

# The Abundance and Distribution of Non-native Woody Species in Sacramento Valley Riparian Zones

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- Introduction
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- Implications for Management

# Introduction

- The Central Valley's riparian zones provide opportunities for establishment and spread of non-native species.
  - Important factors: Frequent disturbance, summer water
- Over 20 woody non-native species are in these riparian zones.
- The distribution and abundance of these species is not well documented.
- Our study provides a regional data set for assessing distribution and abundance in riparian zones of streams and small rivers.
  - Random sample of available sites stratified by riparian zone width
  - 47 plots (1 ha in size) along 16 waterways
  - Recorded riparian zone attributes, and riparian vegetation (and wildlife)

# Study Area

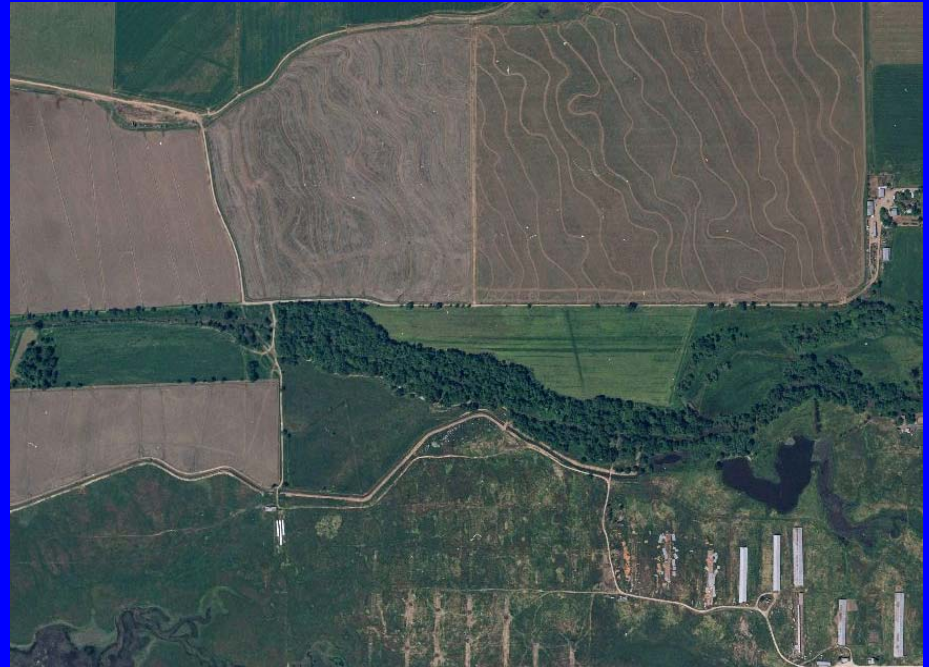


# Riparian Zone Attributes

- Surrounding Land Use
- Presence of Infrastructure (roads, canals, power lines, levees)
- Evidence of disturbance
  - Incision, overbank flows
  - Tree cutting, dumping

# Surrounding Land Cover a Mosaic of Natural, Agricultural and Developed Cover

- Mean Cover w/in 250 m:
  - Natural 43%
  - Agricultural 38%
  - Developed 18%
- Only 17% of plots surrounded entirely by natural vegetation



# Infrastructure Frequently Present in Riparian Zones

- Infrastructure in 55% of plots
- Mean distance to nearest road was 139 m
- Levees or bank protection in < 20% of plots



# Riparian Zones Typically Disturbed

- Evidence of overbank flows in 57% of plots
- Channel incised at 62% of plots
- Evidence of dumping or tree cutting in over half of plots



# Riparian Zone Vegetation

- General Structure
  - Width
  - Cover of tree, shrub and herb layers
- Species Composition
  - Tree layer: Native, Non-native, Other
  - Shrub layer: Native, Non-native

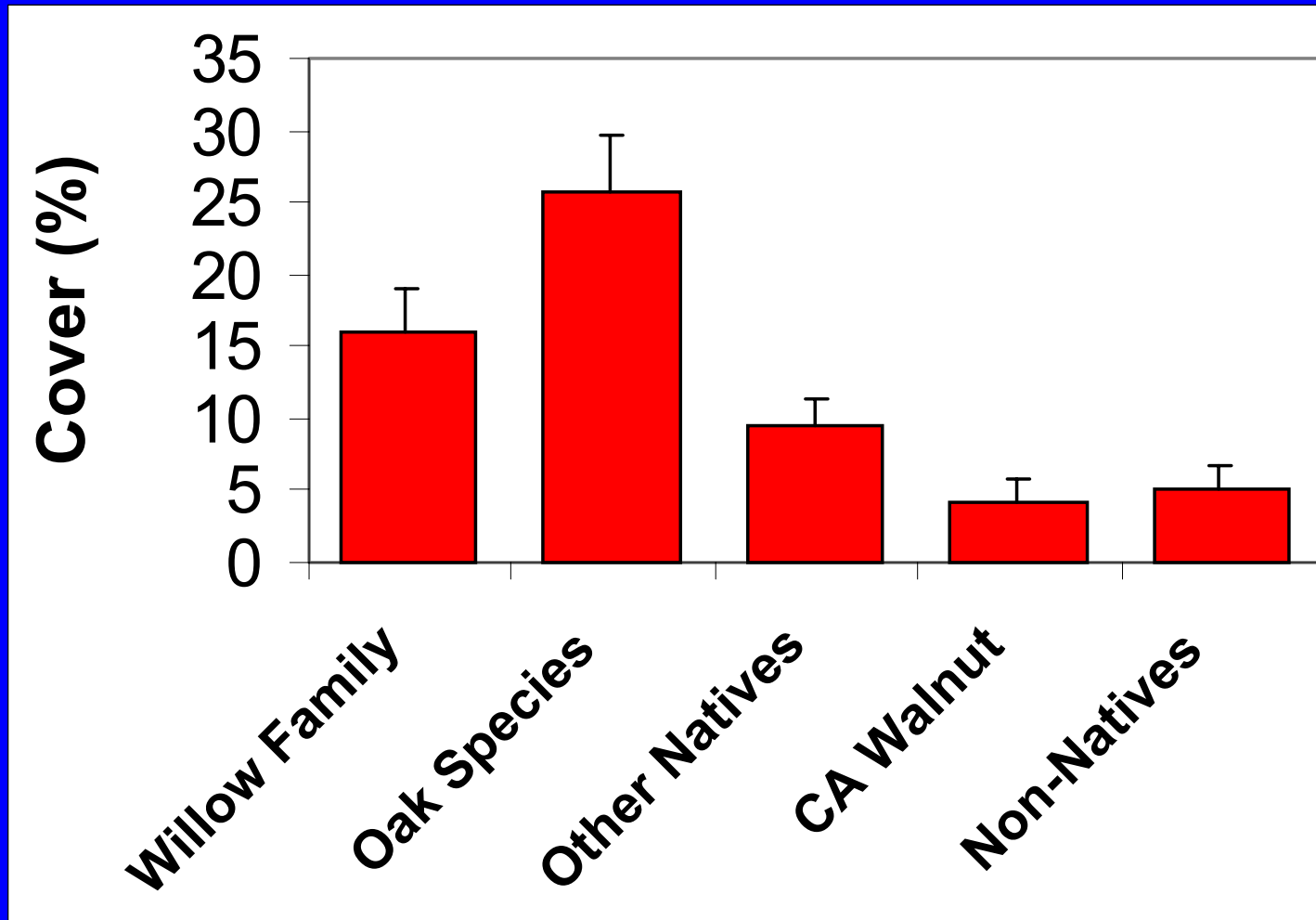


# Riparian Vegetation in Relatively Narrow Bands with an Open, Discontinuous Canopy

- Widths at plots averaged 36 m (due to our sample design > typical width in Valley)
- Mean tree cover just 46%
- Shrub cover 41%
- Herb cover 76%



# Tree Layer Dominated by Native Species



# Most Abundant and Widespread Non-native: *Ailanthus altissima*

- In 21% of plots
- Mean cover in plots was 8% (range 1-38%)
- Shade-intolerant
- Has potential to dominate sites by forming persistent clonal thickets



# Non-native Woody Species in Plots ( $N = 47$ )

Species	Frequency (%)	Mean Cover (%)
<i>Ailanthus altissima</i>	21	8
<i>Prunus</i> species	15	3
<i>Morus alba</i>	11	15
<i>Tamarix</i> species	9	5
<i>Eucalyptus globulus</i> , <i>Maclura pomifera</i> , <i>Ficus carica</i>	4	1-15
<i>Catalpa bignonioides</i> , <i>Olea europea</i> , <i>Ulmus</i> species	2	<1-3

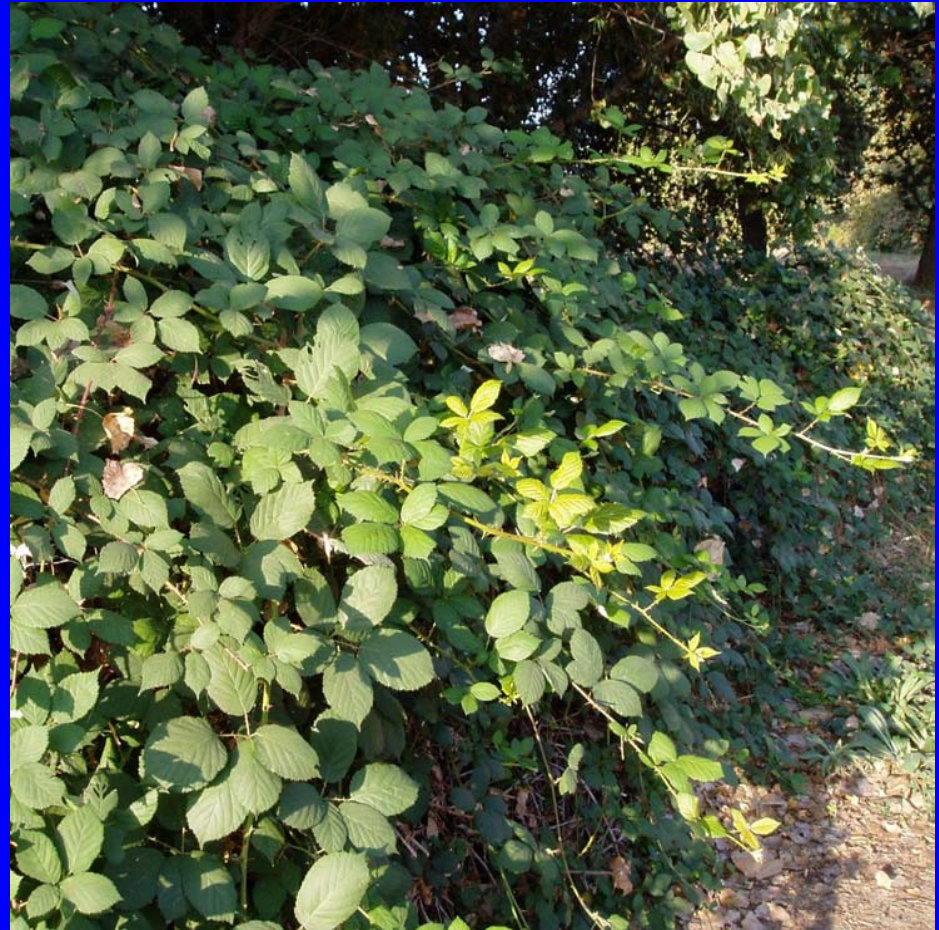
# California Black Walnut (*Juglans hindsii*) - A Non-native?

- Historical distribution highly restricted
- Widely planted, first as an ornamental and then as a rootstock
- Introgression from *J. regia* and *J. nigra*
- Present in 34% of plots, mean cover 4%



# Shrub layer dominated by the Non-native Himalayan Blackberry (*Rubus discolor*)

- In 70% of plots
- Averaged 34% cover where present
- Accounted for half of all cover in shrub layer of all 47 plots
- Forms dense evergreen thickets



# Implications for Management

- Himalayan blackberry abundant, widespread and beyond control at regional and watershed scales
- Other species widely distributed but abundant only locally, and control still possible
  - Examples: Mulberry, Red Sesbania
- Pattern of distribution suggests expanding distributions

# *Sesbania punicea* - An Example of a Locally Abundant Species

- Cultivated in CA by 1930
- Not in a flora until 1994
- By 2000, reported from multiple localities
- Abundant along Lower American River and San Joaquin River at Fresno
- Has potential to alter ecosystem





# Mulberry - Another Example of a Locally Abundant Species?

- Present in all plots along Deer Creek
- Absent from all other plots
- Also reported from along San Joaquin, Merced and American Rivers.



# For Woody Non-natives, What Does Their Patchy Distributions and Low of Abundance Represent?

- “Escapes and transient small populations?”
- Stable naturalized populations?
- Recently established and expanding populations?

# Evidence Suggests Populations of Woody Non-natives are Expanding

- Historical information regarding spread
  - (Example: *Sesbania punicea*)
- On-going range expansion elsewhere
  - (Example: *Tamarix* species)

Therefore, control now is likely to preclude further change to the Sacramento Valley's riparian ecosystems.

Thank you for your time and interest!

