

Climate-Smart Tools to Protect California's Freshwater Biodiversity

March 20, 2025

Ted Sommer



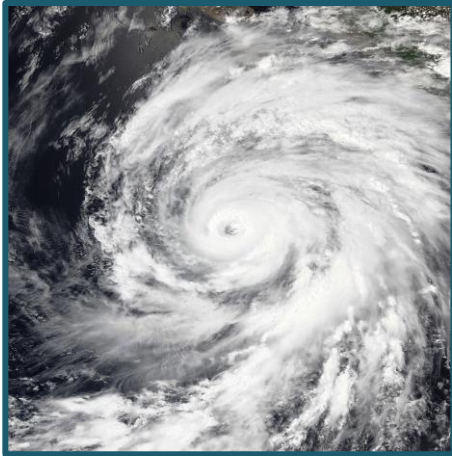
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TIME HIGHS

Woodland Hills **121°**
Records since 1949 **2020**

High temperatures

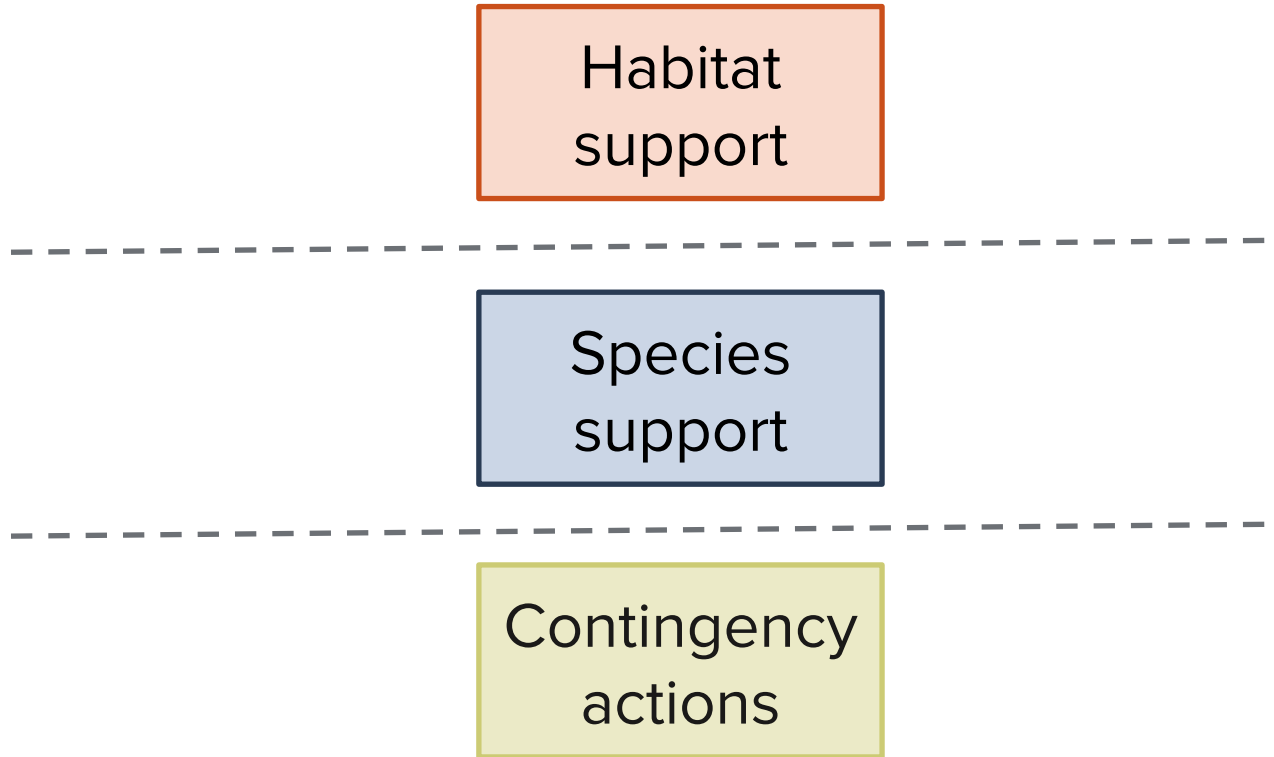
The 121° degrees today at Woodland Hills is the highest all-time temperature official site in L.A. County.

Paso Robles **117°**
Records since 1948 **2020**

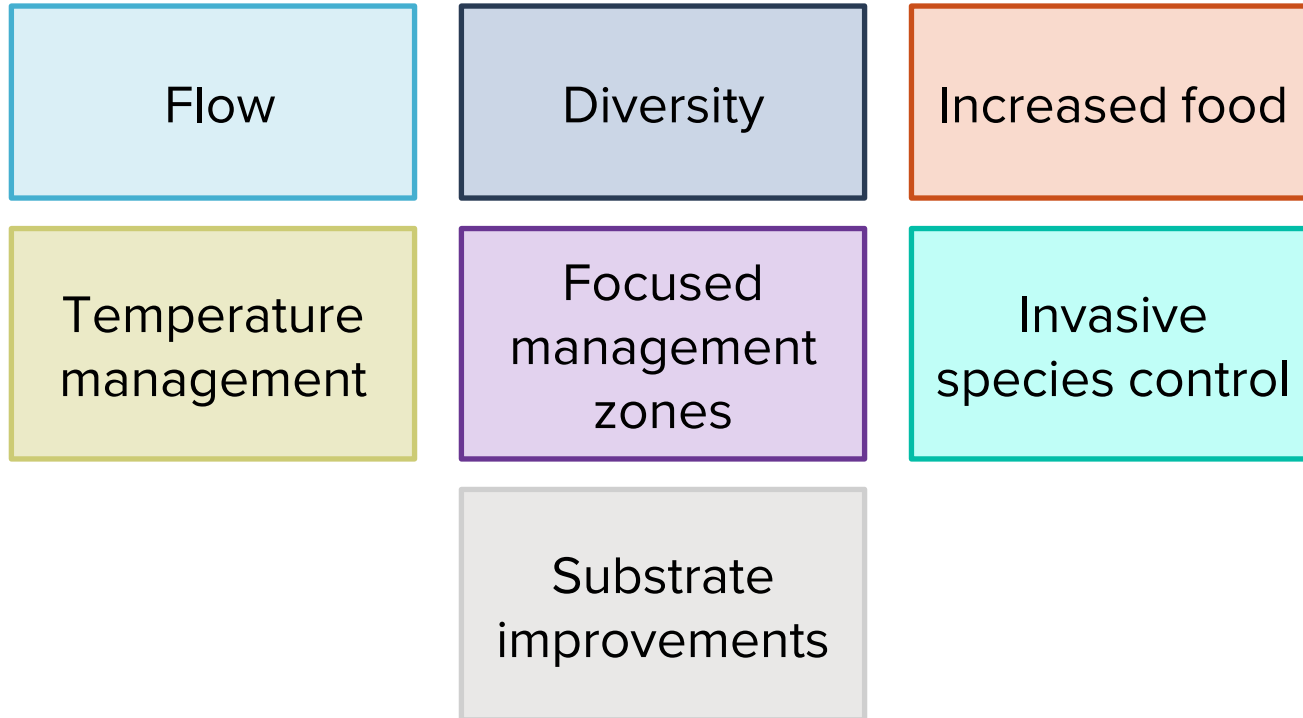
The 117° degrees today at Paso Robles is the highest all-time temperature official site in San Luis Obispo County.

OTHER SERVICE
 PUBLIC ADMINISTRATION
 and CA

Toolbox framework

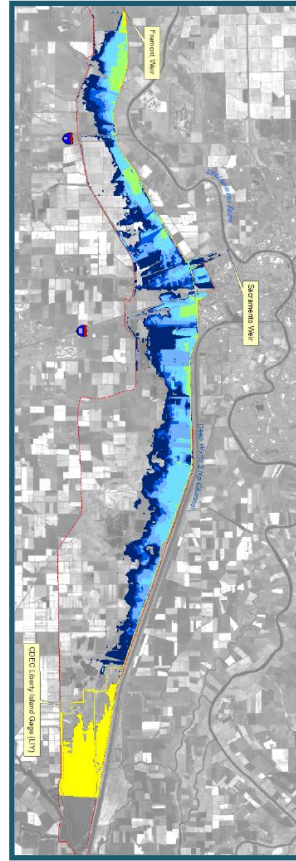


Strategy 1: Habitat support



Habitat restoration

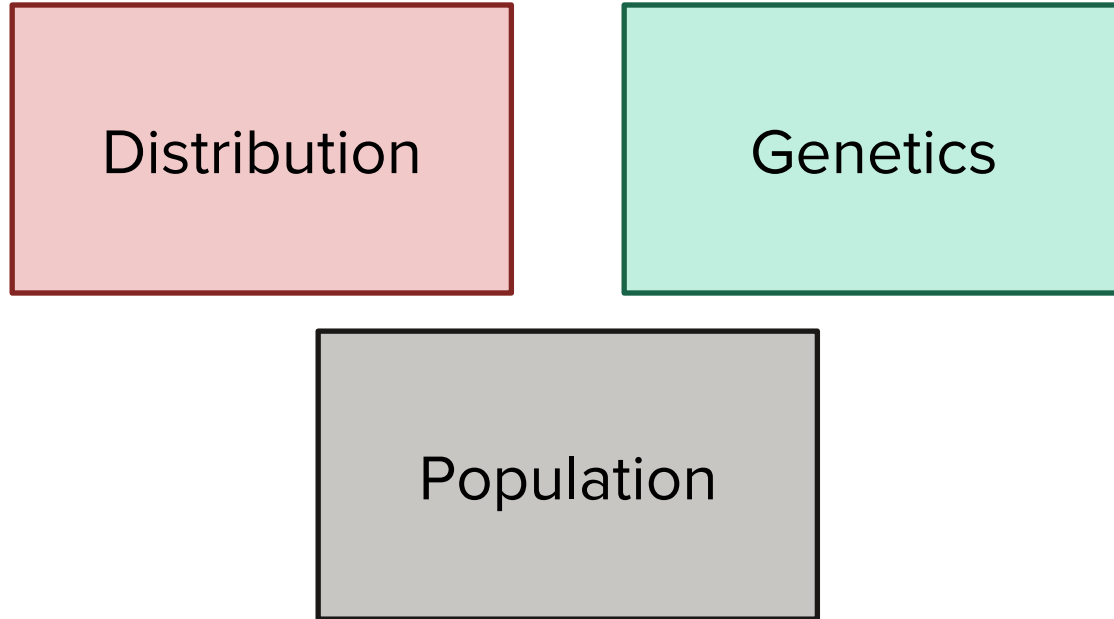
Yolo Bypass floodplain



Flow

Habitat diversity

Strategy 2: Species support



Distribution support

Klamath River dam removal



Historical
habitat
access

Habitat
support

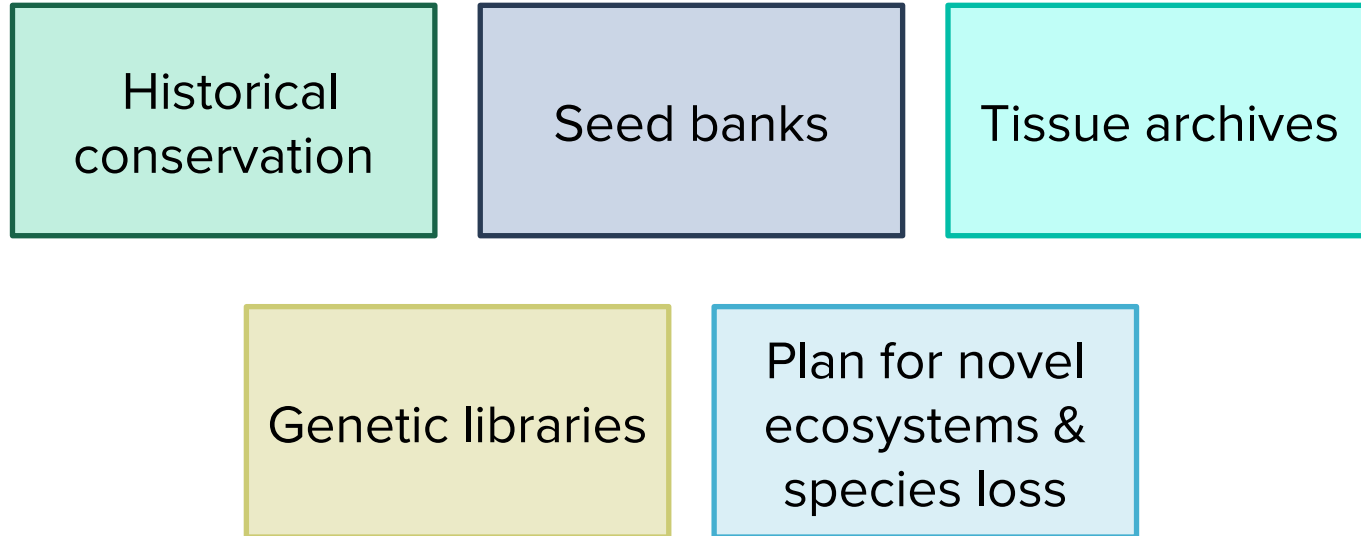
Genetics

Shellfish breeding



Assisted
evolution

Strategy 3: Contingency actions



Contingency planning

Frozen Zoo

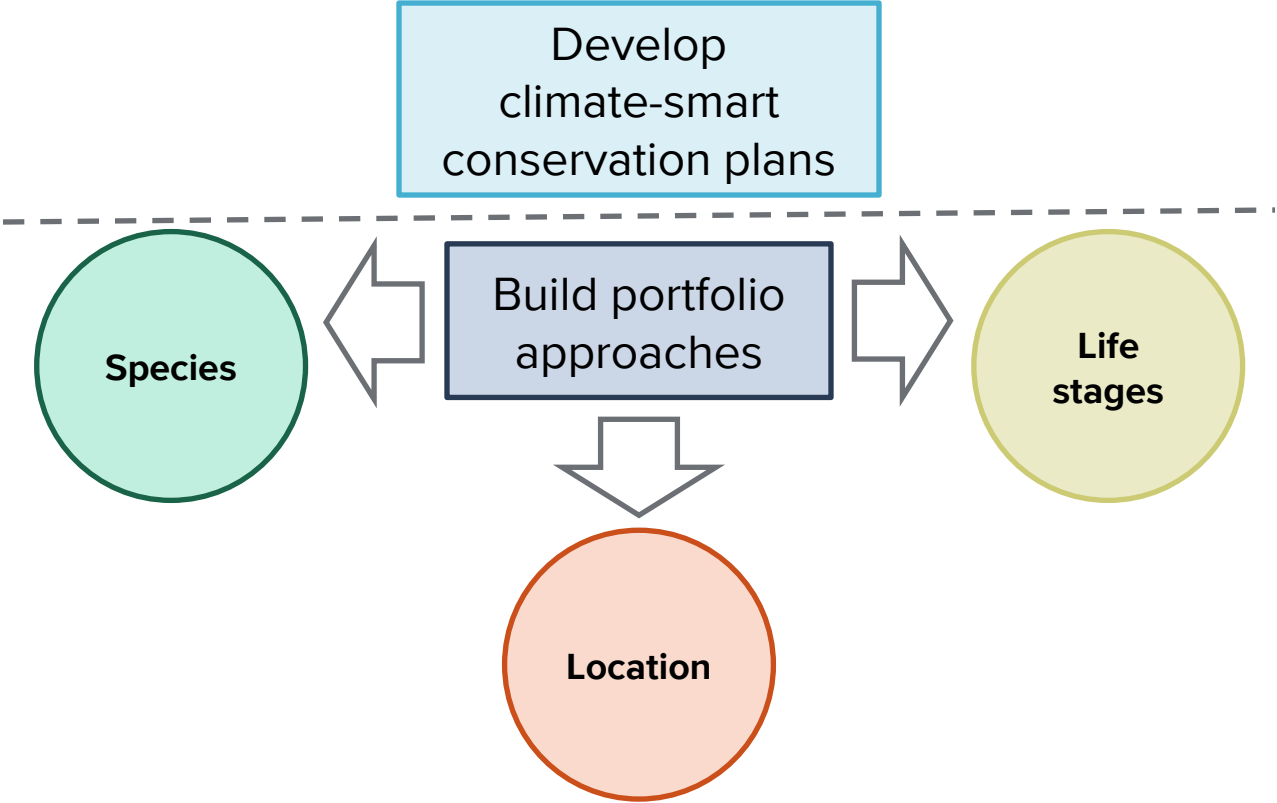


Seed banks

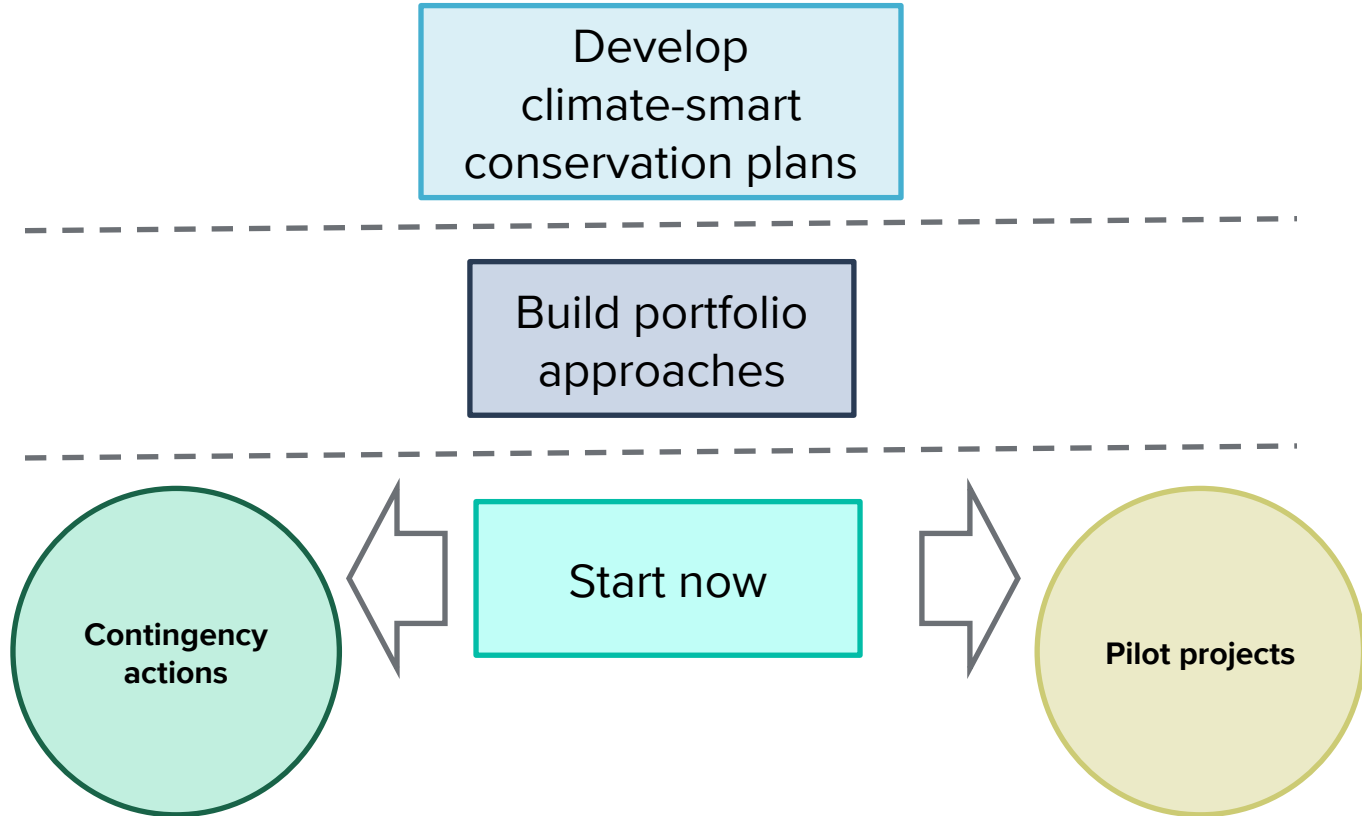
Tissue
archives

Genetic
library

Key recommendations



Key recommendations



Notes on the use of these slides

These slides were created to accompany a presentation. They do not include full documentation of sources, data samples, methods, and interpretations. To avoid misinterpretations, please contact:

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Thank you for your interest in this work.

Implementing Climate-Smart Tools

Laws and Institutions

March 20, 2025

Jennifer L. Harder



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Refocus species protection

- The endangered species acts allow a climate-smart approach
 - Focus on recovery
 - Use ecosystem-based management
 - Consider future conditions—plan for novel ecosystems
 - Prepare for ongoing change
- Reallocate regulatory agendas, staff, funding
- Address institutional culture—agencies, stakeholders, advocates

“Research and recovery” permitting

- Federal permits
 - ESA § 10(a)
 - Hatchery and genetic Management plans
- State permits
 - CESA § 2081(a)
 - Scientific collecting permits
 - Fully protected species
 - Restoration permitting

- Assisted migration
- Contingency actions
- Genetics and diversity
- Hatchery reform

Recommended actions

- Develop climate-smart conservation plans
- Strengthen recovery requirements
- Develop policy for:
 - Assisted migration and experimental populations
 - Assisted evolution (hybridization, epigenetics, transgenics)
- Fund contingency actions—e.g., seed banks, tissue archives

Environmental law and institutional culture

- Build organizational capacity for adaptation
 - Governance—watershed planning with oversight
 - Data and information
 - Flexibility, with boundaries
- Institutional culture and leadership
 - Accept risk
 - Be nimble
 - Reward innovation



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