

San Francisco Zoo and Gardens Conservation Programs

Rochelle Stiles, PhD

Conservation Special Projects Supervisor

“The mission of the San Francisco Zoo is to connect people with wildlife, inspire caring for nature and advance conservation action.”



con·ser·va·tion

1. the act of conserving; prevention of injury, decay, waste, or loss;
preservation: *conservation of wildlife*
2. official supervision of rivers, forests, and other natural resources in order to preserve and protect them through prudent management.
3. a district, river, forest, etc., under such supervision.
4. the careful utilization of a natural resource in order to prevent depletion.

Conservation Goals

- Local community conservation action and expand local partnerships
- Partner with and support national and international conservation and research projects
- Promote green practices and increase the Zoo's demonstration spaces
- Encourage and explore sustainable practices and projects
- Conservation messaging in exhibit design and graphics
- Professional training and research opportunities for staff and volunteers
- Participate in regional, national, and international cooperative management and conservation programs (SSPs, TAGs)



Animal Conservation Actions

Managed Programs in SSPs: 79

- 46 Species of Mammals
- 28 Species of Birds
- 4 Species of Reptiles
- 1 Species of Amphibians

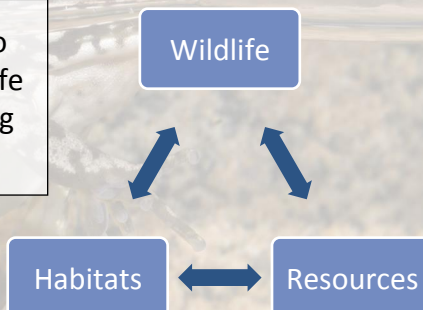


Today's Talk

- SF Zoo's conservation goals & actions
- Conservation program partnerships
- Field conservation/head-starting programs
 - SF Forktail Damselflies
 - Mountain Yellow-Legged Frogs
 - California Red-legged Frogs
 - Yosemite Toads
 - Western Pond Turtles

Conservation Philosophy

To advance the San Francisco Zoo's goal of conserving wildlife and wild places while inspiring conservation action.



Resource Conservation Actions

- Sustainability at the Zoo and at home
- Smart decisions for seafood
- Locally grown foods for the animals and café



Walking the Walk

Promote green practices and increase the Zoo's demonstration spaces

- Recycling programs – compost, cardboard/glass/plastic, batteries, hazardous waste, cell phones
- Encouraging reusable water containers with water charging stations
- Moving away from selling plastic one-use water bottles
- Compostable disposables at cafés
- Greenie's Conservation Corner organic gardening, composting and rainwater collection
- Electric vehicle charging station
- Staff bike program
- Encourage public transportation use by staff and zoo guests



Sustainable Seafood and the Seafood Watch Program

What Consumers Can Do

- Use the guide or app
- Make ocean-friendly choices when you eat seafood
- Dine at a partner restaurant

Learn About Ocean Issues

- Learn about the impacts of wild caught seafood
- Discover how aquaculture can meet growing global demand



Habitat Conservation Actions

Zoo Crew at Presidio/Mountain Lake Park

- Teen volunteers removing non-native plants and replanting with native species

“Greenies” Garden

- Summer programs to encourage backyard gardening for people and wildlife

Renew the Zoo

- Corporate and group volunteer projects to help beautify and improve habitats at the Zoo

Wildlife Conservation Actions

Financial support to NGOs, SSPs, researchers, and other conservation groups

Public awareness

- Graphics
- Animal Themed Days
- Fundraising through creative means
- SSA marketplace
- Commercial partnerships

Opportunities to link staff with researchers

- Earthwatch
- Ludwig Scholarship
- WCN Expo
- Conferences



Who have we supported?

- Annual financial contributions**
- AZA Tiger SSP
 - Polar Bears International
 - Red Panda Network
 - Madagascar Fauna Group
 - International Rhino Foundation
 - PAMS Foundation
 - Cheetah Conservation Fund
 - Chacoan Peccary SSP
 - AZA SAFE Vaquita SOS
 - IUCN/SSC
 - Gorongosa Carnivore Project



Long-term Partnerships

International

- Wild Welfare
- Snow Leopard Conservancy
- Polar Bear International

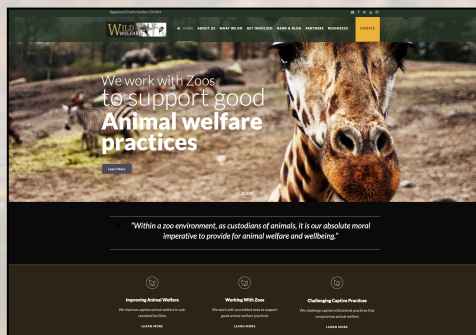


Domestic

- San Francisco Forktail Damselfly
- Mountain Yellow-legged Frog
- California Red-legged Frog
- Western Pond Turtle



Wild Welfare



Goals: Bring up the welfare state of animals in non-accredited zoos and join their efforts to positively influence animal welfare across the globe.

Actions: To help non-accredited institutions become accreditable by supporting the host facility in staff training, program development, strategic planning, guidance on animal care, welfare monitoring, or other needs as identified over a five-year period.

Snow Leopard Conservation Project in Nepal



Goals: Improve animal welfare, public health, and conserve snow leopards

Actions: Provide herders with predator-proofing techniques for their livestock and basic training in animal health care and husbandry techniques.

Polar Bear International: Arctic Ambassador Center Program



Goals: To sustain a future for polar bears across the Arctic.

Actions: Arctic Ambassador Centers (AACs) are a collection of zoos, museums, and aquariums that educate the public about climate change and provide leadership for carbon-emission reductions in their communities.

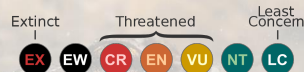
Field Conservation Projects

CA Local Species



We are head-starting:	IUCN Status	US Status
S. Mountain Yellow-legged Frog	Extinct: EX, EW; Threatened: CR, EN, VU; Least Concern: NT, LC	Endangered
Sierra Nevada Yellow-legged Frog	Extinct: EX, EW; Threatened: CR, EN, VU; Least Concern: NT, LC	Endangered
California Red-legged Frog	Extinct: EX, EW; Threatened: CR, EN, VU; Least Concern: NT, LC	Threatened
Yosemite Toad	Extinct: EX, EW; Threatened: CR, EN, VU; Least Concern: NT, LC	Threatened
Western Pond Turtle	Extinct: EX, EW; Threatened: CR, EN, VU; Least Concern: NT, LC	Petitioned
San Francisco Forktail Damselfly	Extinct: EX, EW; Threatened: CR, EN, VU; Least Concern: NT, LC	Rare

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San Francisco Forktail Damselfly



- Insect Zoo staff collect, breed, rear and release damselflies
- Released over 12,000 captive bred naiads, juveniles, and adult damselflies
- Signage and outreach at release sites
- Release sites at Mountain Lake and Fort Point/Crissy Field



It takes a community...

Collaboration with National Park Service, Presidio Trust and SFSU

Zoo Crew volunteers!



Goals:

- Population restoration and re-establishing extinct populations
- Securing small, at risk populations by expanding range
- Habitat enhancement and restoration
- Long term monitoring
- Creating awareness

Mountain Yellow-Legged Frogs



Threatened Amphibians

7,506

Declining

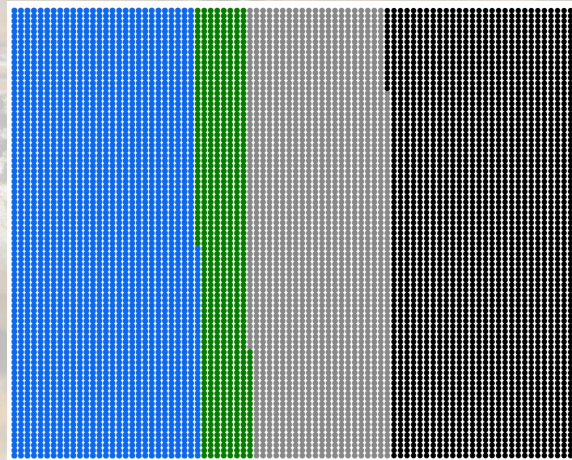
42% (3,153)

Threatened/ Endangered

33% (2,477)

Need Data

25% (1,876)

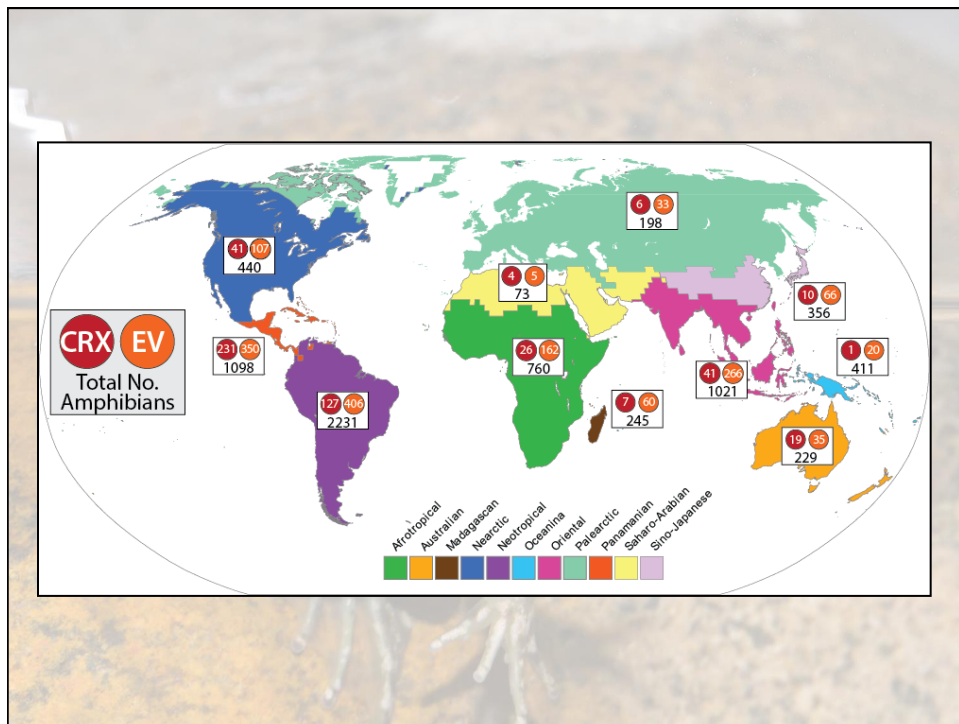


All amphibian lineages affected

- Salientia: frogs and toads
- Caudata: salamander
- Gymnophiona: caecilians



All photos from www.amphibiaweb.org



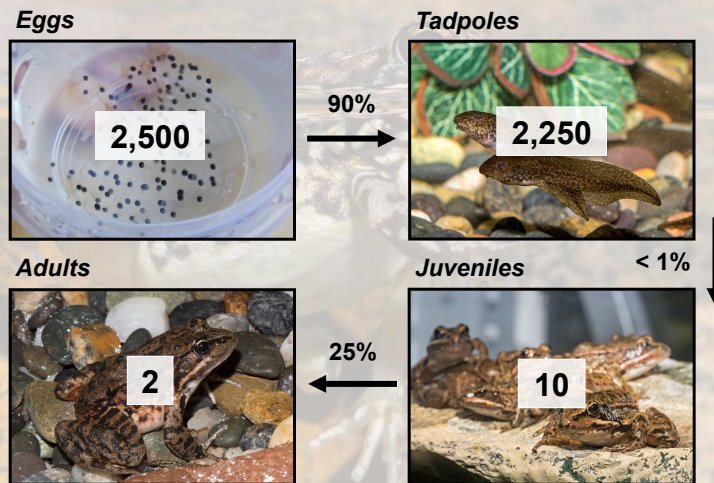
Threats to Amphibians

Invasive species Pollution Habitat loss Disease Climate change Over-collection

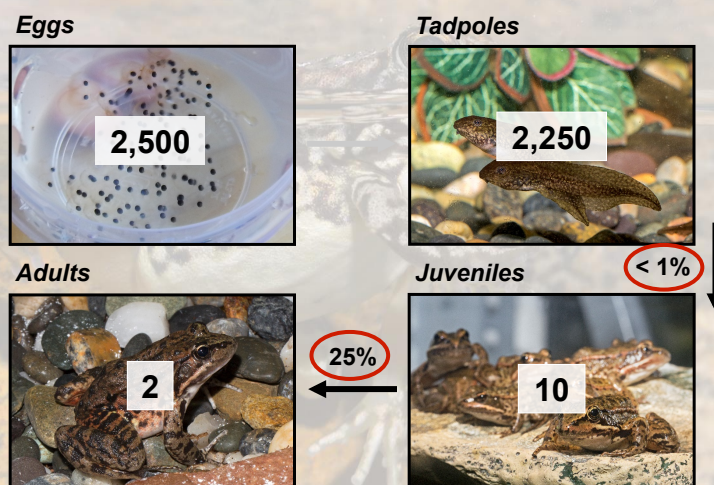
Manageable

Unmanageable

Head-starting



Head-starting



Head-starting

Eggs



Tadpoles



Adults



Juveniles

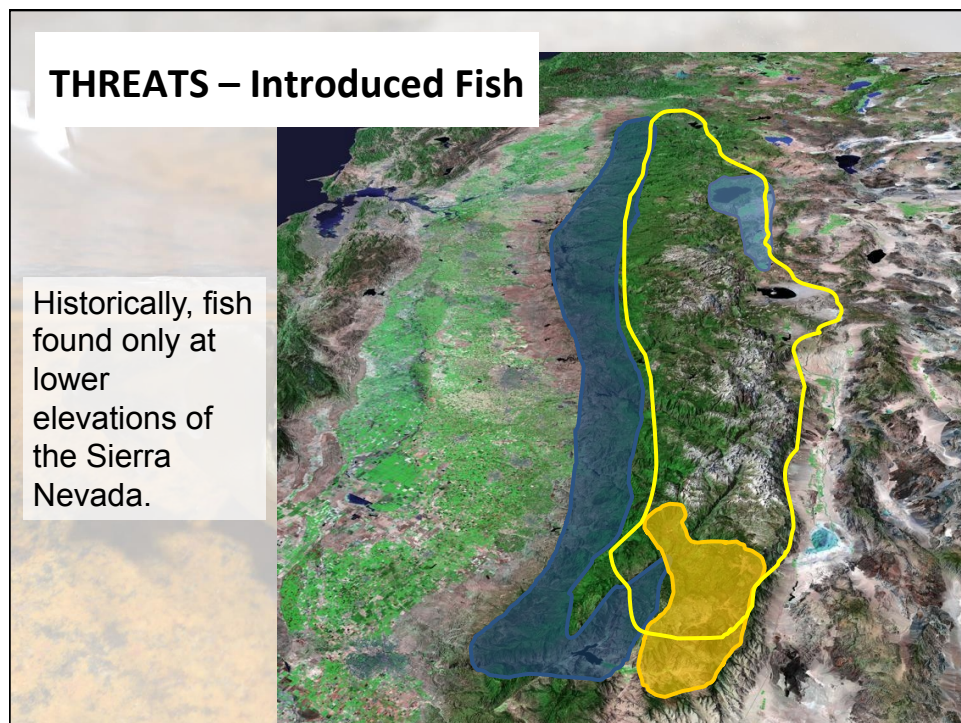
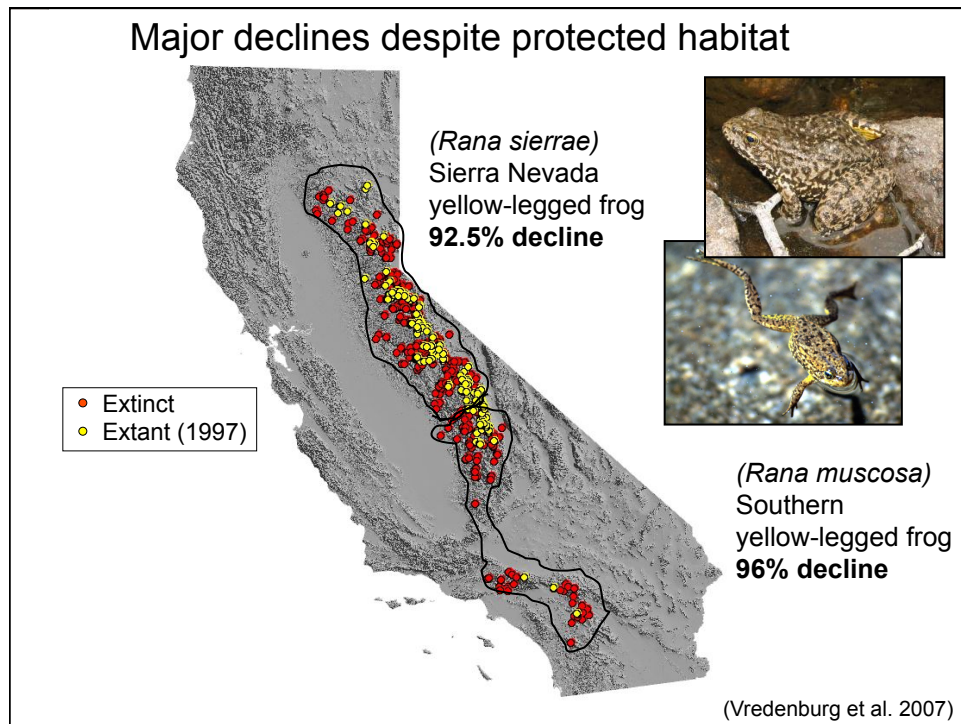


96%

73%

Mountain Yellow-Legged Frogs



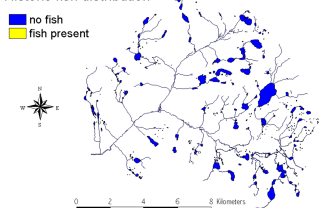


THREATS – Introduced Fish

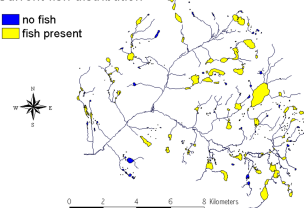
- 1950s and 1960s – trout reared in hatcheries introduced to Sierra Nevada remote areas
- Created significant reduction of Yellow-legged Frogs



Humphreys Basin & French Canyon
Historic fish distribution



Humphreys Basin & French Canyon
Current fish distribution



Restoring frog habitat works!

2004

Reversing introduced species effects: Experimental removal of introduced fish leads to rapid recovery of a declining frog

Vance T. Vredenburg*

Department of Integrative Biology and Museum of Vertebrate Zoology, University of California, Berkeley, CA 94720

BIOLOGICAL CONSERVATION 135 (2007) 11–20



ELSEVIER

available at www.sciencedirect.com



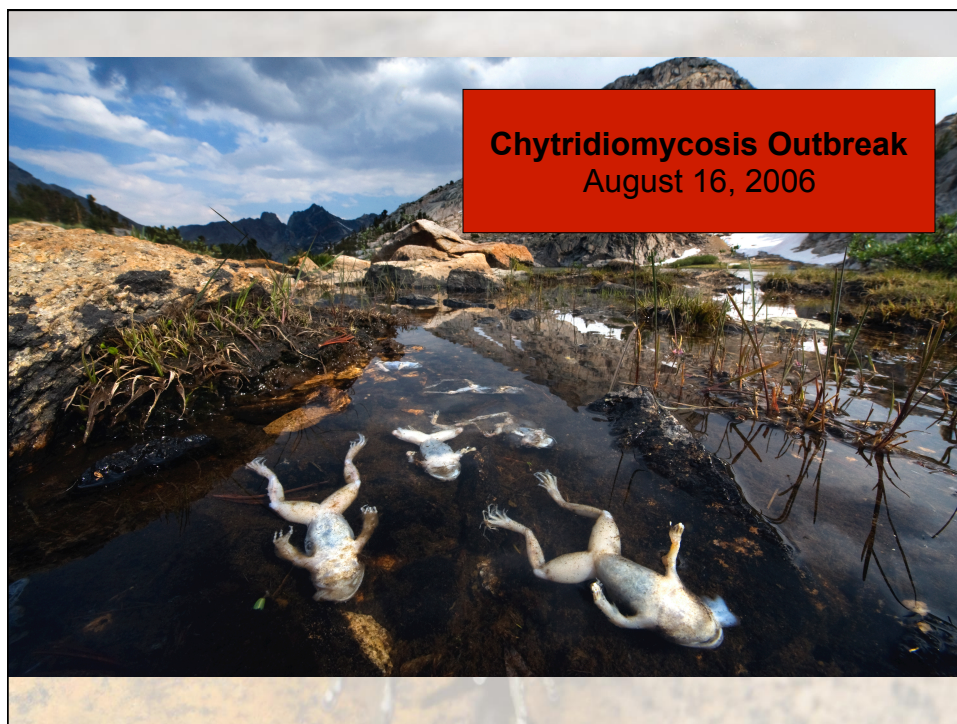
journal homepage: www.elsevier.com/locate/biocon



2007

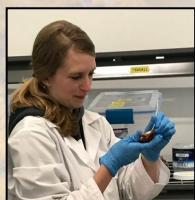
Removal of nonnative fish results in population expansion of a declining amphibian (mountain yellow-legged frog, *Rana muscosa*)

Roland A. Knapp^{a,*}, Daniel M. Boiano^b, Vance T. Vredenburg^c



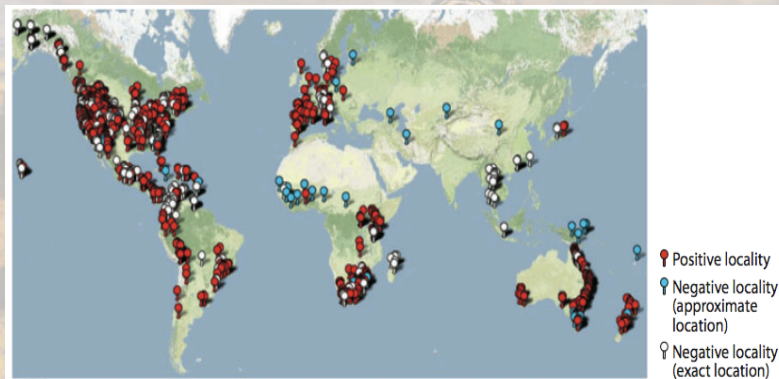
Chytrid Fungus

- Infection =
Batrachochytrium dendrobatidis (Bd)
- Disease =
Chytridiomycosis



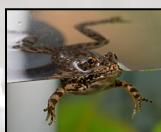
Worldwide Distribution of *Bd*

*Map from Fisher et al. 2009



Mountain Yellow-legged Frog Conservation Program

1. Emergency salvage of frog populations that are at risk of localized extinction
2. Captive rearing for reintroduction projects in the Sierra Nevada
3. Experiment with novel test of acquired immunization treatment that may provide an effective method of minimizing pathogen impacts post release



Throughout the Sierra

Desolation, Lake Tahoe

Goal: Restore MYLF to recently restored lakes.

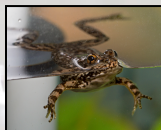
- 160 frogs released in 2015 and 2016
- 116 frogs released in 2019
- 5 years of frog monitoring by CDFW and UCSB

Sequoia-Kings Canyon

Goal: Salvage unique populations before extinguished.

- Salvage tadpoles and frogs in wilderness areas
- Over 200 frogs released 2016-2018
- Currently rearing 300 frogs/tadpoles





Throughout the Sierra

Plumas National Forest

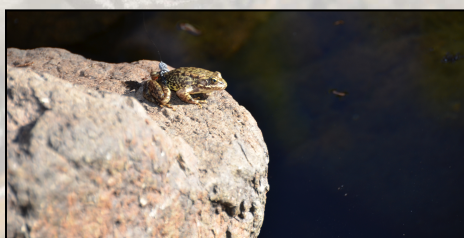
Goal: Increase population at Northern edge of the range where recruitment of young is not successful

- Hundreds of frogs released
- Radio tracking to learn movements
- Rearing 60+ frogs/tadpoles for release

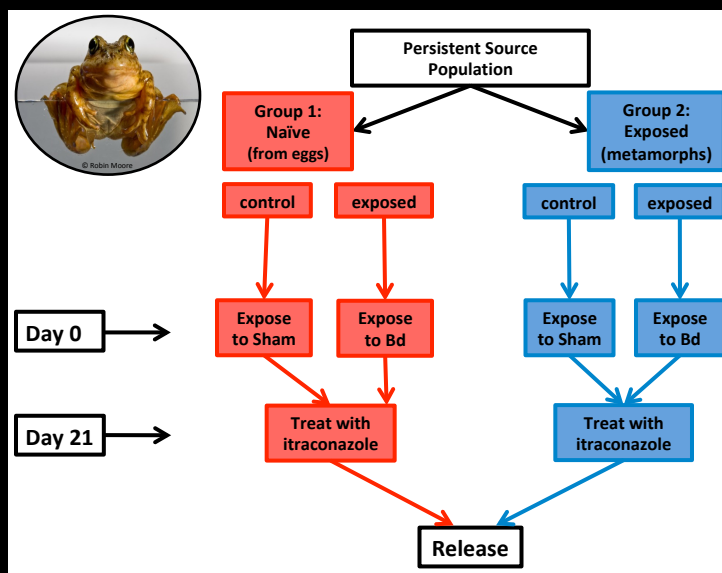
Yosemite National Park

Goal: Re-establish extinct population in backcountry of Park

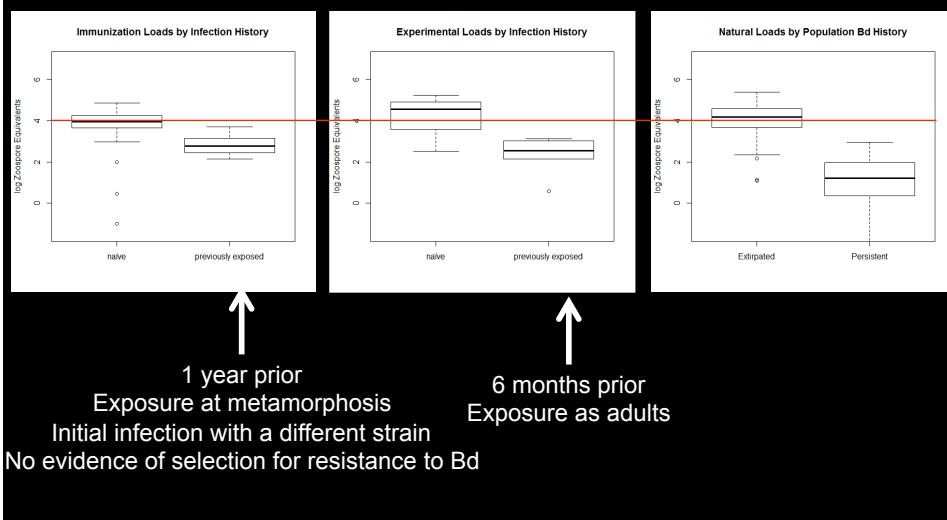
- 90 frogs reared/released in 2019
- Currently rearing 400 frogs/tadpoles



Immunization at the Zoo



Susceptibility to *Bd*



California Red-legged Frogs



Value to California

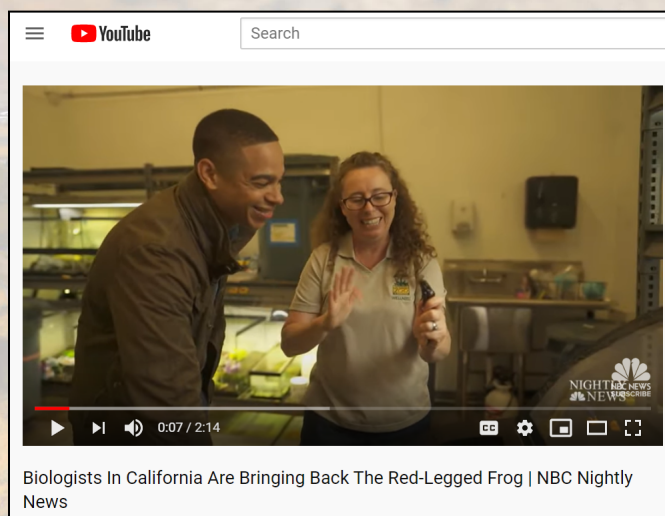
- Our state amphibian!
- Threatened species
- Extinct in much of Sierras



SF Zoo efforts

- Released frogs in 2017-2019 at 5 sites in Yosemite Valley
- Chytrid susceptibility research
- Personality/behavior research
- Breeding in park occurred in 2019

NBC Nightly News

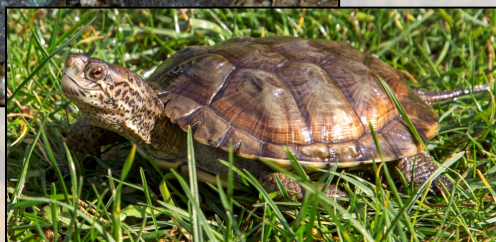


Yosemite Toads

- Recovery Plan under development by USFWS – listed as threatened
- No successful rearing in captivity prior to 2017
- Collaboration on chytrid study at University of Nevada-Reno
- 35 toadlets!



Western Pond Turtles



Western Pond Turtle

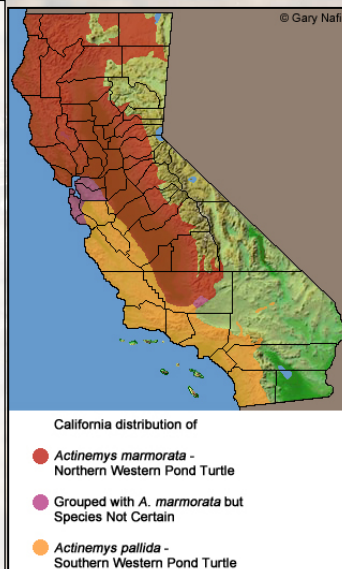
Only native aquatic turtle on the West Coast

Range (historical vs current)

- Contiguous distribution along South British Columbia to North Baja California
- Declines in much of WA & some in OR and CA

Conservation Status

- Washington: Endangered
- Oregon: Threatened
- California: Species of Special Concern



San Francisco's Mountain Lake



Re-establishing wildlife

2012-2013, head-started 60+ turtles
Recorded growth data and took blood
for stress hormone study
Experimented with hard and soft
releases
Radio-telemetry for post-release
monitoring



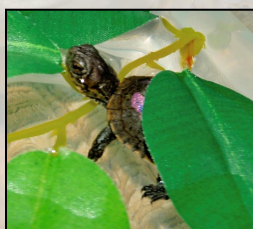
The North Bay Western Pond Turtle Project

2008-2017 Collaboration between university research and zoo conservation programs

Investigated poorly understood aspects of WPT biology

Field Projects – 7 graduate students

- Nest site selection and nest site fidelity (philopatry)
- Characterizing nest microhabitat conditions
- Studies of *in situ* nest temperatures
- Habitat restoration and turtle reintroduction



Marin Headlands



- Released 24 turtles 2017-2019
- Rearing 45 hatchlings for 2020 and 18 for 2021
- Working with SSU and NPS on nesting behavior, selection, and sex determination questions



Program Partnerships

US Fish and Wildlife Service	Stanislaus National Forest
California Department of Fish and Wildlife	Eldorado National Forest
US Forest Service	Sierra National Forest
National Park Service	City of San Francisco
Yosemite National Park	San Francisco Department of Recreation and Parks
Sequoia-Kings Canyon National Park	Association of Zoos and Aquariums
Golden Gate National Recreation Area	Chelonian Taxon Advisory Group
Point Reyes National Seashore	Amphibian Taxon Advisory Group
The Presidio Trust	Oakland Zoo
Plumas National Forest	Fresno Chaffee Zoo
American River Conservancy	UC Santa Barbara
Sierra Foothill Conservancy	UC Davis
Sierra Nevada Aquatic Research Laboratory	SF State University
Mariposa Public Utilities District	Sonoma State University
Bureau of Land Management	

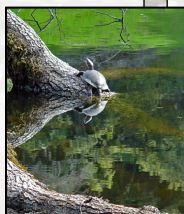


Mission:

To combine the power of zoo and aquarium visitors with the resources and collective expertise of AZA members and partners to save animals from extinction.

10 Signature Species

- **Western Pond Turtle**
- Cheetah
- African Penguin
- Sharks
- Sea Turtles
- Gorilla
- Black Rhino
- Whooping Crane
- Vaquita
- Asian Elephant



Now 28 SAFE species

Zoo Project Coordinator for 2 SAFE Projects:

- SSP Husbandry/Genetics Project
- WPT Range-wide Conservation Coalition

Other projects in SAFE plan:

- Assisting with shell disease monitoring and treatment
- Citizen Science funding being sought
- Regional working groups
- Population assessments
- Habitat restoration

Conservation Staff



Jarrod

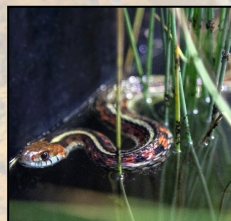
Rochelle

Jessie



Ian

California Conservation Corridor



2020 Conservation Activities

- Earth Day, World Oceans Day
- Conservation Lecture Series in ongoing!

Join us for upcoming lectures:

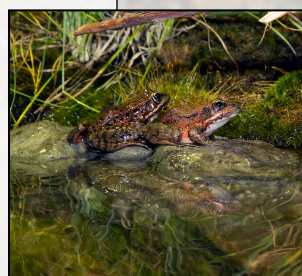
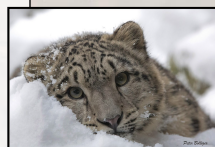
Conserving Snow Leopards: new approaches and innovative tools

Saturday, Feb 15th, 12:30-1:30pm

SF Zoo Amphibian Conservation

(title coming soon!)

Saturday, April 18th, 12:30-1:30pm



Questions?

