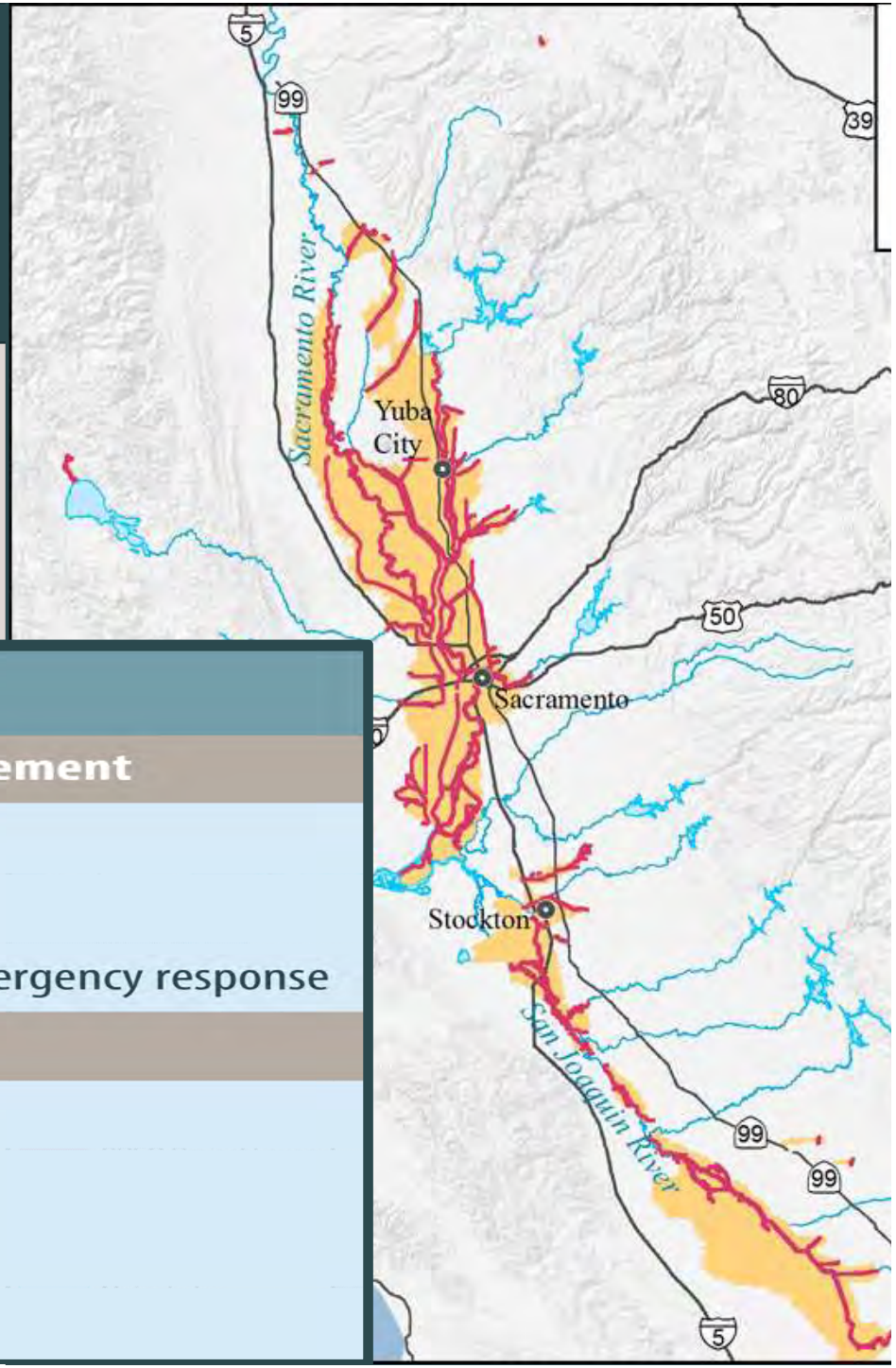
- Key influences and concepts

Assessment

- Methods
- Results
- Conclusions and Recommendations

Background

CVFPP

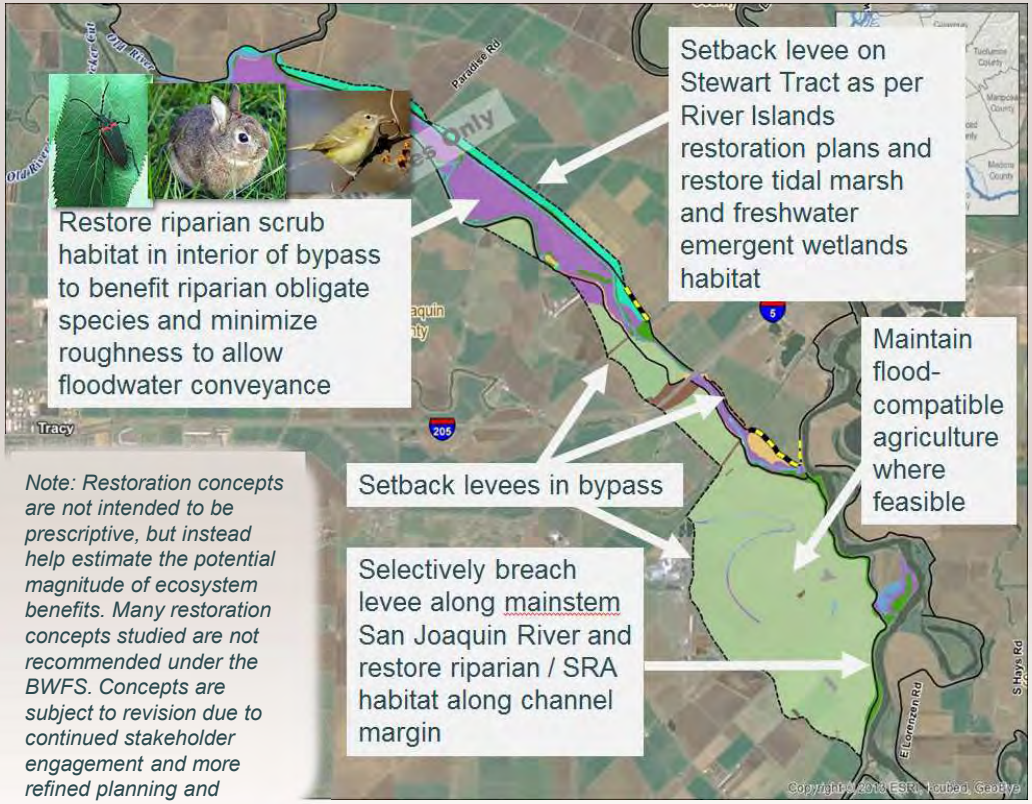


CVFPP GOALS
Primary Goal: Improve flood risk management
Reduce the chance of flooding
Reduce damages once flooding occurs
Improve public safety, preparedness, and emergency response
Supporting Goals
Improve Operations and Maintenance
Promote Ecosystem Functions
Promote Multi-benefit Projects
Improve Institutional Support

Basin-Wide Feasibility Studies

Ecosystem Restoration Concepts

- Bypass improvements
- Levee setbacks
- Transitory storage areas



Note: Restoration concepts are not intended to be prescriptive, but instead help estimate the potential magnitude of ecosystem benefits. Many restoration concepts studied are not recommended under the BWFS. Concepts are subject to revision due to continued stakeholder engagement and more refined planning and analysis.

Assessment Rationale

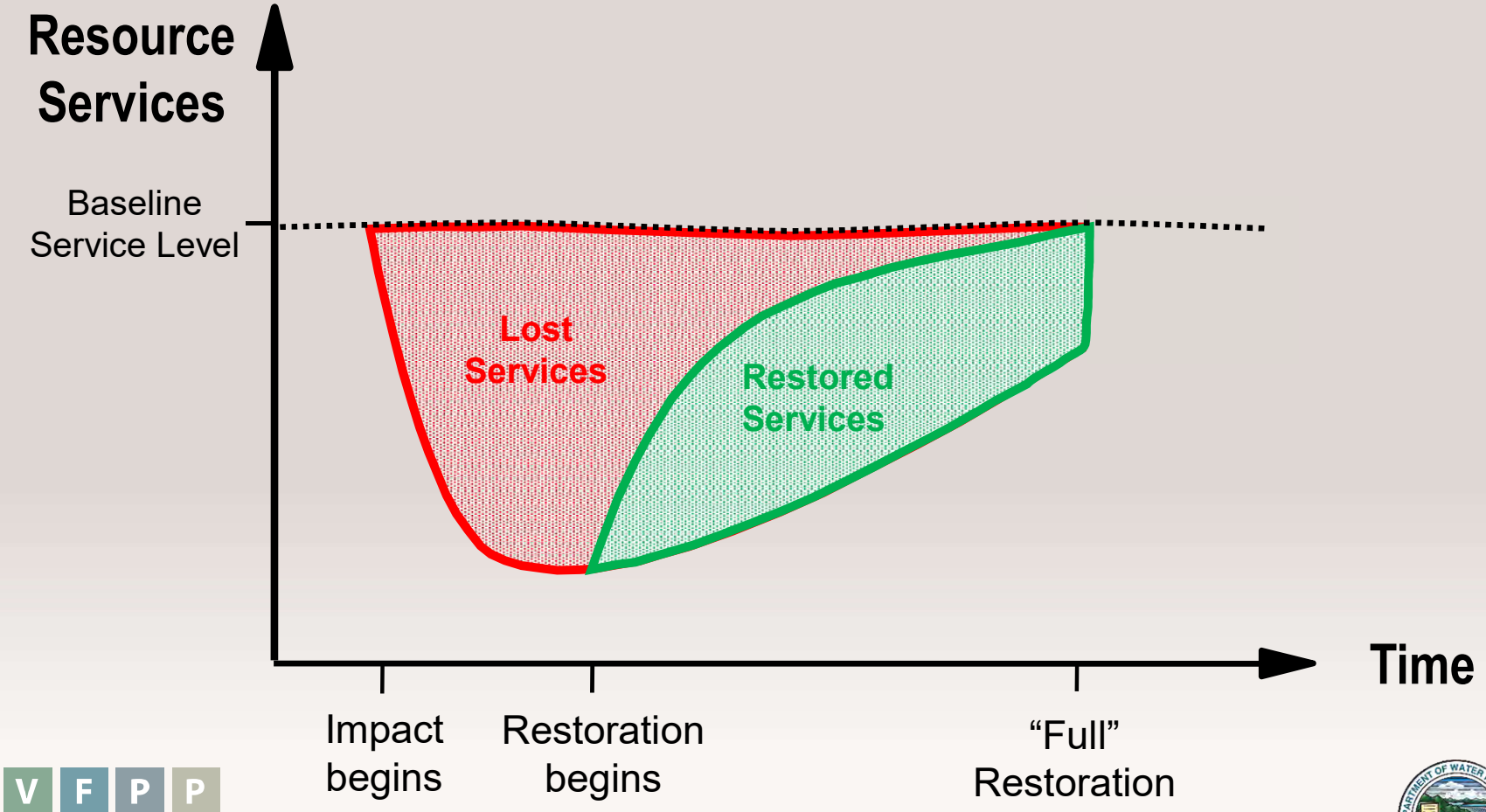
- **Key influences**
- **Key concepts**

Key influences

- Draft Central Valley Flood System Conservation Strategy (DWR 2016)
- California Rapid Assessment Method (CRAM, SFEI 2013)
- Habitat Equivalency Analysis (HEA)

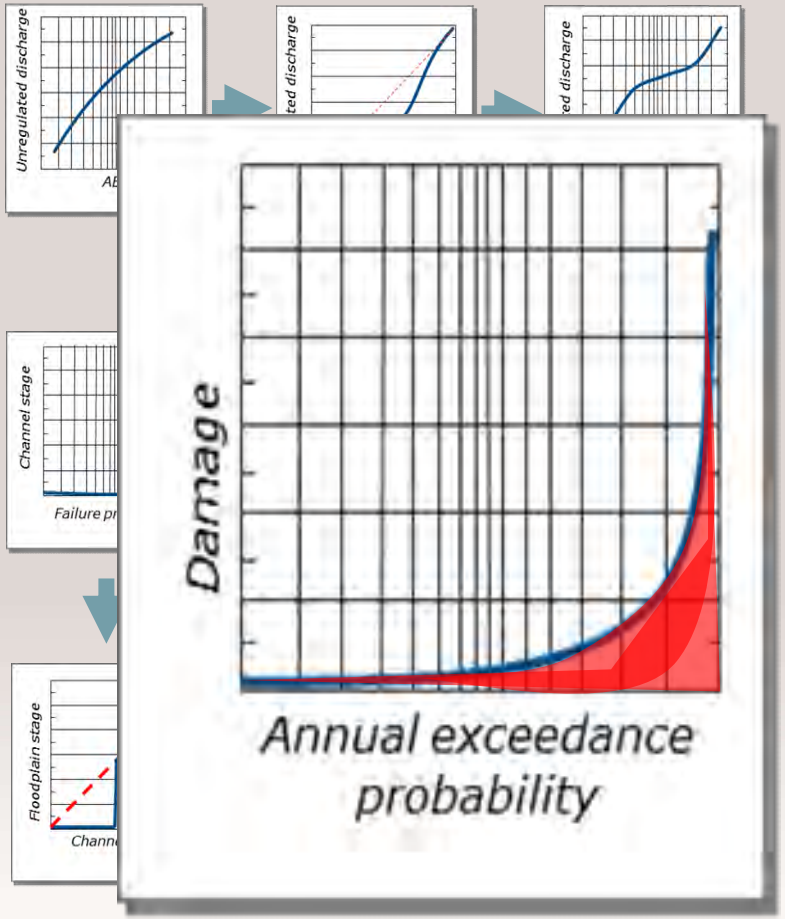
Key concepts

Habitat / Resource Equivalency Analysis

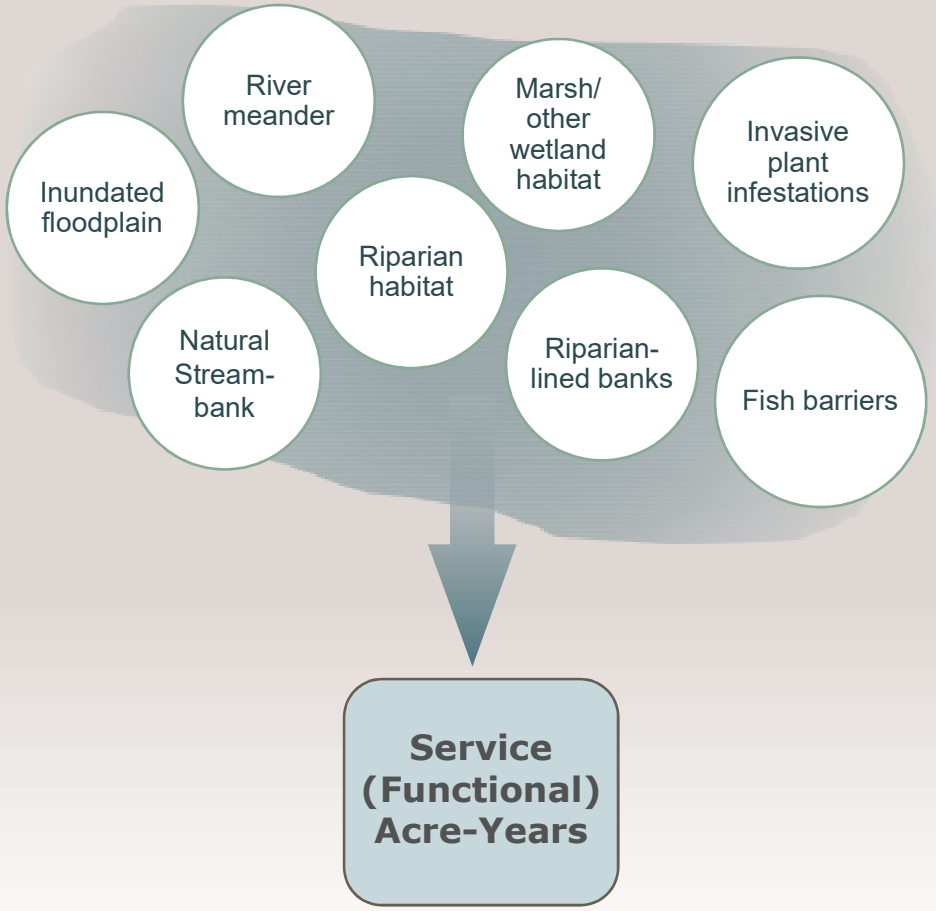


Key concepts

Flood Risk



Ecosystem Function



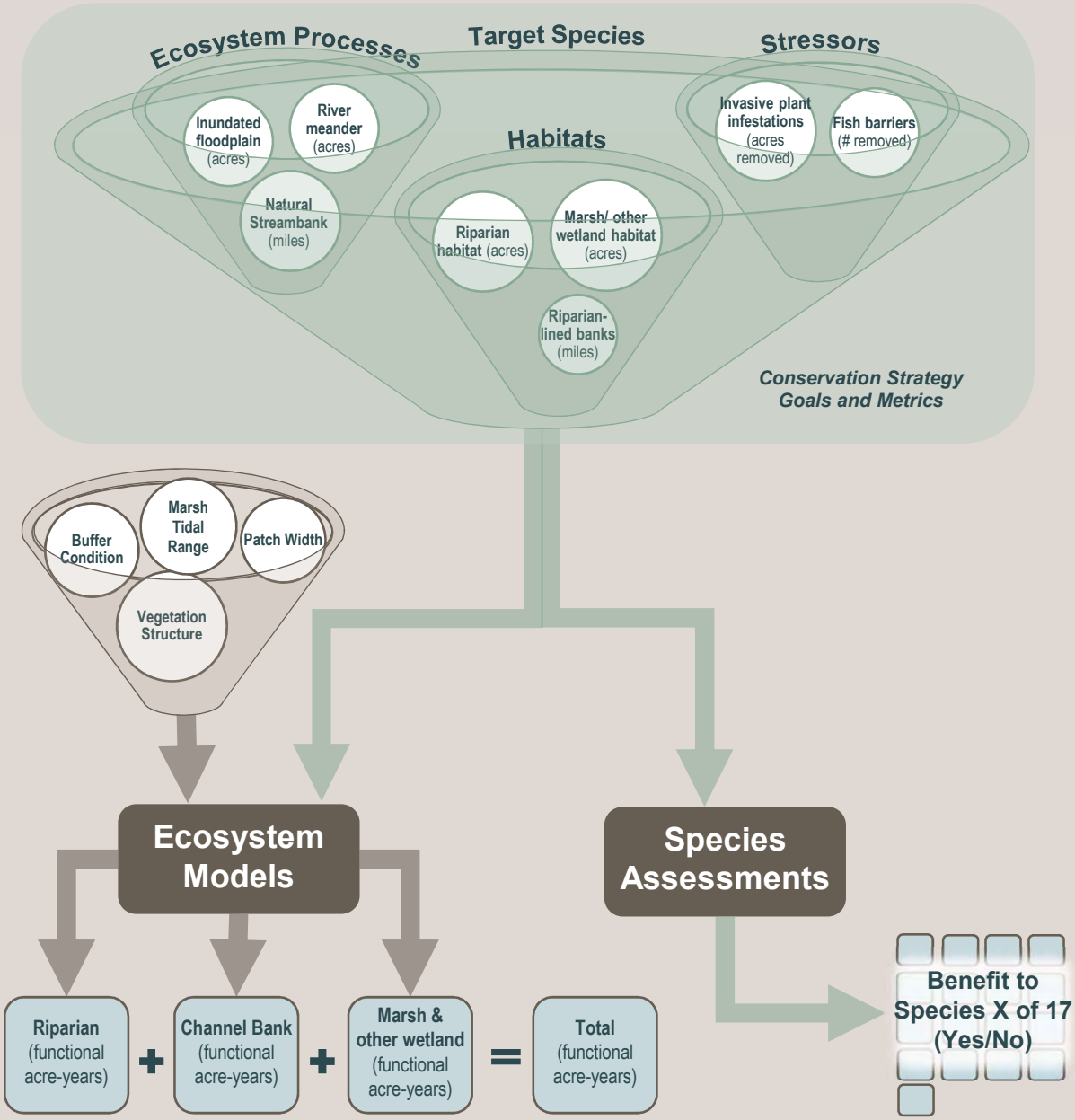
Assessment

- **Methods**
- **Results**
- **Conclusions and Recommendations**

Methods

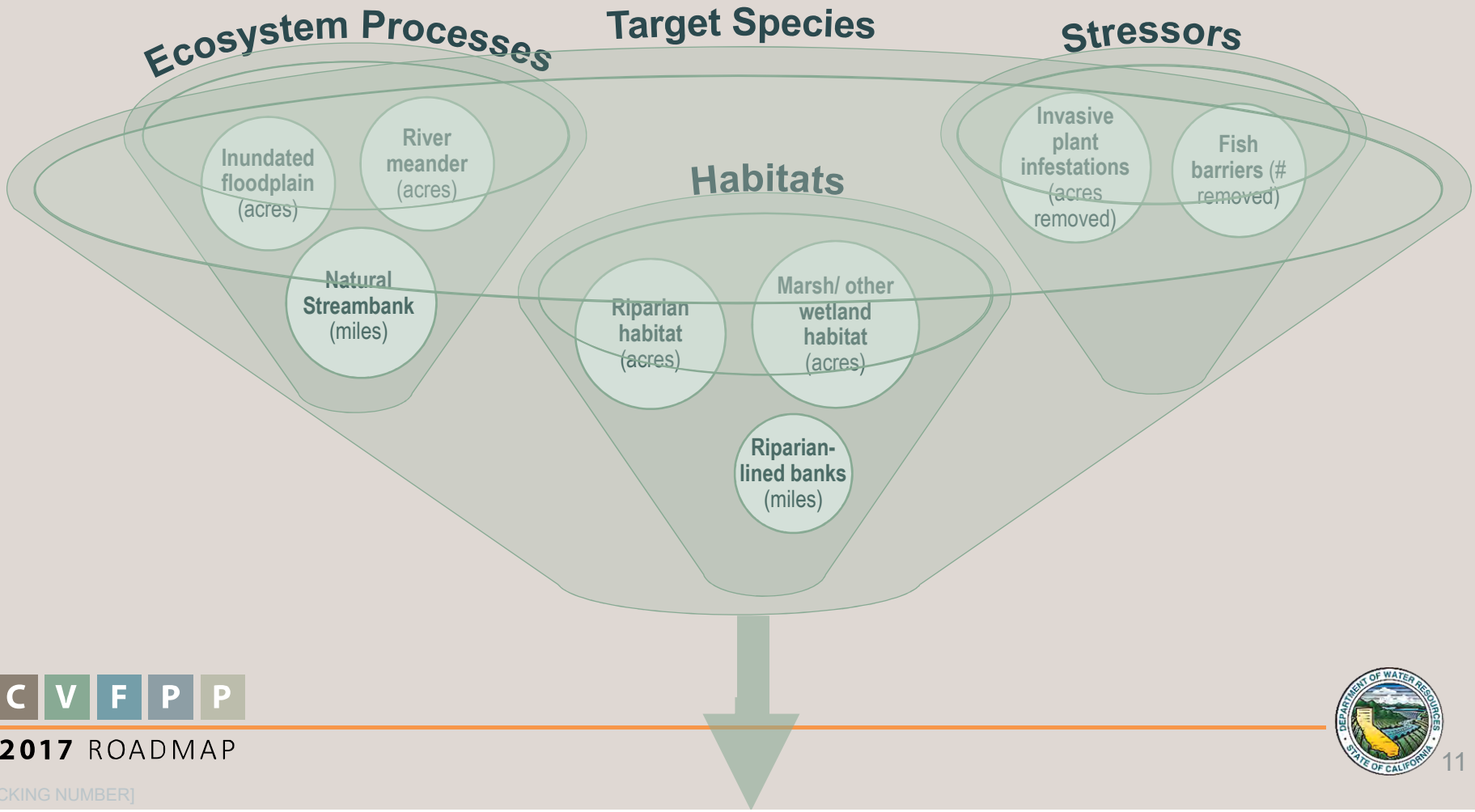
Models

- Riparian
- Marsh & other wetland
- Channel bank

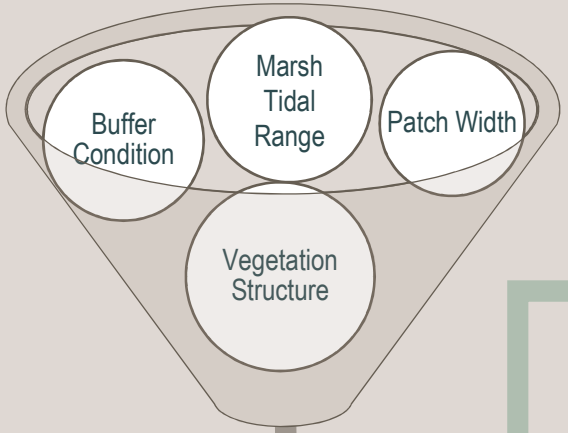


Methods

Conservation Strategy Goals and Metrics



Methods



Ecosystem Models

Species Assessments

Riparian (functional acre-years) + **Channel Bank** (functional acre-years) + **Marsh & other wetland** (functional acre-years) = **Total** (functional acre-years)

Benefit to Species X of 17 (Yes/No)

Methods

Variables – Riparian model

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

Methods

Structure for all models

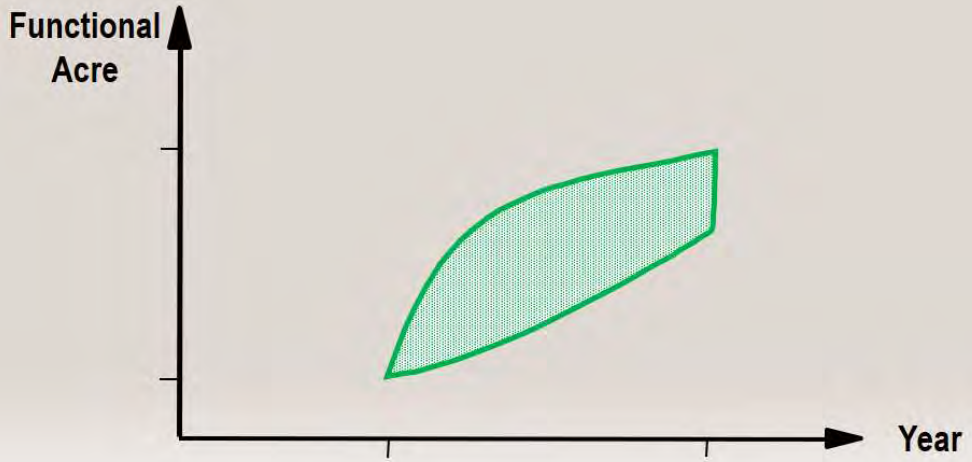
Functional Acre $\approx f\,[\,Acreage \times (Process + Structure + Landscape + R)\,]$

Methods

Deriving functional acre-years

Functional Acre $\approx f\,[\,Acreage \times (Process + Structure + Landscape + R)\,]$

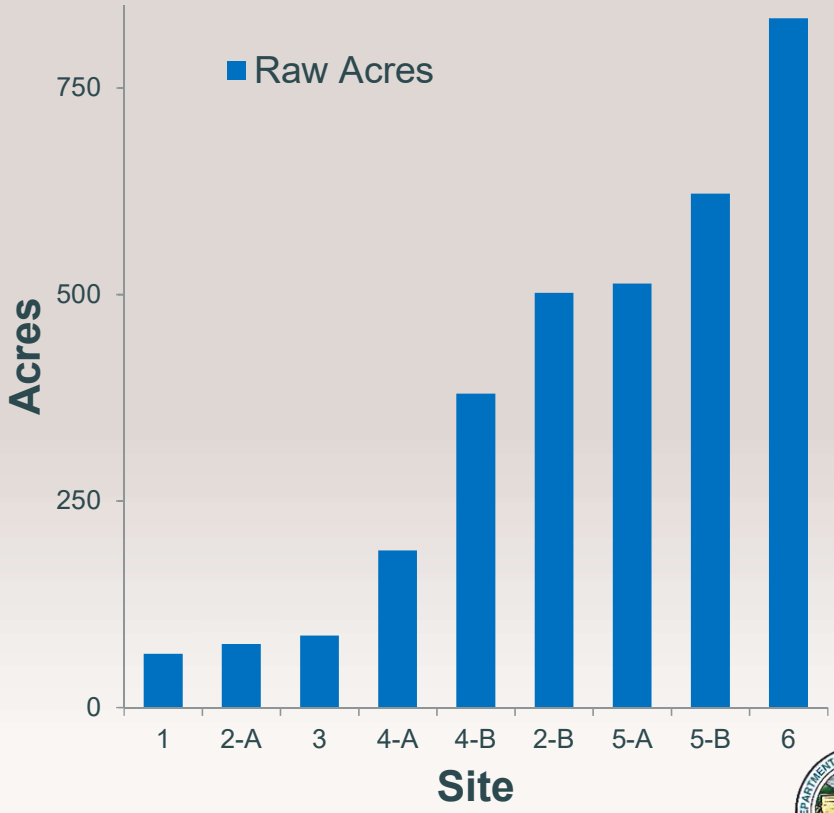
Functional Acre-Years $= \sum_{First\ time\ interval}^{Last\ time\ interval}$ **Functional Acre**



Results

Raw Acres vs. Functional Acres

Net increase in Riparian Scrub/Woodland Acreage

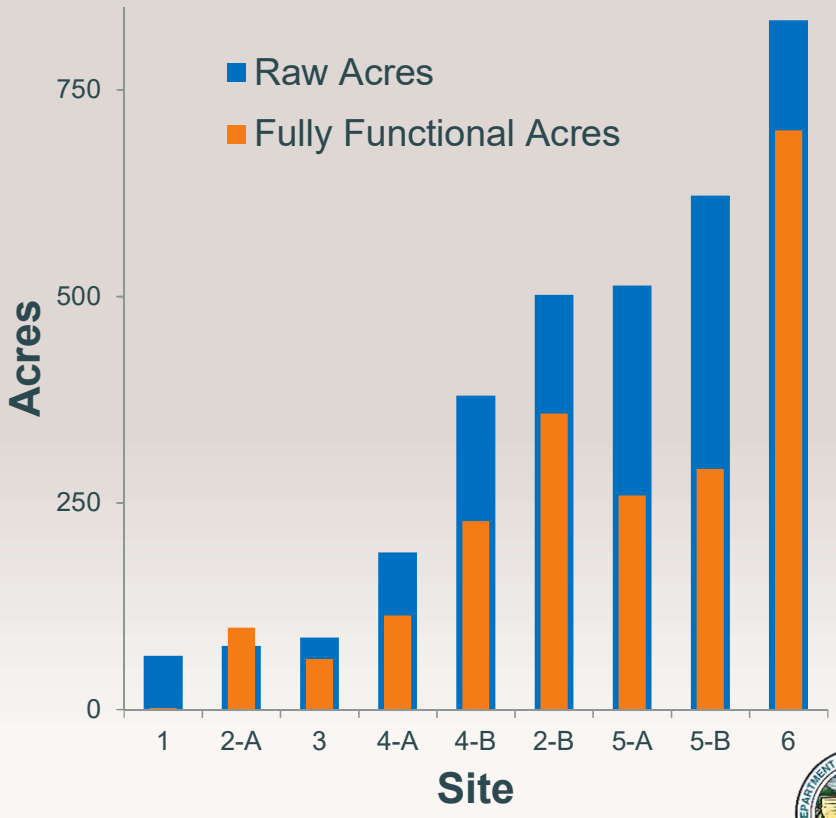


Results

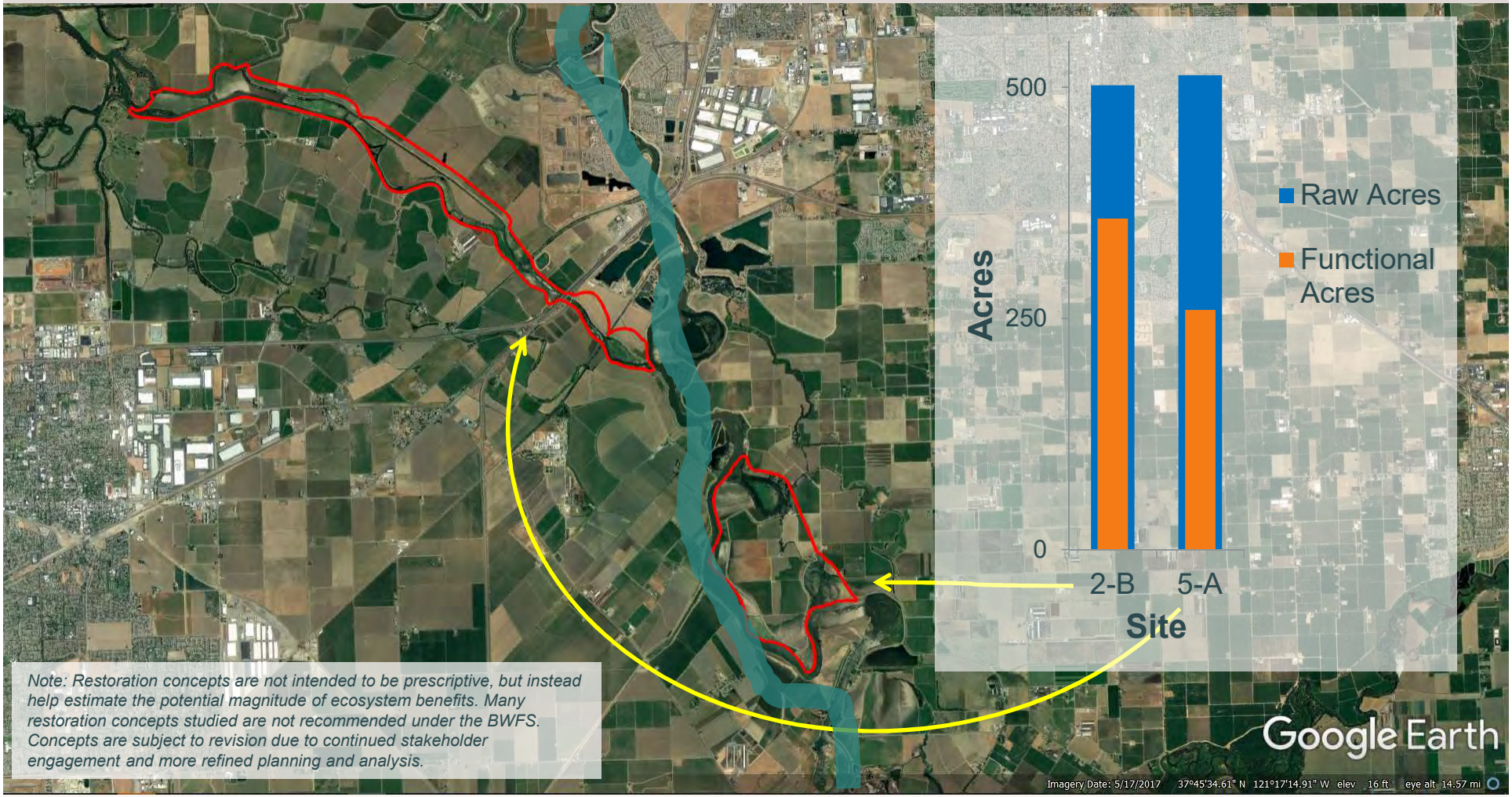
Raw Acres vs. Functional Acres

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

Net increase in Riparian Scrub/Woodland Acreage & Function



Results

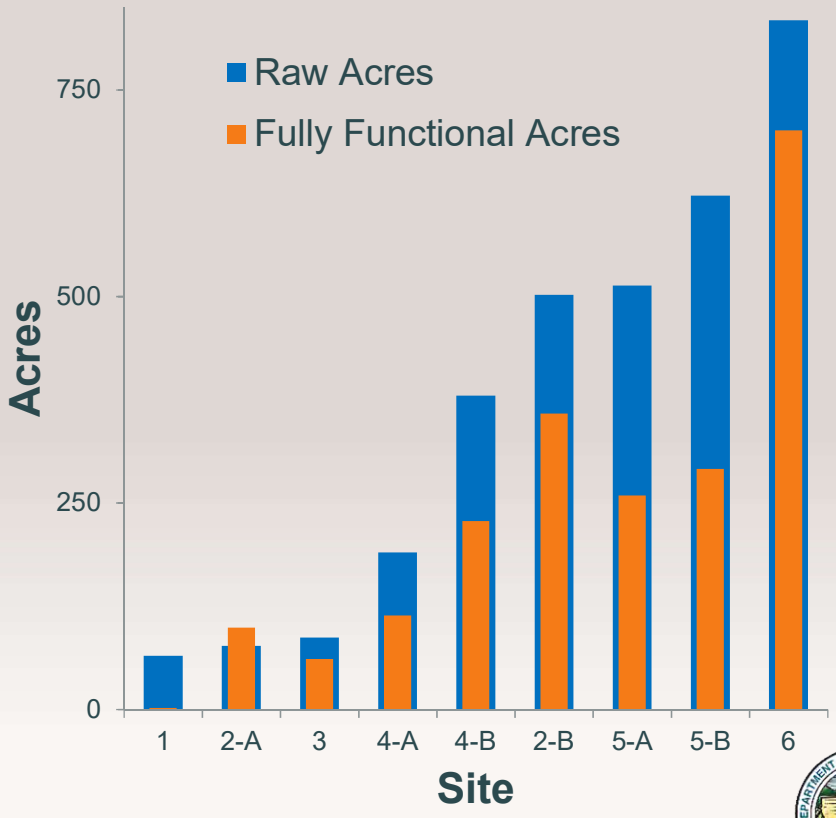

500
250
0
Acres
Raw Acres
Functional Acres
2-B
5-A
Site
Note: Restoration concepts are not intended to be prescriptive, but instead help estimate the potential magnitude of ecosystem benefits. Many restoration concepts studied are not recommended under the BWFS. Concepts are subject to revision due to continued stakeholder engagement and more refined planning and analysis.
Google Earth
Imagery Date: 5/17/2017 37°45'34.61" N 121°17'14.91" W elev 16 ft eye alt 14.57 mi

Results

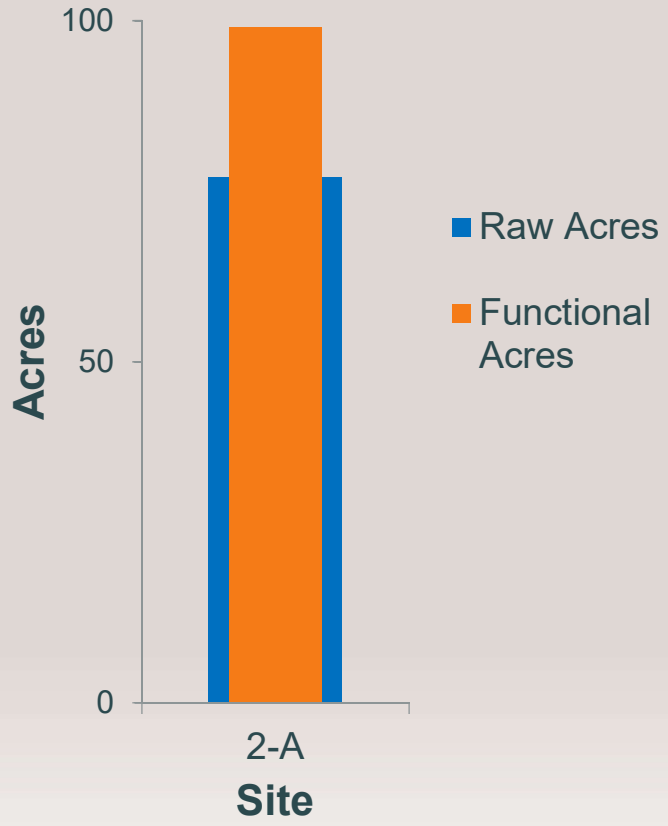
Raw Acres vs. Functional Acres

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

Net increase in Riparian Scrub/Woodland Acreage & Function



Results



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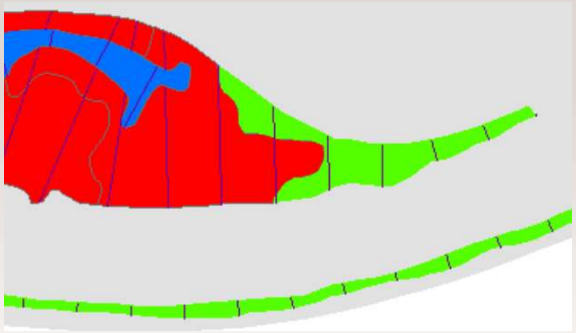
CVFPP

2017 ROADMAP

Conclusions of Expert Review

- Reconsider weightings of variables
- Enhance site-scale attributes
  - Reduce patch size/shape bias
  - Include corridor width
  - Measure continuity of functional habitat



Recommended Applications

- Quantify restoration uplift
- Assess restoration cost effectiveness
- Refine or optimize the restoration concepts
- Potential yardstick for compliance or effectiveness monitoring

References and Resources

Primary References

- Draft Central Valley Flood System Conservation Strategy (DWR, 2016)
- 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)