



# California Freshwater Conservation Blueprint

CABW - October 21, 2015

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(The Nature Conservancy)  
Kurt Fesenmyer (Trout Unlimited)

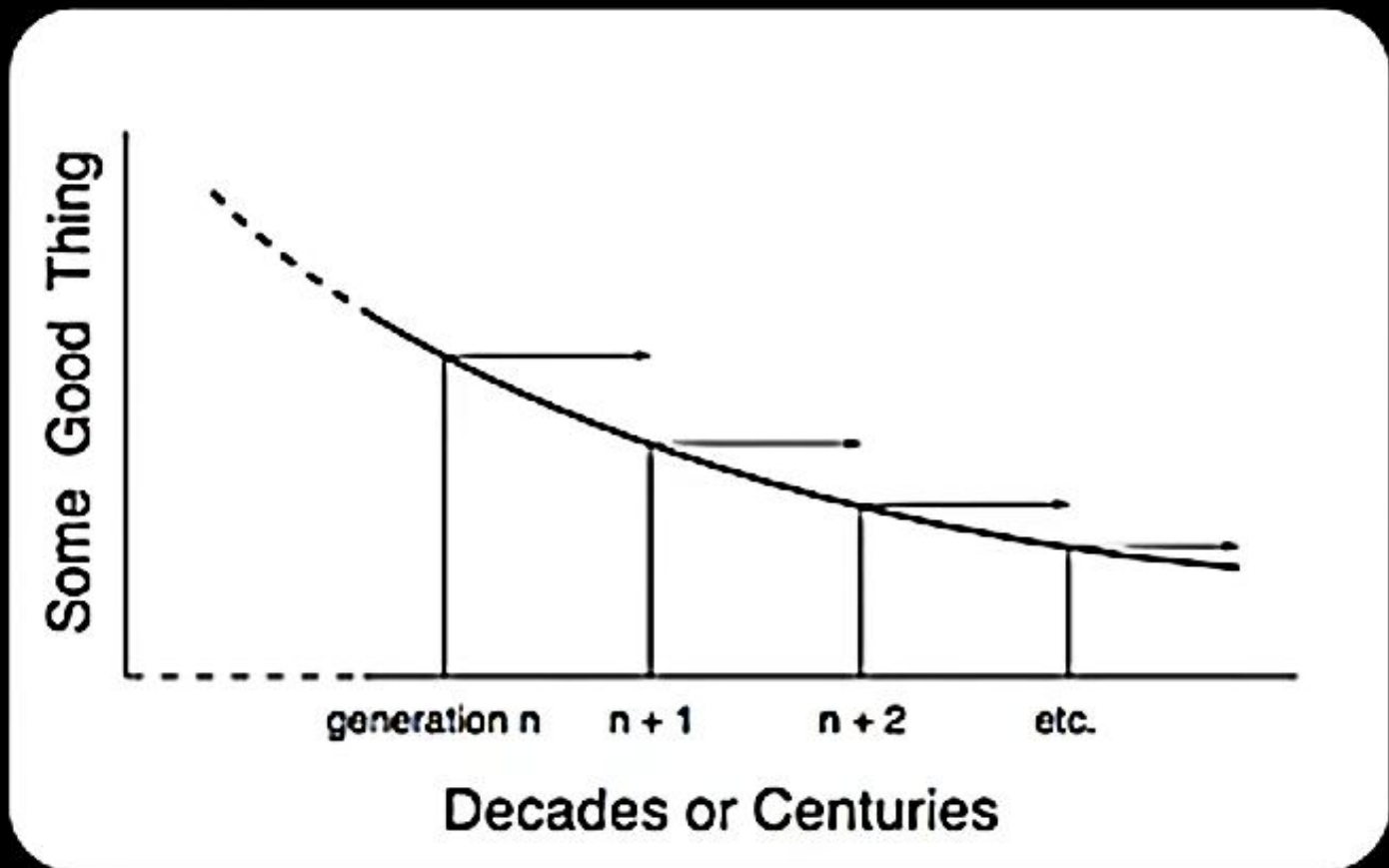


# Adapting to a “new normal”



“...the declining populations of natural insect pollinators in the surrounding localities have created a perpetual need for human pollinators in the apple orchards of Maoxian County.”

# Shifting Baselines



Source: Daniel Pauly, Ted Talk, 2012

**EACH TIME THE  
BASELINE DROPS, WE  
CALL IT THE NEW  
"NORMAL."**

# Concept

Species



Systems



Current Condition



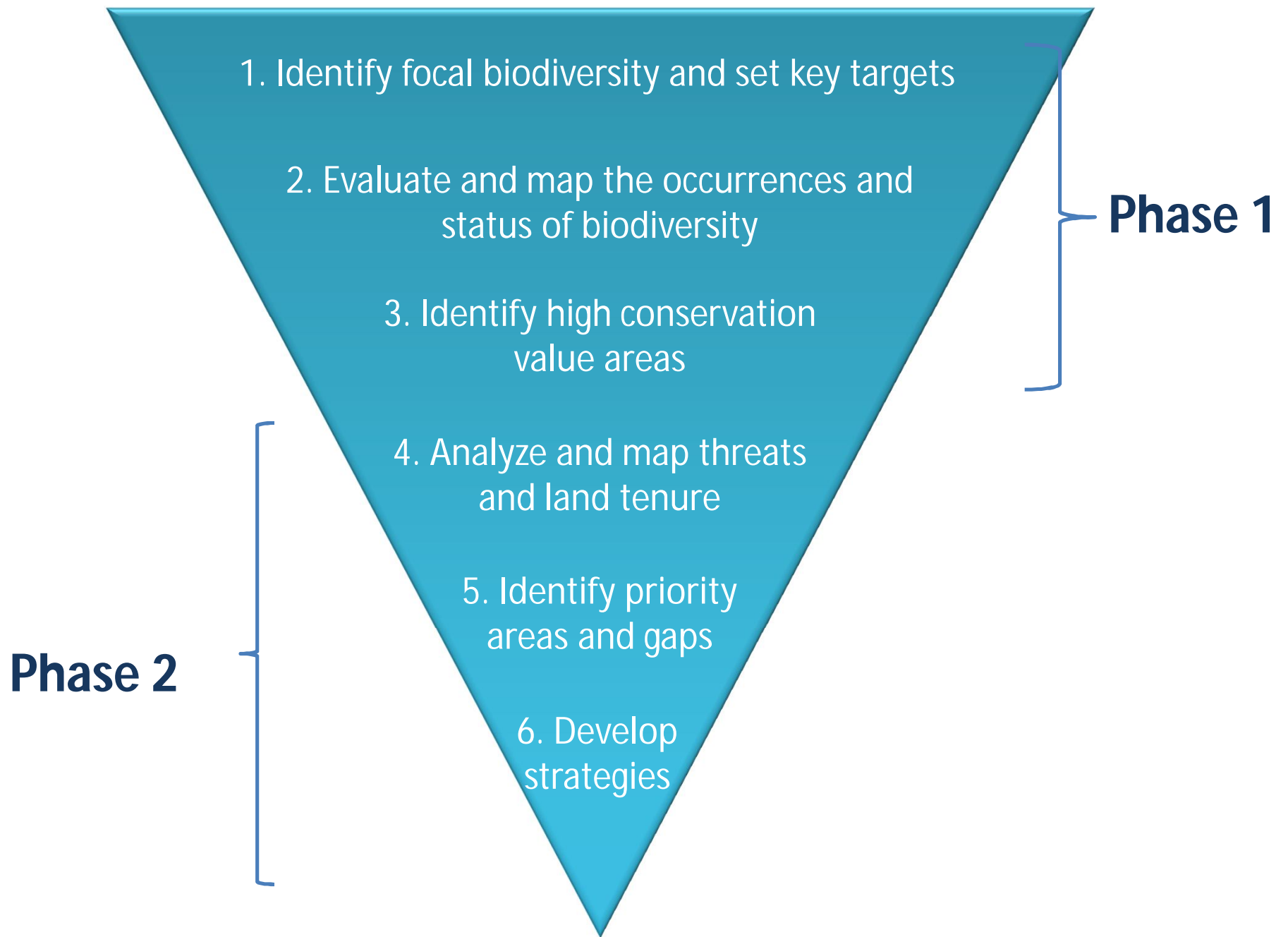
Future  
Threats

Strategies



Protection

s



# Phase 1 Working Group

Rodd Kelsey, Kirk R. Klausmeyer, Larry Serpa,  
Jackson Shedd - **TNC**

Kurt A. Fesenmyer, Rene Henery - **Trout  
Unlimited**

Joseph Furnish, Michael Kellett - **US Forest  
Service**

Tom Gardali - **Point Blue**

Ted Grantham, Peter B. Moyle, Ryan Peek,  
Rebecca Quinones, Nick Santos, Amber Wright –  
**UC Davis**

Josh Viers – **UC Merced**

Jacob Katz – **CalTrout**

Sarah Kupferberg – **McBain Associates**

Patrick McIntyre, Pete Ode, Andy Rehn, Steve



# 1. Identify focal biodiversity and set key targets

What and  
where are  
freshwater  
species in  
California?



California Tiger Salamander (*Ambystoma californiense*)  
(Solano County ) Photo by Jackson Shedd



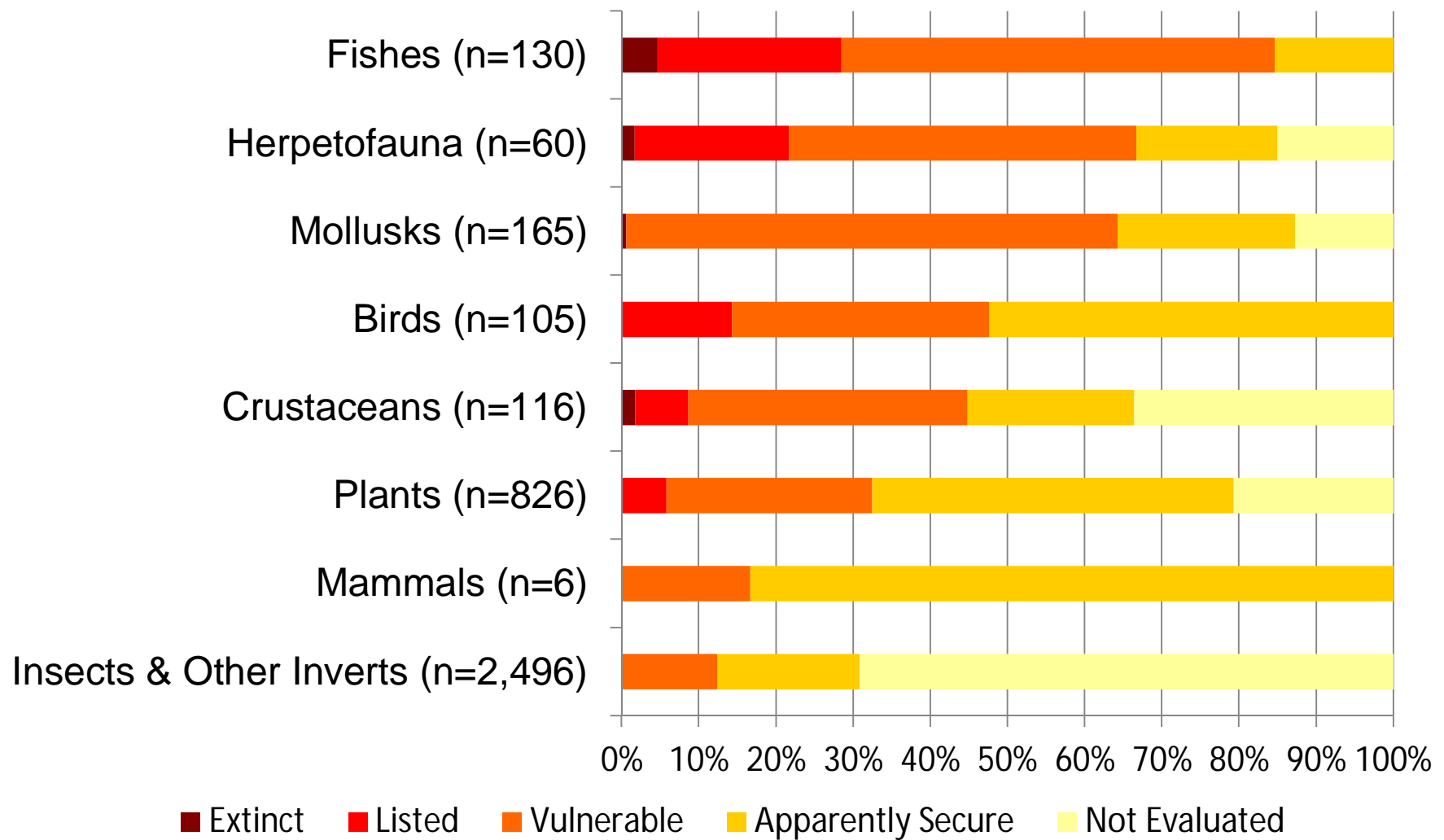
# What are freshwater species?

Criteria defined for:

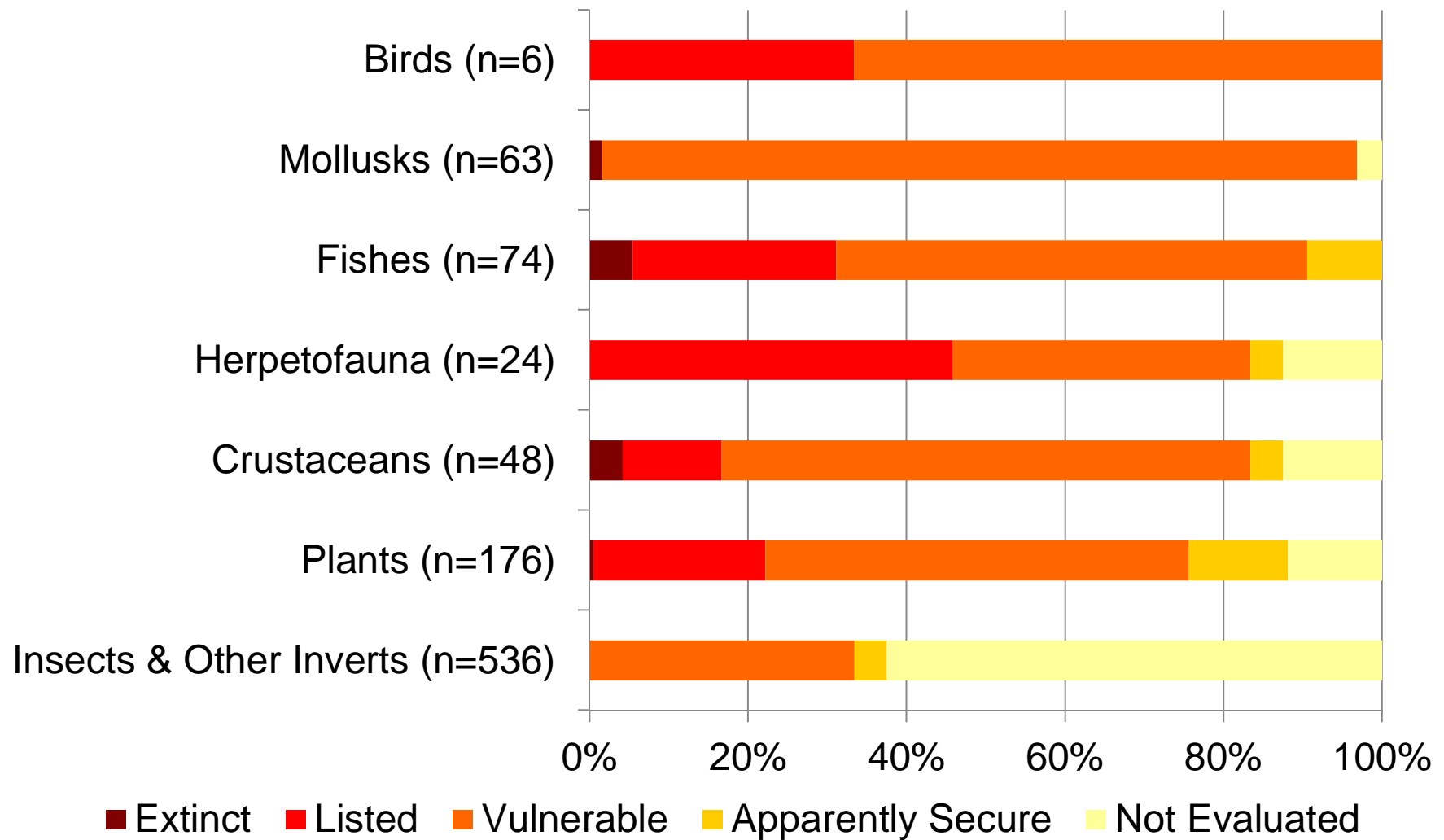
- Amphibians and Reptiles
- Benthic Macroinvertebrates
- Birds
- Fish
- Plants



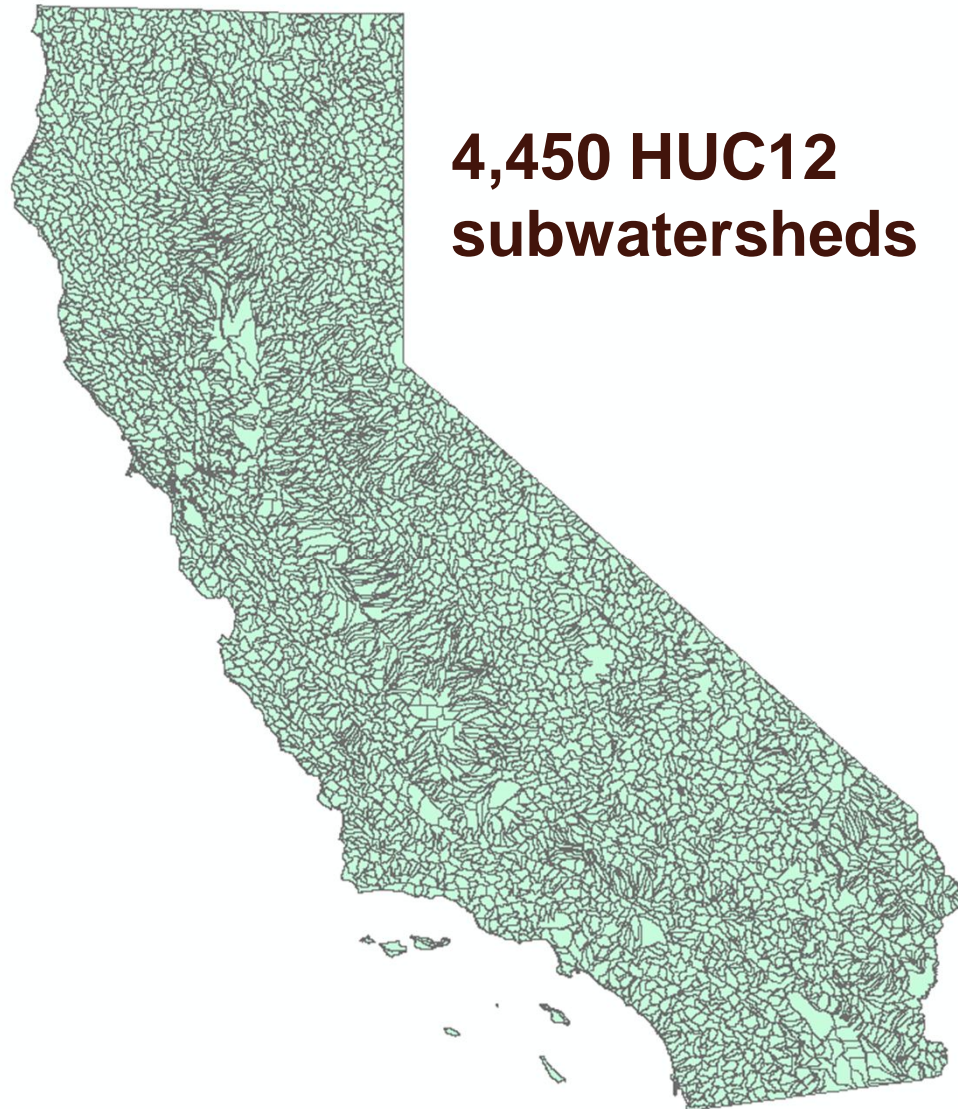
# All Taxa



# Endemic Taxa



## 2. Evaluate and map the occurrences and status of biodiversity

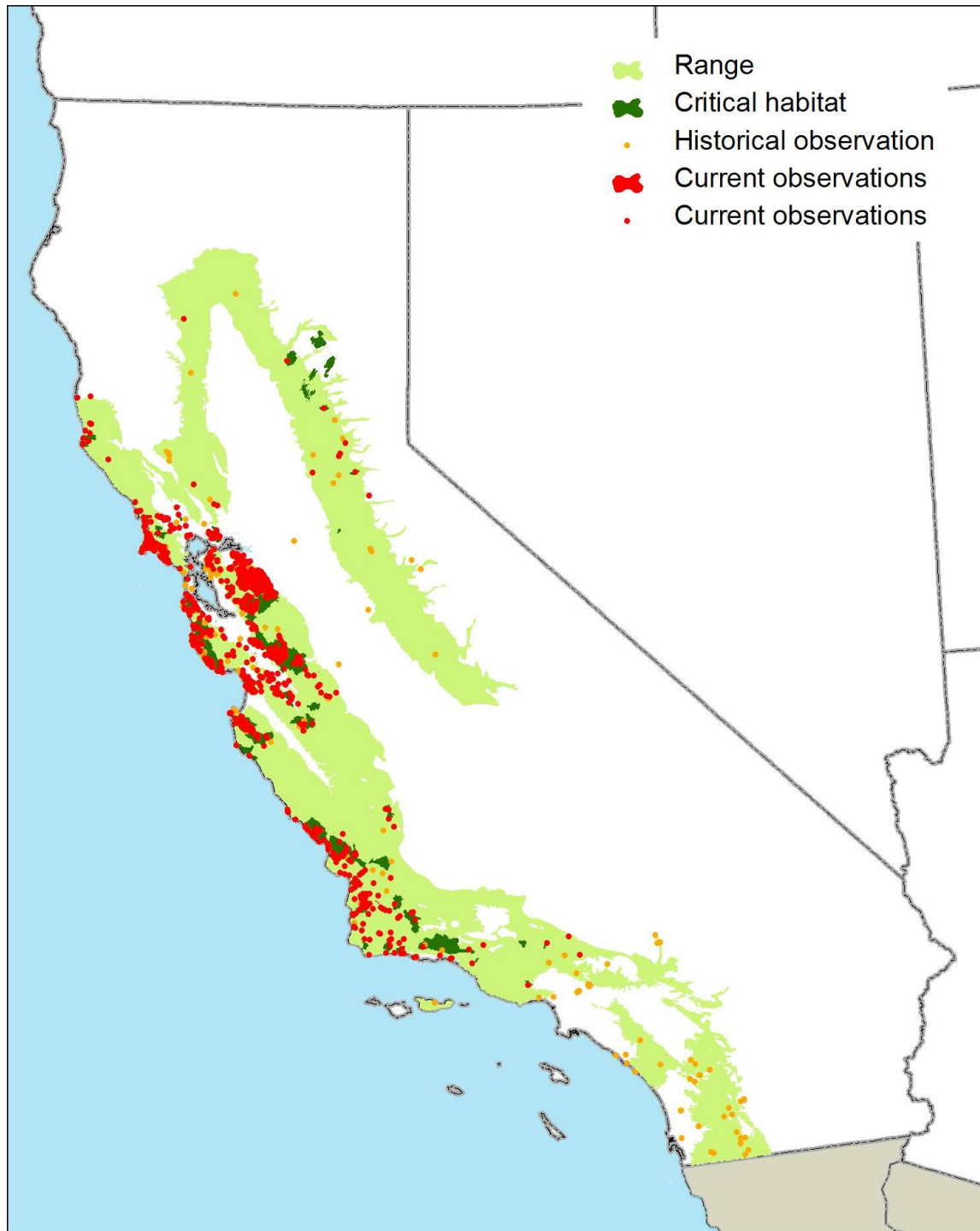


# Spatial Data Sources

Sources	Point features	Line features	Polygon features	Total features
GBIF	2,631,338			2,631,338
Buglab	356,239			356,239
SWAMP	168,702			168,702
California Avian Datacenter	125,972			125,972
Consortium of CA Herbaria	81,089			81,089
Other data sources	35,918	23,689	575	60,182
HerpNet	55,191			55,191
CNDDDB	9,914		8,394	18,308
CalBug	18,099			18,099
BIOS	1,361	33	21	1,415
PISCES			130	130
CWHR			66	66

This list represents 495 total data sources





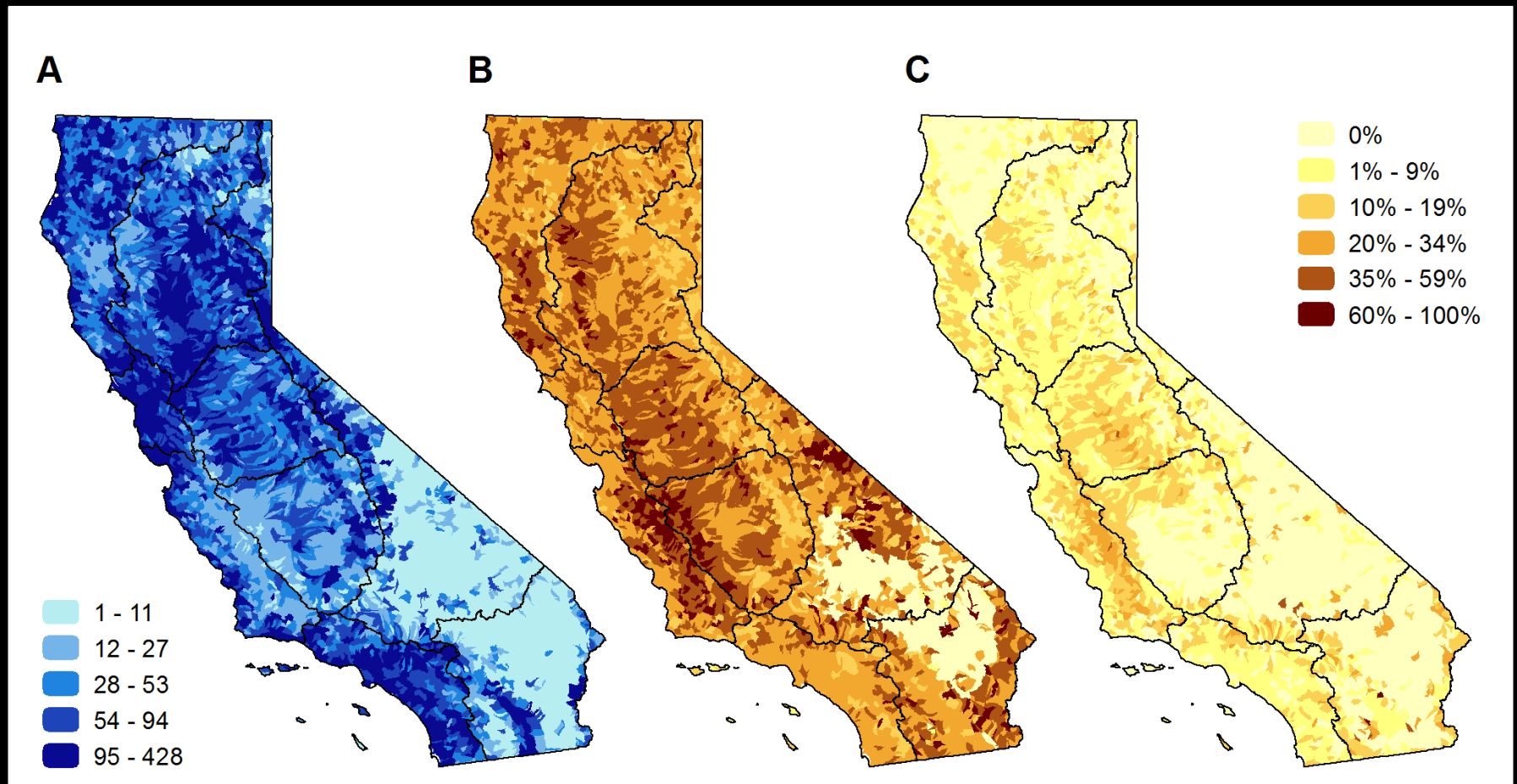
# Spatial Data Collection



Red-legged frog

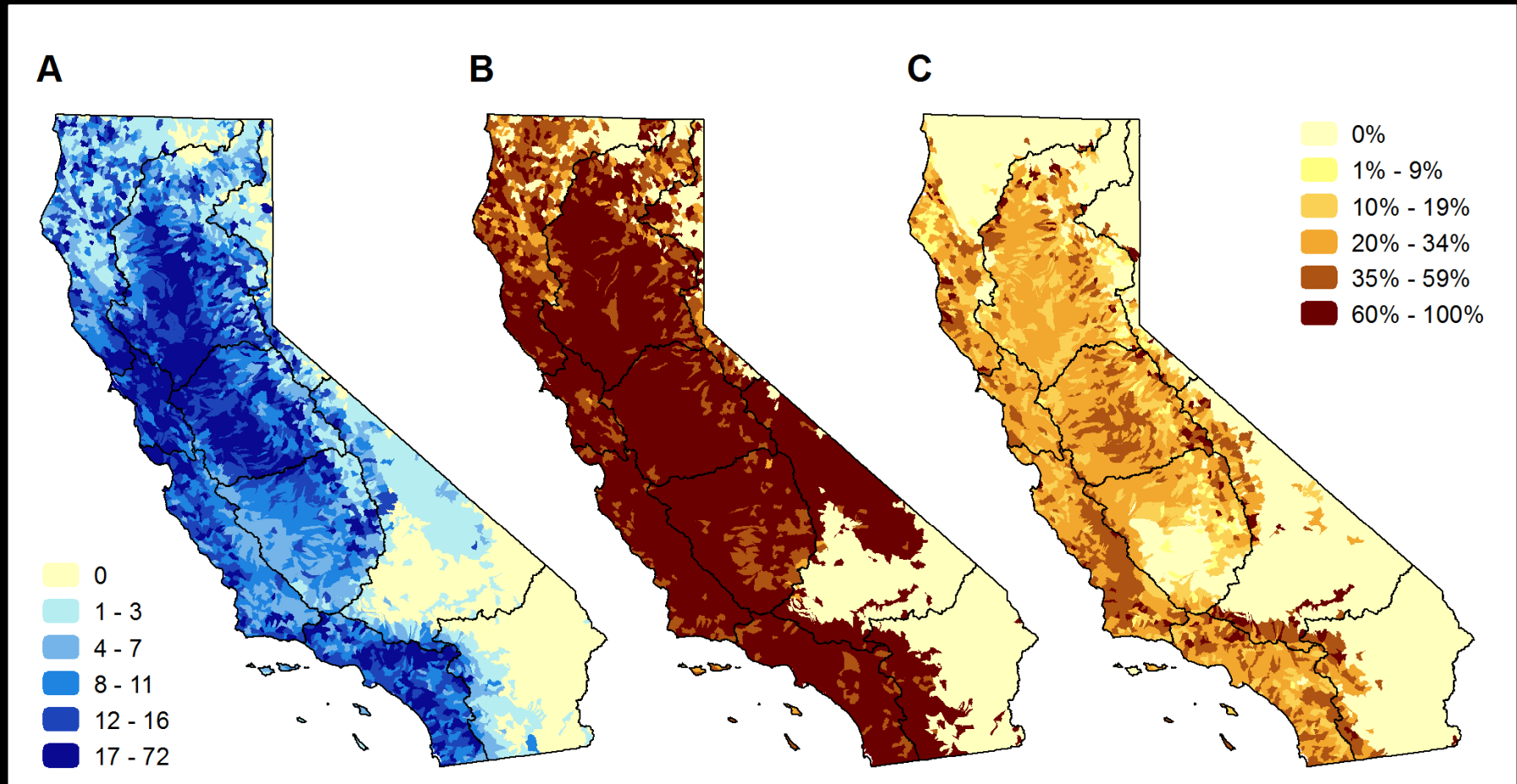


# Patterns Freshwater Biodiversity



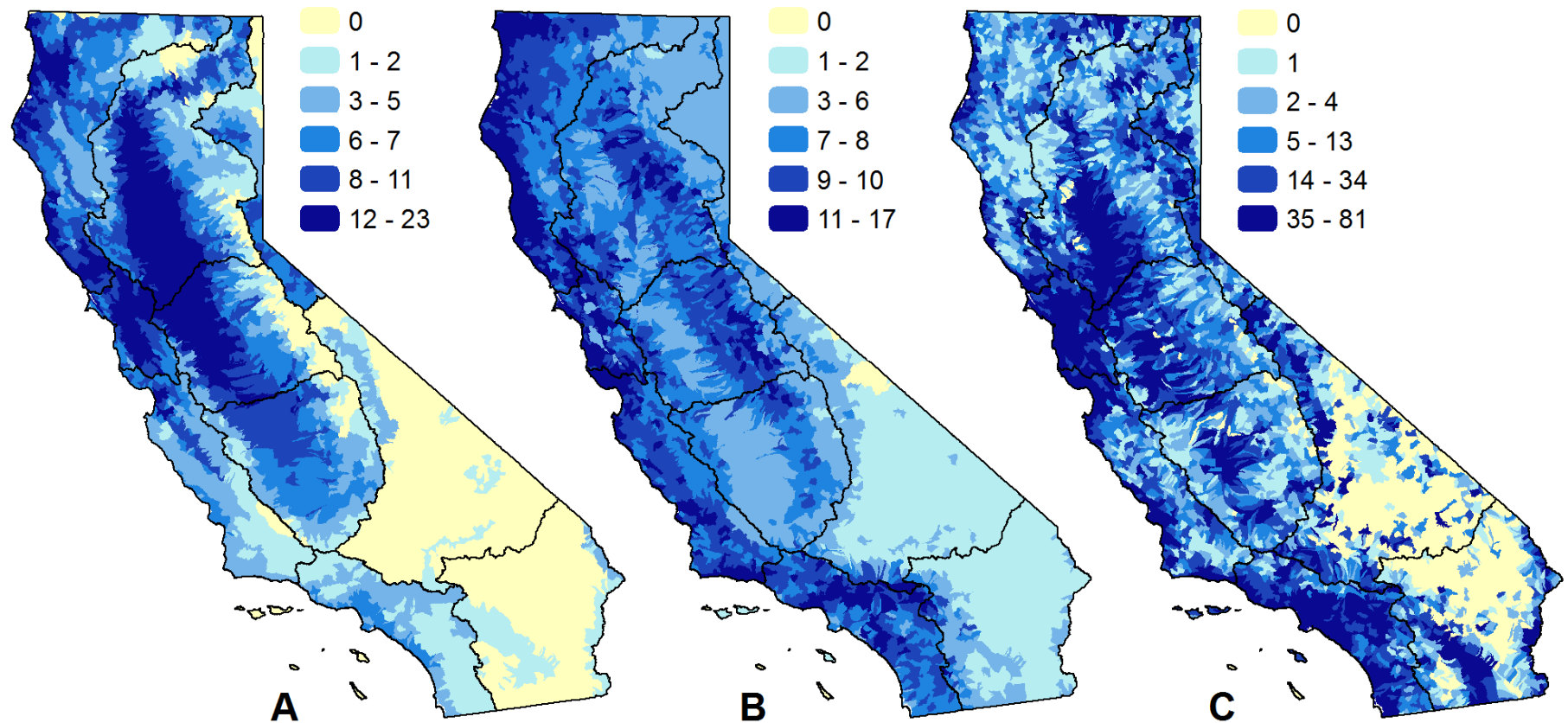
All species (A), % Vulnerable (B), % Listed (C)

# Patterns Freshwater Biodiversity



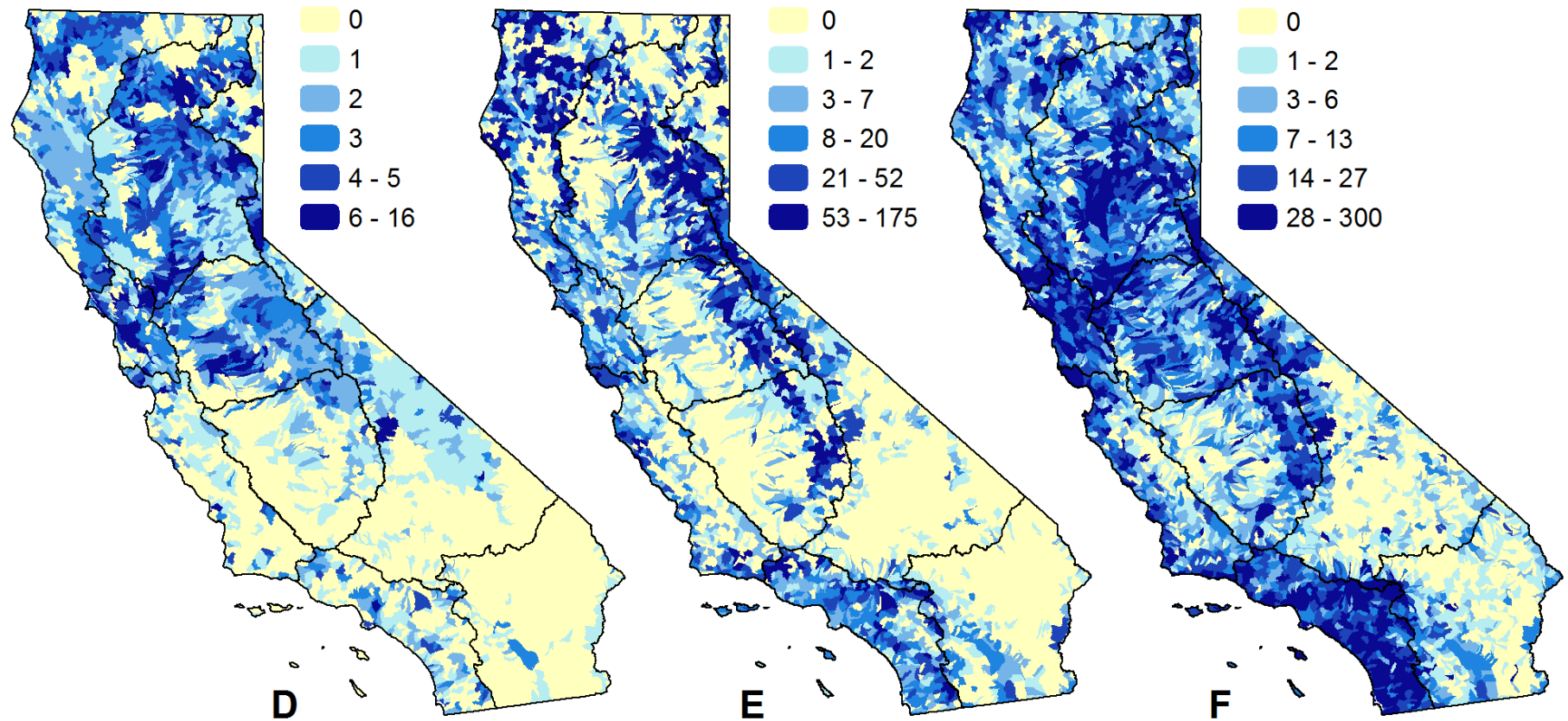
Endemic species (A), % Vulnerable (B), % Listed (C)

# Patterns by Taxonomic Group



Richness of (A) fish, (B) herps (C) birds

# Patterns by Taxonomic Group



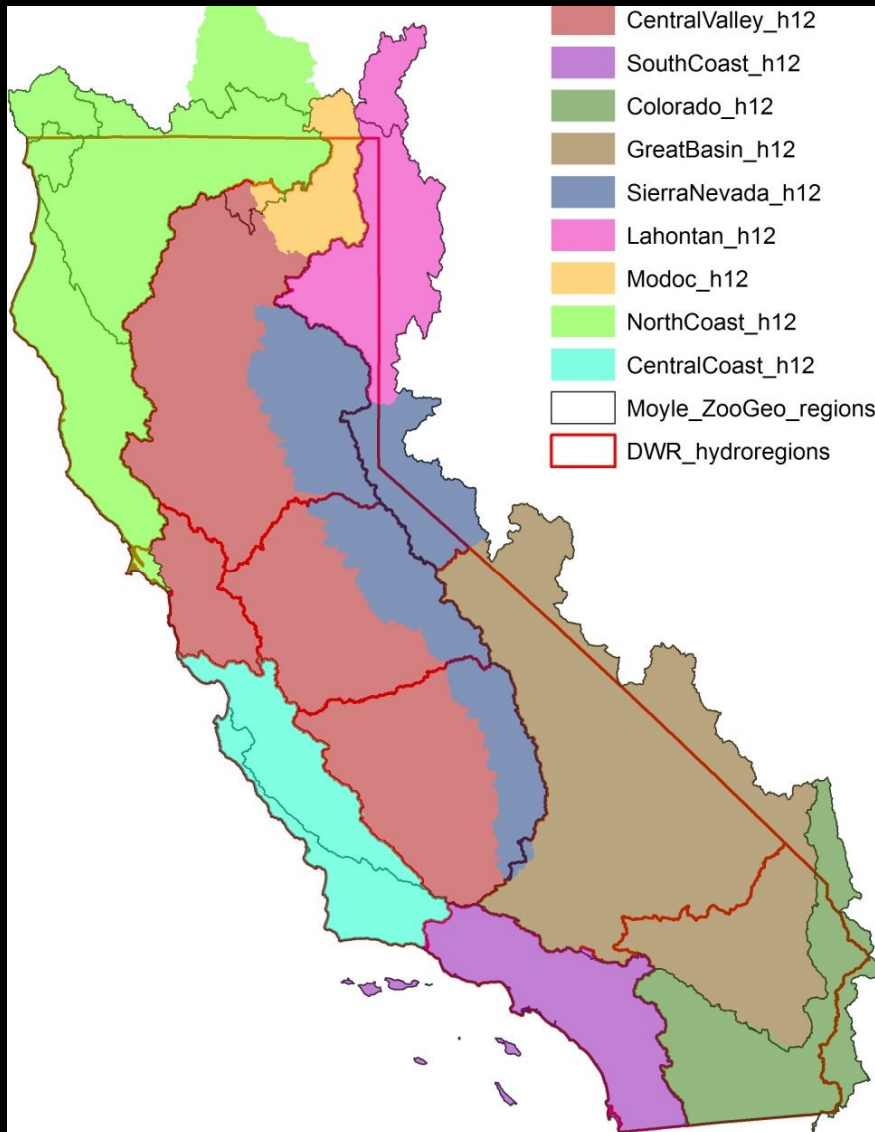
Richness of (D) mollusks/crustaceans (E)  
insects and other inverts (F) plants

## For More Information:

- PlosOne: J. Howard et al 2015 “Patterns of Freshwater Species Richness, Endemism, and Vulnerability in California” July 6, 2015
- Open Source Database in BIOS:

<https://map.dfg.ca.gov/bios/?al=ds1197>

### 3. Identify high conservation value areas (CVAs)



9 Freshwater  
Conservation  
Planning Regions



# Taxonomic Groups

## Freshwater fishes

Anadromous (migratory) spp, ***n* = 26**

Wide-ranging (resident) spp, ***n* = 52**

Range-restricted (resident) spp, ***n* =**

## Sensitive amphibian & reptiles

Lotic (river & stream) spp, ***n* = 9**

Lentic (lake-dependent) spp, ***n* =**

Generalist (lotic/lentic) spp, ***n* = 2**

## Sensitive invertebrate families

Aquatic crustaceans (sensitive), ***n***

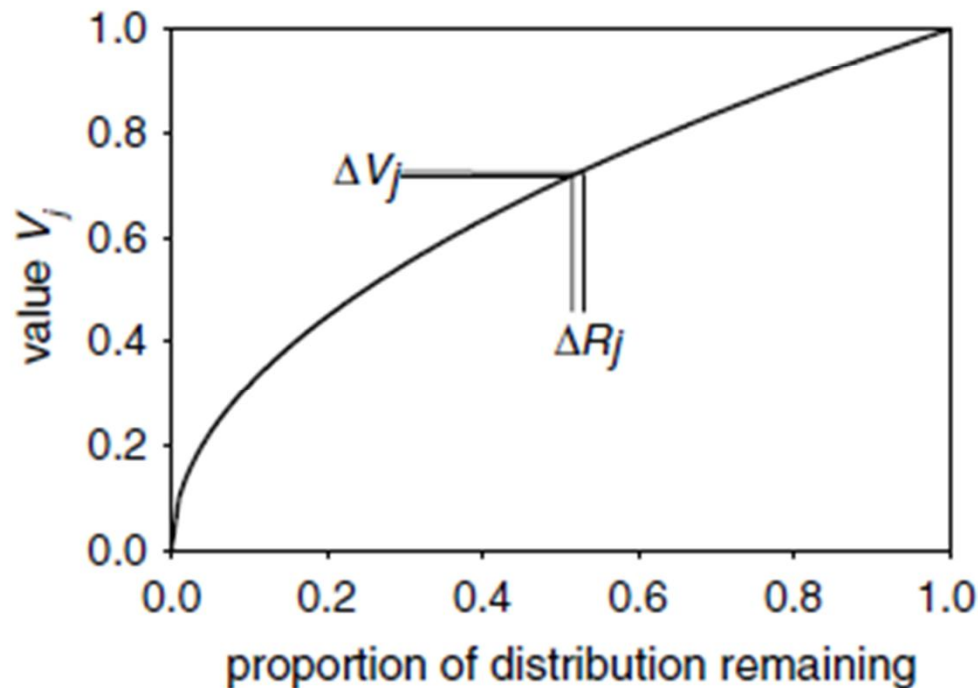
Aquatic mollusks (sensitive), ***n* = 6**

Aquatic insects (sensitive), ***n* = 44**

# Zonation

Evaluates observed or modeled species distributions in a complementarity-based reserve selection approach

Implements cell-based algorithm, removing least valuable cell first, resulting in hierarchy of 'conservation value'

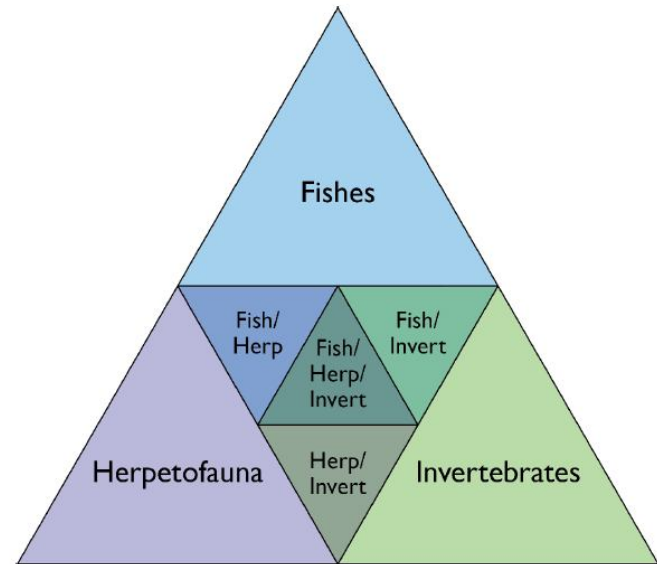
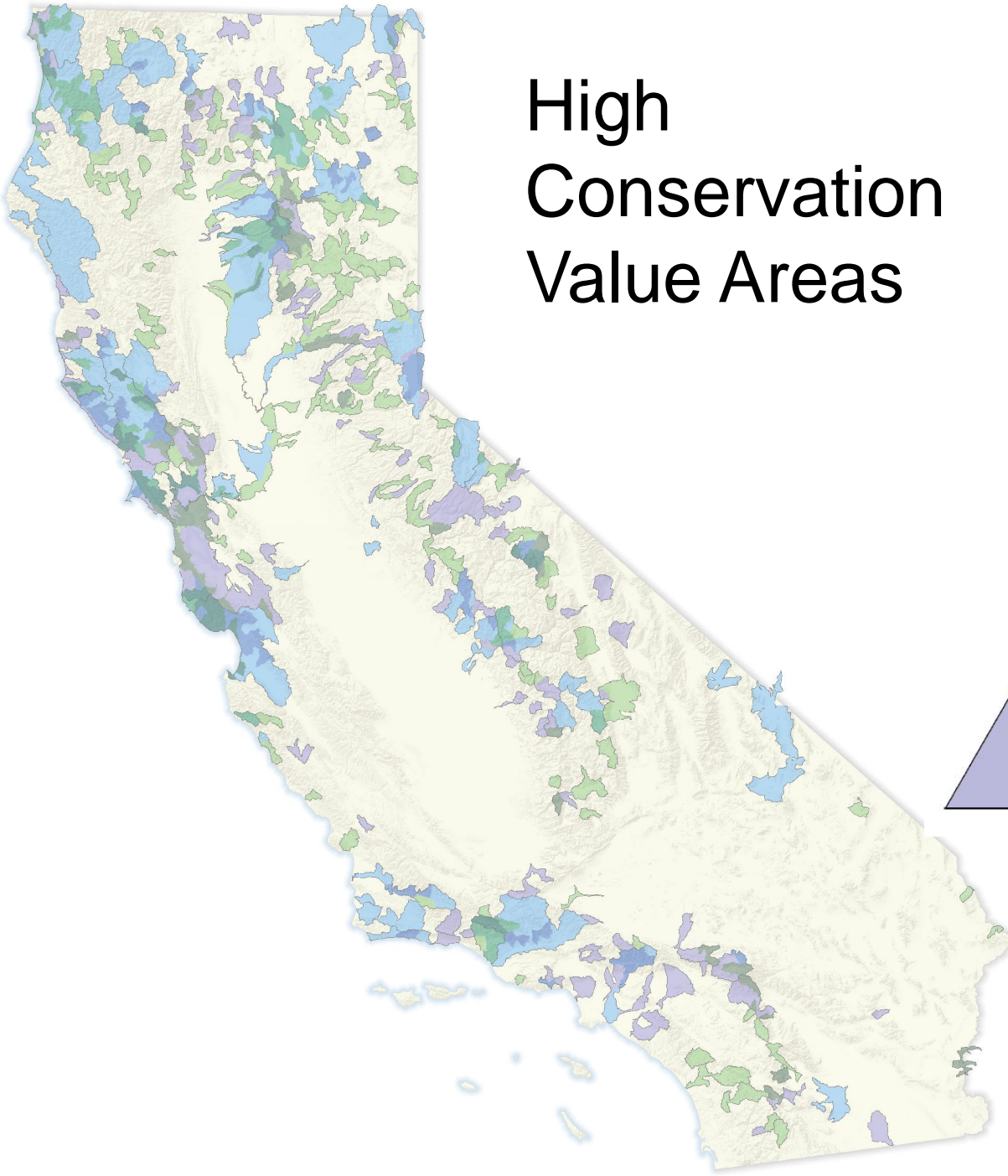


Value determined by cell occupancy, species weights, and range sizes of species

# Zonation Results

- 1,082 HUC12s were identified as high conservation value areas
- These subwatersheds total 26 million acres (~25% of California)
- By taxonomic group:
  - 584 subwatersheds for fishes
  - 377 subwatersheds for herpetofauna
  - 401 subwatersheds for invertebrates
- High CVAs for fish, herpetofauna and invertebrate overlap in 100 HUC12 subwatershed

# High Conservation Value Areas





1. Identify focal biodiversity and set key targets



2. Evaluate and map the occurrences  
and status of biodiversity



3. Identify high conservation  
value areas

4. Analyze and map  
threats and land tenure

5. Identify priority  
areas and gaps

6. Develop  
strategies  
and  
action  
plan

**Phase**

**1  
Completed  
(Database,  
Published  
paper, report  
and maps  
available)**

**Phase**

**2  
By June  
2016**

## Blueprint Phase 2: Where we are

- Compiled threats data (diversion, dams, land use, passage etc.)
- Incorporated HealthyStreams data
- Developed visualization tool to evaluate threats and watershed health for CVAs
- Identified potential strategies for CVAs

[https://public.tableau.com/profile/kurt.fesenmyer#!/vizhome/Book4\\_1943/CVAStory](https://public.tableau.com/profile/kurt.fesenmyer#!/vizhome/Book4_1943/CVAStory)

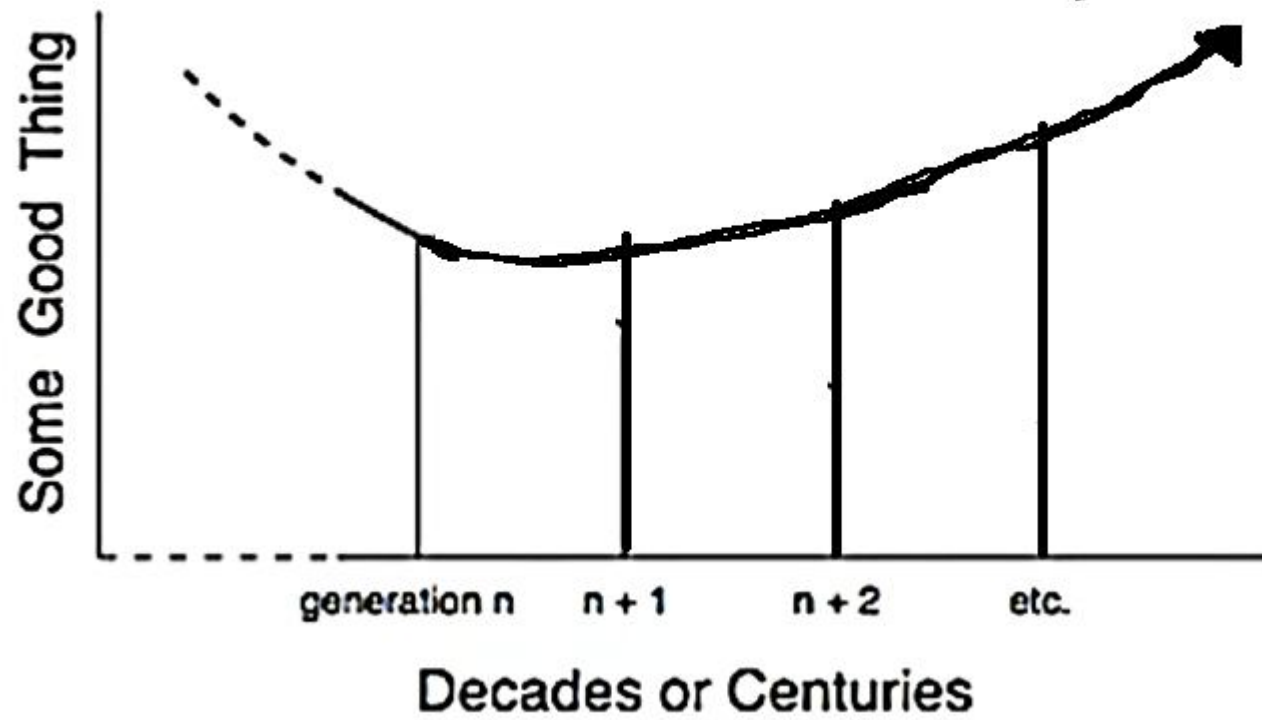
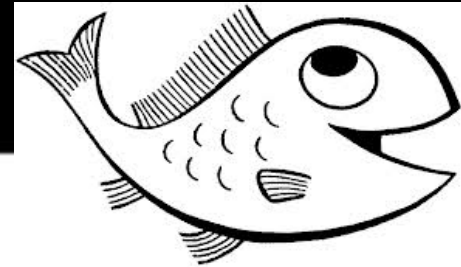


# Blueprint Phase 2: Where we are going

Form working group to (by June 2016):

- Analyze, review and interpret mapped threats and land tenure
- Identify priority areas and gaps
- Develop strategies and action plan

• Any interest? Contact me!





The End

