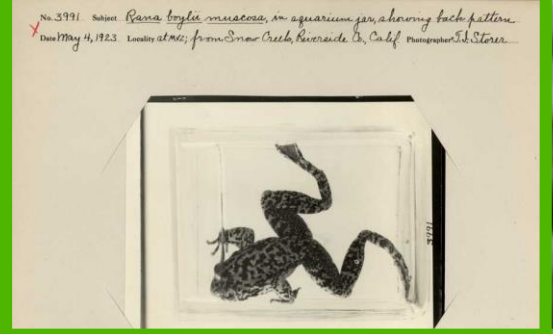

Establishing a Conservation Breeding & Reintroduction Program for the Endangered Mountain Yellow-Legged Frog

Talisin T. Hammond, PhD

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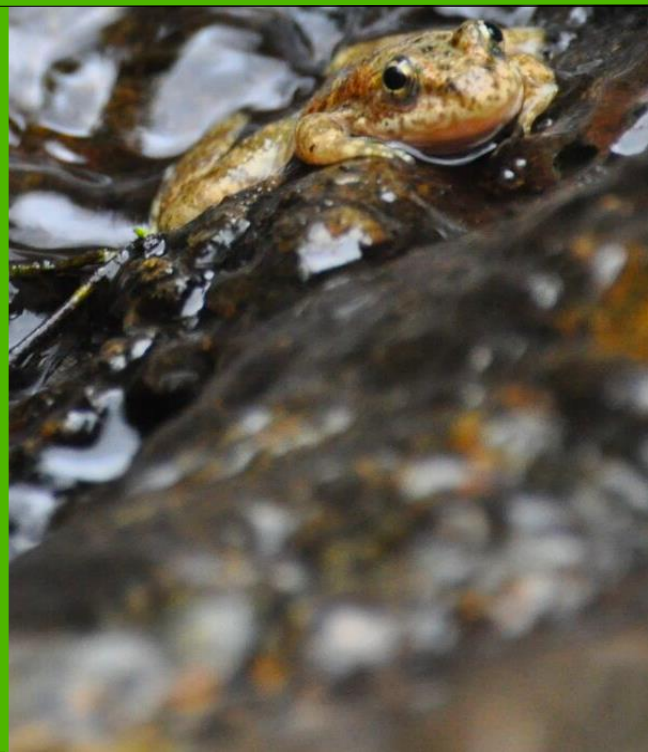

The Frog Team

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Partners:
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Omaha Zoo, Angeles Natioal Forest,
San Bernardino National Forest,

U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR

USGS
science for a changing world

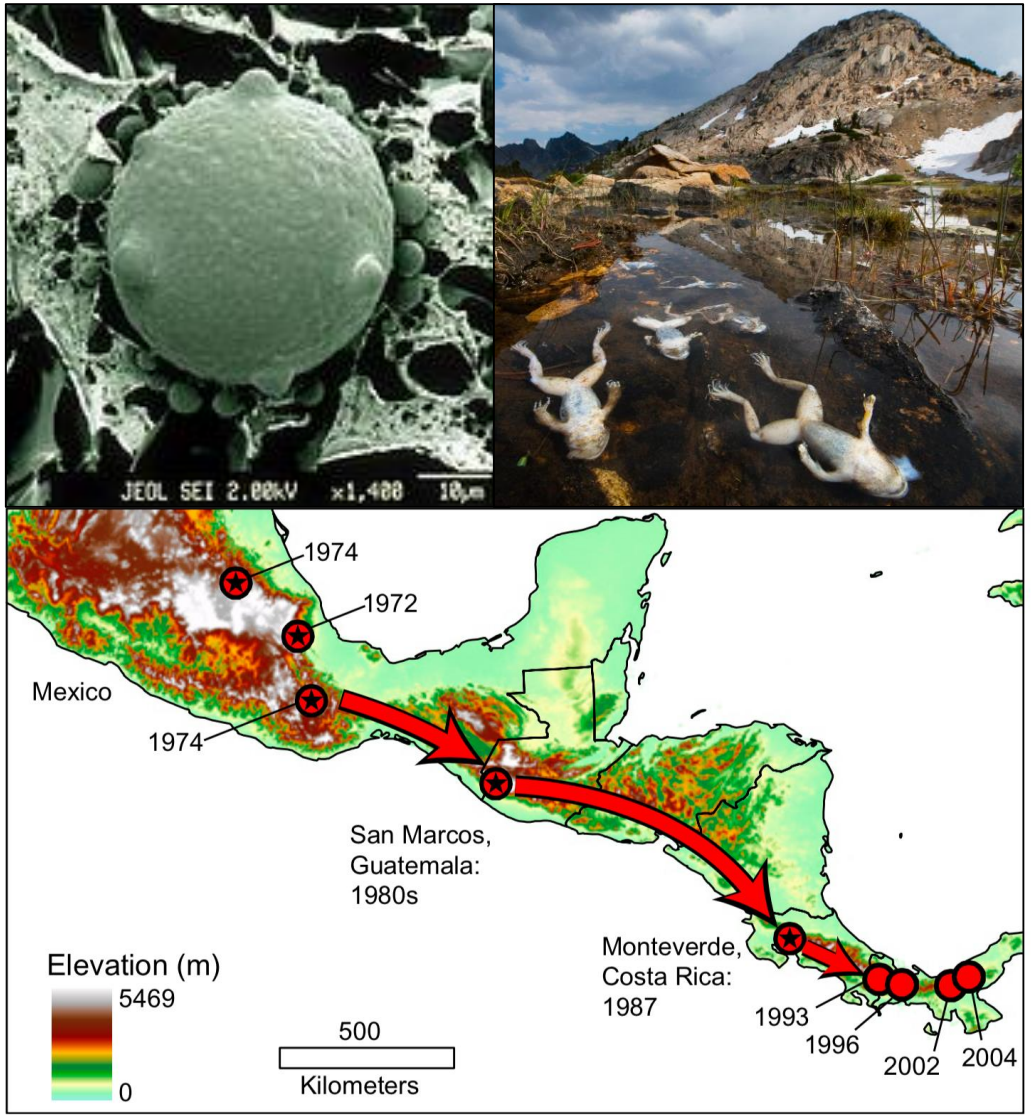
Museums, Conservation & Recovery Ecology

DDT & eggshell
thinning in birds of prey

Photos: NHM London, Carnegie Museum, Chip Clark, Wikipedia, Galen Rowell/Corbis

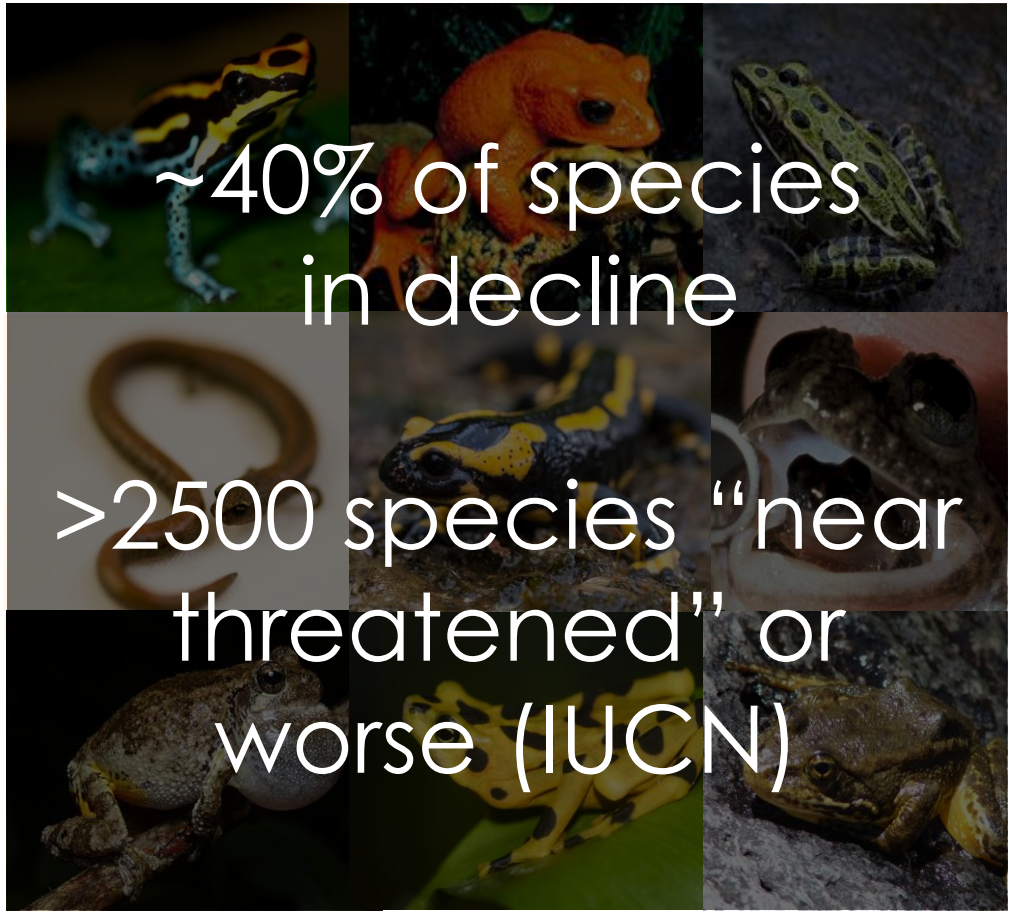
Batrachochytrium dendrobatidis (Bd) in Museums

- Fungal pathogen that causes the disease chytridiomycosis a.k.a. "chytrid"
- Infects amphibian skin disrupting osmotic regulation
- Can be fatal. Highly infectious → mass die-offs



Photos: Wikipedia; Joel Sartore; Cheng et al., 2011

Amphibian Extinction Crisis



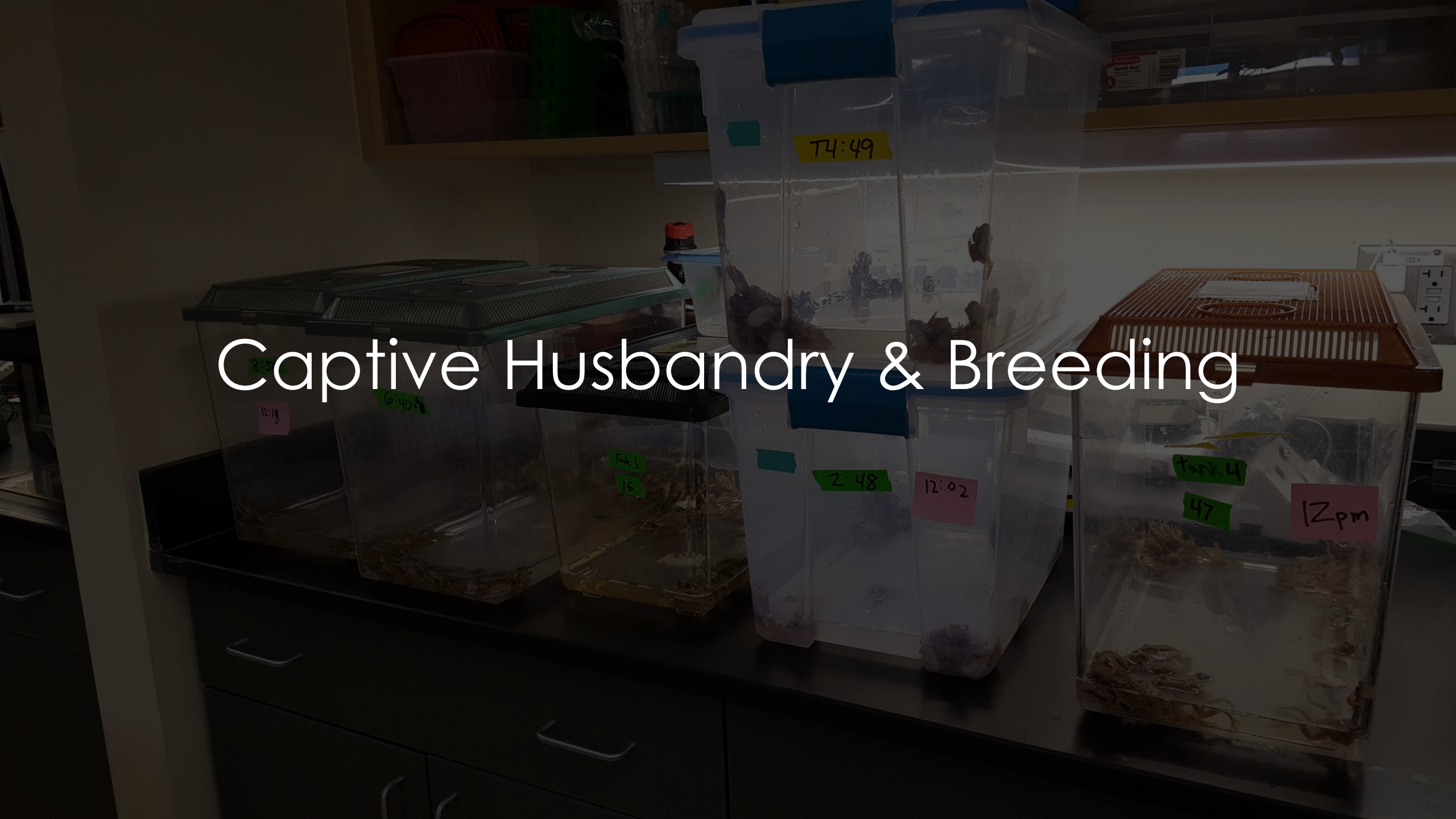
Mountain Yellow-Legged Frogs (*Rana muscosa*)

Mountain Yellow-Legged Frogs (*Rana muscosa*)

Map based on specimen data from Vertnet

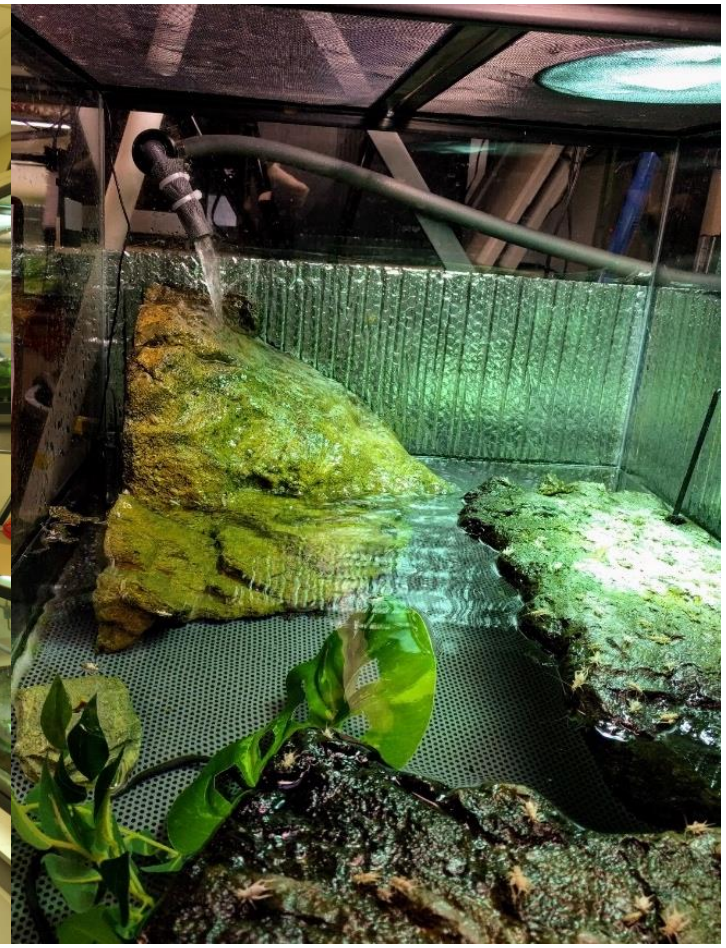
- Declines began in late 1960s attributed to habitat loss, extreme events, introduced predators, & chytrid
- <200 left in wild in southern CA
- 2006: first animals brought to San Diego Zoo Institute for Conservation Research in a salvage operation.

Mission: captive breeding assurance colony of mountain yellow-legged frogs for reintroduction into the wild.



Captive Husbandry & Breeding

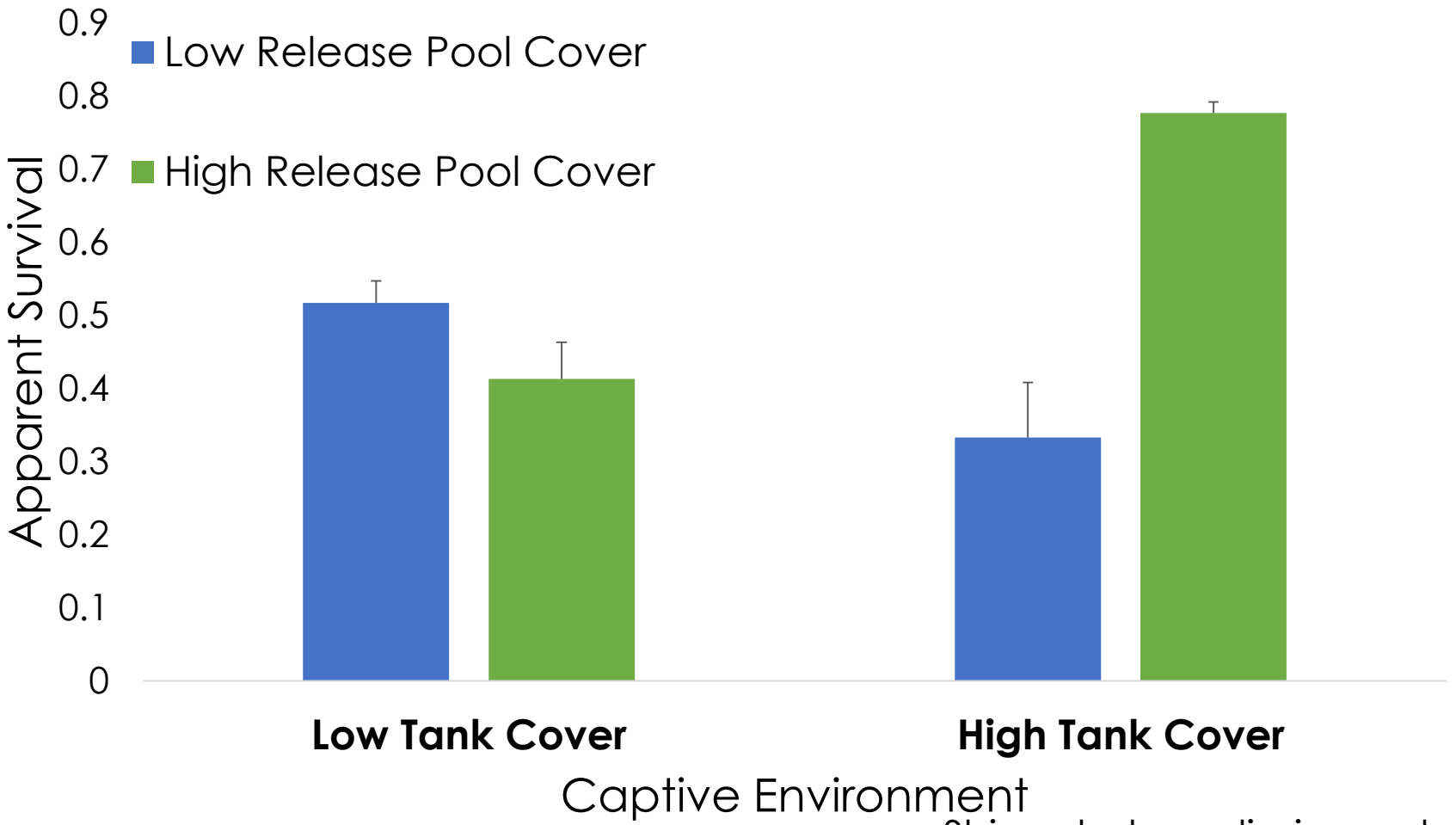
Captive Husbandry & Breeding



Make captivity more like the wild

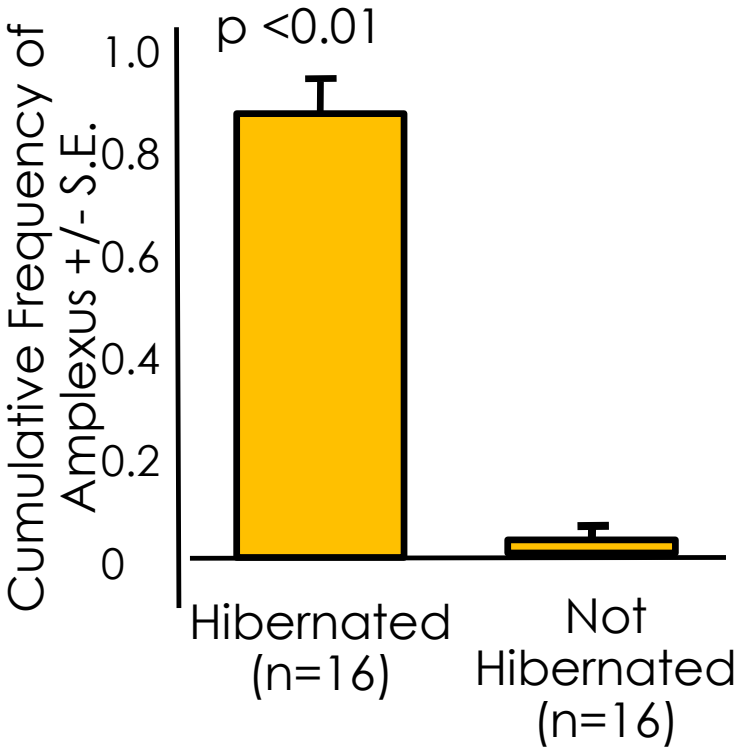
- Dietary variability
- Plant cover
- Seasonal variation (winter)
- Group/density variation
- Natal habitat matching

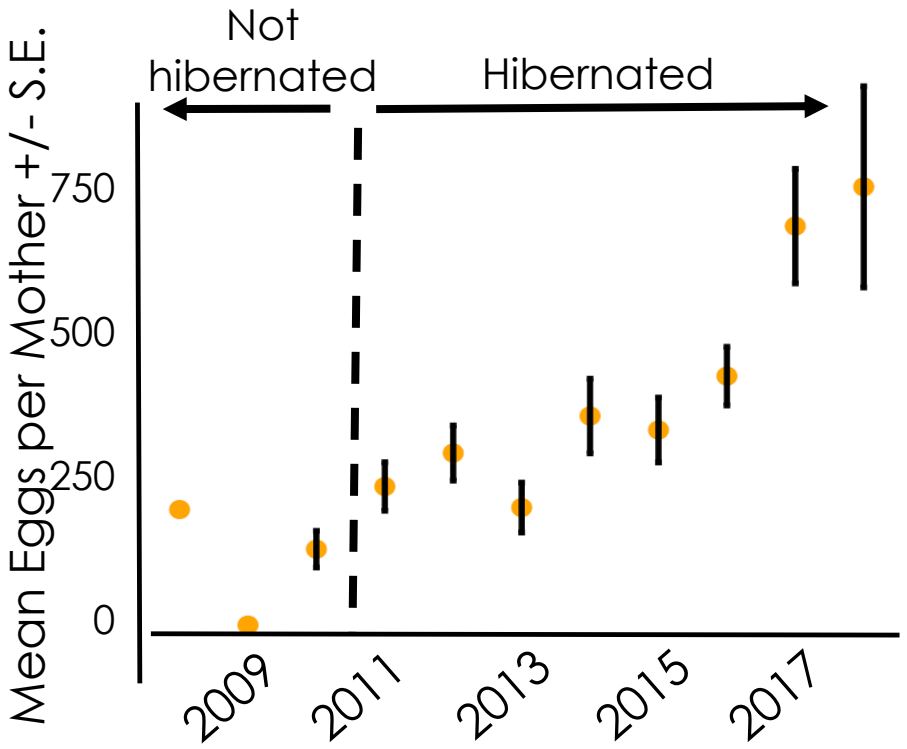
Vegetative Cover in Captivity Impacts Post-Release Survival

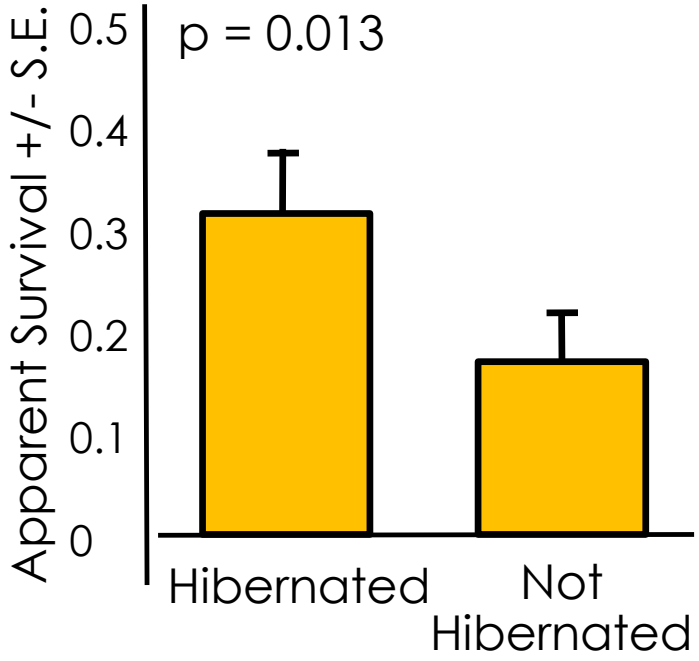


Shier et al., preliminary data

Hibernation Increases Reproduction & Post-Release Survival



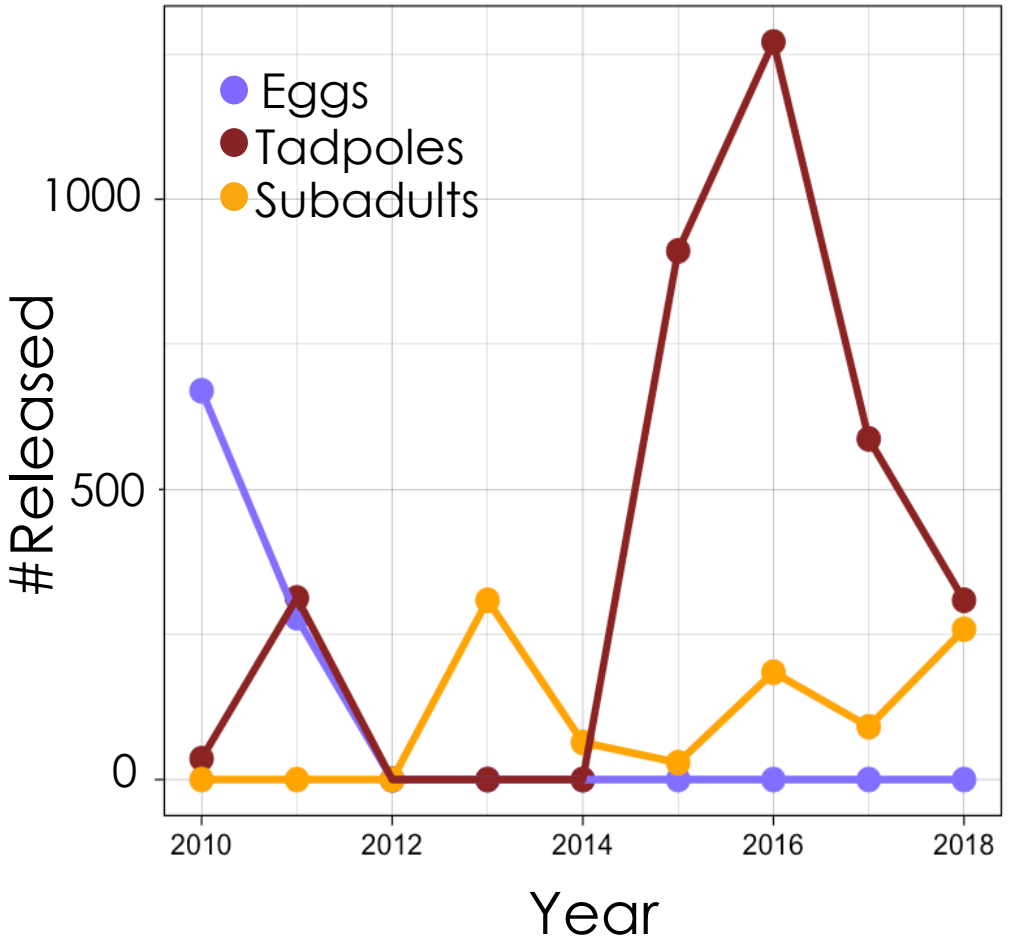




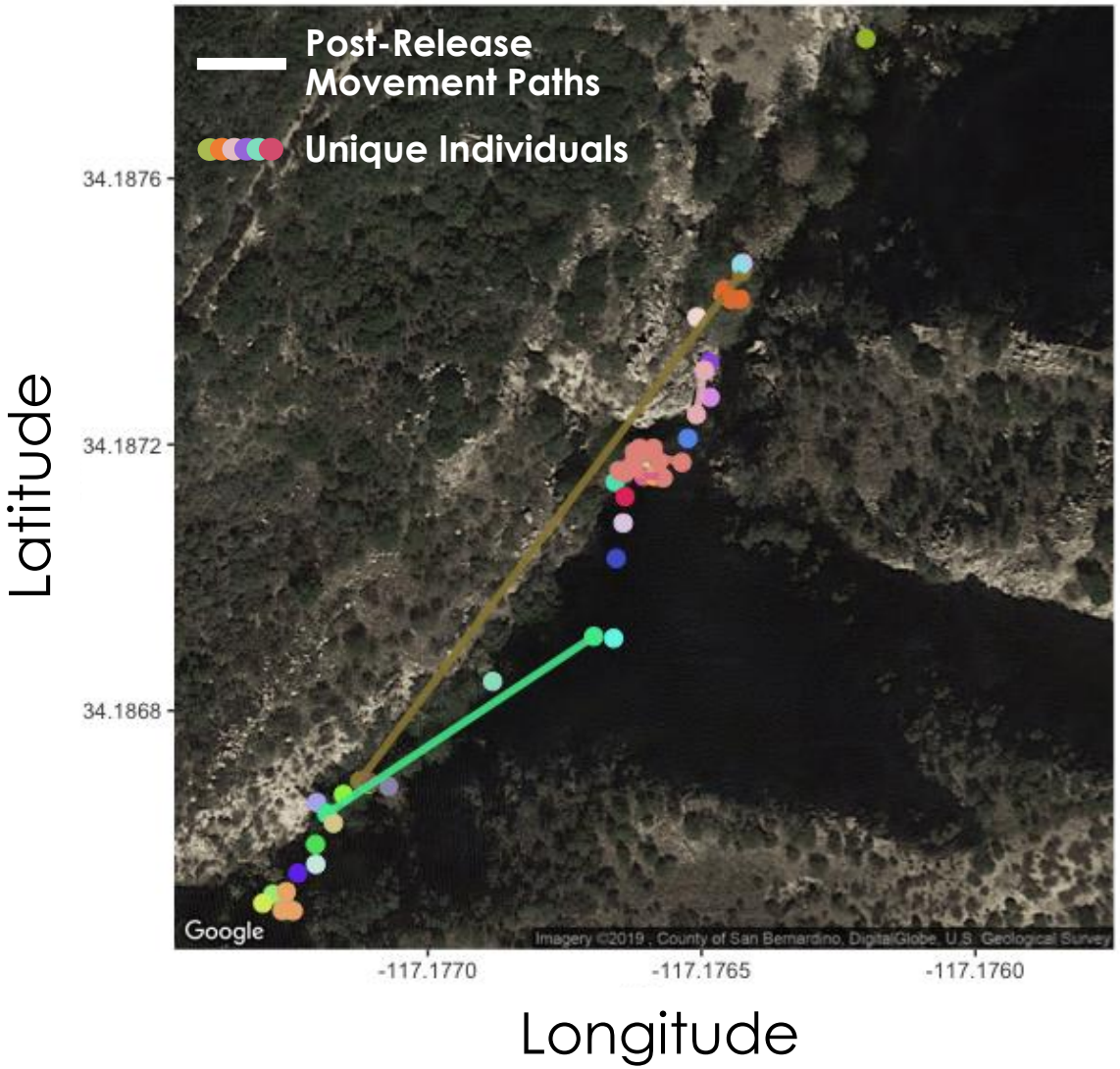
Santana et al., 2015; Calatayud et al., in prep


Reintroductions

Reintroductions



Post-Release Surveys



How are post-release movement and survival impacted by:

- Environmental enrichment
- Predator training
- Hard vs. soft release

Identifying the problems facing demonstrable reintroduction success


Chytrid

Detection of frogs in the field



Lack of genetic diversity

Predation



Climate change/drought

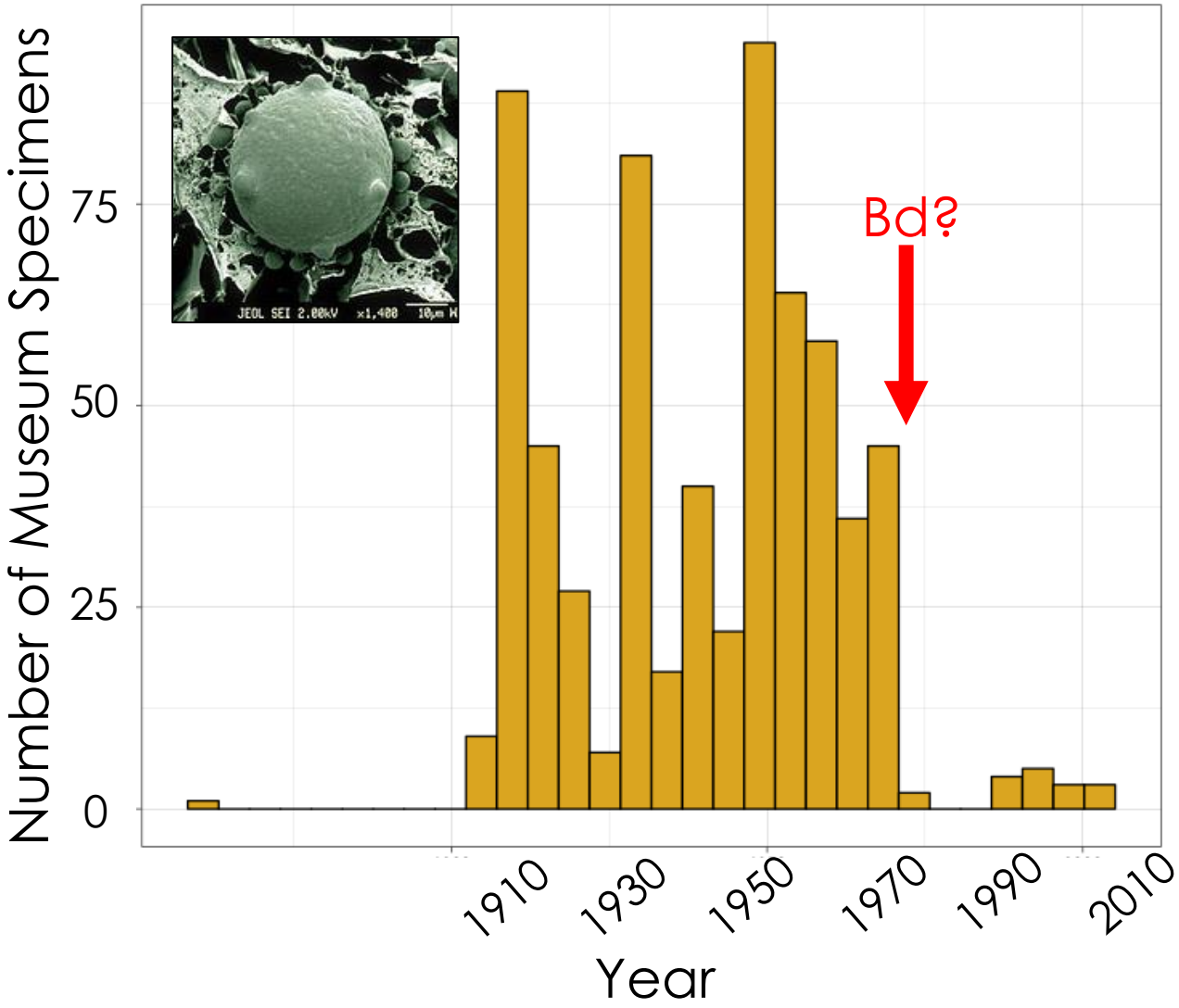
Fires / extreme events



Habitat loss/degradation

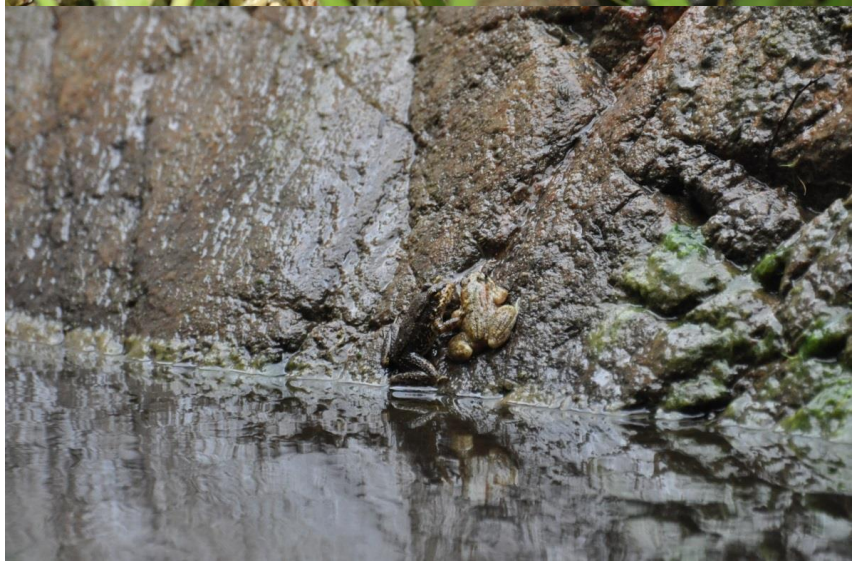
Chytrid

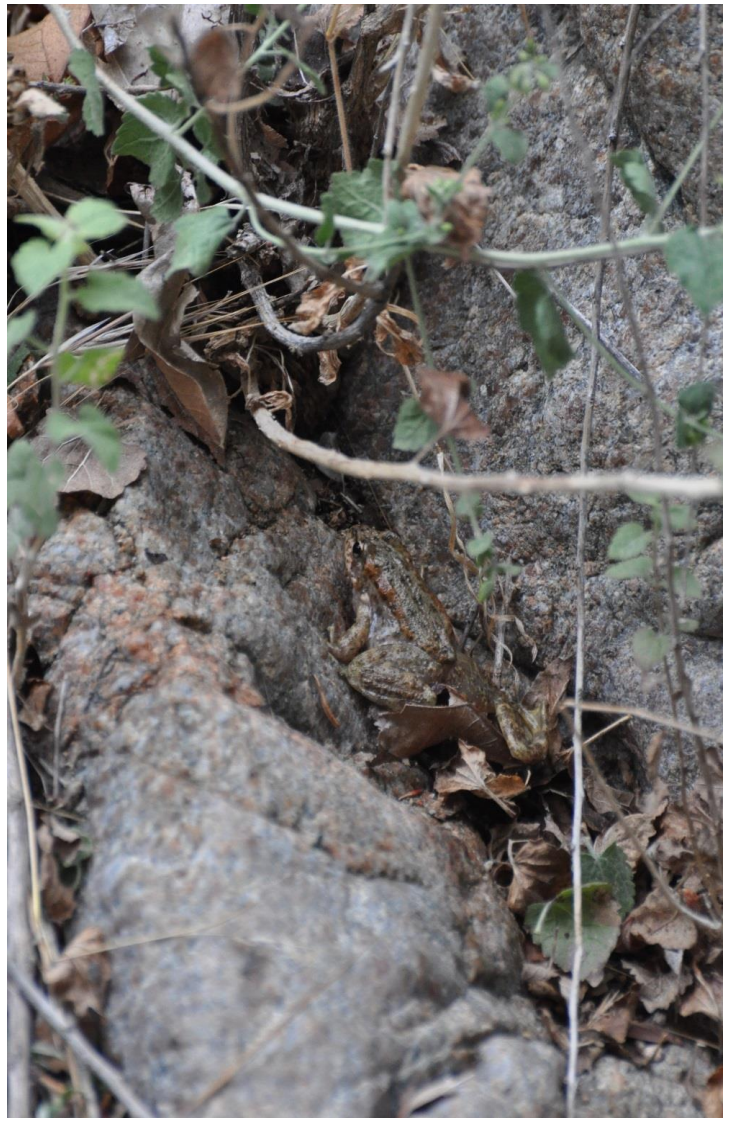
- Presumed a cause of decline, but no historical data for Southern CA
- Now infects all populations, but only intermittent signs of fatalities
- We can use historical data preserved and archived in natural history museums to understand causes of decline



Mountain Yellow-Legged Frogs at The Nat

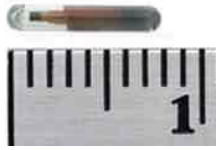
Detection

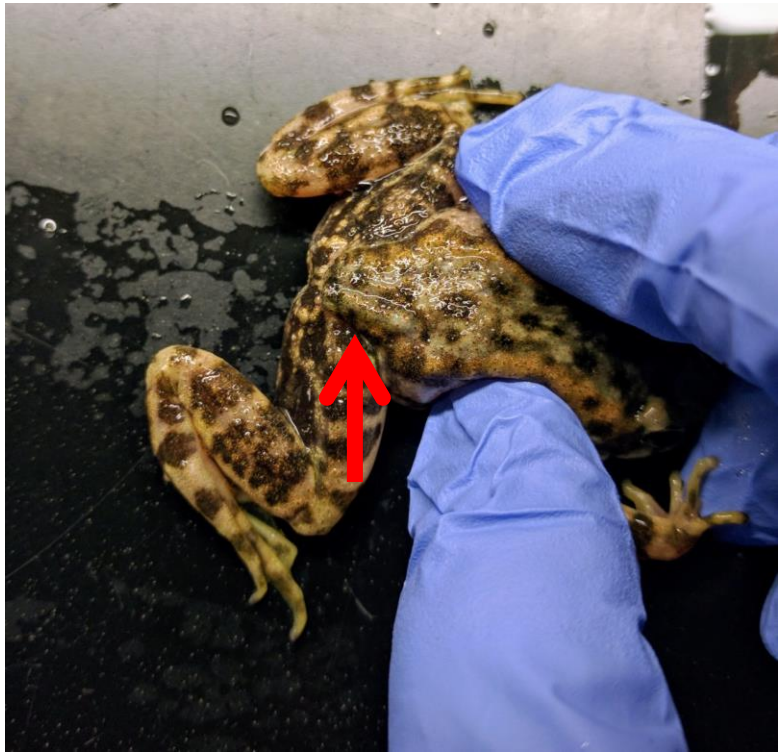




Passive Integrated Transponder (PIT) Radio Frequency Identification (RFID) Tags

8 mm
PIT Tag





Scent Detection Dogs
a.k.a. “Frog Dogs”

Summary

- Amphibian declines are a global biodiversity crisis, including here at home
- Museums have a big role to play in conservation studies
- Making captive settings like wild settings is key
- Using the scientific method in recovery ecology studies allows for progress

Acknowledgments

Funding & Support

- San Diego Zoo Institute for Conservation Research
- National Science Foundation
- USFWS
- AZA

Partners

- USGS
- USFWS
- CADFG
- Angeles & San Bernardino National Forests
- Los Angeles Zoo
- Omaha Zoo

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