The Nature Conservancy

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California Freshwater Species Database & Conservation Blueprint

CABW, November 19, 2014

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The mission of The Nature Conservancy is to conserve the lands and waters on which all life depends.

Road Map

1. California Freshwater Species Database
2. California Freshwater Conservation Blueprint

1. California Freshwater Database

What and where are freshwater species in California?

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

Below the Surface:
CALIFORNIA'S FRESHWATER BIODIVERSITY

The Nature Conservancy
Protecting nature. Preserving life.

- June 2013 - Released report and public database

- June – July 2013 – Received lots of comments, critiques

- August 2013 – Formed working group to revise database

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**

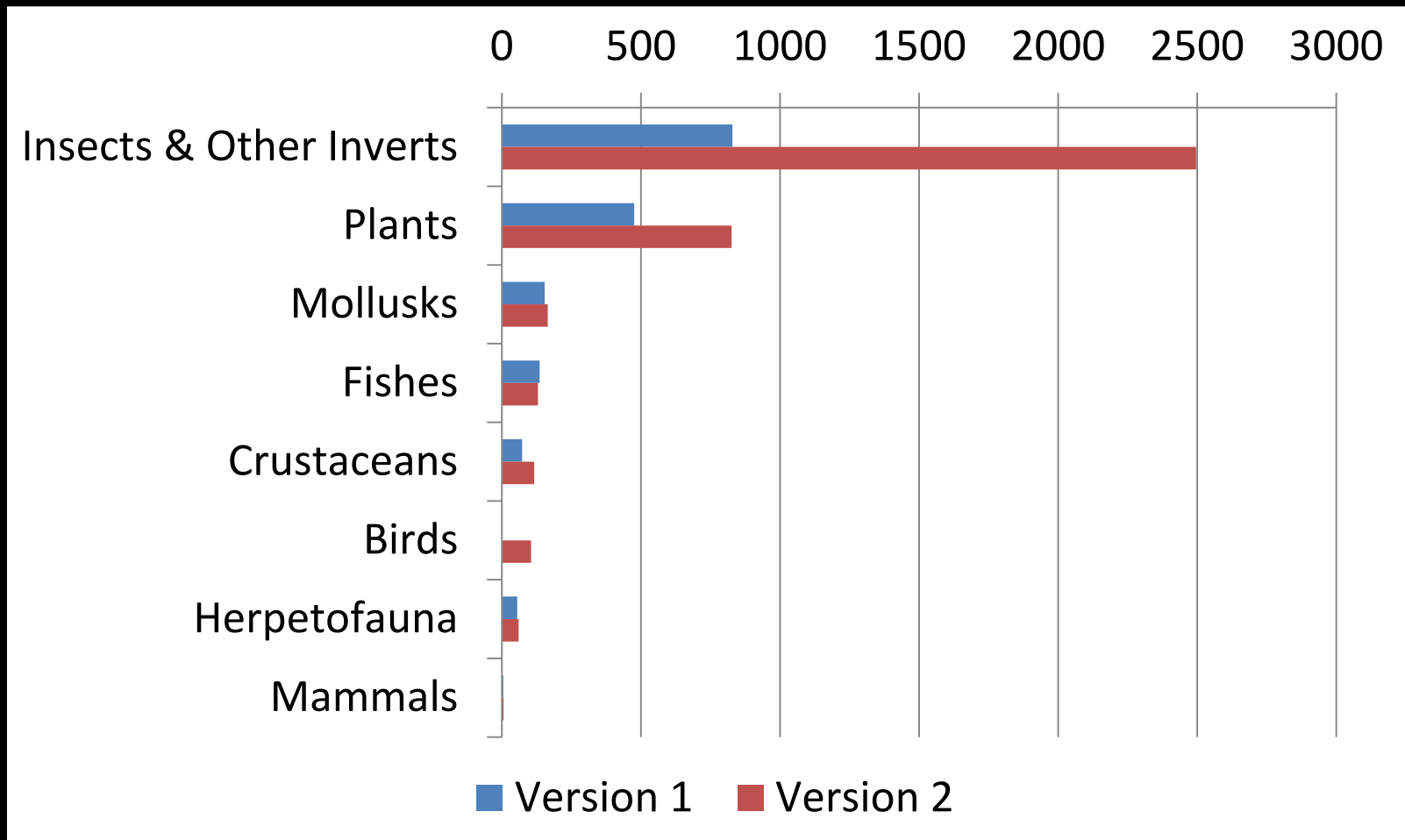Patrick McIntyre, Pete Ode, Andy Rehn, Steve

What are freshwater species?

Criteria defined for:
- Amphibians and Reptiles
- Benthic Macroinvertebrates
- Birds
- Fish
- Plants

Taxa List (species and subspecies)

Bar chart comparing Version 1 (blue) and Version 2 (red) across taxa groups:

Taxa	Version 1	Version 2
Insects & Other Inverts	~830	~2500
Plants	~470	~830
Mollusks	~140	~160
Fishes	~130	~120
Crustaceans	~60	~110
Birds		~100
Herpetofauna	~40	~40
Mammals		

X-axis: 0, 500, 1000, 1500, 2000, 2500, 3000

Version 1 = 1,728 species (relied on NatureServe for species list)

Version 2 = 3,904 species (relied on various sources for

Study Area

Version 1

Version 2

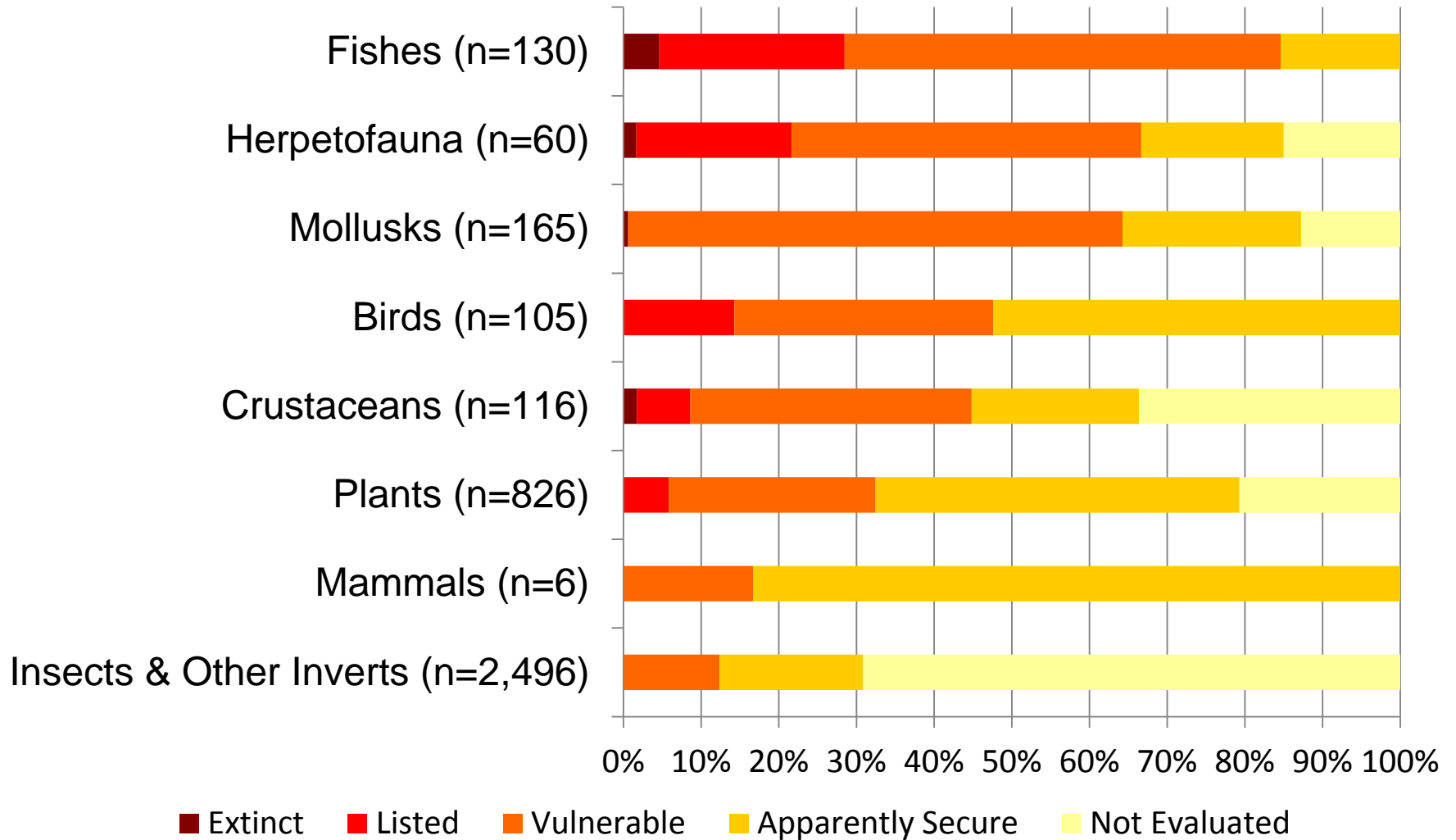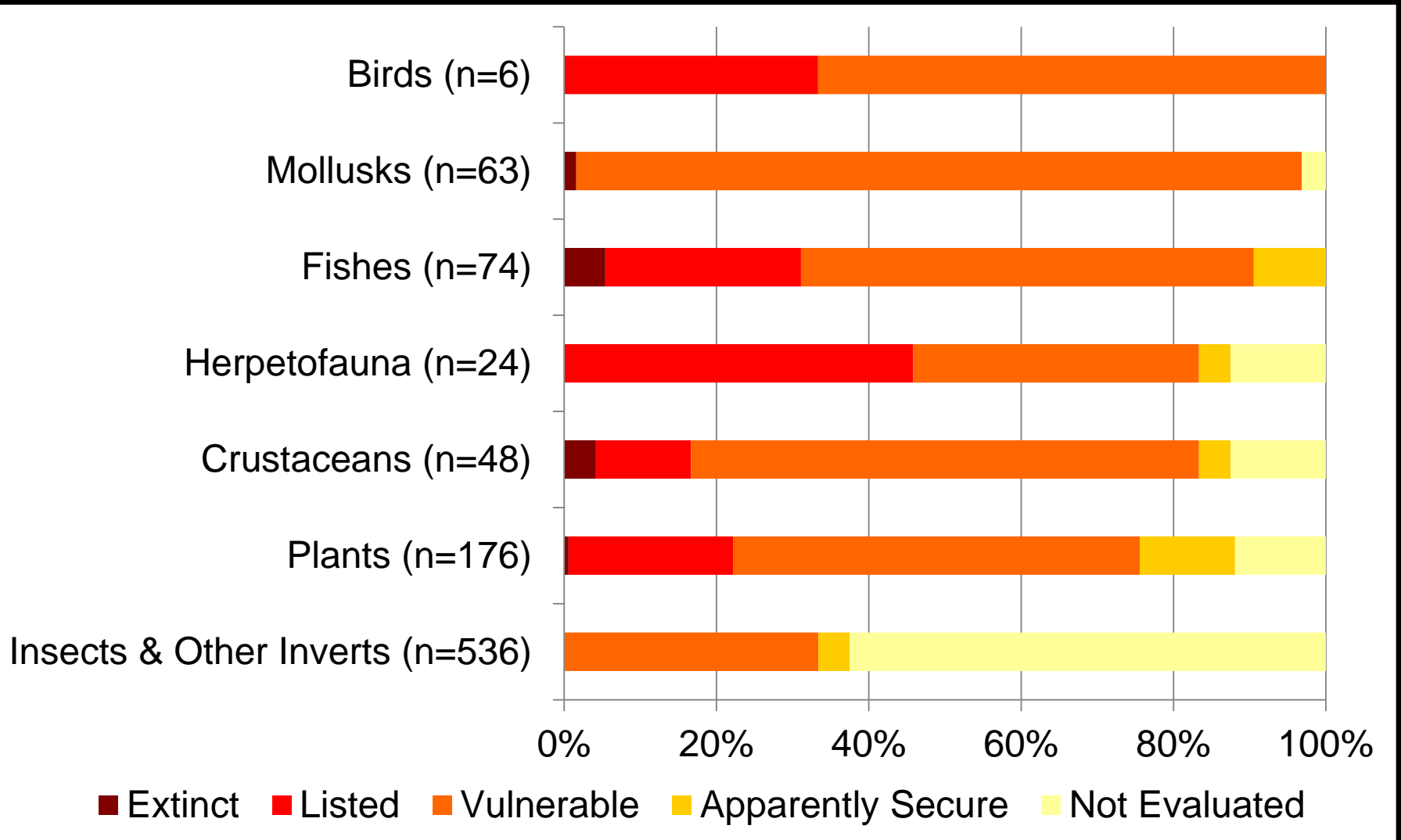All Taxa

Endemic Taxa
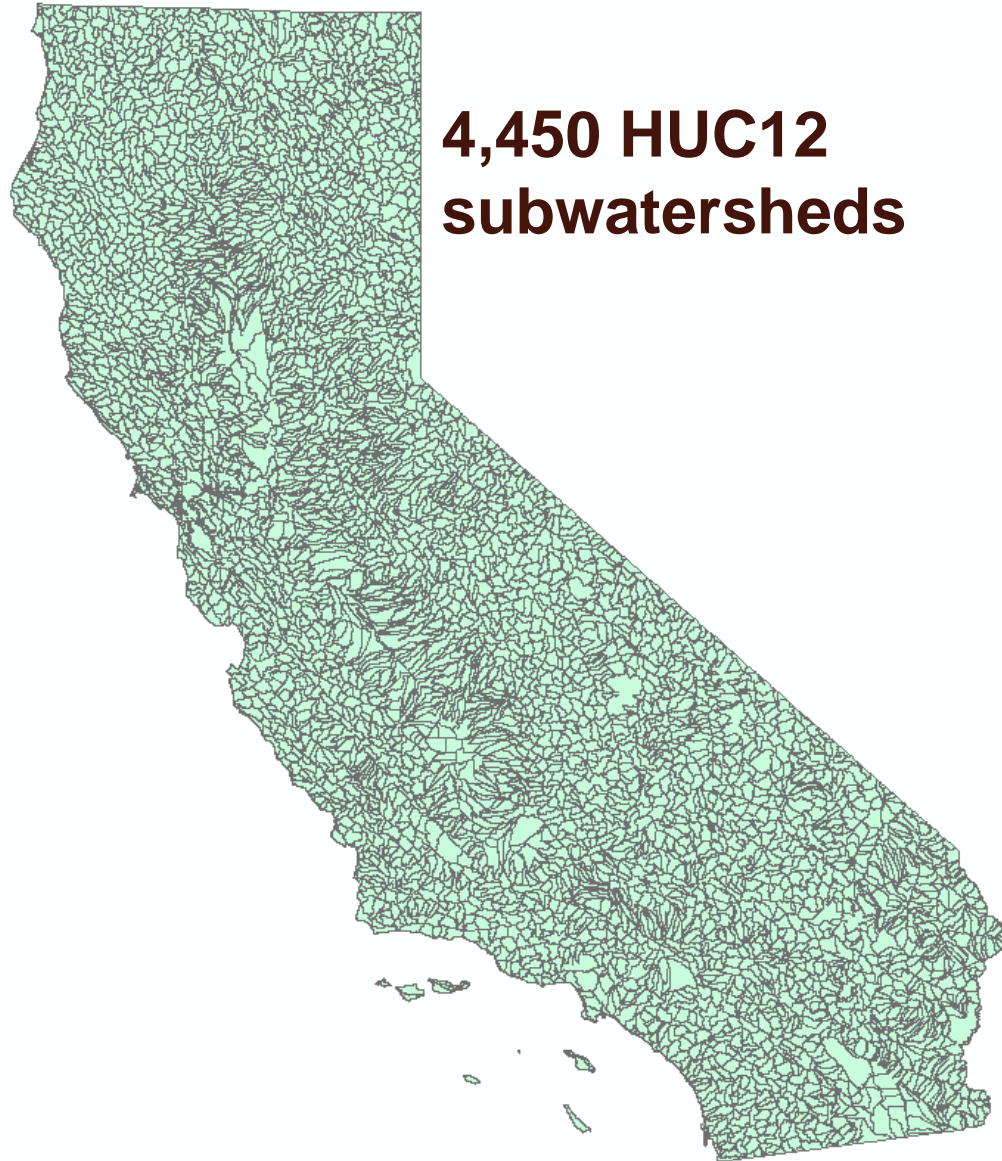
Spatial Data

4,450 HUC12 subwatersheds

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
CNDDB	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

© Larry Serpa

Red-legged frog

Legend:
- Range
- Critical habitat
- Historical observation
- Current observations
- Current observations
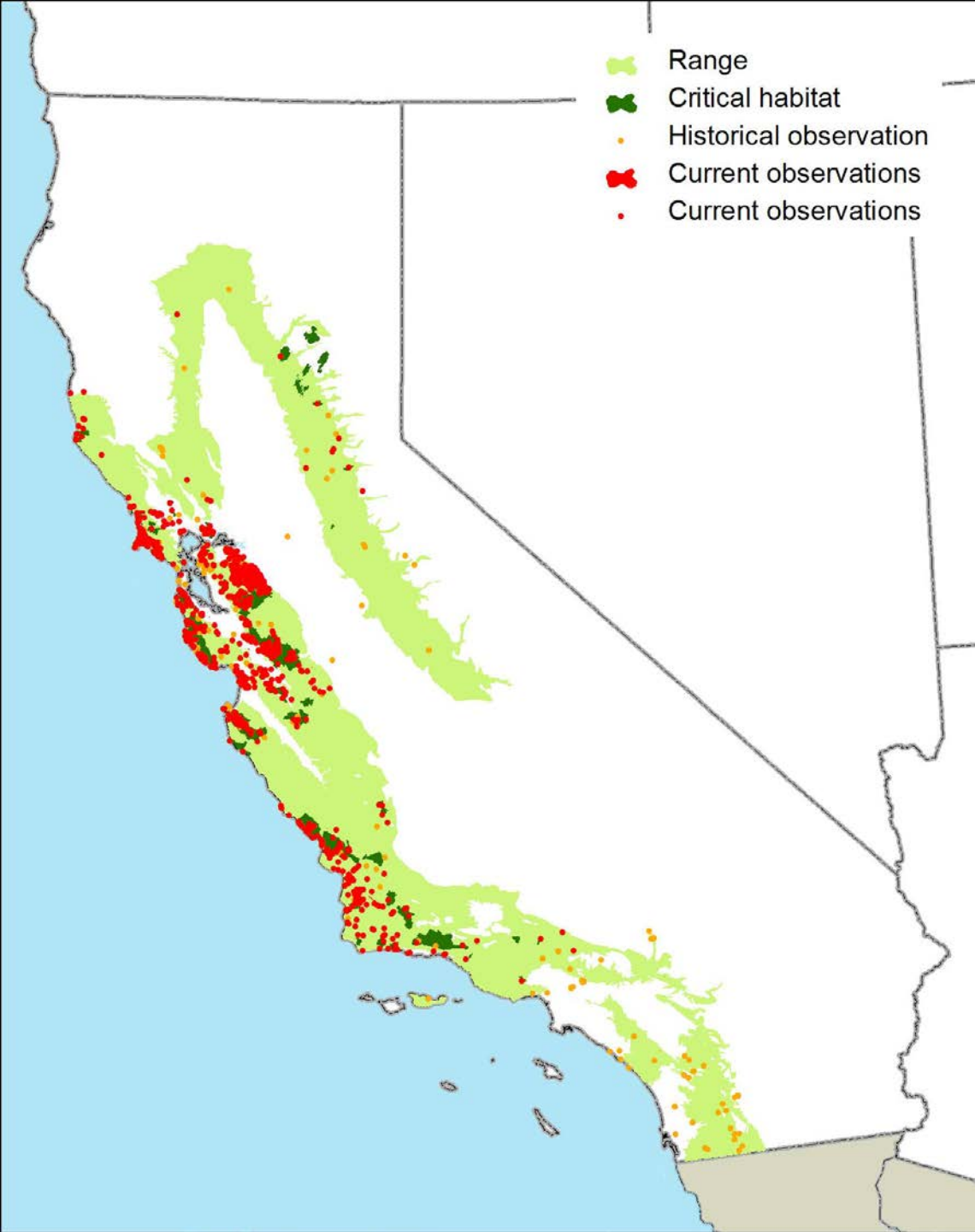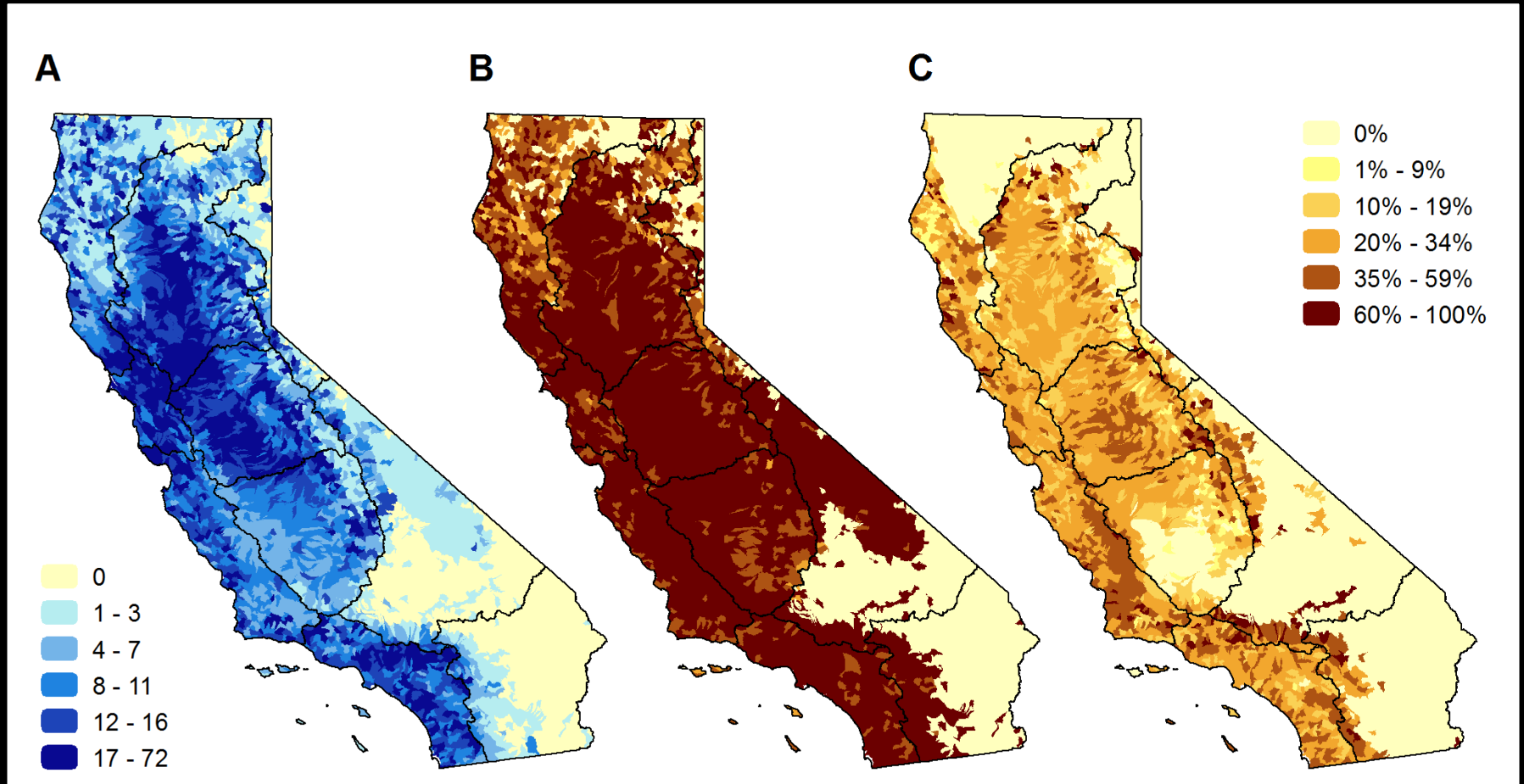
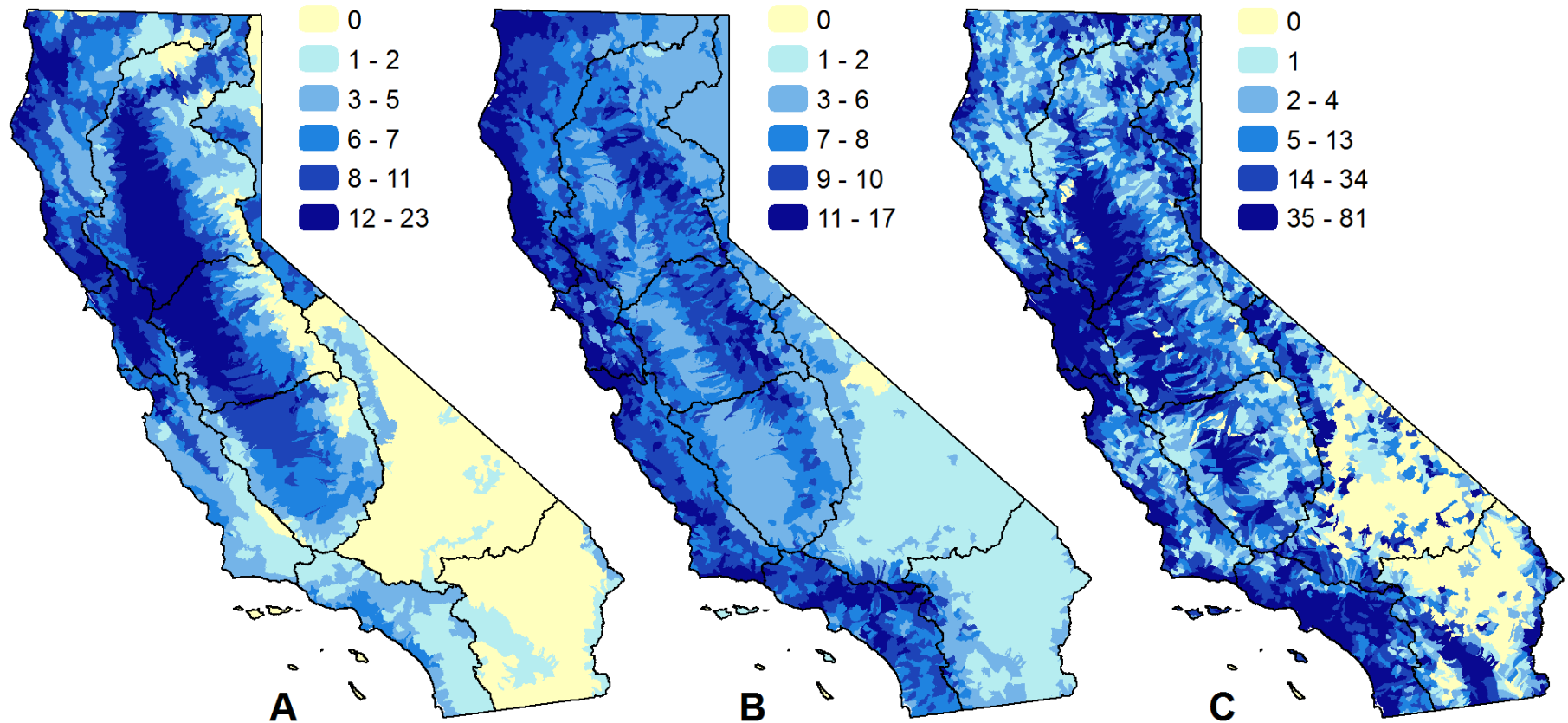# Patterns Freshwater Biodiversity
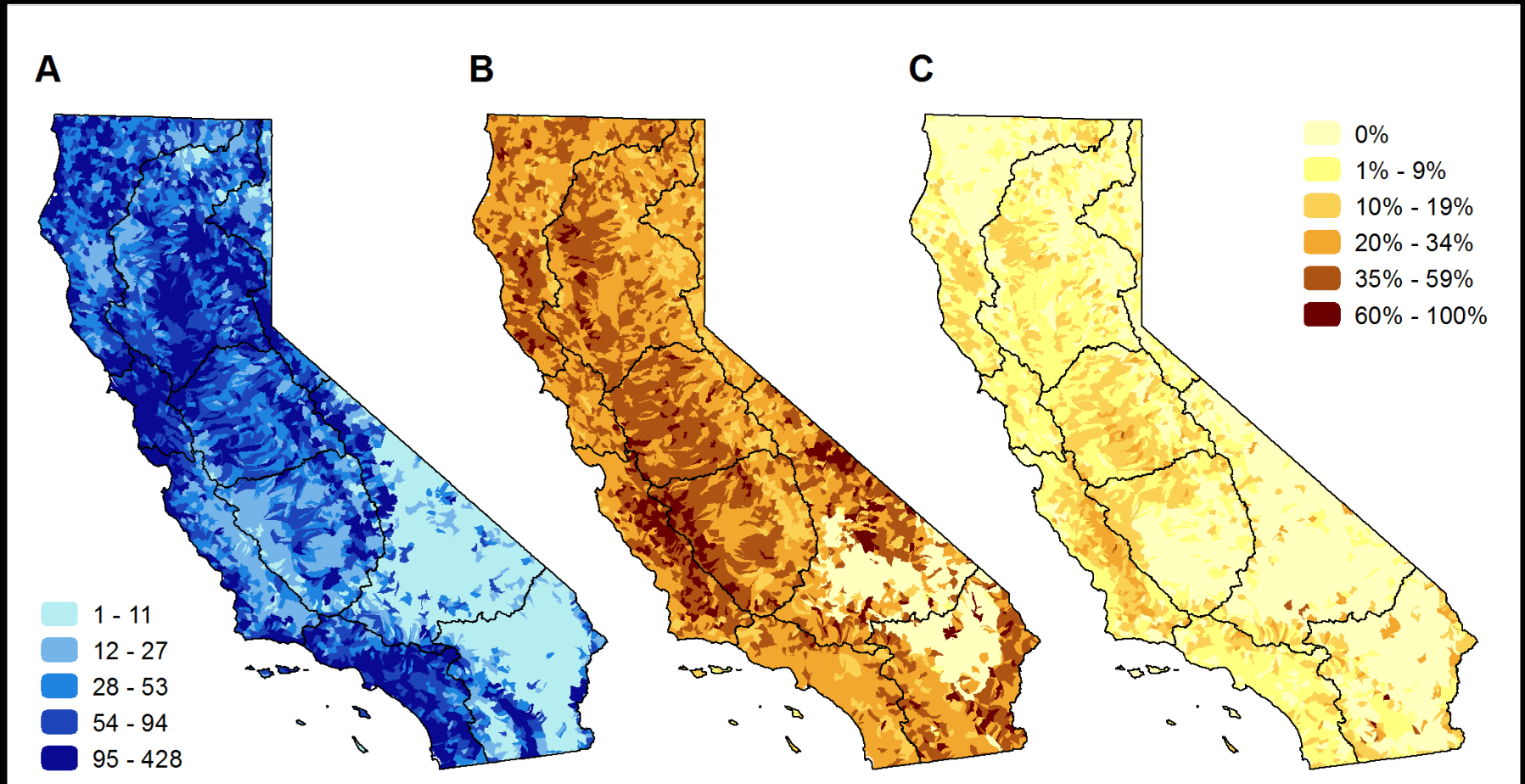
All species (A), % Vulnerable (B), % Listed (C)
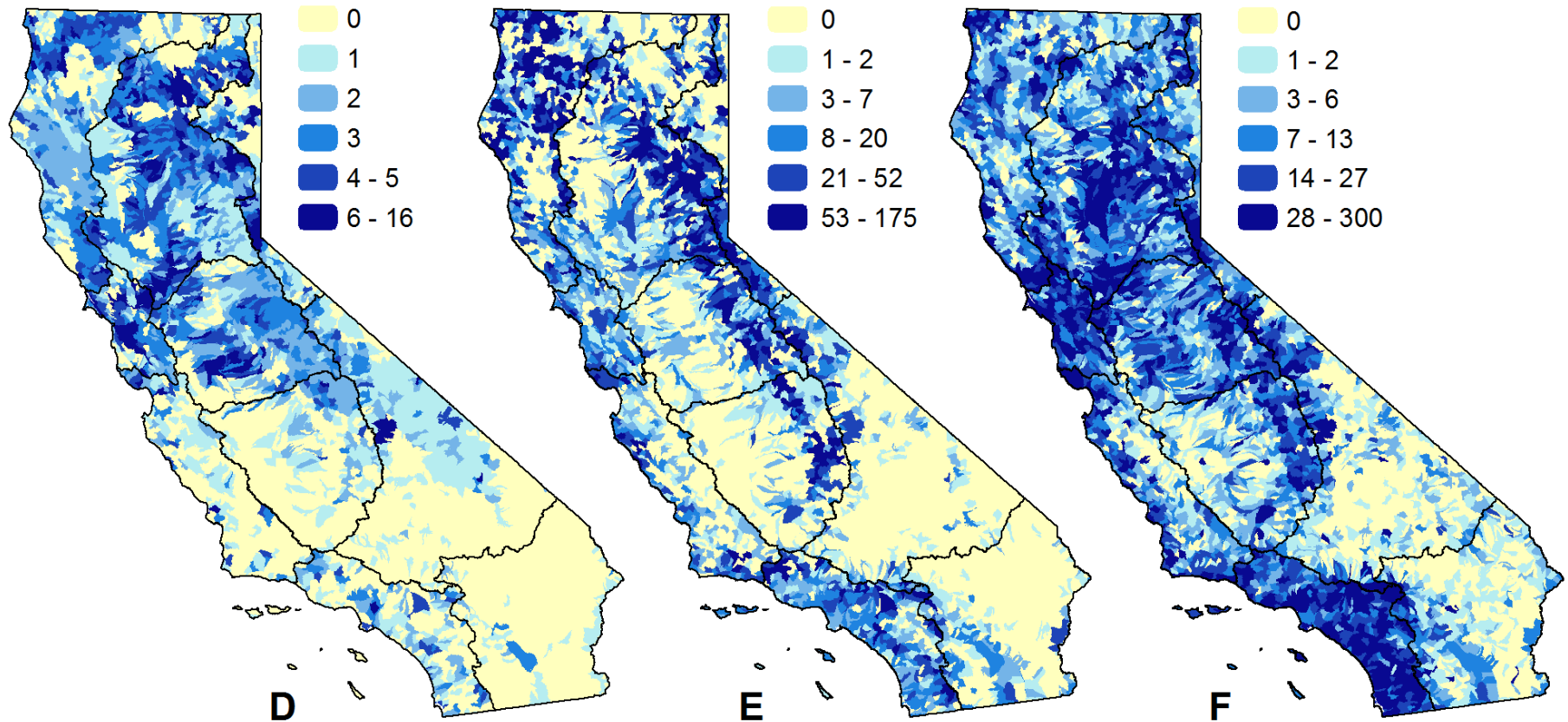
Patterns Freshwater Biodiversity

Endemic species (A), % Vulnerable (B), % Listed (C)
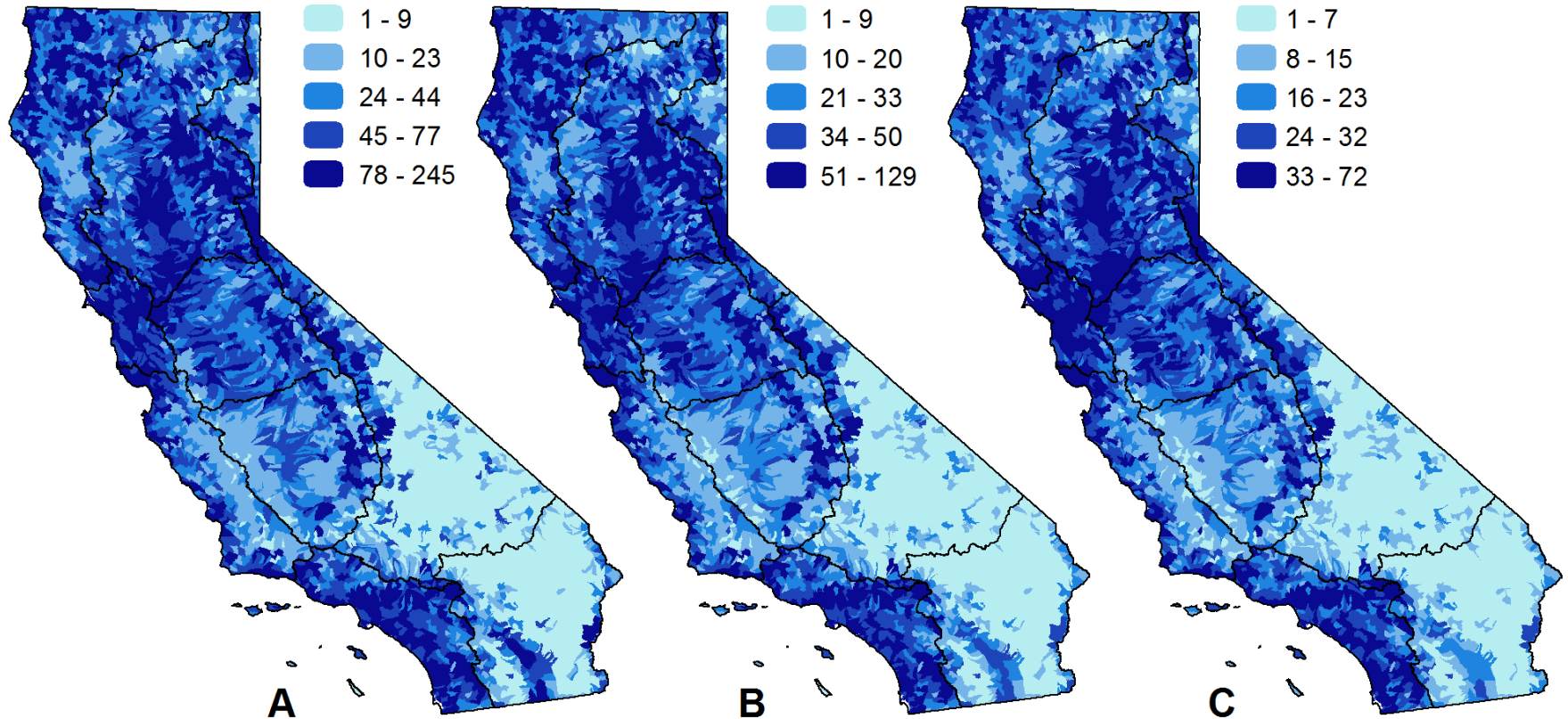
Patterns by Taxonomic Group

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

Patterns by Taxonomic Group

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

Richness by Taxonomic Rank

Richness of genera (A), families (B), and orders (C)

Next Steps

o Develop interactive map and publically accessible database housed on New California Water Atlas website (castatewater.org)

o Incorporate database into BIOS

o Publish paper on patterns of richness, vulnerability and endemism

o Partnerships to develop other products/papers/map series

2. California Freshwater Blueprint
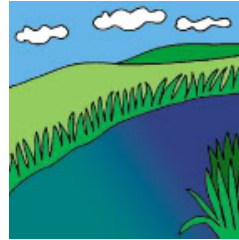
Project Goals

- Identify priority freshwater conservation areas in California (Phase 1)

- Develop regional- and watershed-specific conservation strategies (Phase 2)
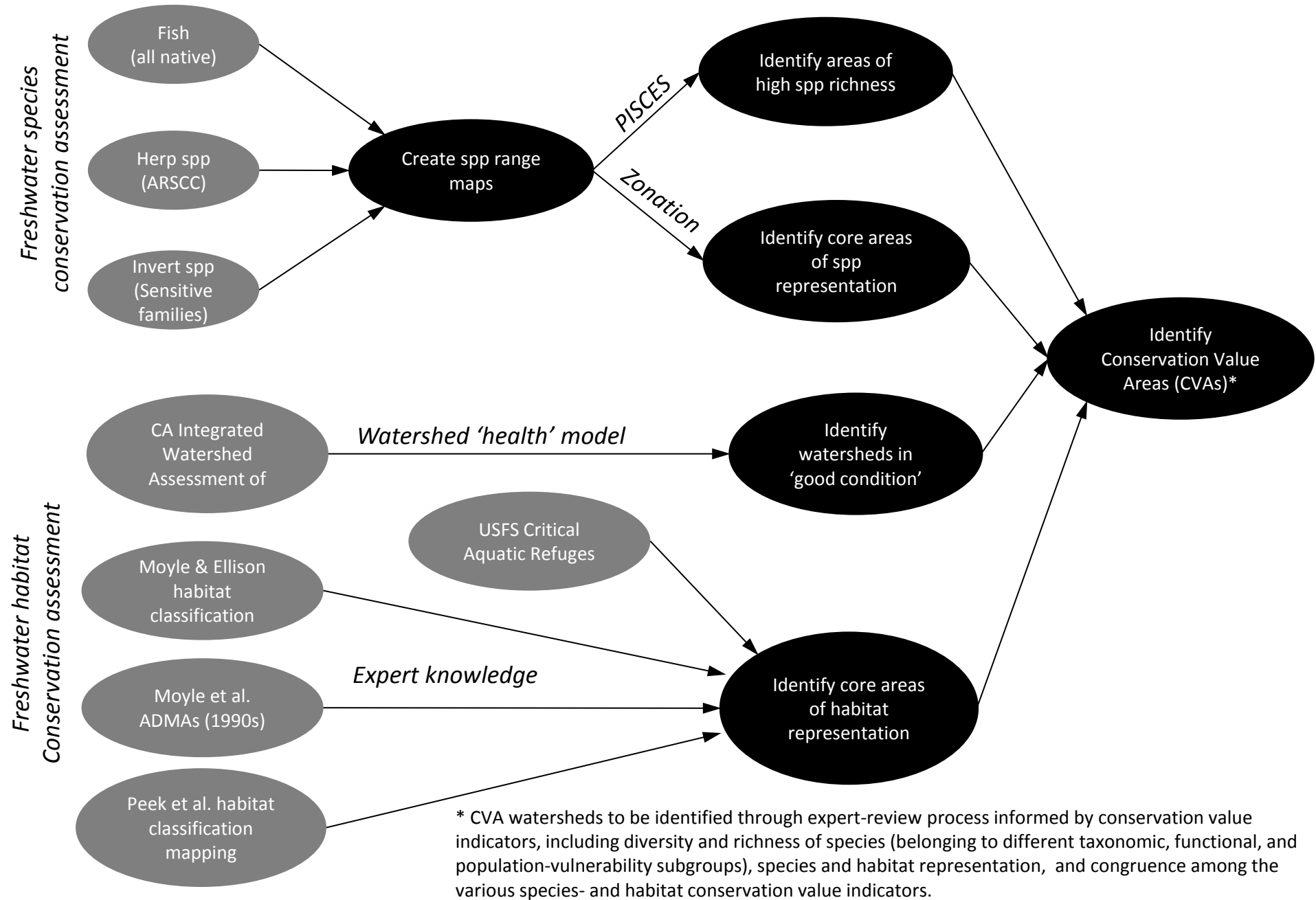
Concept

Species

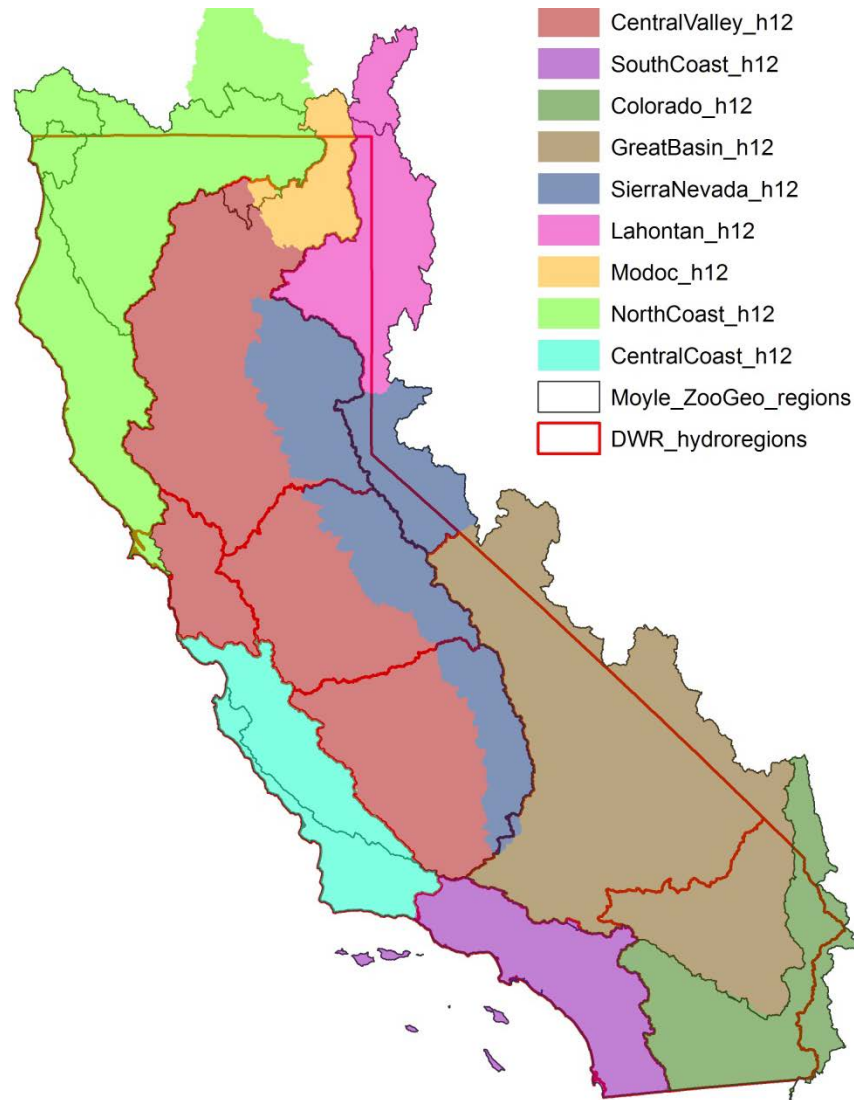Systems

Current Condition

Future Threats

Strategies

Protections

National Wild & Scenic Rivers

Work Flow to Identify Freshwater Ecosystem Conservation Value Areas (Phase 1)

Freshwater species conservation assessment

Fish (all native)

Herp spp (ARSCC)

Invert spp (Sensitive families)

Create spp range maps

PISCES → Identify areas of high spp richness

Zonation → Identify core areas of spp representation

Freshwater habitat Conservation assessment

CA Integrated Watershed Assessment of

Watershed 'health' model → Identify watersheds in 'good condition'

USFS Critical Aquatic Refuges

Moyle & Ellison habitat classification

Expert knowledge

Moyle et al. ADMAs (1990s)

Peek et al. habitat classification mapping

Identify core areas of habitat representation

Identify Conservation Value Areas (CVAs)*

* CVA watersheds to be identified through expert-review process informed by conservation value indicators, including diversity and richness of species (belonging to different taxonomic, functional, and population-vulnerability subgroups), species and habitat representation, and congruence among the various species- and habitat conservation value indicators.

Study Area

■	CentralValley_h12
■	SouthCoast_h12
■	Colorado_h12
■	GreatBasin_h12
■	SierraNevada_h12
■	Lahontan_h12
■	Modoc_h12
■	NorthCoast_h12
■	CentralCoast_h12
□	Moyle_ZooGeo_regions
□	DWR_hydroregions

9 Freshwater Conservation Planning Regions

Species Groups

Freshwater fish
- Anadromous (migratory) spp, *n = 26*
- Wide-ranging (resident) spp, *n = 52*
- Range-restricted (resident) spp, *n = 47*

Sensitive amphibian & reptiles
- Lotic (river & stream) spp, *n = 9*
- Lentic (lake-dependent) spp, *n = 7*
- Generalist (lotic/lentic) spp, *n = 28*

Select invertebrate families
- Aquatic crustaceans (sensitive), *n = 6*
- Aquatic mollusks (sensitive), *n = 6*
- Aquatic insects (sensitive), *n = 44*
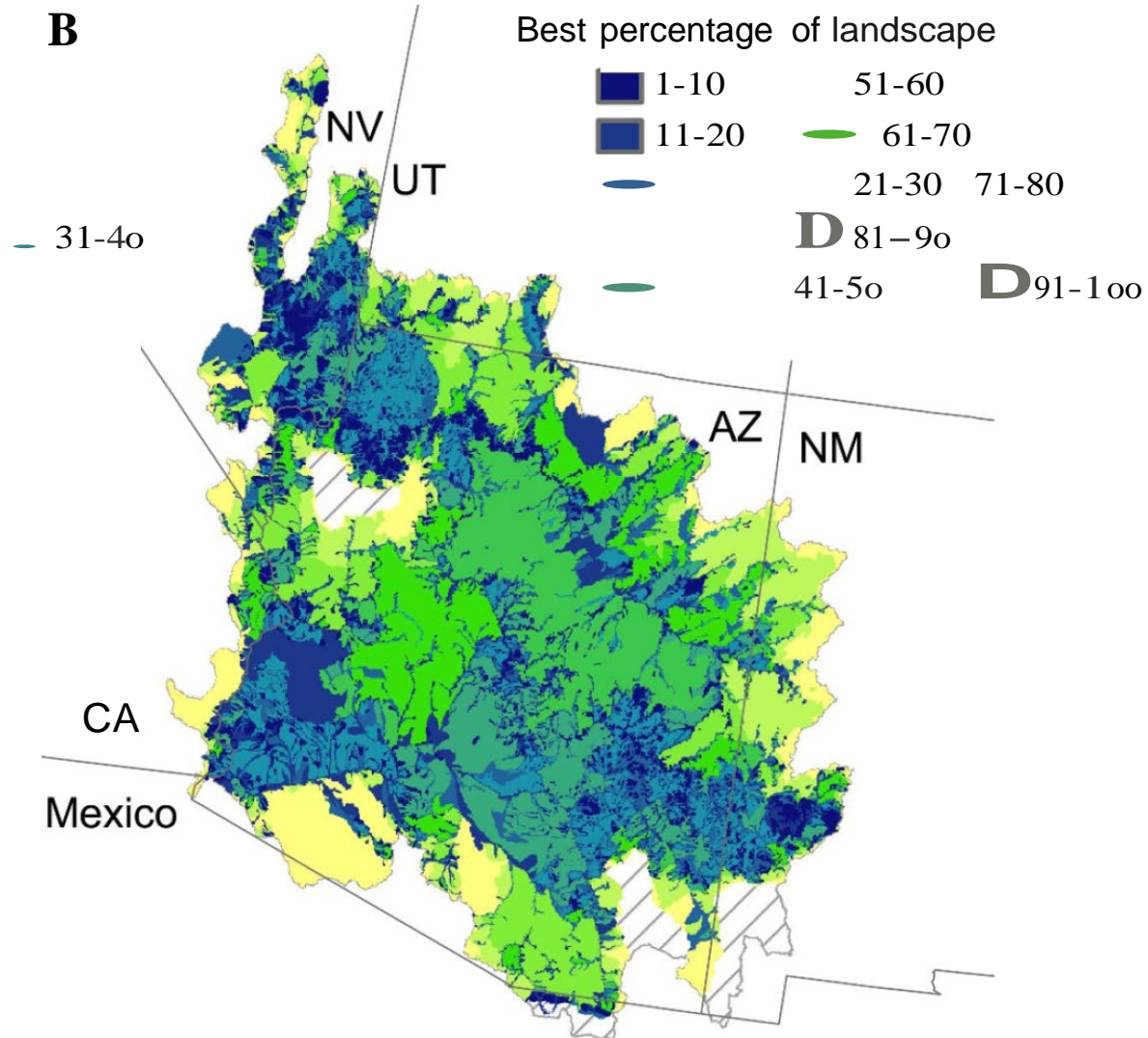
Zonation

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'
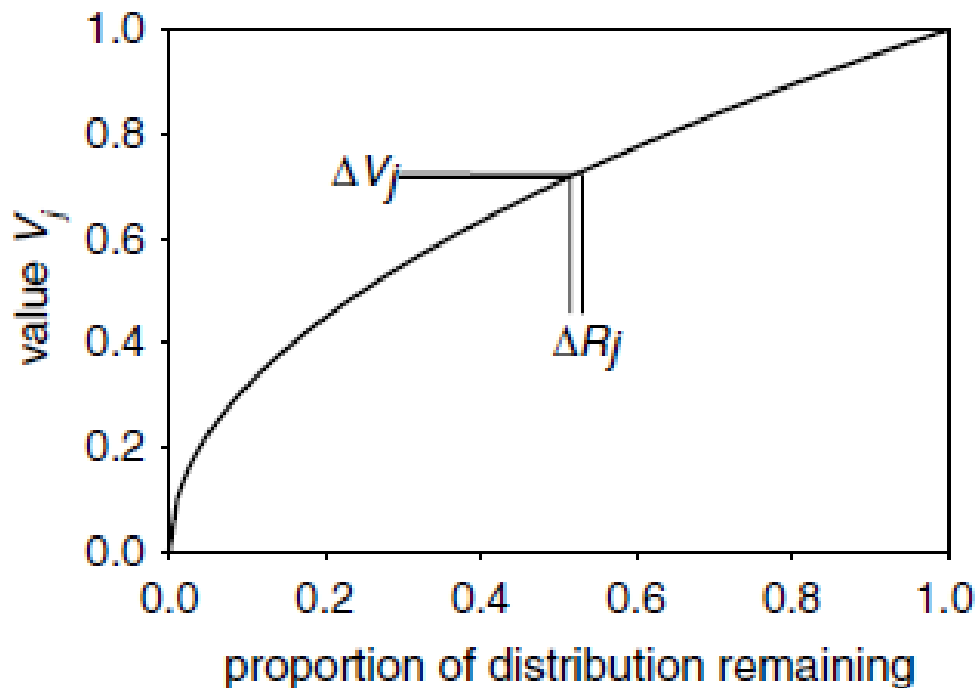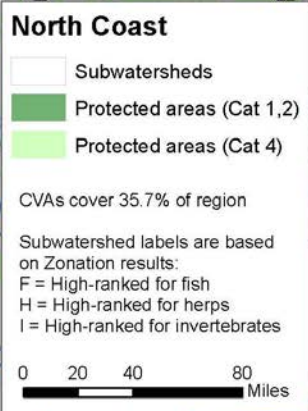

Value determined by cell occupancy, species weights, and range sizes of species
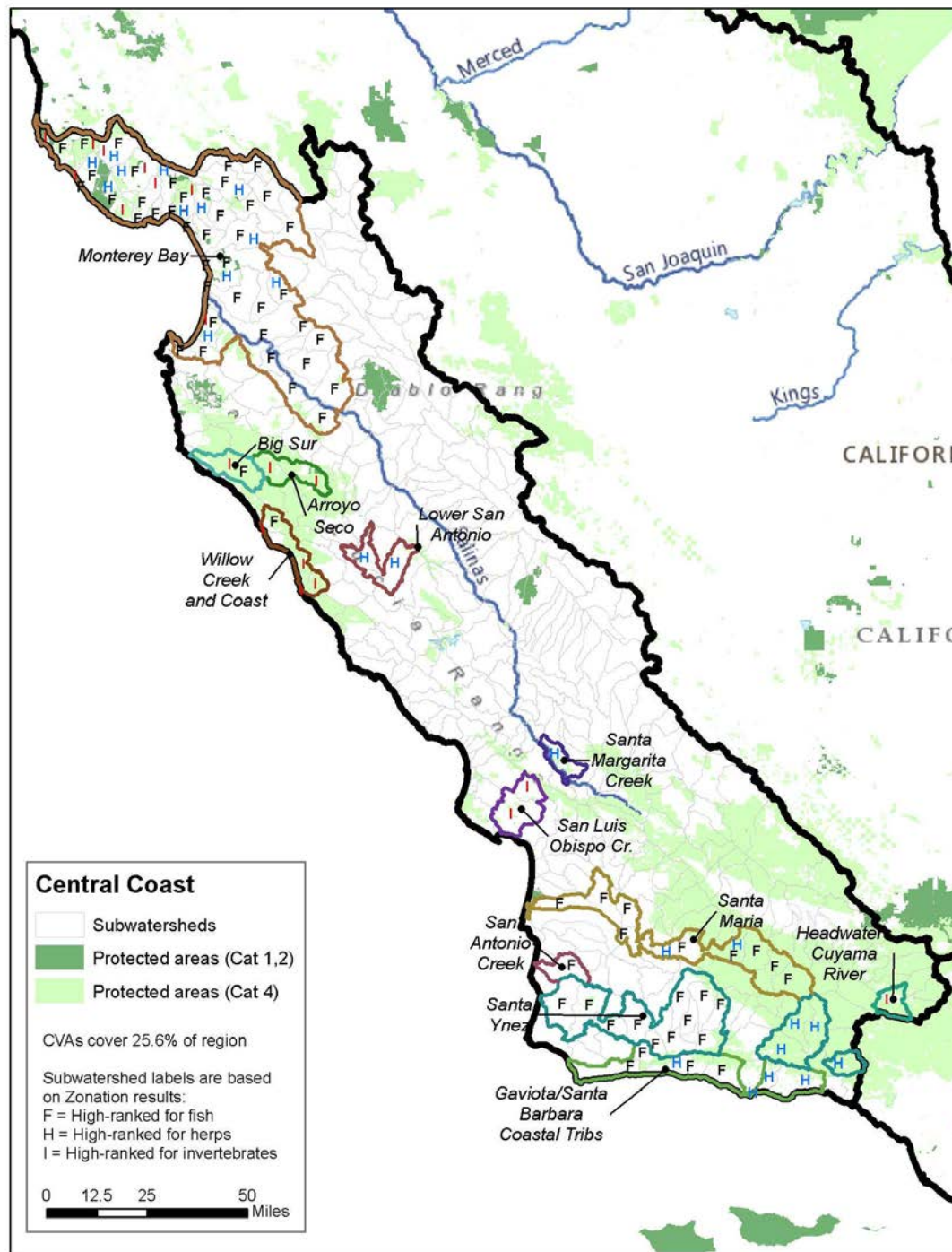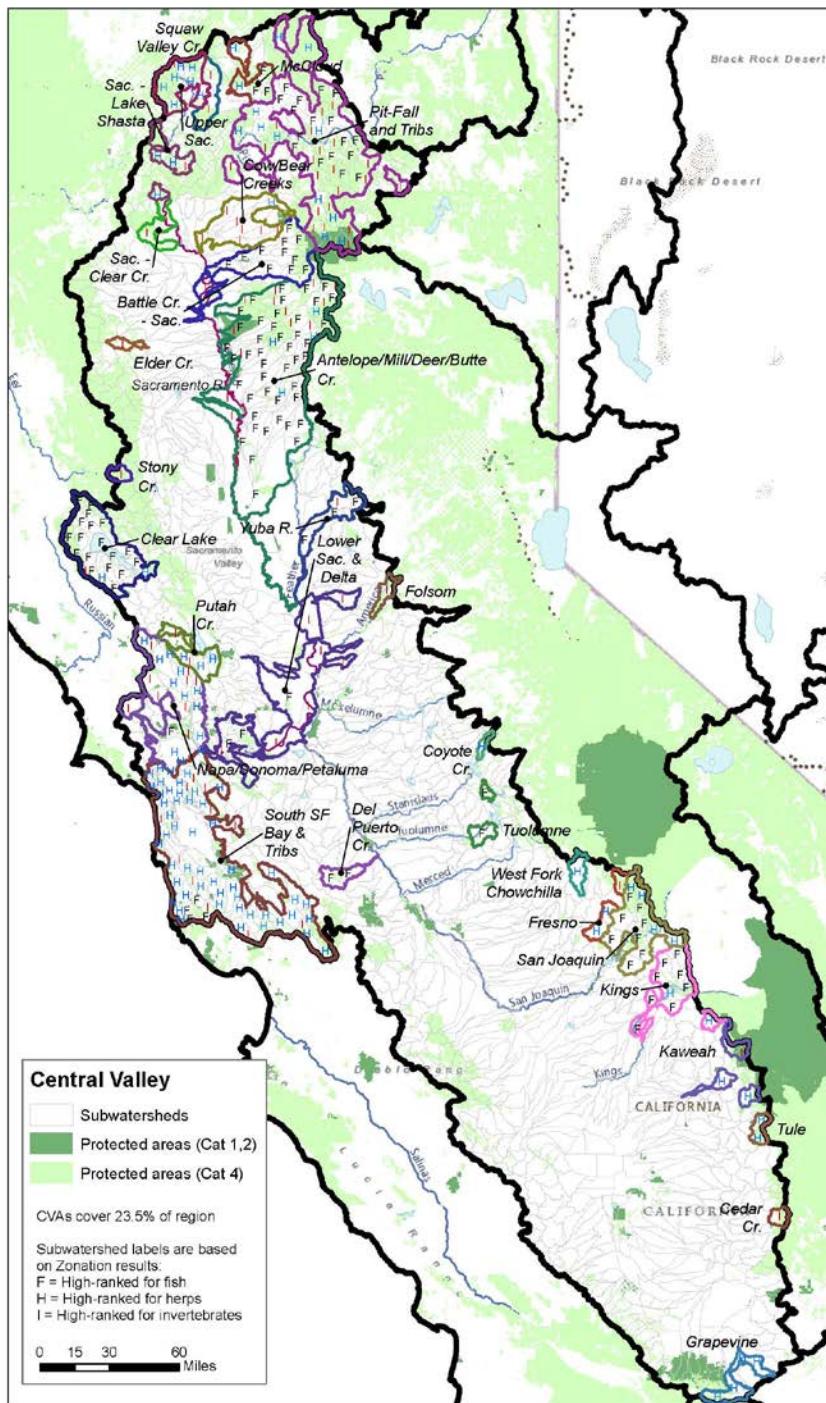
Zonation- Outputs

B

Best percentage of landscape

1-10	51-60
11-20	61-70
	21-30 71-80
	D 81–9o
41-5o	D 91-1oo

31-4o

NV

UT

AZ   NM

CA

Mexico

Draft High Freshwater Conservation Value Areas

(to be revised based on expert review)

North Coast

- Subwatersheds
- Protected areas (Cat 1,2)
- Protected areas (Cat 4)

CVAs cover 35.7% of region

Subwatershed labels are based on Zonation results:
F = High-ranked for fish
H = High-ranked for herps
I = High-ranked for invertebrates

0   20   40   80 Miles

Draft High Freshwater Conservation Value Areas
(to be revised based on expert review)

Central Coast

- Subwatersheds
- Protected areas (Cat 1,2)
- Protected areas (Cat 4)

CVAs cover 25.6% of region

Subwatershed labels are based on Zonation results:
F = High-ranked for fish
H = High-ranked for herps
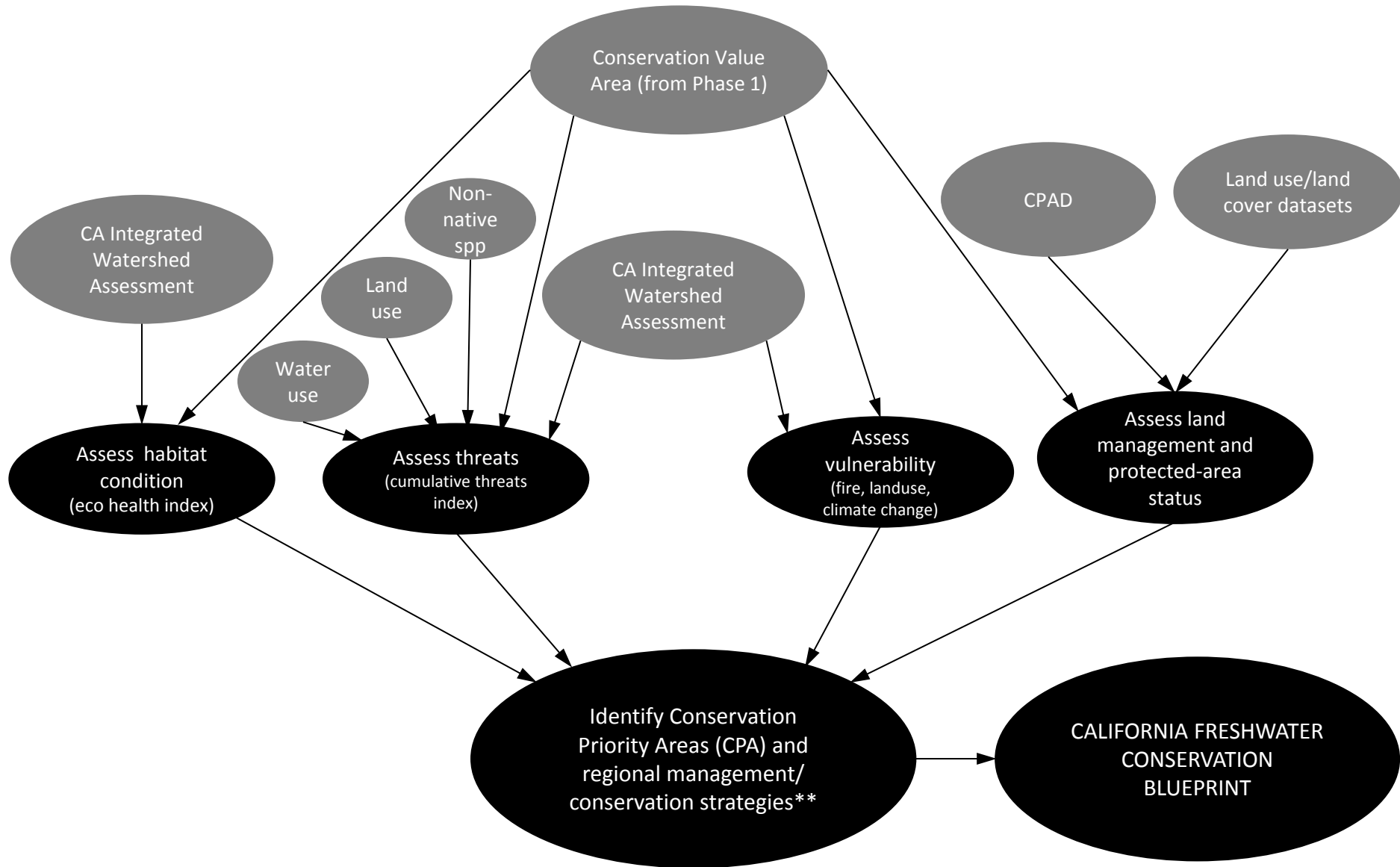I = High-ranked for invertebrates

0   12.5   25   50 Miles

Draft High Freshwater Conservation Value Areas
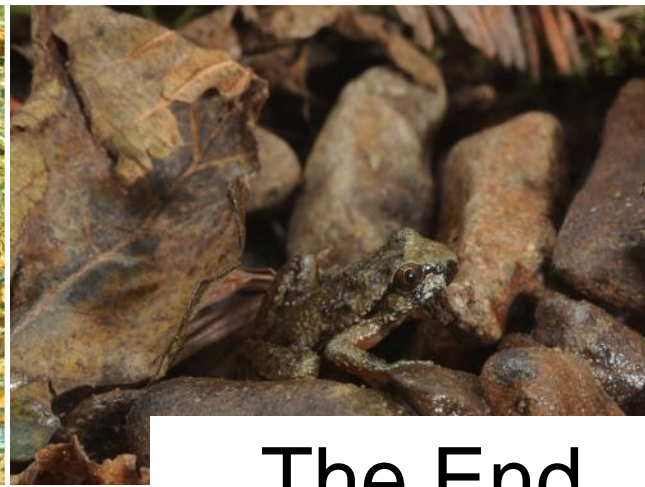
(to be revised based on expert review)

Phase 2: Identify and Develop Management Plan for Freshwater Conservation Priority Areas

** Conservation priority areas and regional management/conservation strategies to be determined through expert review process, informed by current watershed conditions, existing threats, future threats (vulnerability), and land-management status. Strategies will also consider biophysical and life-history requirements of the species and/or habitat indicators of conservation value present within the Conservation Priority Area.

Next Steps

- Finalize high conservation value areas – report and maps
- Form working group to develop strategies
- Identify priority areas based on threats, opportunities and land tenure
- Identify conservation strategies
- Outreach

The End