Ventura Fish and Wildlife Office

Strategic Habitat Conservation in the Santa Clara River

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Allison Alvarado, California State University Channel Islands
Laura Riege, The Nature Conservancy
Bruce Orr, Stillwater Sciences
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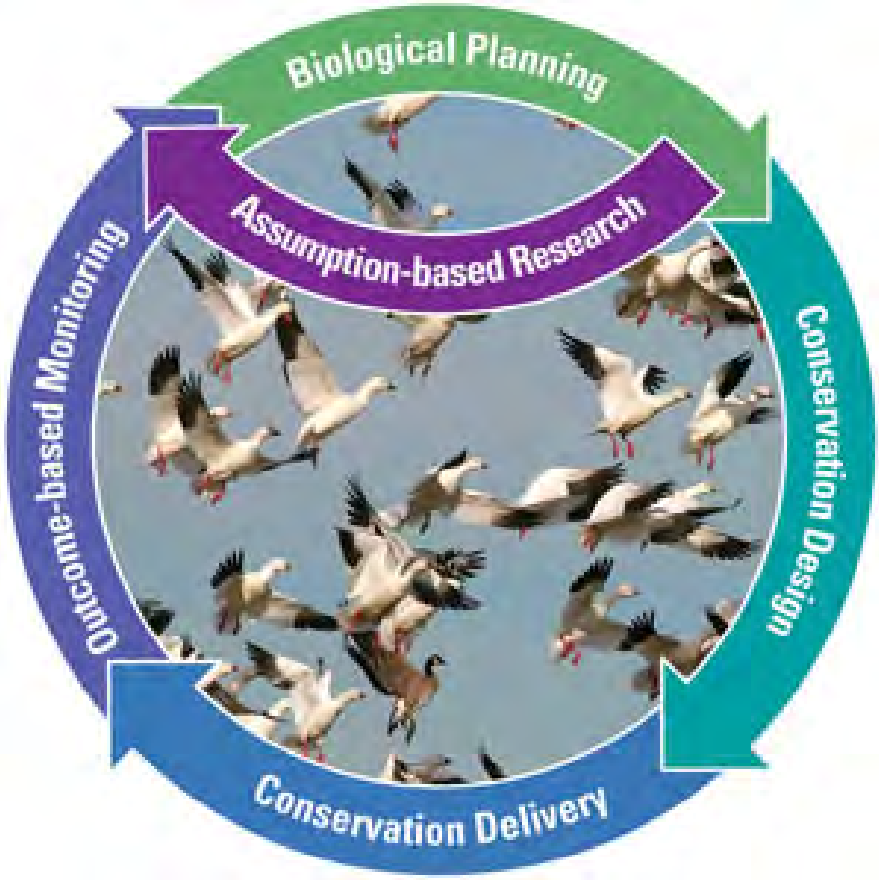
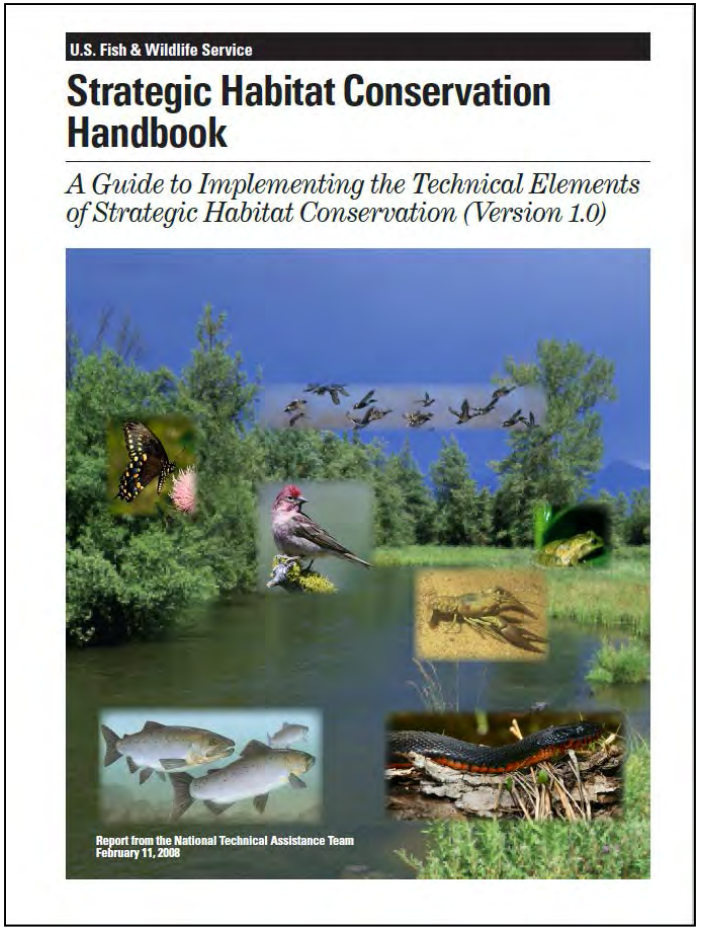
October 18, 2017

Photo by: Barbara Wampole

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people.

Strategic Habitat Conservation



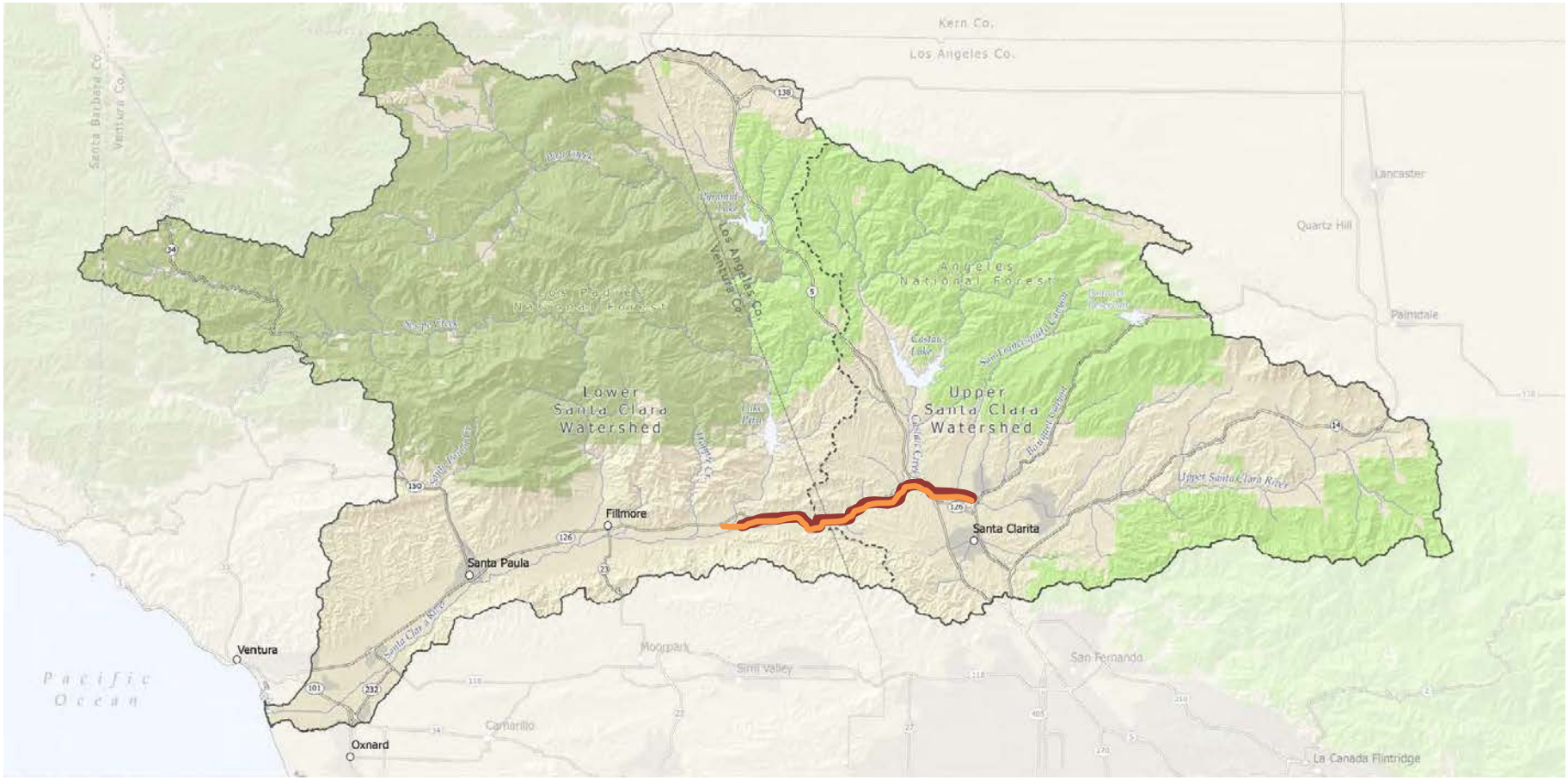


http://www.fws.gov/landscape-conservation/

Santa Clara River Oil Spills

1991: ExxonMobil • 74,000 gallons • 15 miles of River

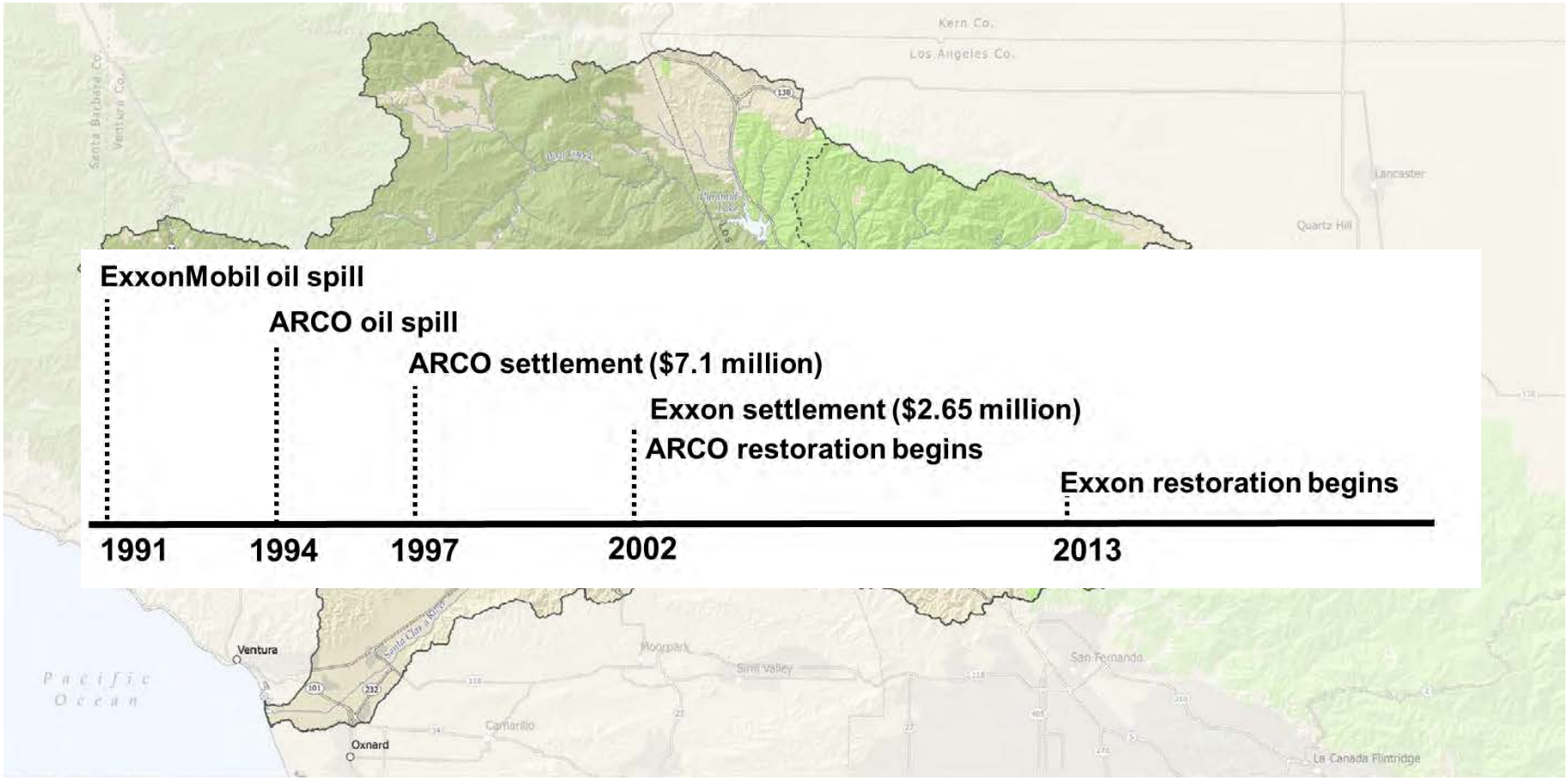
1994: ARCO • 190,000 gallons • 16 miles of River



Santa Clara River Oil Spills

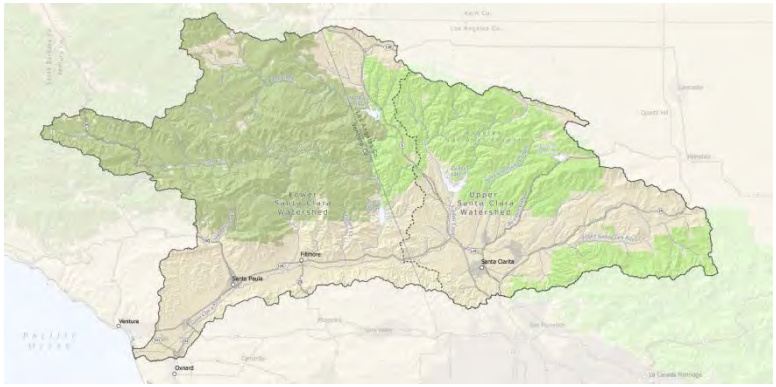
1991: ExxonMobil • 74,000 gallons • 15 miles of River • $2.65M

1994: ARCO • 190,000 gallons • 16 miles of River • $7.1M



Strategic Habitat Conservation

1. Start with ecologically meaningful scale



2. Work in partnerships to maximize effectiveness

The Nature Conservancy
Protecting nature. Preserving life.

Coastal Conservancy

USGS
science for a changing world

Watershed Protection District
VENTURA COUNTY

NOAA
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

California Department of Fish & Wildlife

U.S. Fish & Wildlife Service
Department of the Interior

Sierra Club
Founded 1892

The Western Foundation of Vertebrate Zoology
Avian Research and Conservation since 1956

University of California Santa Barbara
CCBER
Cheadle Center for Biodiversity & Ecological Restoration

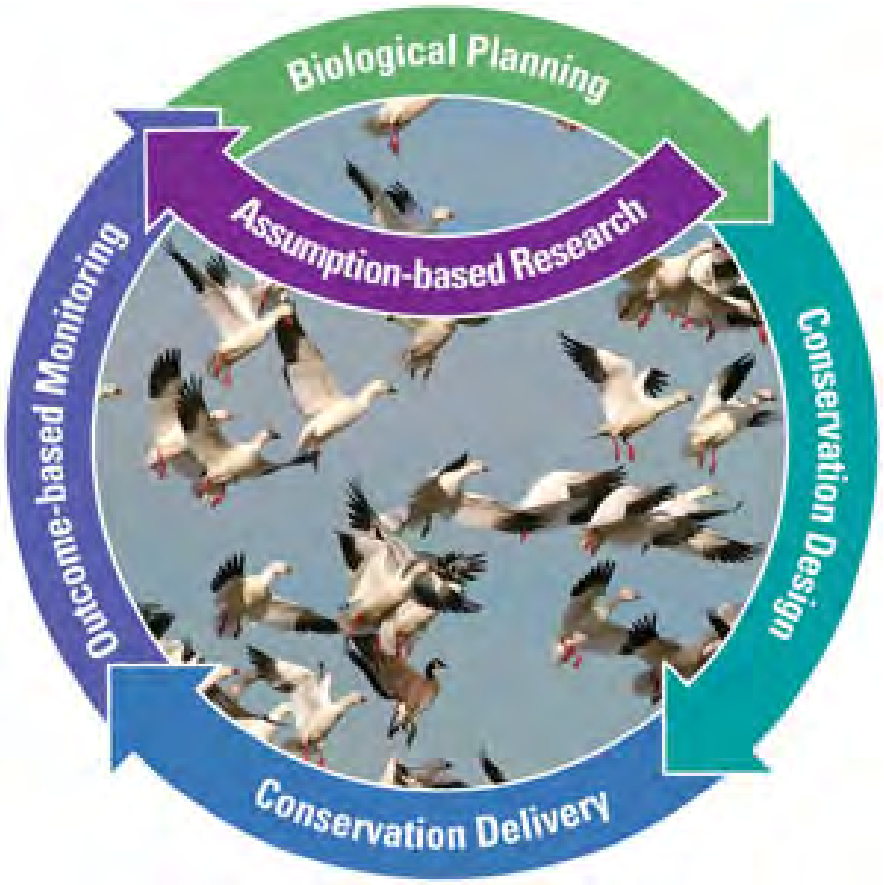
Fillmore Unified School District

CSUCI

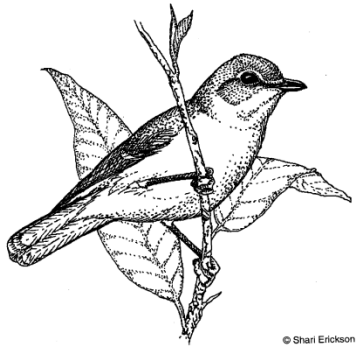
Stillwater Sciences

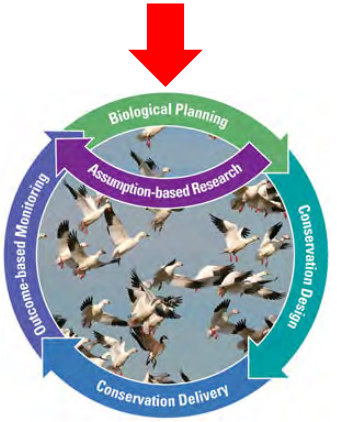
3. Implement adaptive management framework…

Step 1: Biological Planning

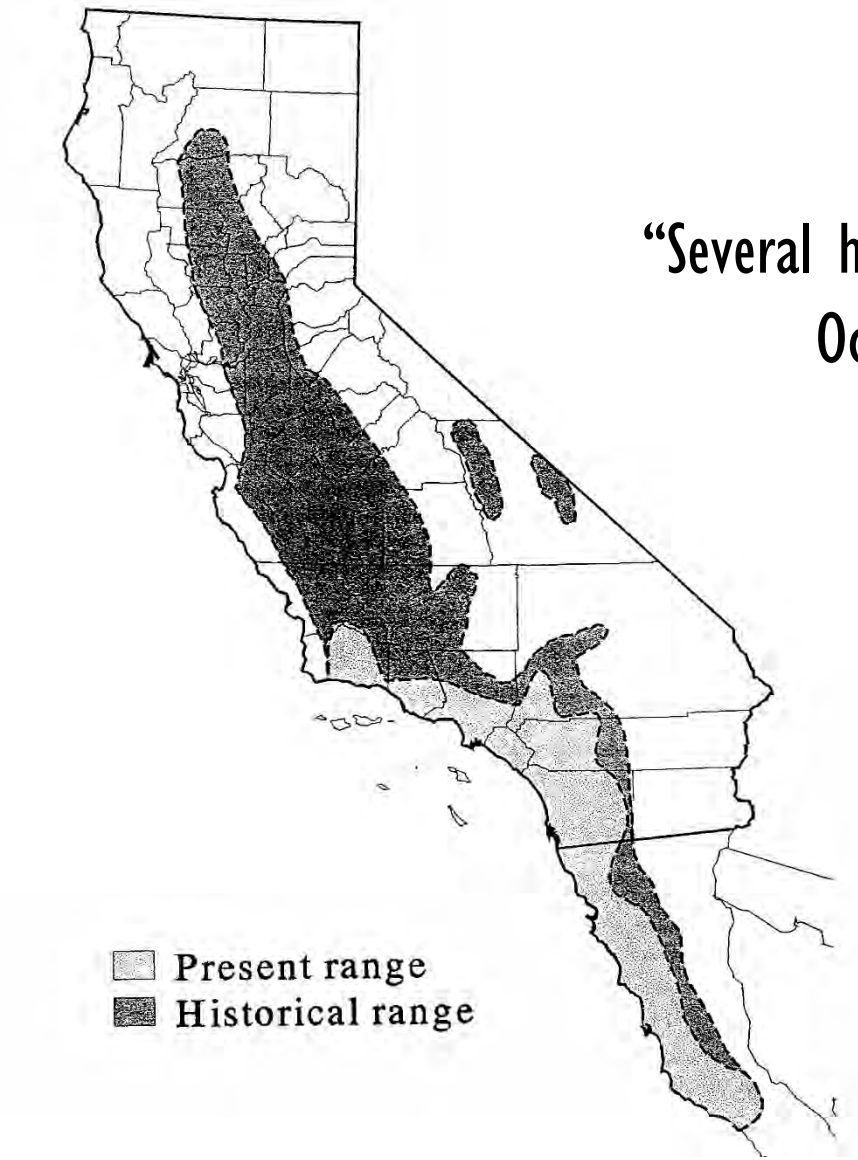


Focal Species: Least Bell's vireo (*Vireo bellii pusillus*)





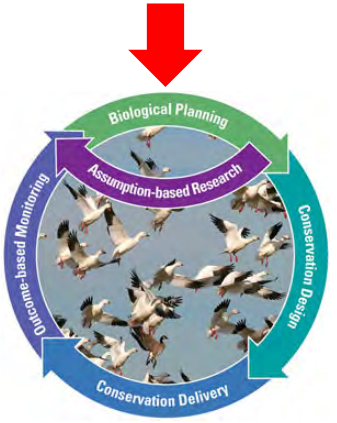
Least Bell's vireo (*Vireo bellii pusillus*)



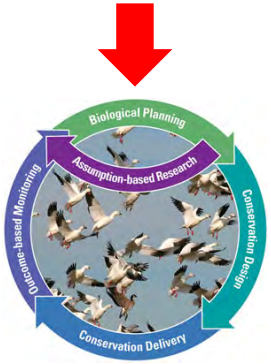
Recovery goals:

"Several hundred pairs" in focal watersheds

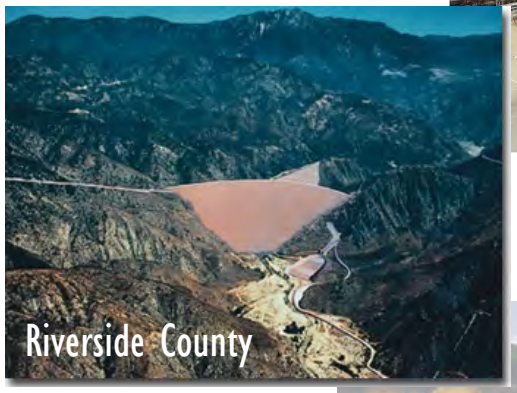
Occupancy in historic range



Reasons for Decline



Habitat Loss



Brood Parasitism

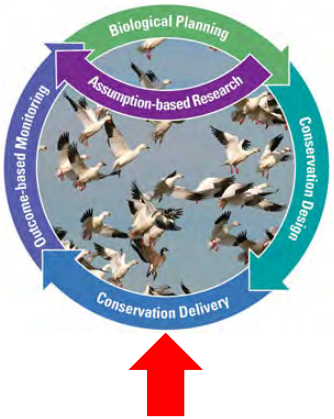
Brown-headed cowbirds (*Molothrus ater*)

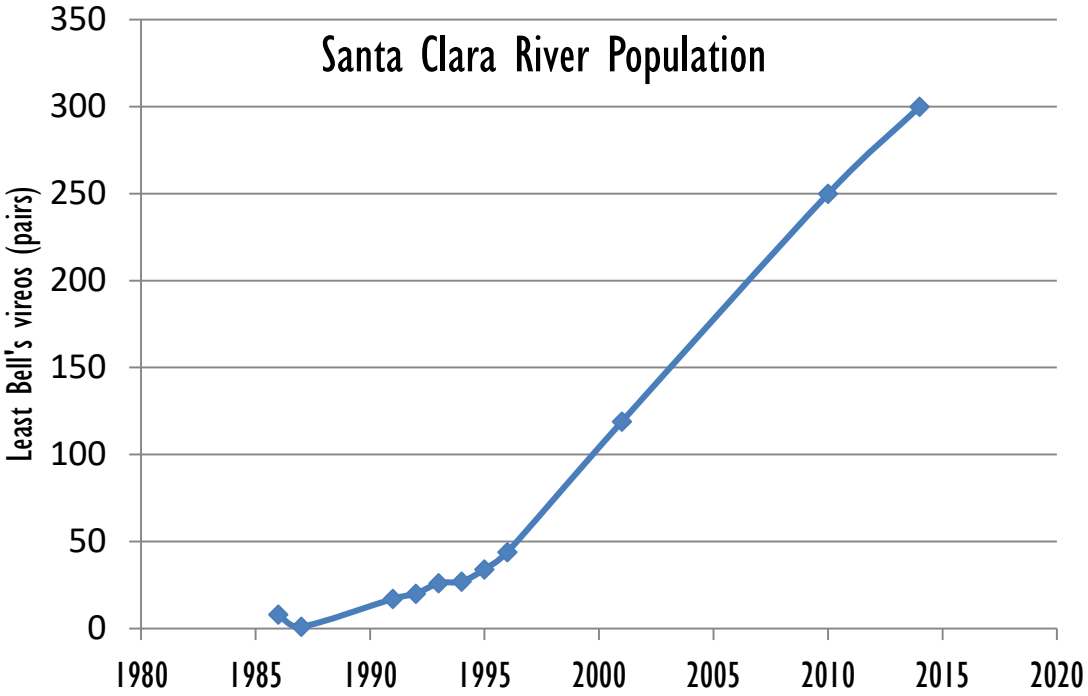
Griffith Wildlife Biology

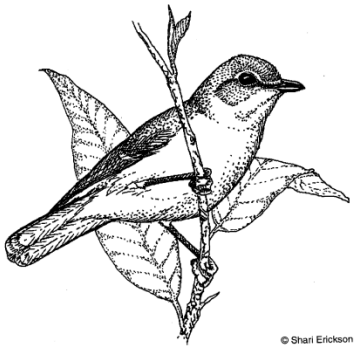
Step 2: Conservation Design

1. Protect/Conserve the Santa Clara River corridor
2. Remove non-native, invasive, riparian vegetation
3. Control brown-headed cowbirds

Step 3: Conservation Delivery



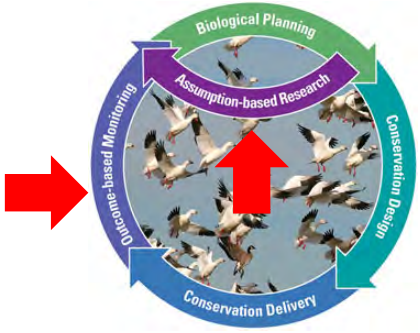




Recovery goal:

"Several hundred pairs" in focal watersheds

Step 4 & 5: Monitor and Adapt



Habitat Quality

How much?

Cowbird Parasitism

How much?

Habitat Quantity

(post-flood successional state)

LBVI Population

(What is the population goal? Are were there?)

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Western Foundation of Vertebrate Zoology

CSUC

Stillwater Sciences

The Nature Conservancy
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U.S. FISH & WILDLIFE SERVICE

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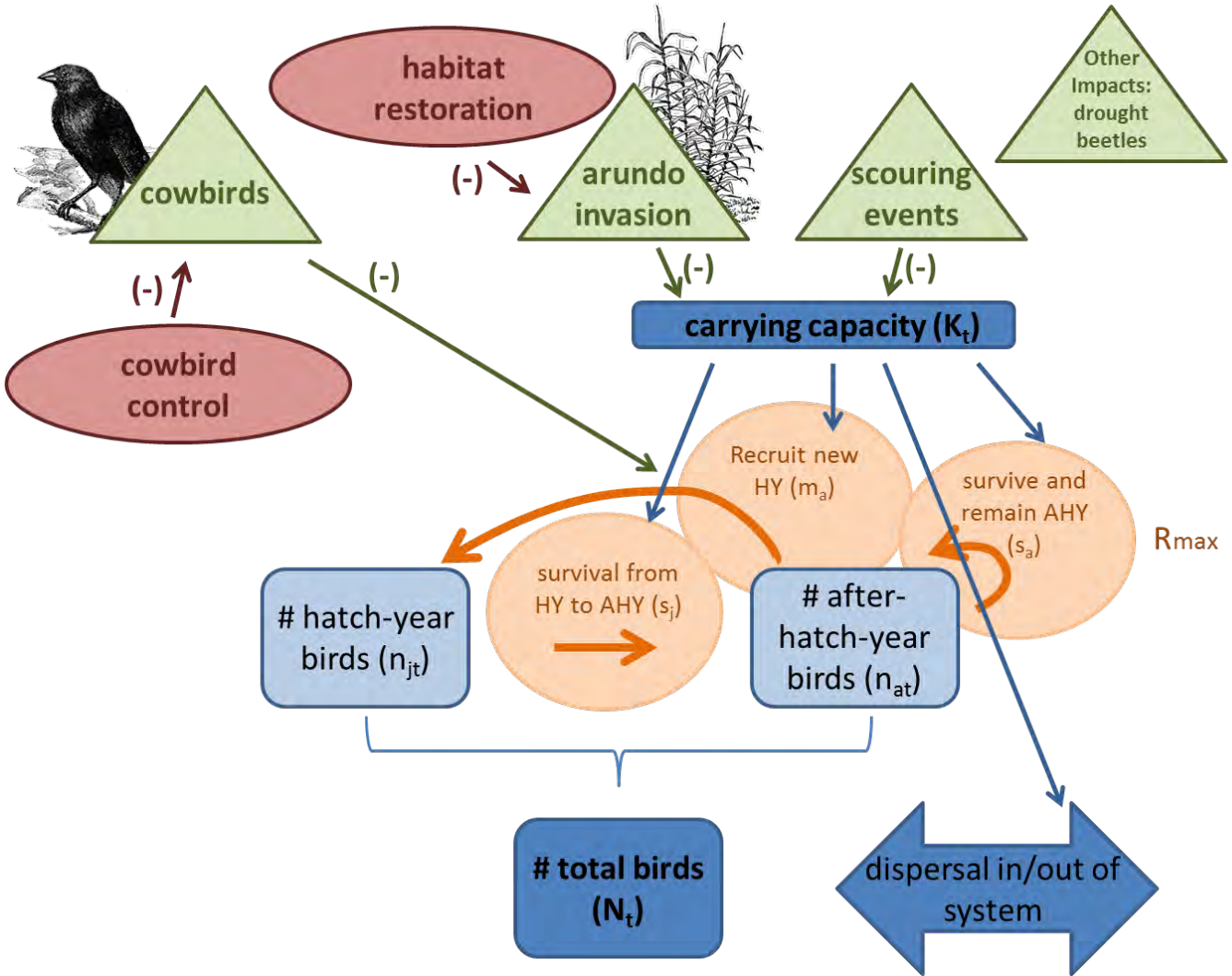
Upper Midwest Environmental Science Center

Decision Support Tool

Jessica Stanton & Wayne Thogmartin



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Model Structure

- Designed to account for uncertainty by setting bounds on uncertain parameters and sampling over the range
- Model is a simple stochastic population growth model
- Population is assumed to grow at a growth rate (with annual environmental variation) with a population cap at the carrying capacity

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Model Structure

Initial # of breeding Pairs

150 pairs — 300 pairs

Initial carrying capacity

200 pairs — 500 pairs

Maximum carrying capacity

400 pairs — 700 pairs

Habitat restoration rate

1% — 10%

Annual environmental variation

0.05 — 0.15

1. Latin Hypercube Sampling to create parameter set

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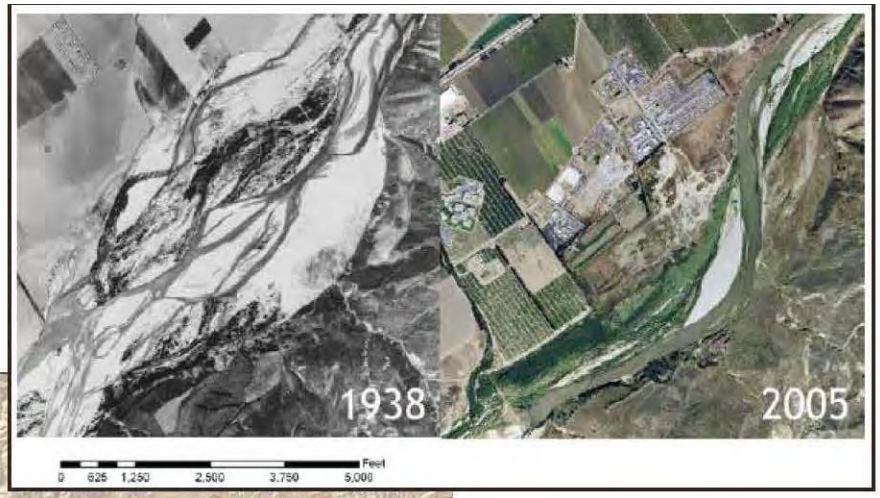
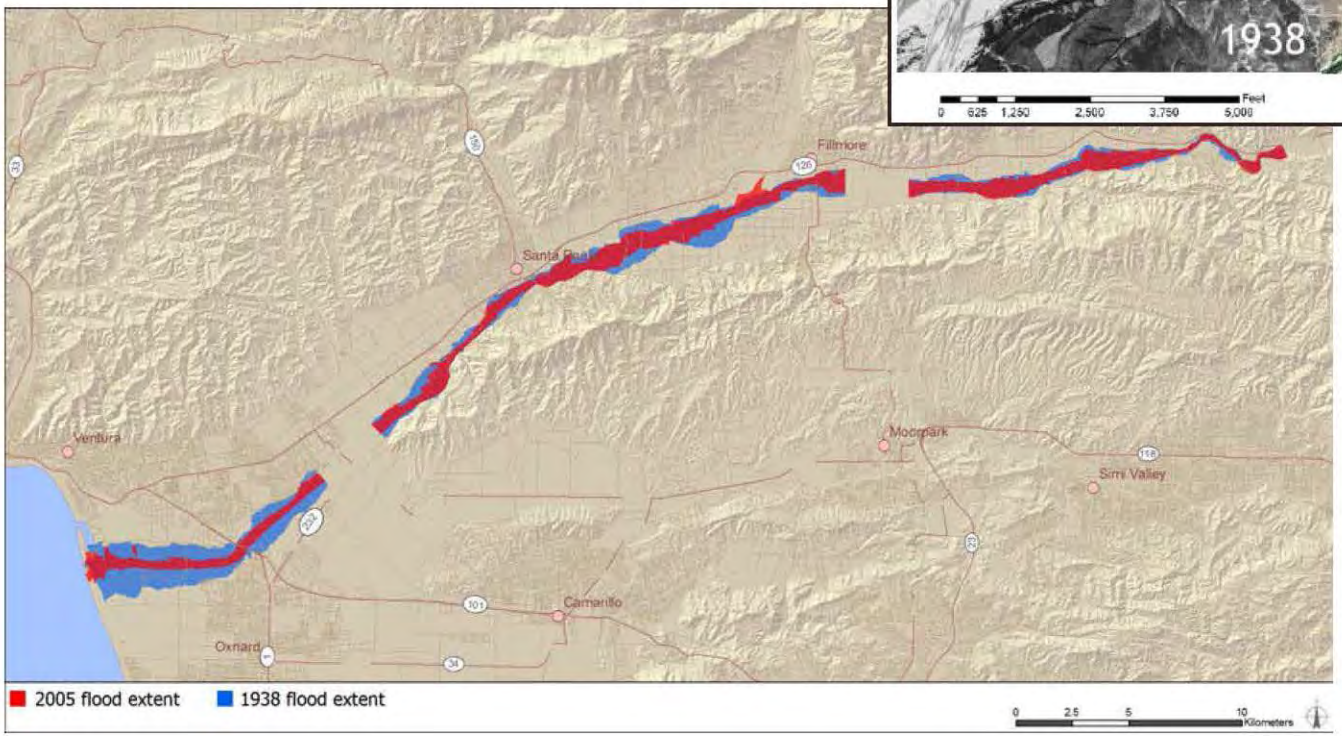
Model Structure

2. Simulate stochastic riparian flood regime trajectory





Stillwater Sciences. 2007

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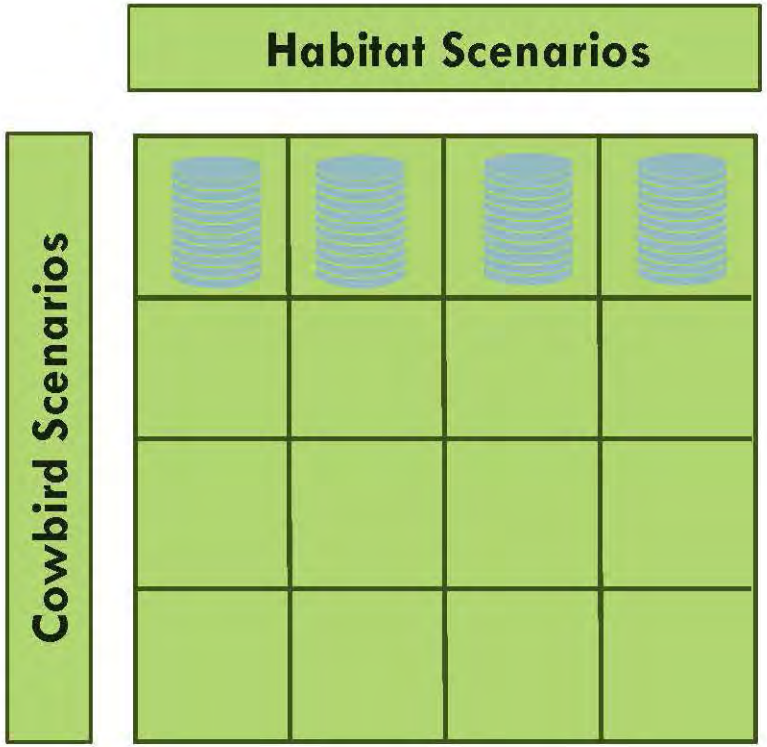
Model Structure

3. Repeat each parameter set over every combination of management scenarios



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Management Scenarios

6 levels of Cowbird Control

0.1 0.2 0.4 0.6 0.8 1.0

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Management Scenarios

6 Habitat Management Scenarios

None

Units – min
- 2 subunits managed
- Initiated in different years
- Continues once begun

Units – med
- 5 subunits managed
- Initiated in different years
- Continues once begun

Units – max
- 6 subunits managed
- Initiated in different years
- Continues once begun

Walk-away
- all subunits managed
- Initiated in different years
- Ceases once goal met

Flood
- all subunits managed
- Initiated after natural scour
- Dependent on area cleared

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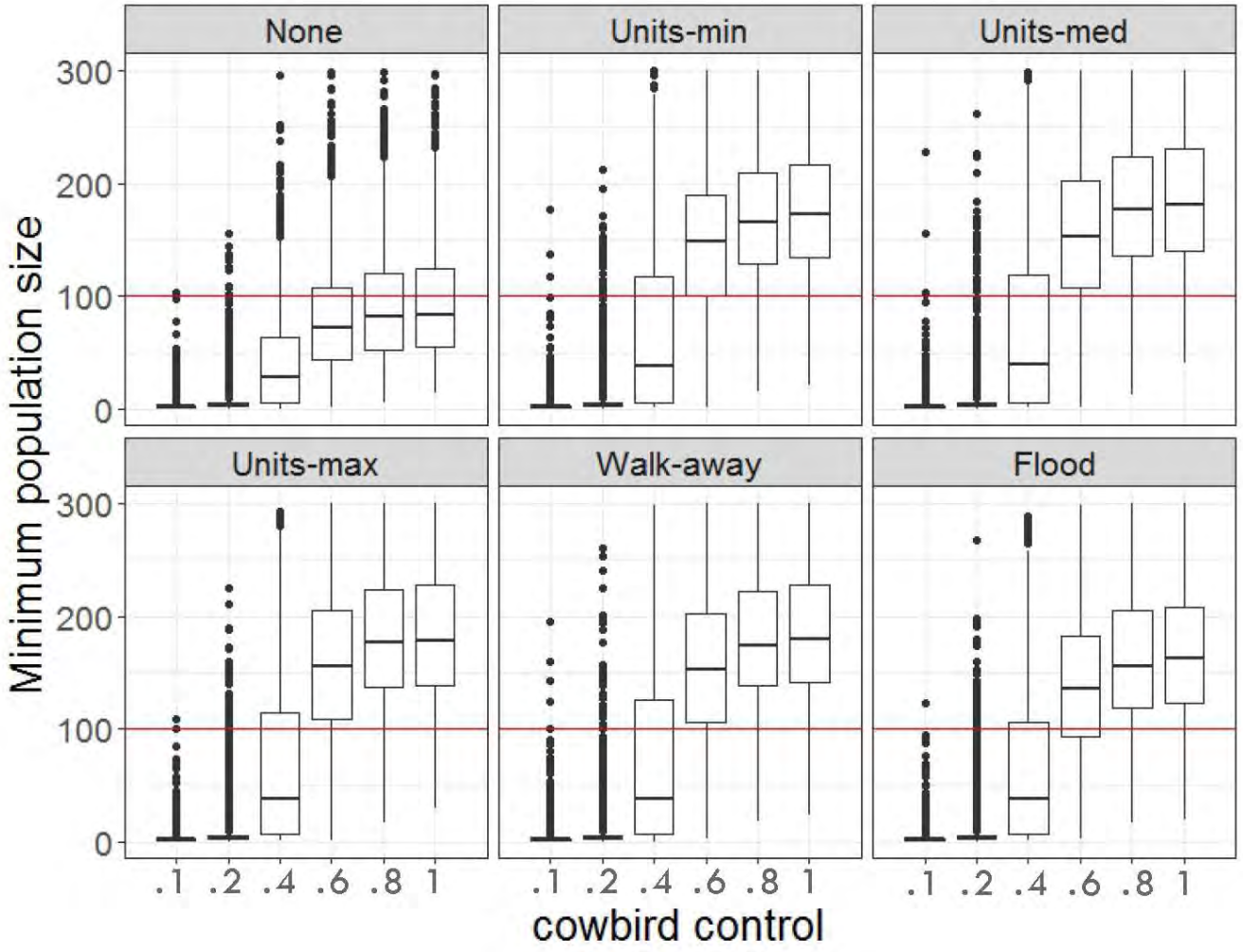
Output Format: Minimum Population Size



NOTE: These results do not reflect final model parameters, and are intended to show output format only

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Least Bell's Vireo Simulation

Select range values to explore how uncertainty impacts model outcome

Initial # of breeding pairs:

150pairs — 300pairs

150 165 180 195 210 225 240 255 270 285 300

Initial carrying capacity

200pairs — 500pairs

200 230 260 290 320 350 380 410 440 470 500

Maximum carrying capacity

400pairs — 700pairs

400 430 460 490 520 550 580 610 640 670 700

Habitat restoration rate

1% — 10%

1 2 3 4 5 6 7 8 9 10

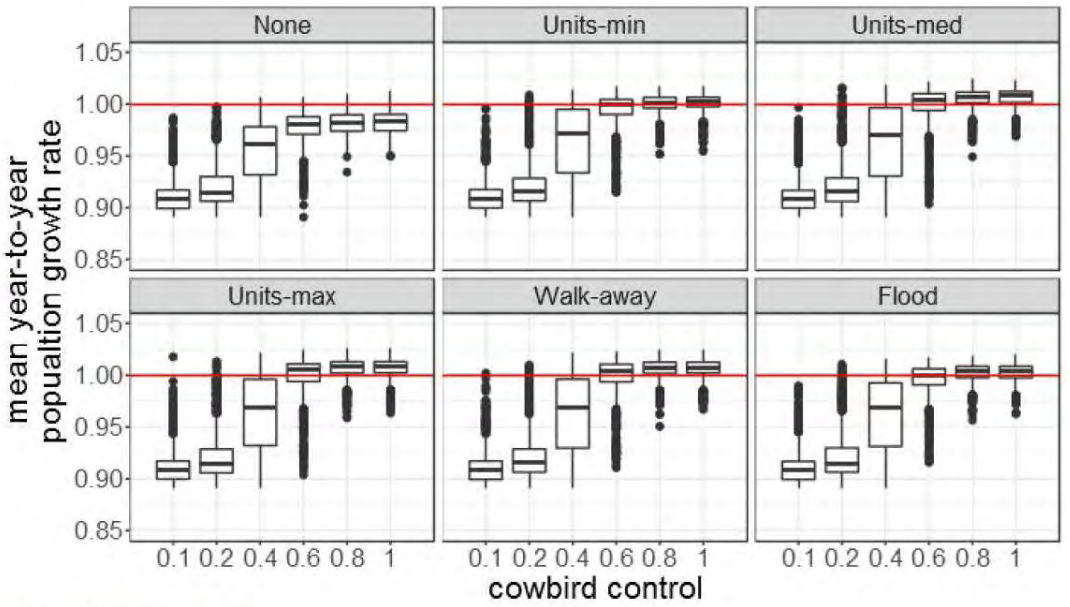
Annual environmental variation

0.05 — 0.15

0.05 0.06 0.07 0.08 0.09 0.1 0.11 0.12 0.13 0.14 0.15

Information | Minimum Populaion | Growth rate | Population change

Mean Population Growth Rate



Average growth rate goal

0.75 — 1 — 1.25

0.75 0.8 0.85 0.9 0.95 1 1.05 1.1 1.15 1.2 1.25

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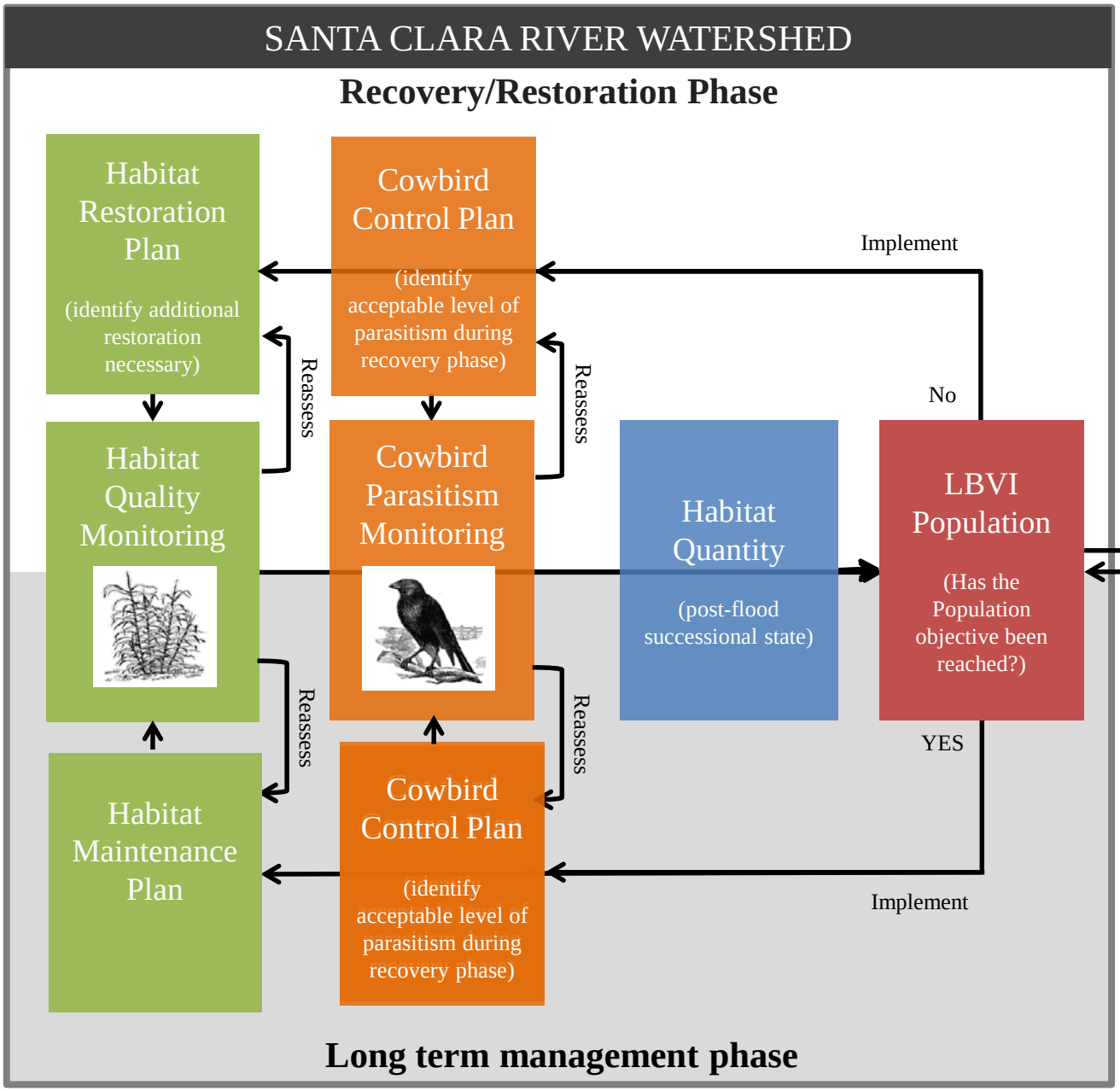
SANTA CLARA RIVER WATERSHED
Recovery/Restoration Phase
Habitat Restoration Plan
(identify additional restoration necessary)
Cowbird Control Plan
(identify acceptable level of parasitism during recovery phase)
Implement
Reassess
Reassess
No
Habitat Quality Monitoring
Cowbird Parasitism Monitoring
Habitat Quantity
(post-flood successional state)
LBVI Population
(Has the Population objective been reached?)
Dispersal to/from other watersheds
Reassess
Reassess
YES
Habitat Maintenance Plan
Cowbird Control Plan
(identify acceptable level of parasitism during recovery phase)
Implement
Long term management phase

Questions?

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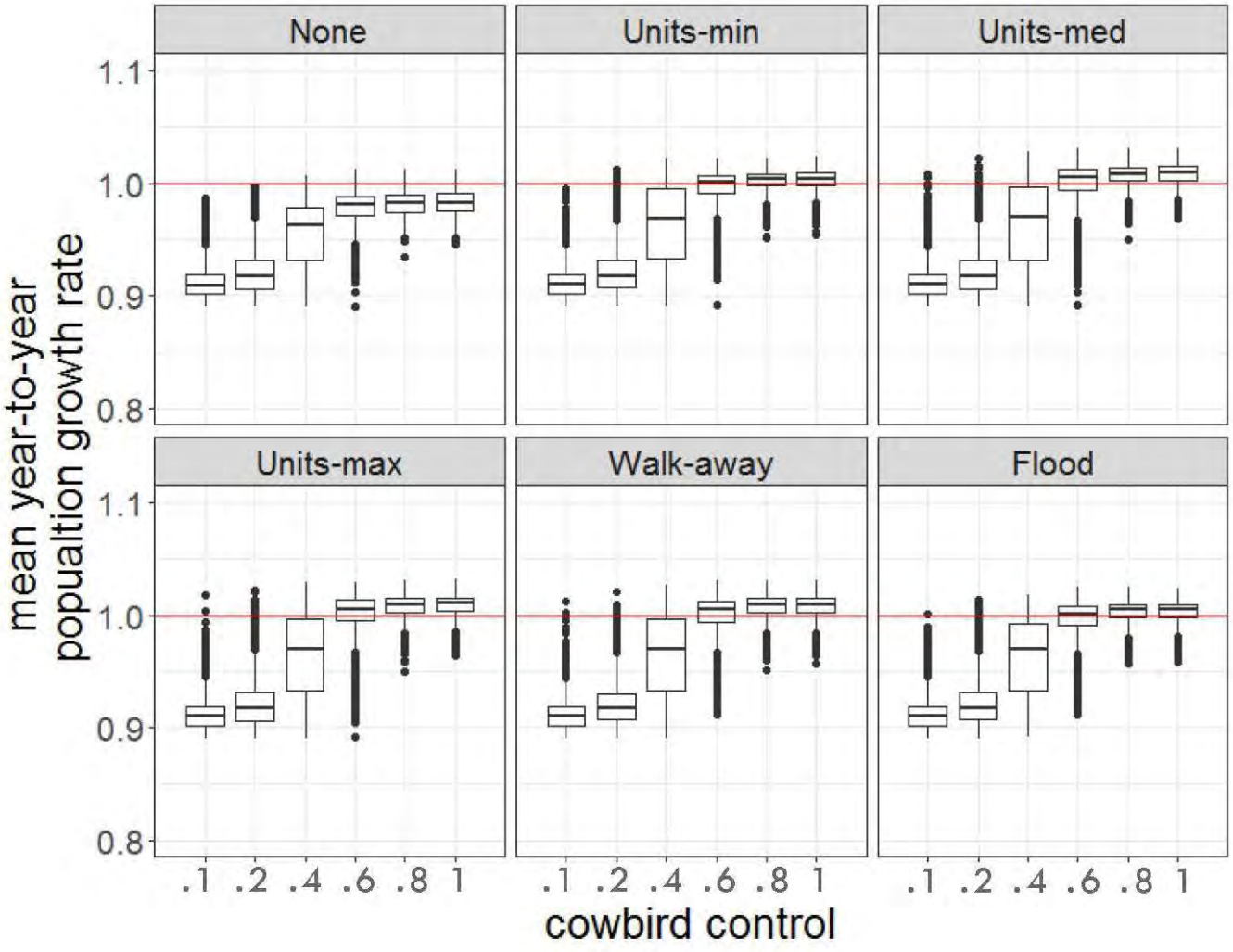
Output Format: Mean Growth Rate



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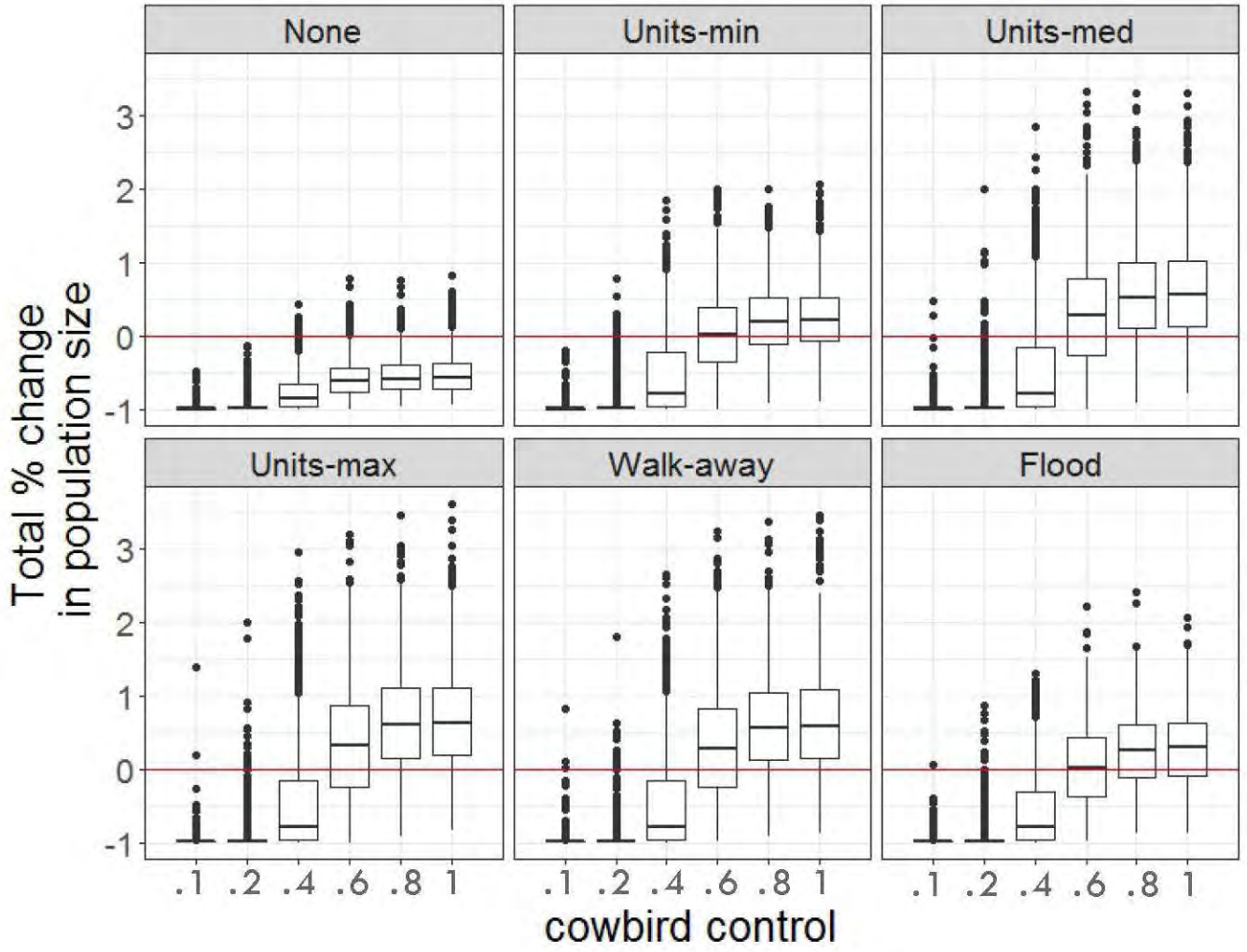
Output Format: Overall population change



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