Assessments for Riparian Environments to Inform The Design of Riparian Restoration Projects

Tom Griggs, Ph.D.
River Partners

Outline

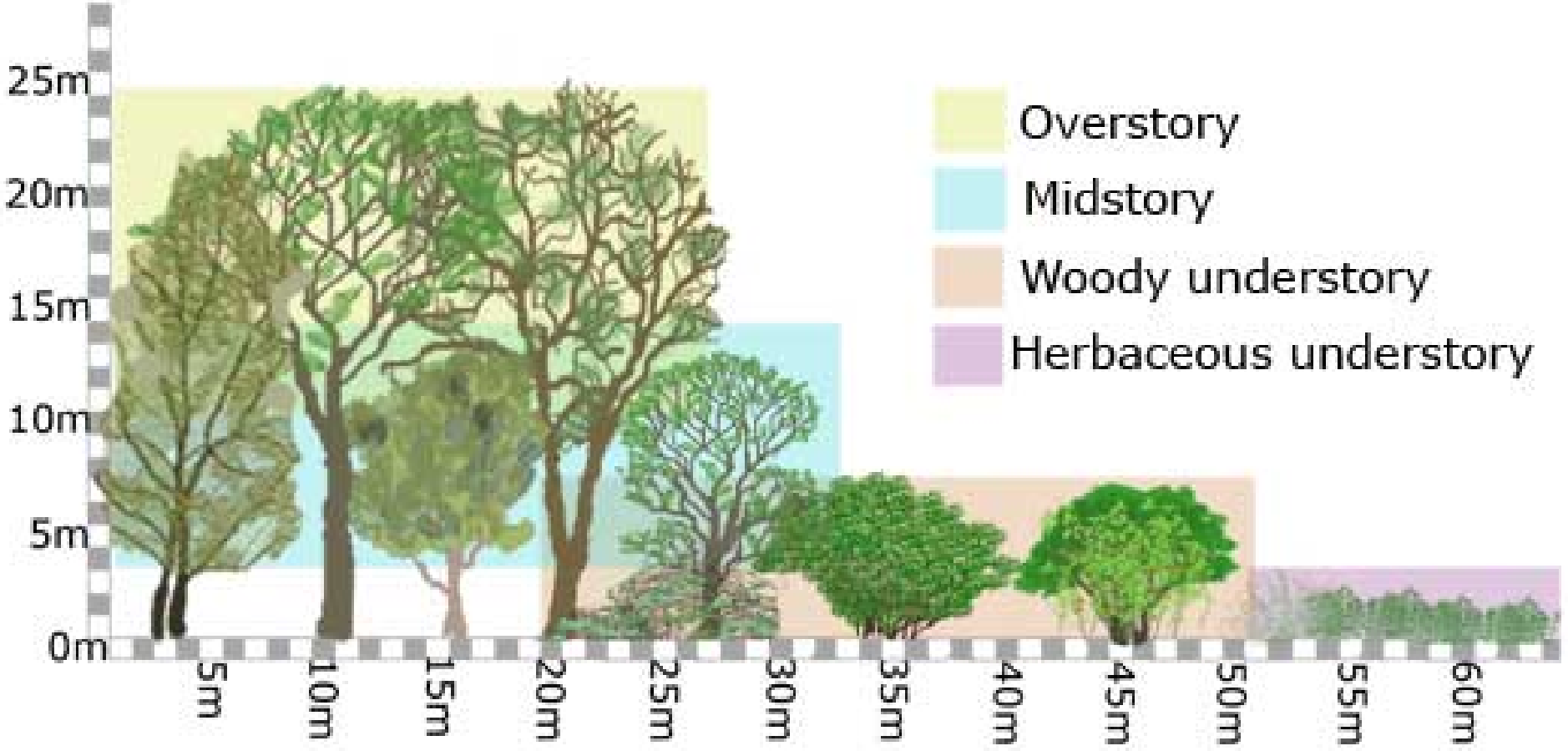
- 1. Introduction – Riparian Vegetation grows on Floodplains.
  - Definitions: Plant Community and Vegetation
  - Large Rivers in the Central Valley with very Narrow Floodplains, i.e., between Flood-Control Levees.
  - Restoration of Vegetation as Wildlife Habitat
  - Planting and Maintenance – Irrigation and Weed Control for 3 years.

- 2. Assessment for Horticultural Potential of the SITE
  - Soils Description
  - Site-specific Hydrology – Flooding patterns, depth to water table.
  - Historic Land-Use
  - Existing Vegetation

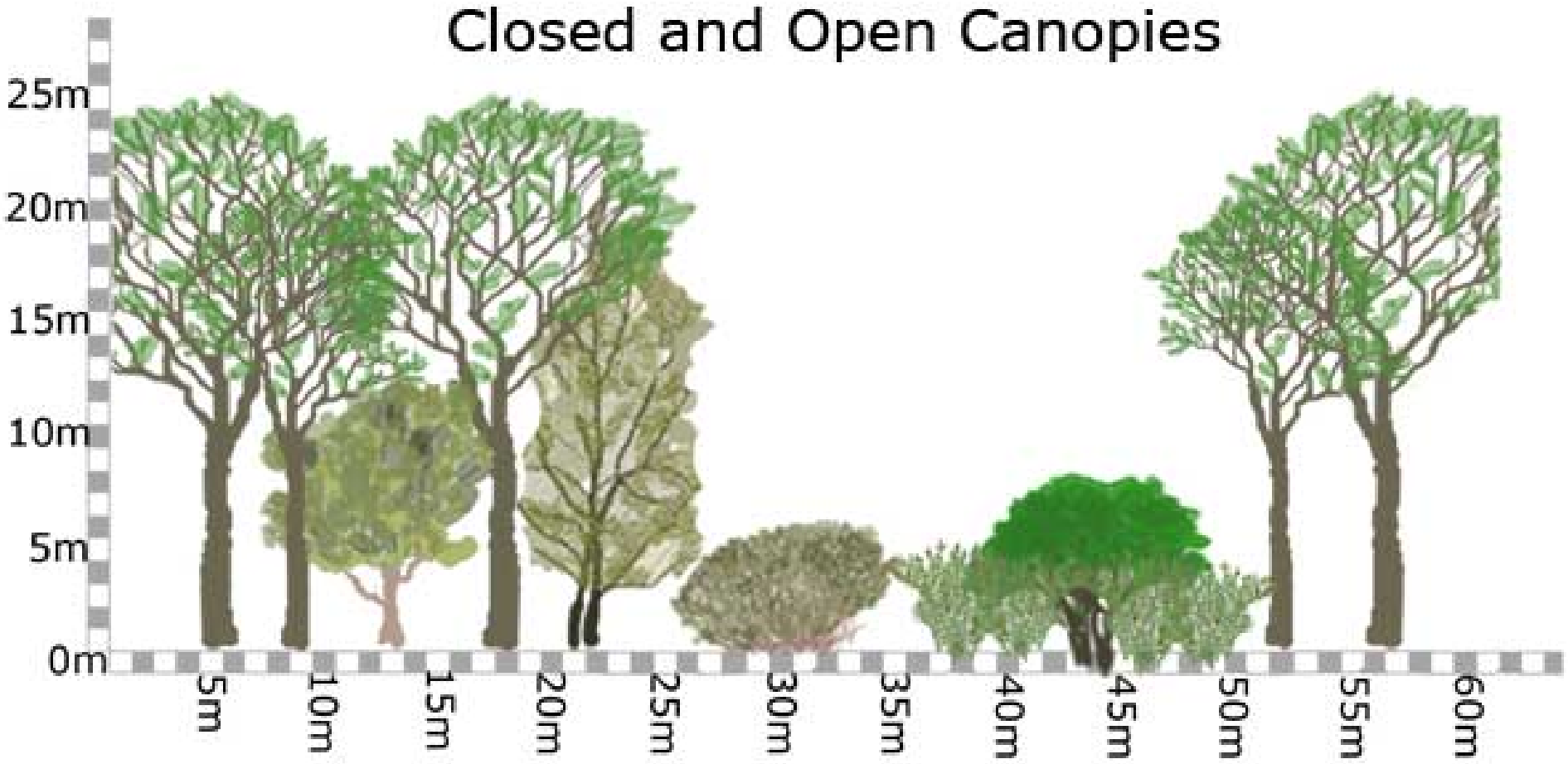
Outline -continued

- 4. Assessment of the Project's Effects on Public Safety.
- Assessment (Monitoring) of Wildlife Use and Horticultural Success at End of Project.

Forest Canopy Layers



Wildlife and Vegetation Restoration Design




Sacramento River – near Butte City


Mixed Riparian Forest
Willow Scrub

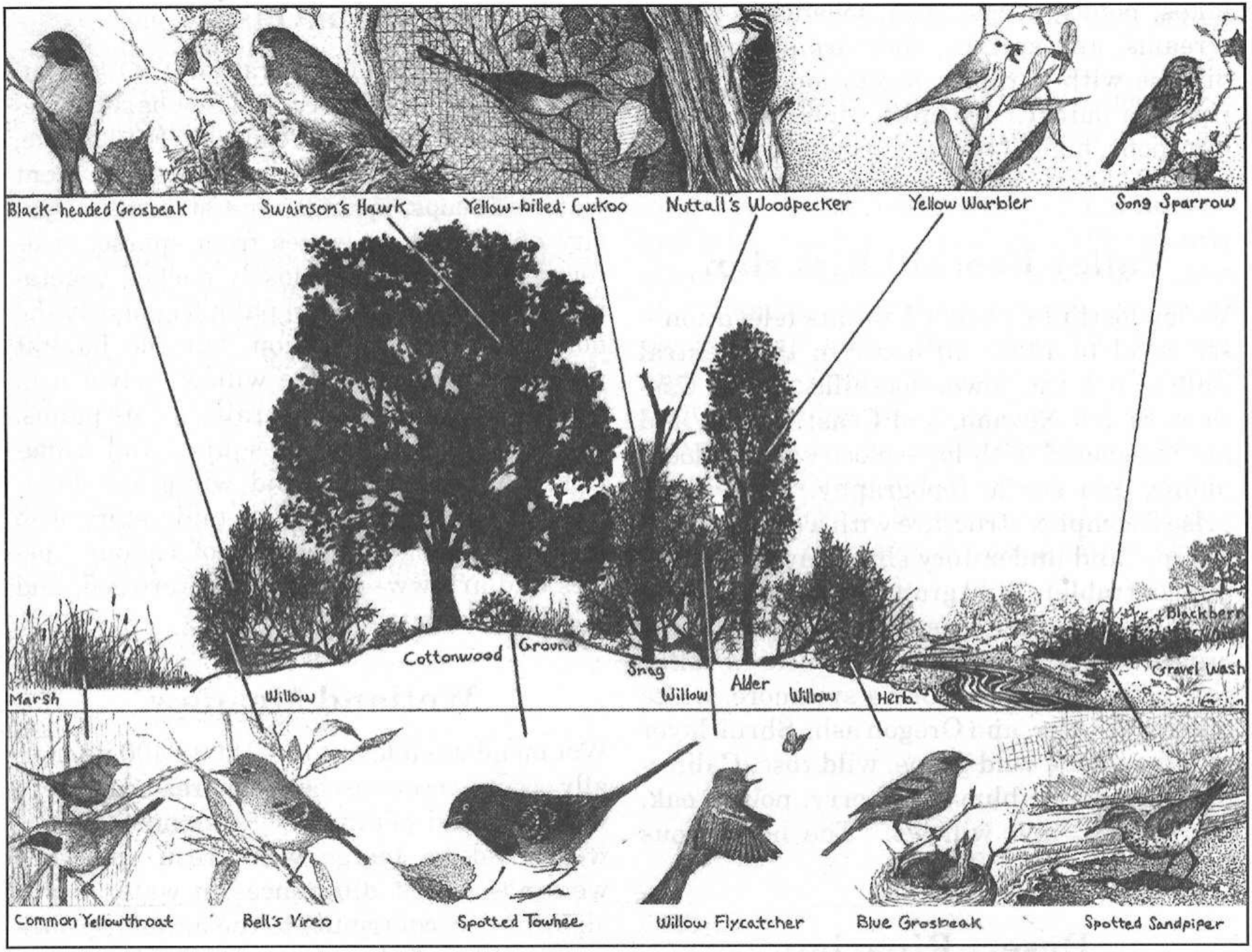

Sacramento River


Sacramento River
Highway 45

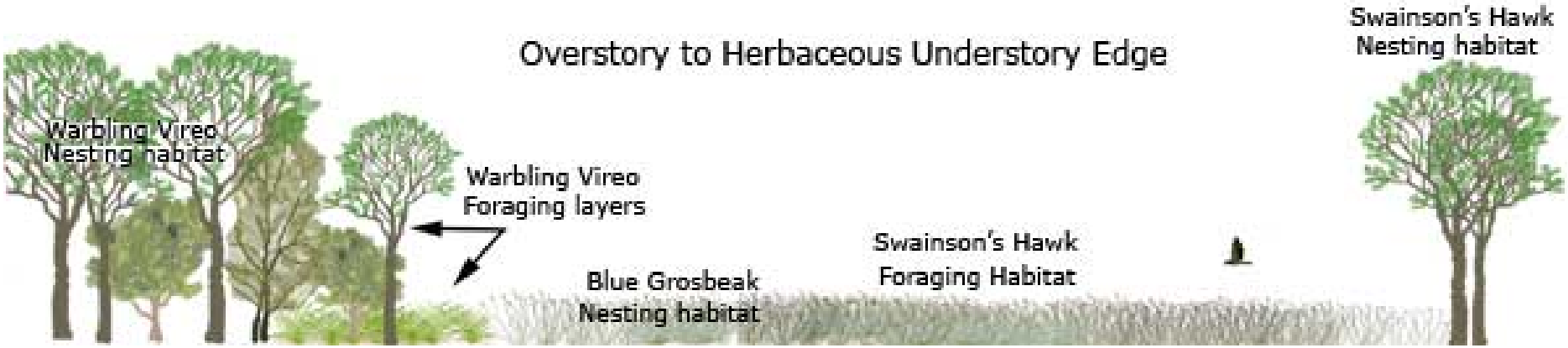

Stanislaus River


Sacramento River Wildlife Corridor

Riparian Wildlife


Black-headed Grosbeak
Swainson's Hawk
Yellow-billed Cuckoo
Nuttall's Woodpecker
Yellow Warbler
Song Sparrow
Marsh
Willow
Cottonwood
Ground
Snag
Willow
Alder
Willow
Herb.
Blackberry
Gravel Wash
Common Yellowthroat
Bell's Vireo
Spotted Towhee
Willow Flycatcher
Blue Grosbeak
Spotted Sandpiper

Wildlife and Vegetation Restoration Design



Wildlife and Vegetation Restoration Design

Dense Willow Thicket with Widely Spaced Trees

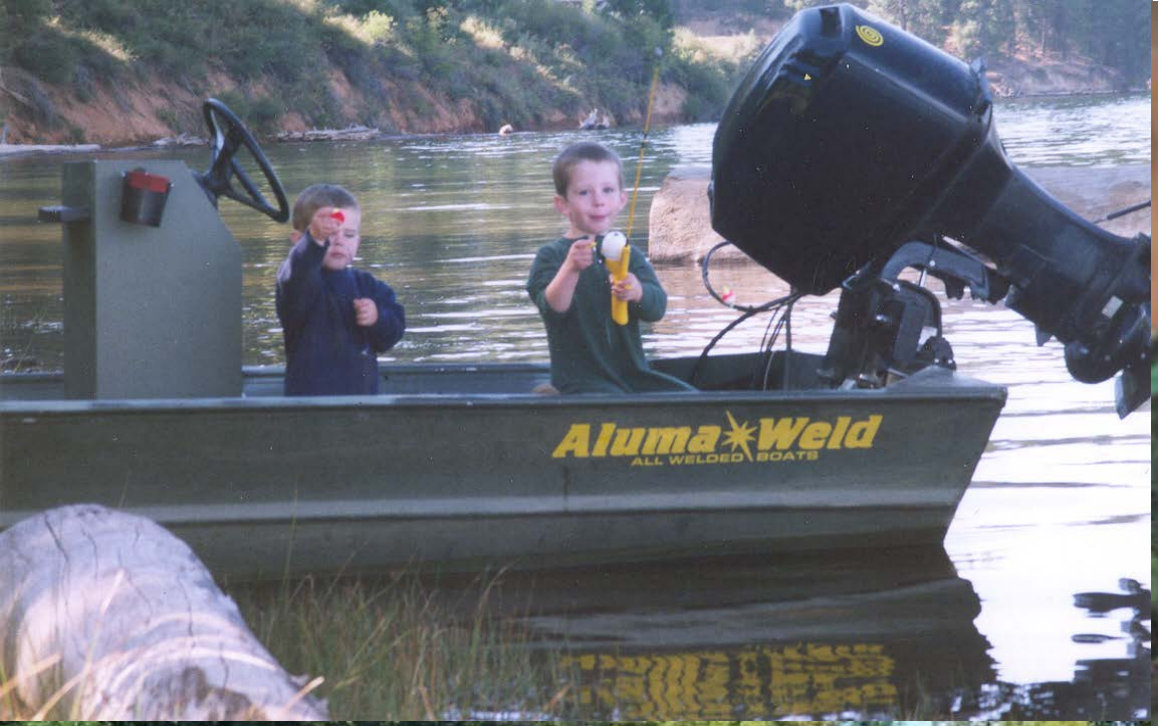
Irrigation Installation

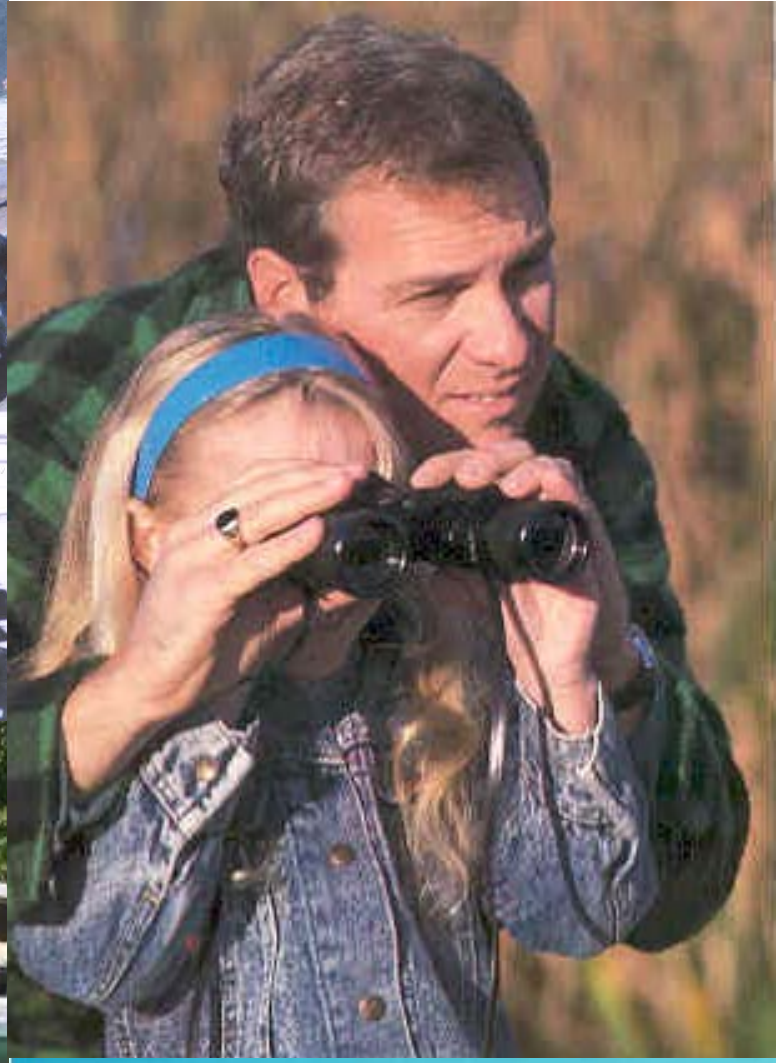
Planting


Planting
Year 1
Year 2
Year 3

The Need for Assessments:

Riparian Restoration within the CONTEXT of the Greater Community

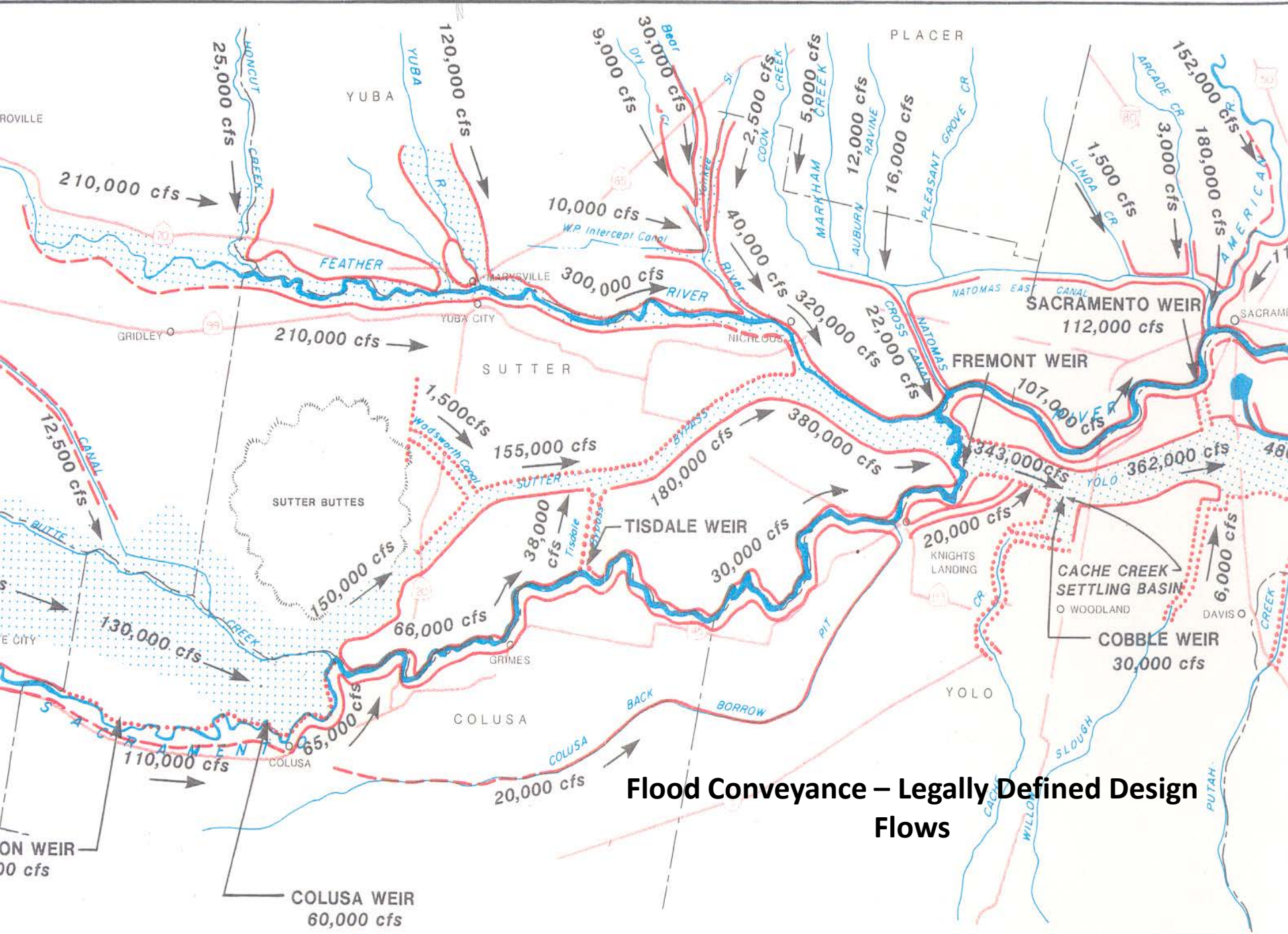

Aluma Weld
ALL WELDED BOATS




Irrigation Conveyance
5.31.2004

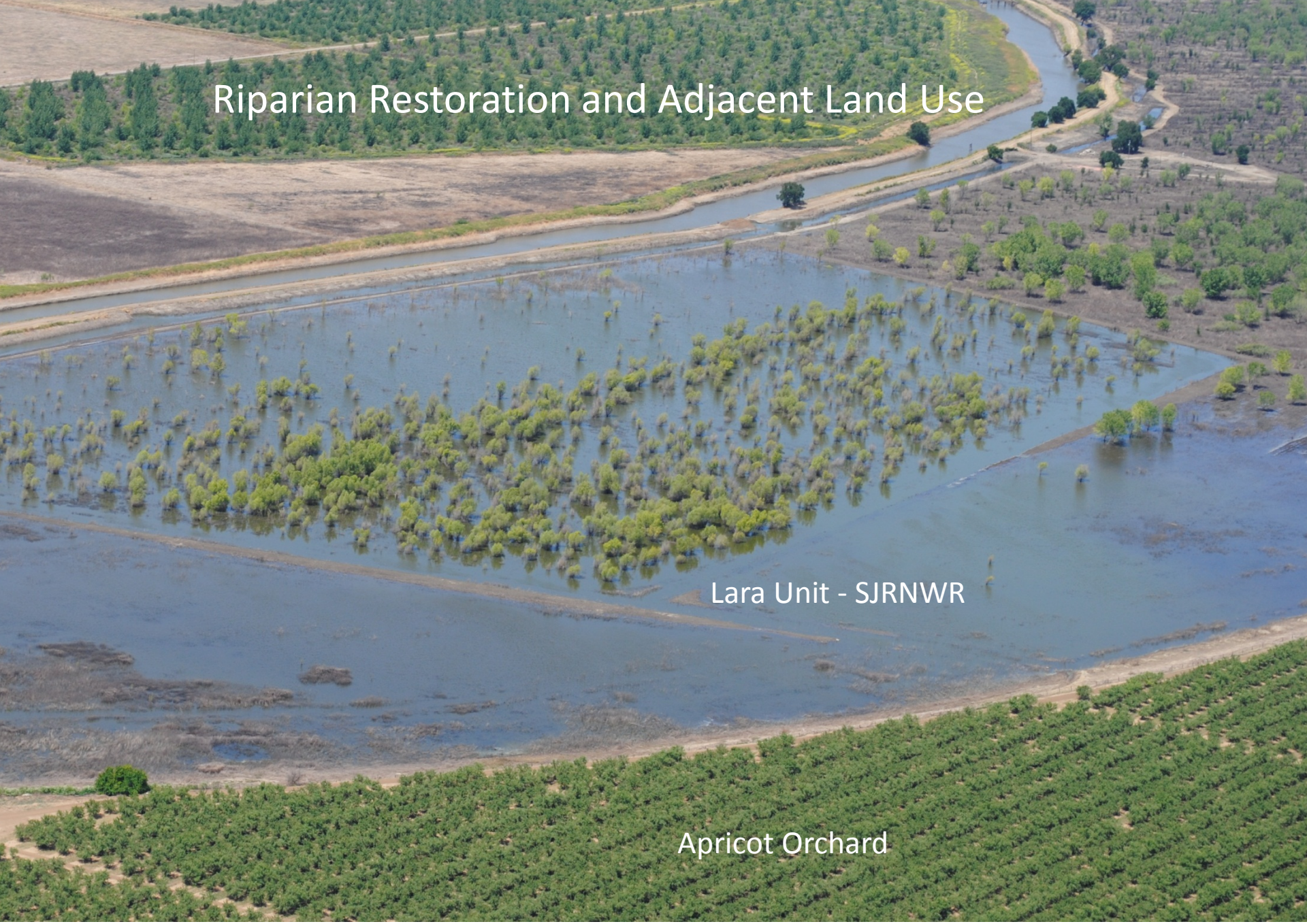

Public Safety and Flood Management


Flood Management and Public Safety



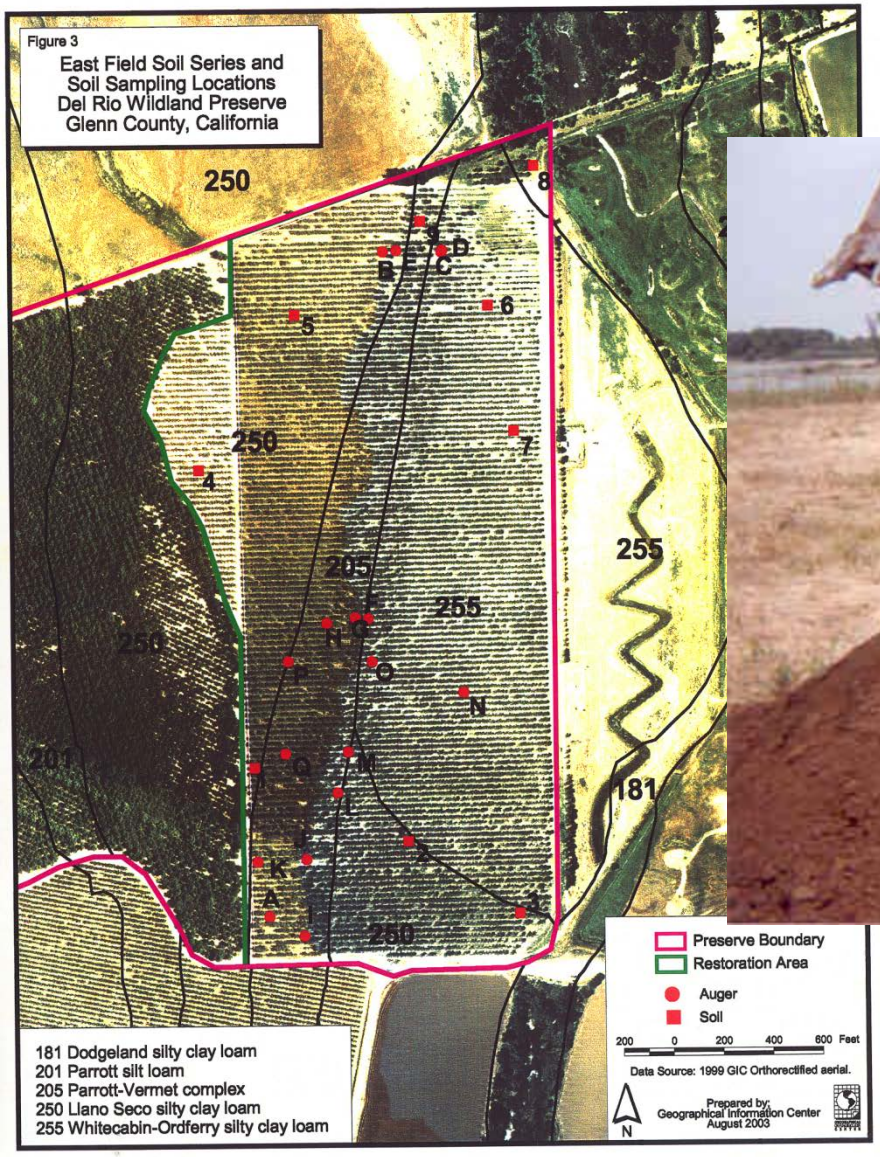
Flood Conveyance – Legally Defined Design Flows


Riparian Restoration on Flood-Prone Land


Riparian Restoration and Adjacent Land Use
Lara Unit - SJRNWR
Apricot Orchard


Riparian Restoration
Walnuts
Levee

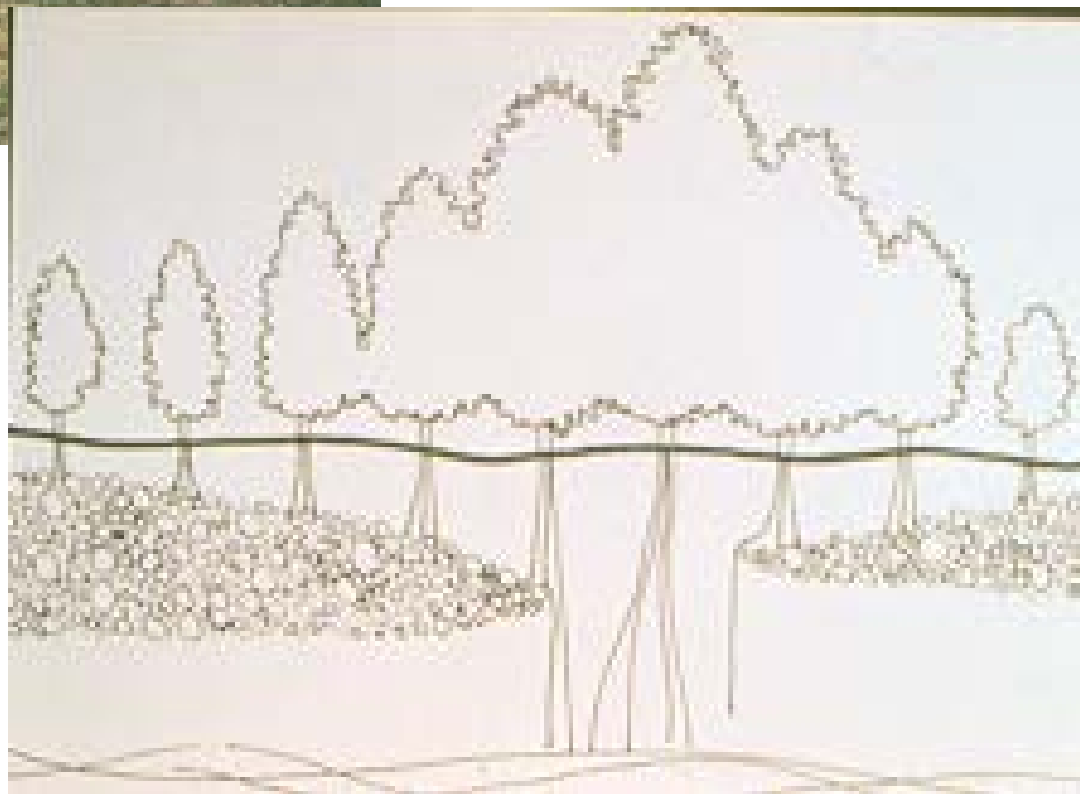
Site Assessment



Evaluation of Site Conditions that support Horticultural Restoration

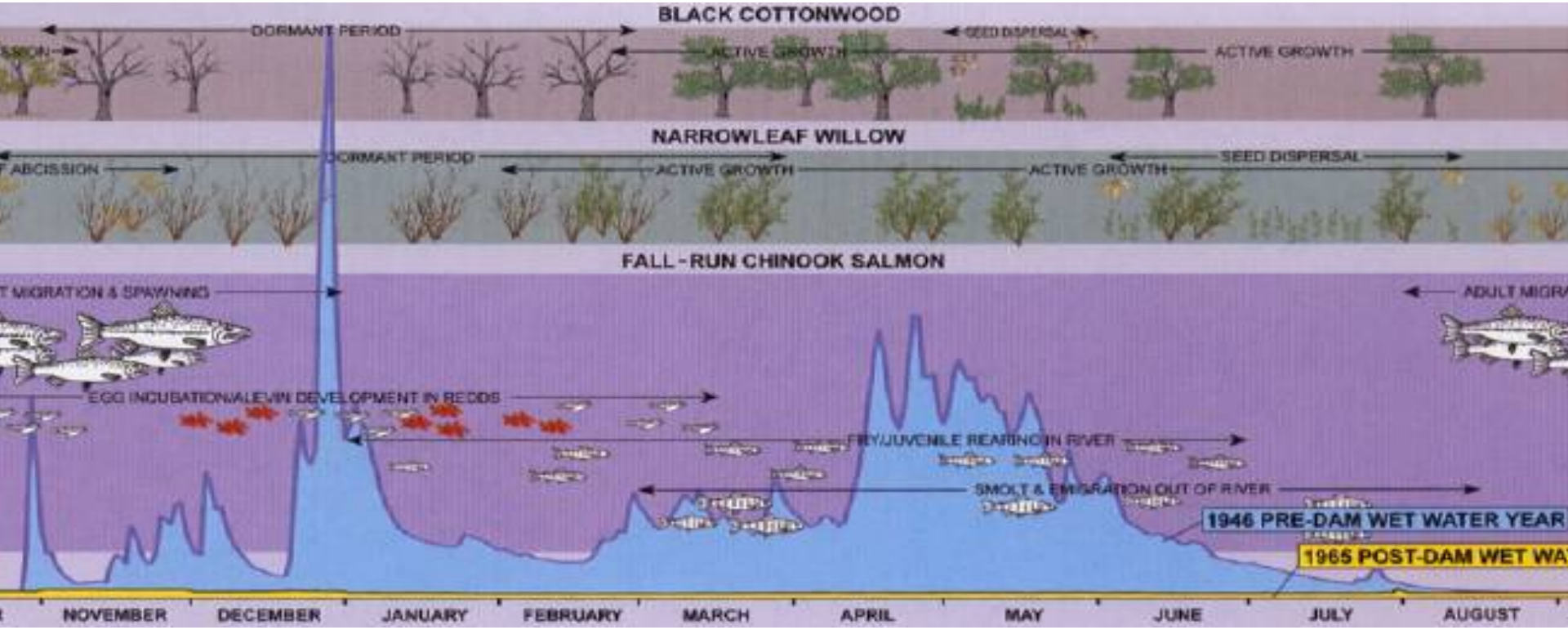
What is going on here?

Answer:
Stratified Soil Profile



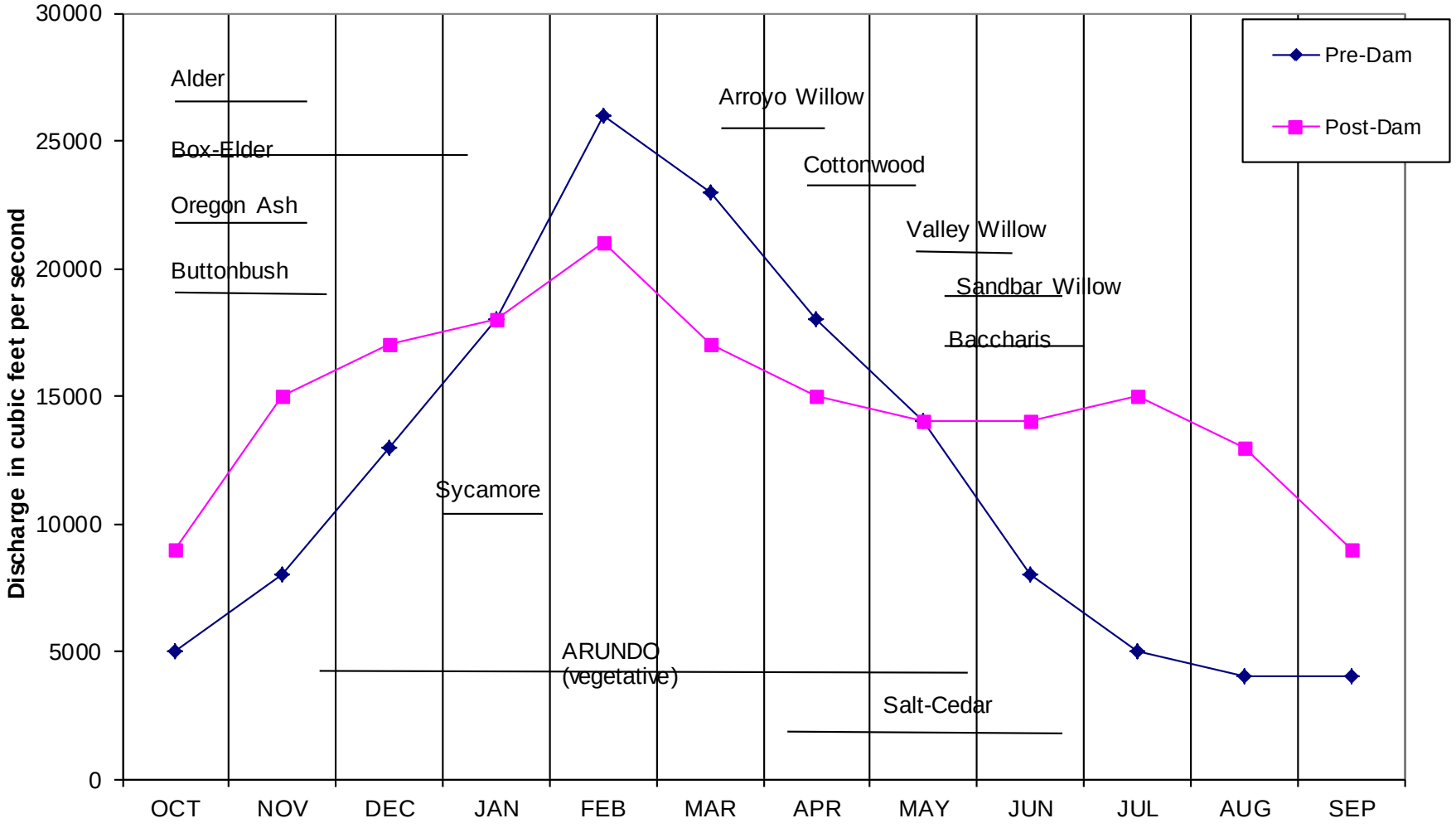
Soil features explain plant growth.

Species' adaptation to the hydrograph of the Trinity River



From McBain and Trush

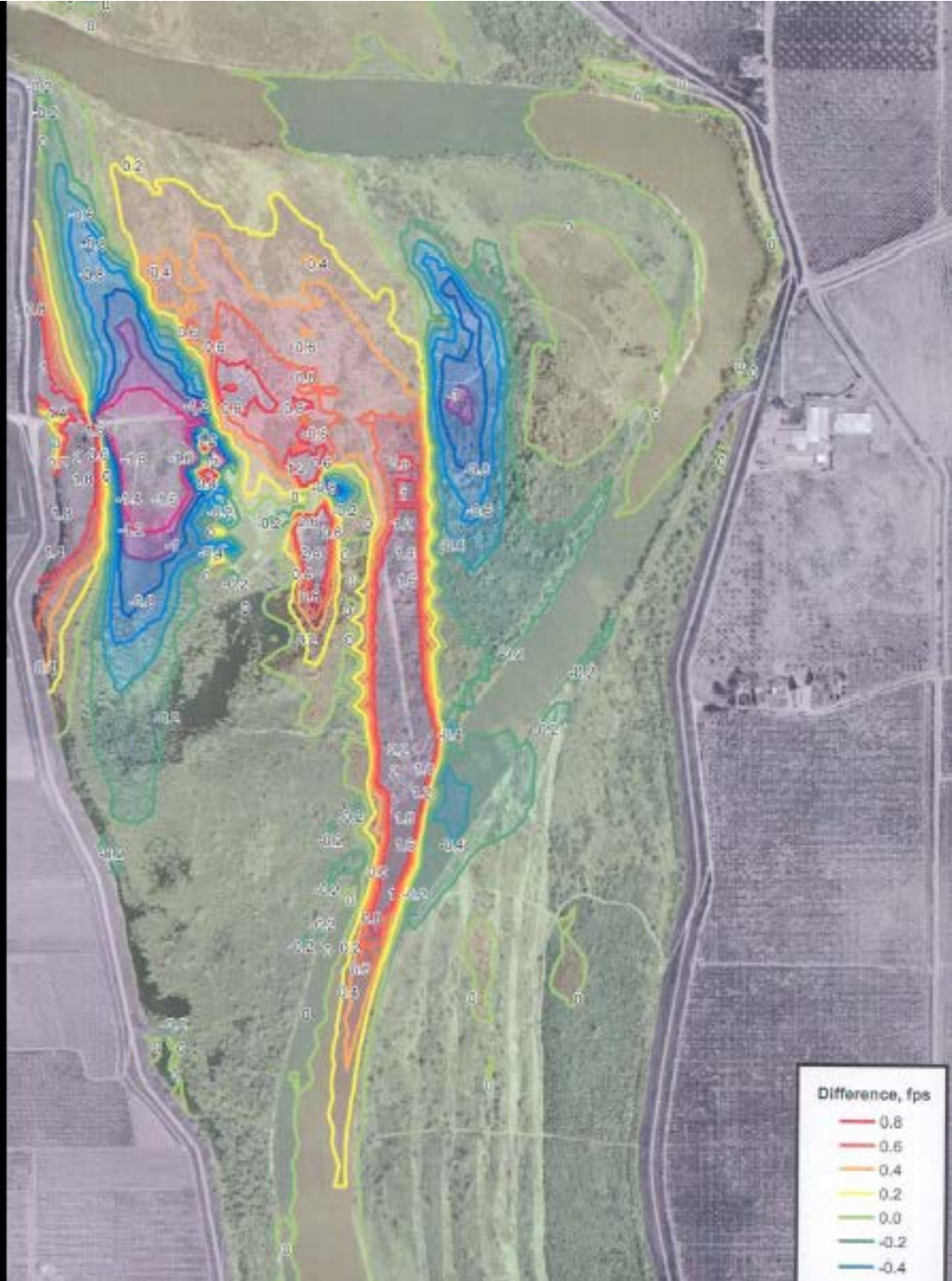
Dates for Seed-Release by Water-dispersed Riparian Tree Species and the Mean Monthly Discharge for the Sacramento River Pre-Shasta Dam and Post-Shasta Dam




Beaver Browsing During Flood
DEEP FLOWS!


Sediment Transport

Hydraulic Modeling



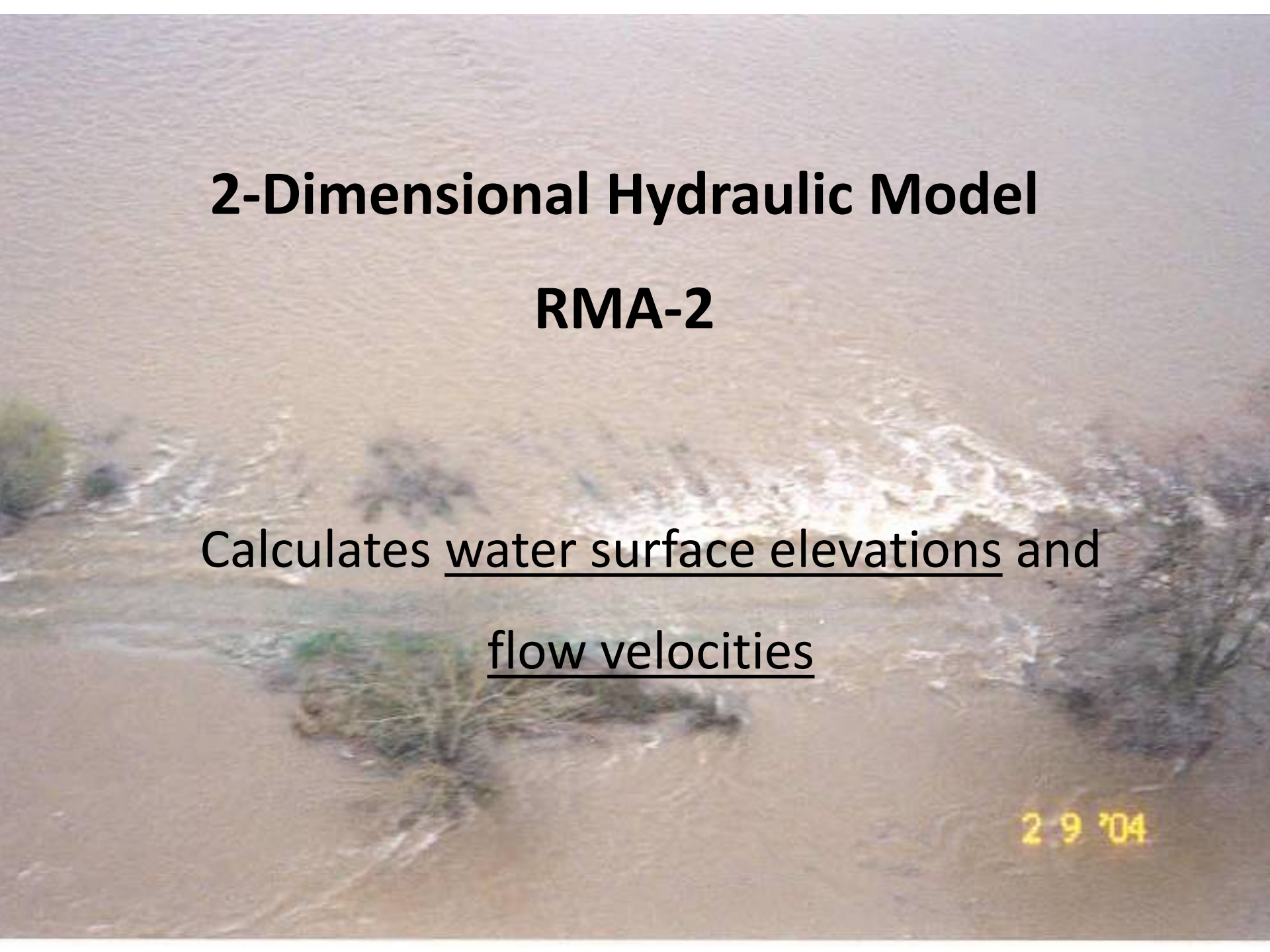

O'Connor Lakes
Project Area
Star Bend
228 acres
Feather River
Funded by:
Wildlife Conservation Board


1969


1987

O’Connor Lakes story

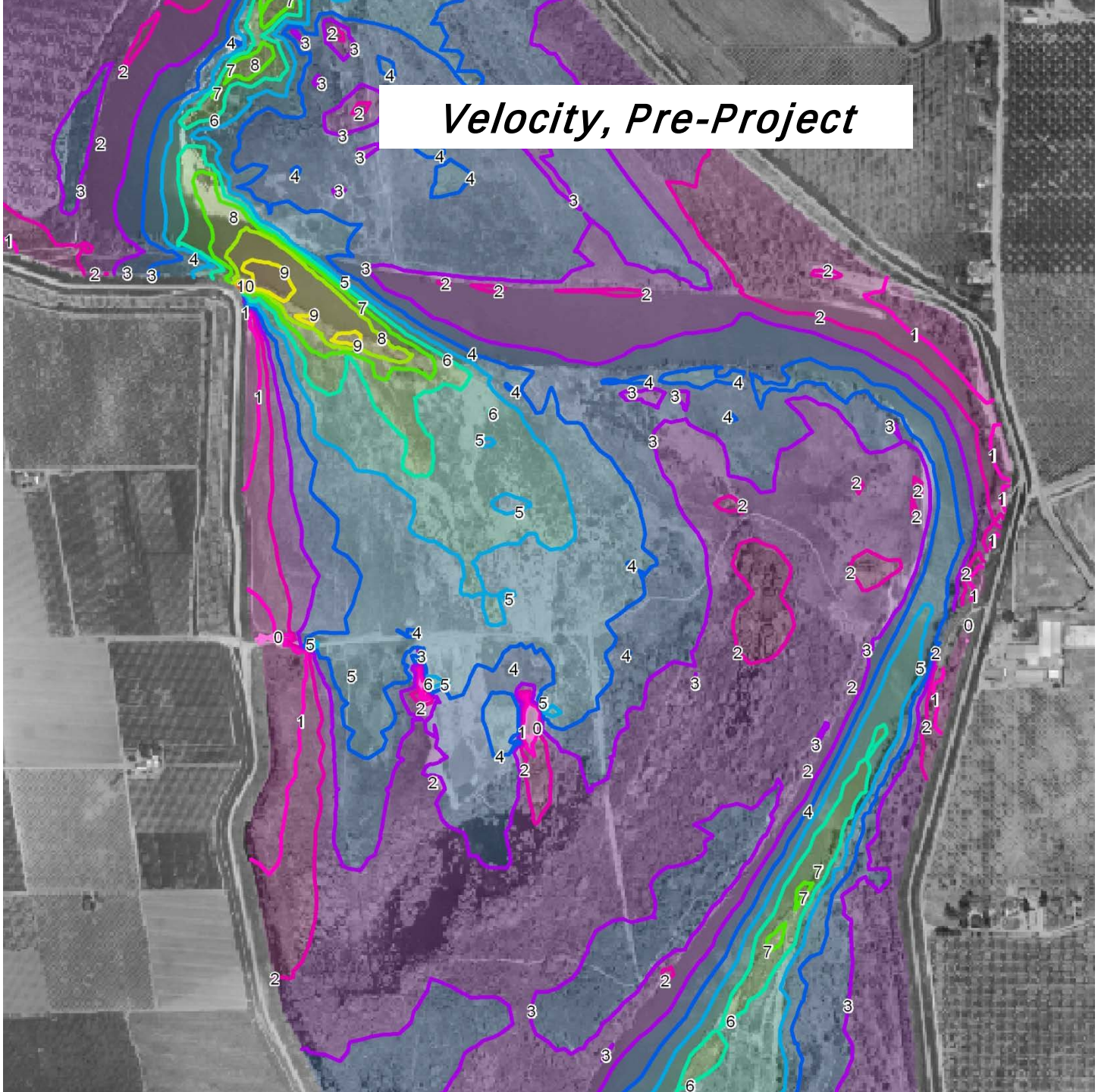
- O’Connor Lake story shows how vegetation apportioned by different roughness values across the floodplain can be used in a 2-d hydraulic model.
- Objective of modeling was to generate a **FLOOD NEUTRAL** planting design



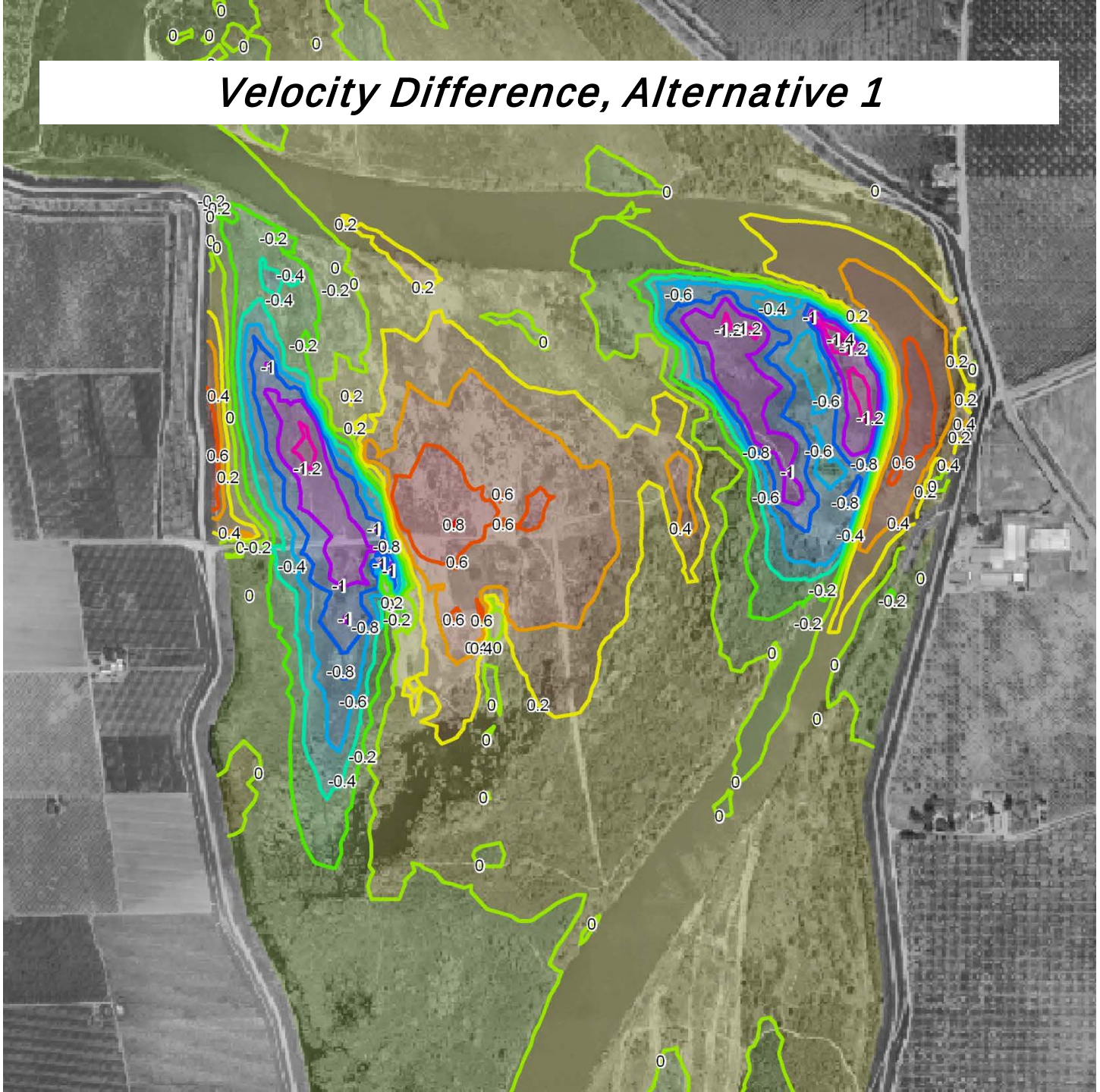
2-Dimensional Hydraulic Model

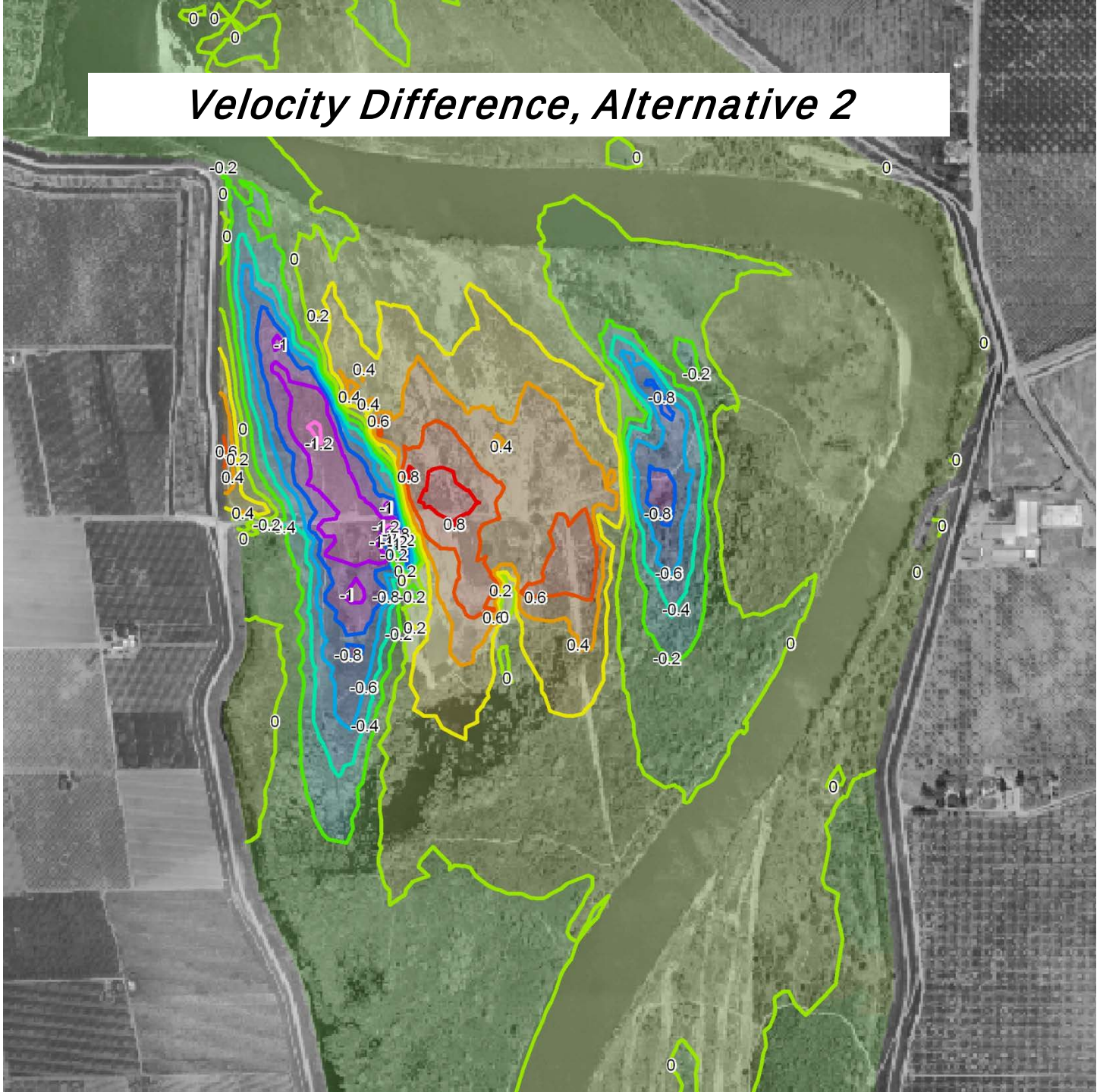
RMA-2

Calculates water surface elevations and flow velocities

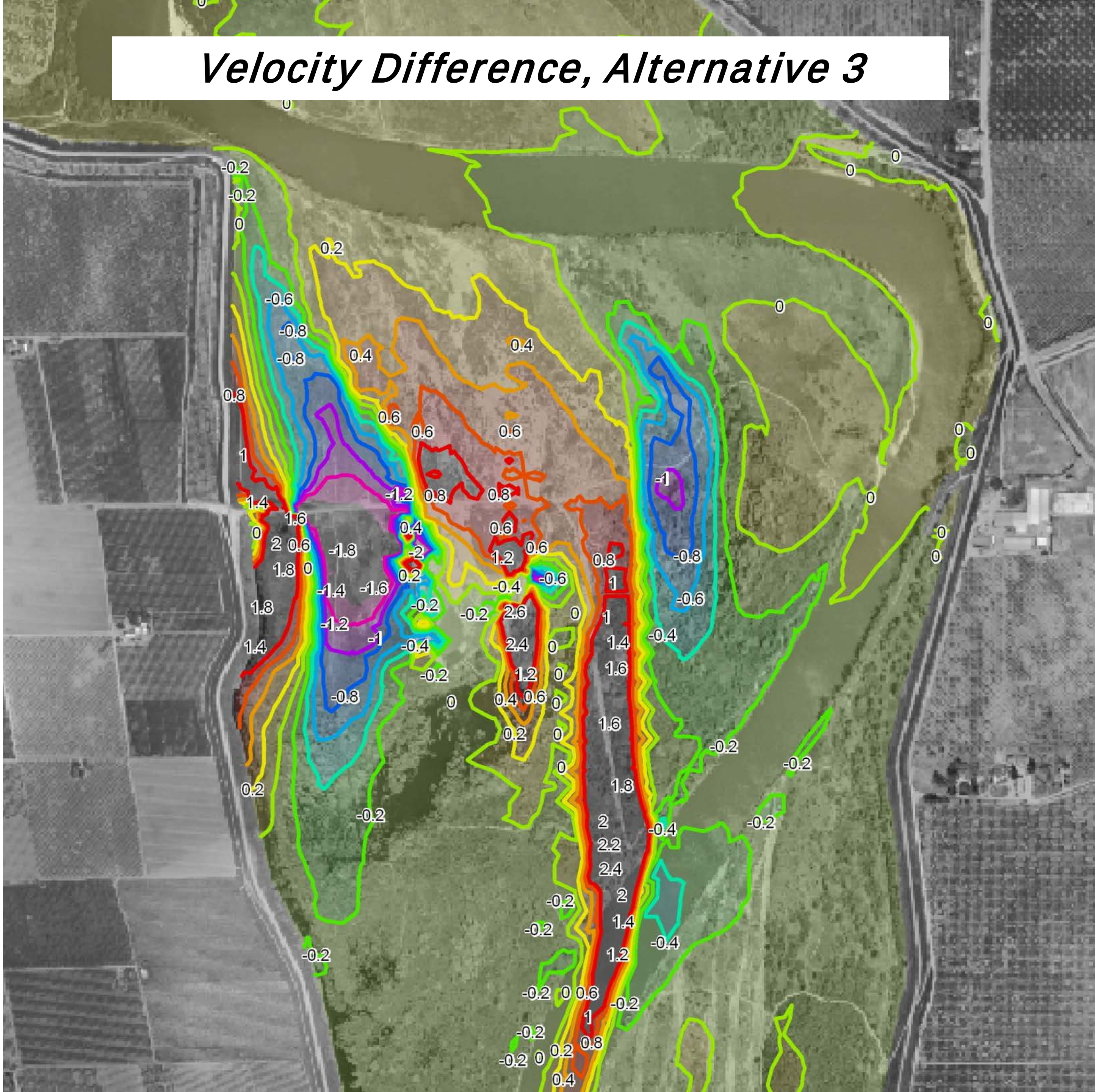

Velocity, Pre-Project

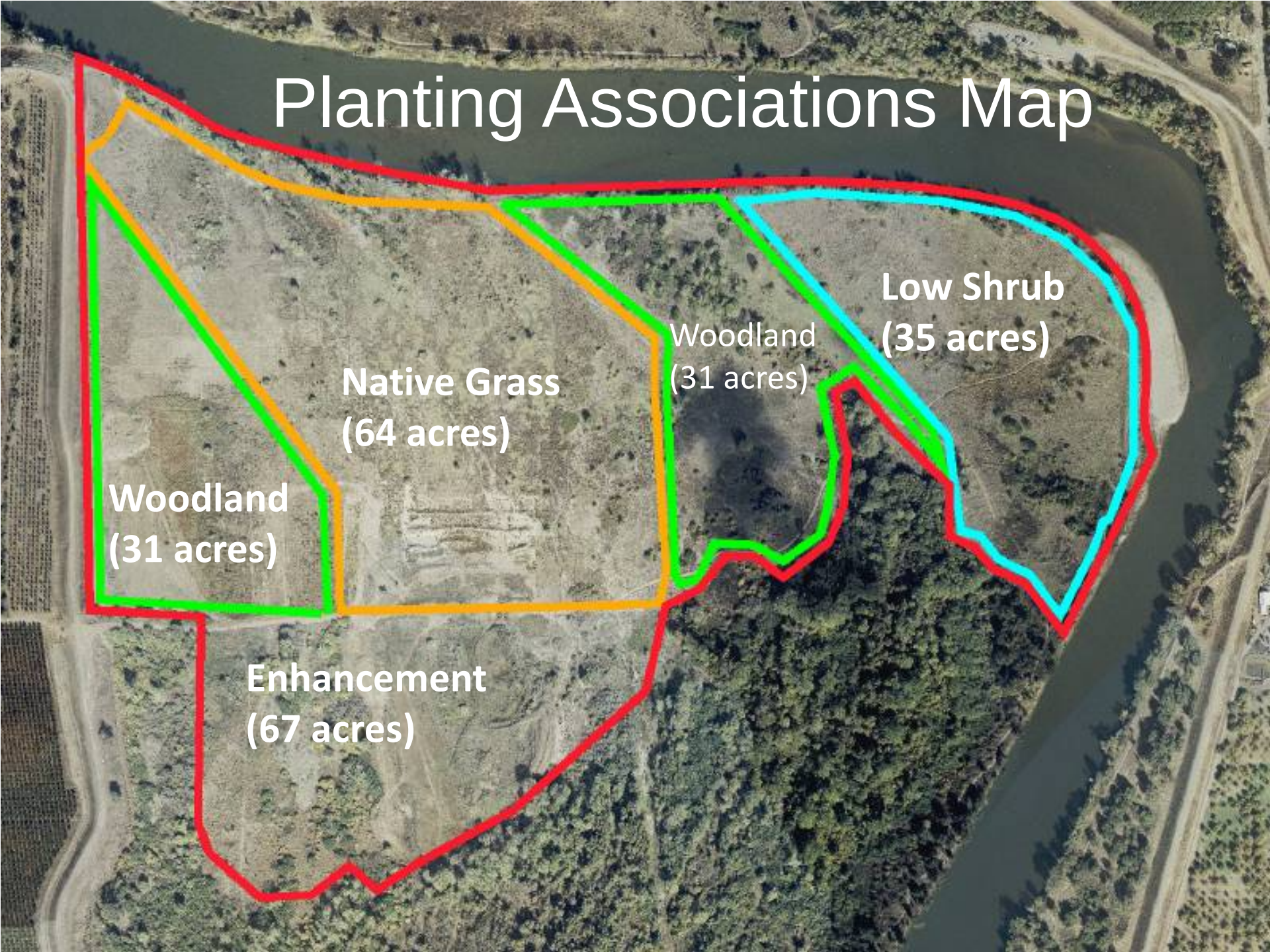
Velocity Difference, Alternative 1




Velocity Difference, Alternative 2

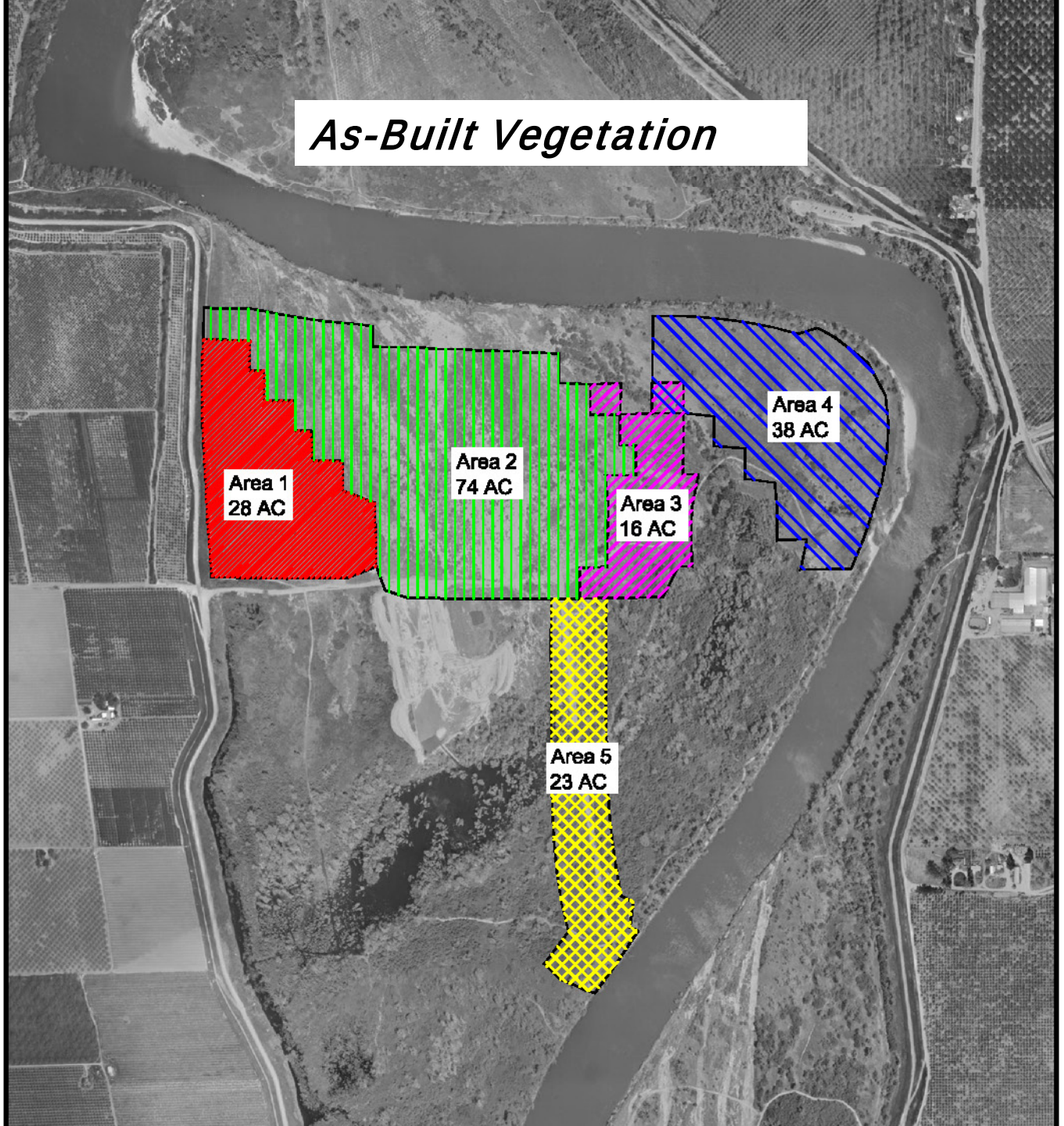
Velocity Difference, Alternative 3



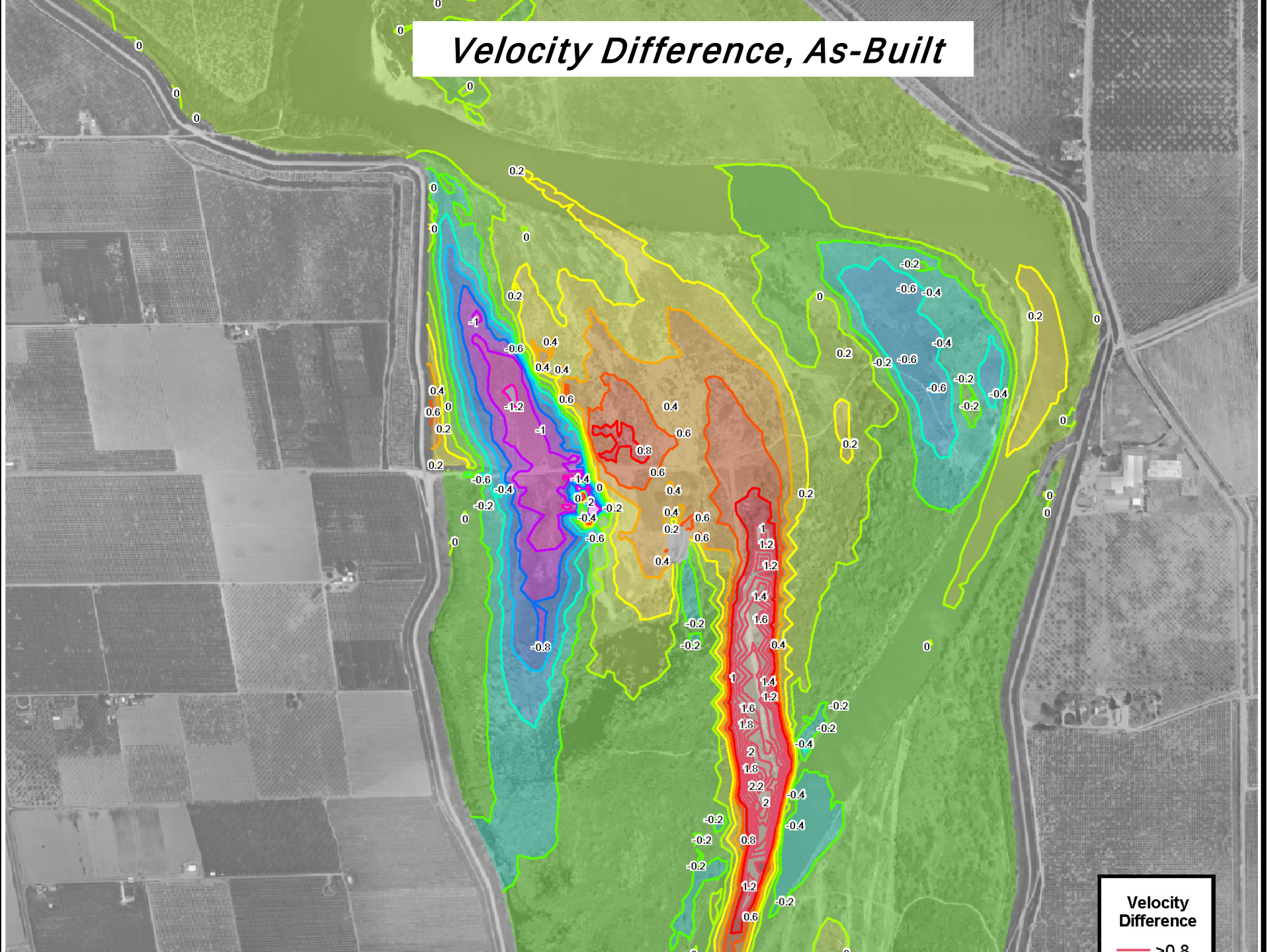

Planting Associations Map
Low Shrub
(35 acres)
Woodland
(31 acres)
Native Grass
(64 acres)
Woodland
(31 acres)
Enhancement
(67 acres)

Hedgerow Planting Design for Flow Conveyance

O’Connor Lakes – Feather River


As-Built Vegetation
Area 1
28 AC
Area 2
74 AC
Area 3
16 AC
Area 4
38 AC
Area 5
23 AC

Velocity Difference, As-Built




Flow: about 65,000 cfs
4 January 2006


9 February 2006


Corridor Flow Depth
Sand Deposition

Conclusions

1. **Riparian revegetation can be designed to provide quality wildlife habitat AND facilitate flow conveyance and sediment transport.**
2. **Revegetation can be used to direct flows away from flood-control structures.**
3. **Restoration can result in lower floodway maintenance costs.**

Assessment of Project Success

Horticultural Success – Individual plant survival and growth

Wildlife Use Monitoring – Nesting, Foraging, Cover


10-year old Restoration Planting


16-year old Restoration Planting


VOTE OF APPROVAL
Endangered least Bell's vireo
First nesting in Central Valley in 60 years


Red Fox
Gray Fox
March 2013 – Vierra Unit SJRNWR

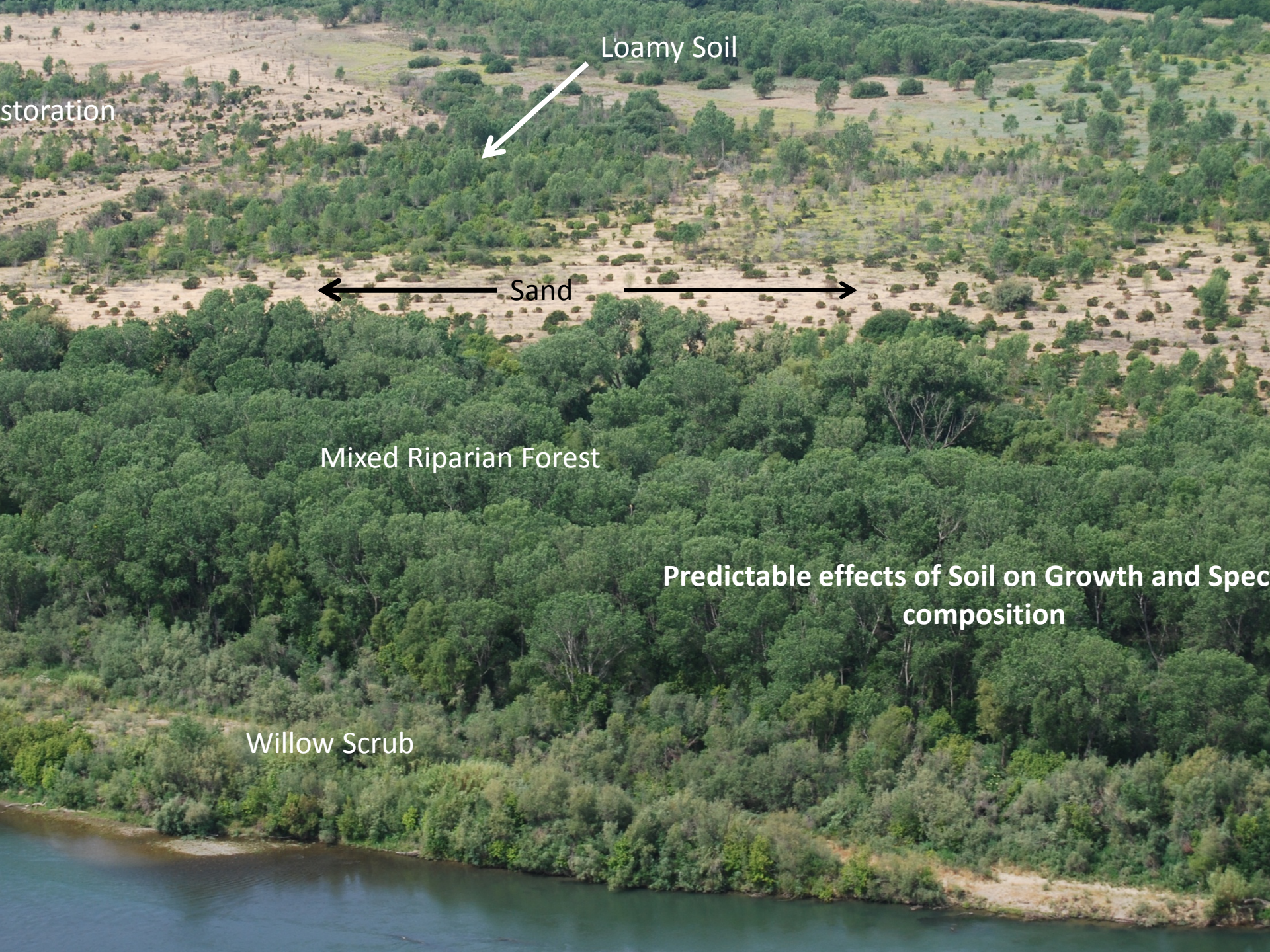
www.RiverPartners.org

California Riparian Habitat Restoration Handbook.

Published By

Riparian Habitat Joint Venture.

http://www.riverpartners.org/documents/Restoration_Handbook_Final_Dec09.pdf


storation
Loamy Soil
Sand
Mixed Riparian Forest
Predictable effects of Soil on Growth and Spec
composition
Willow Scrub