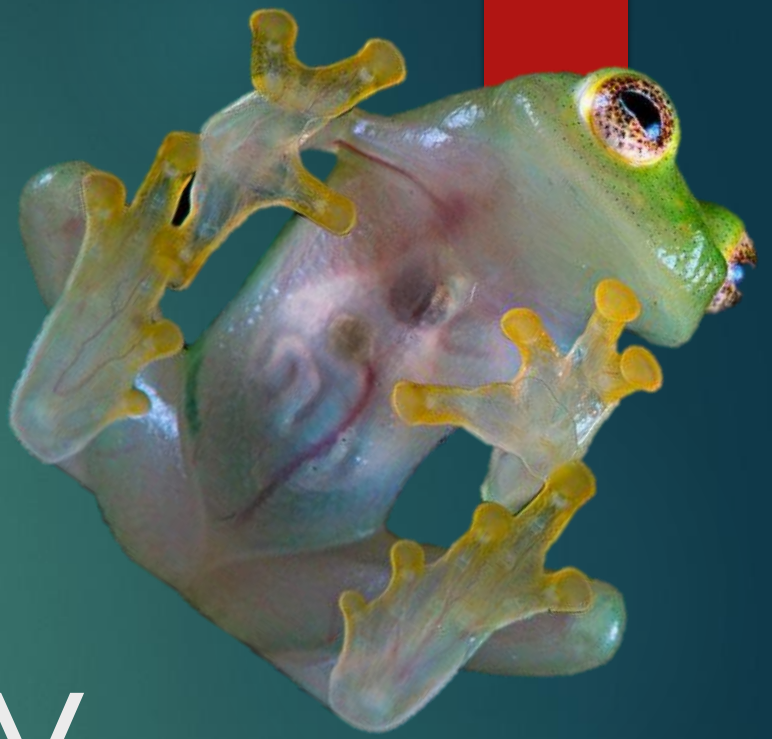
Amphibian Watch 2018

ELDORADO NATIONAL FOREST

PRESENTED BY HEATHER PERRY, PhD

A Few Rules

- No handling of amphibians or reptiles under any circumstance
  - Health and Safety of animals & humans
- No harassing of amphibians
  - Especially during breeding
- No sharing of data



Amphibian Morphology

IN ALL THINGS OF NATURE THERE IS SOMETHING OF THE MARVELOUS

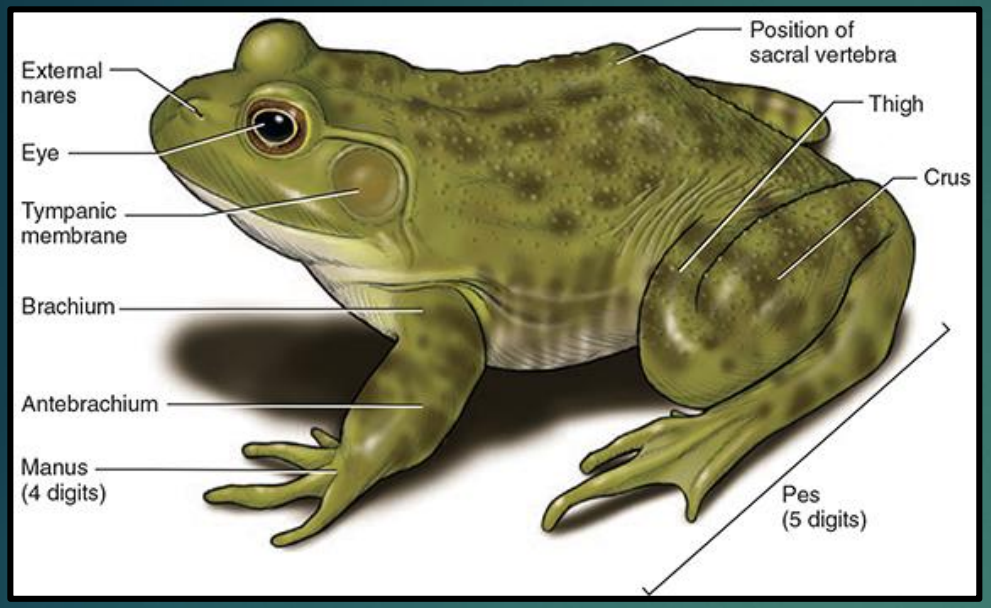
~ARISTOTLE

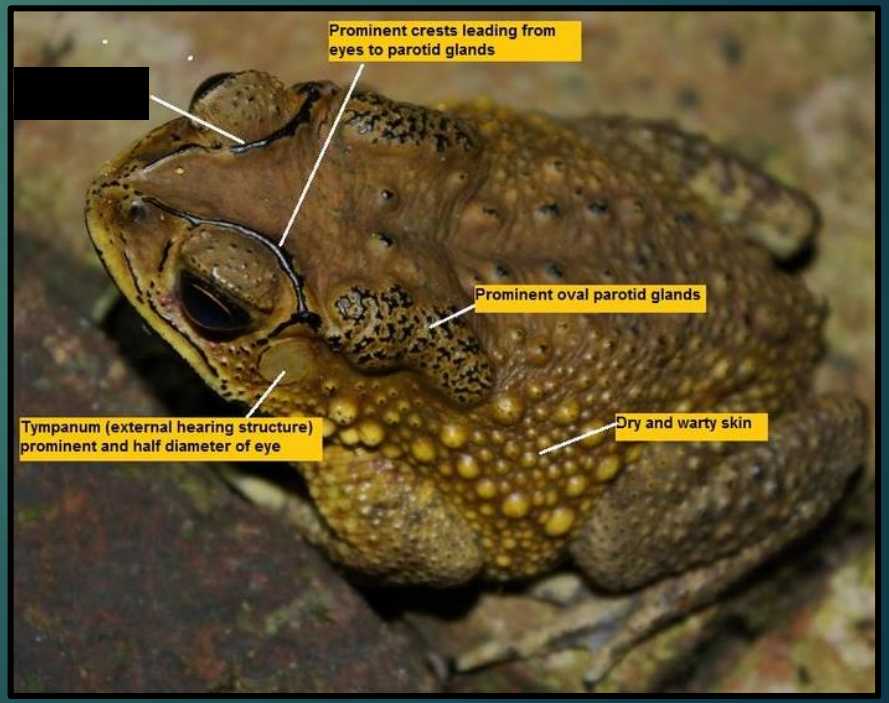
Frogs and Toads

- Smooth skin
- Often reside near aquatic environments as adults
- Egg masses in clumps

- Dry skin & warts/bumps
- Parotoid glands that produce defensive secretions, located behind eye
- Migrate between terrestrial & aquatic ecosystems during breeding season
- Eggs laid in strings

External Morphology





Breeding & Egg Masses

Toads in amplexus; eggs laid in string formation

Frogs in amplexus; eggs laid in clumps/masses

Amplexus: the mating method in frogs and toads where the male clasps the female about the back.

Eggs are fertilized externally.

Females are often larger than males.

Salamanders and Newts

Photo G. Nafis

- Well developed toes for digging
- Long, rounded tails
- Smooth skin

- Rough-skinned when in the terrestrial phase
- Aquatic during breeding season
- Paddle-like tail

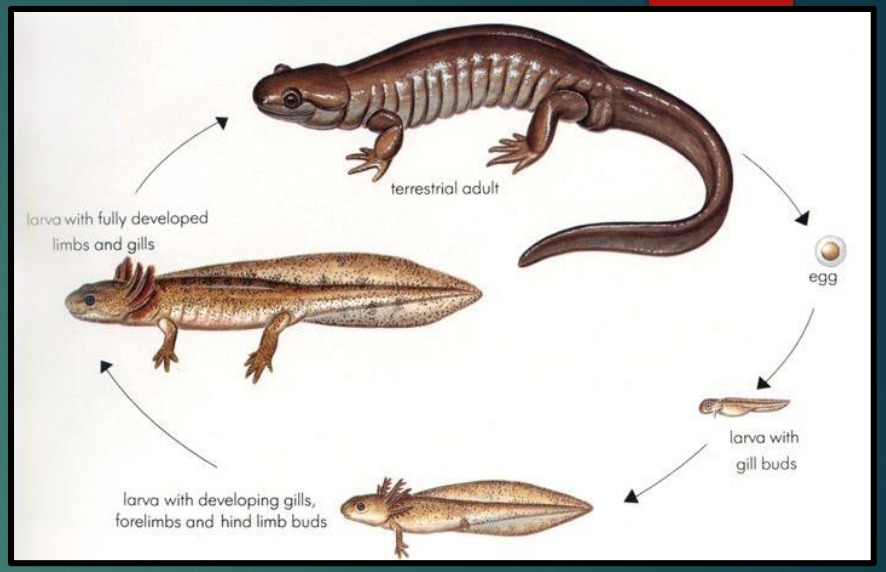
Breeding and Egg Masses

Sierra Newts are more commonly encountered during mating season. They return to aquatic systems and can be seen in amplexus or mating balls. Eggs are laid and attached to submerged substrates.

Long toed salamander eggs attached to submerged woody debris.

Photos G. Nafis

Tadpole vs. Larvae

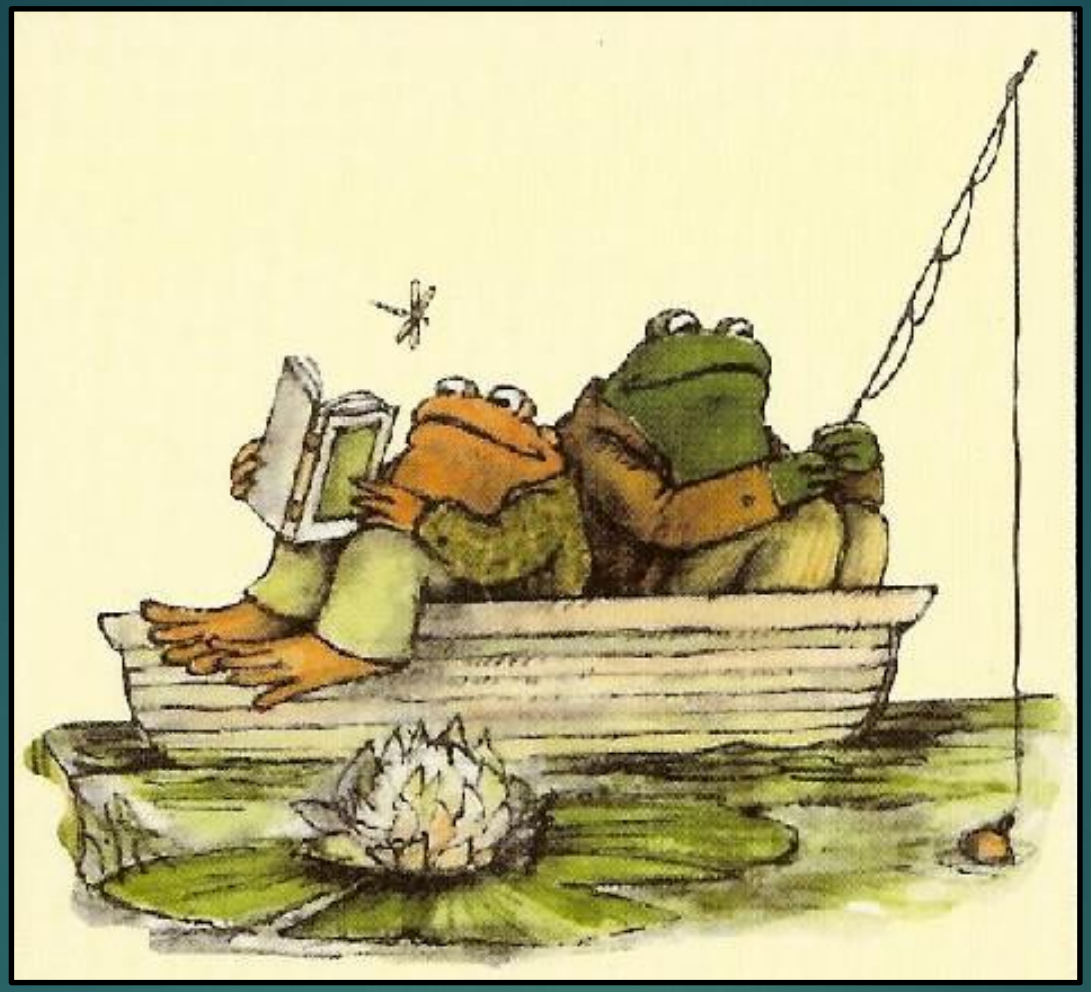


Tadpoles

- Generally no external gills
- Hind legs develop first
- Head is globular

Larvae

- External gills
- Forelegs develop first
- Body is generally more slender



Frogs & Toads

THREATENED & ENDANGERED

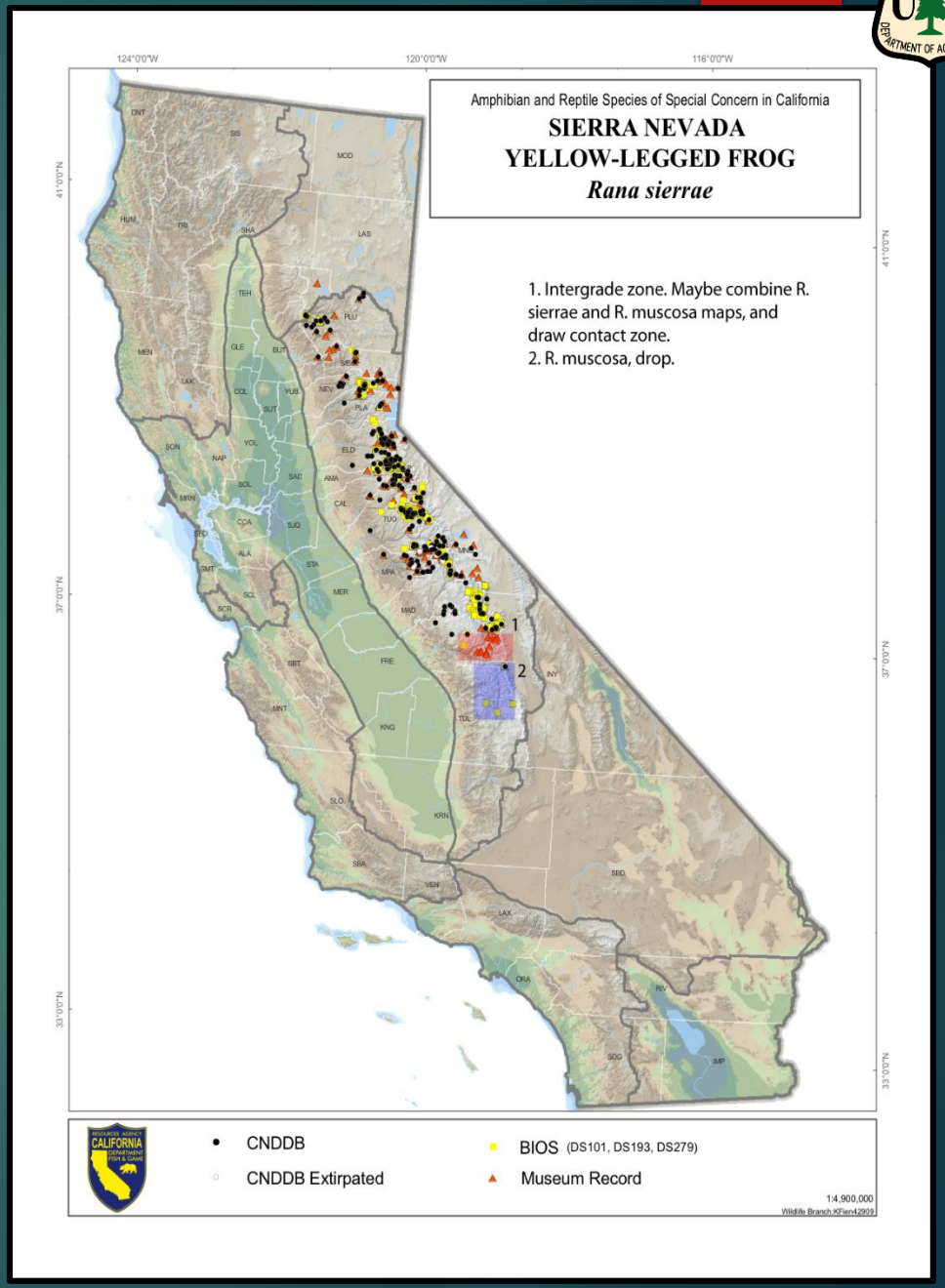
Sierra Nevada Yellow-legged Frog Distribution (*Rana sierrae*)

High elevation species (**ENDEMIC**)

Status: **Endangered**

Declines are attributed to: pesticides, chytridiomycosus, and fish introductions

Highly sensitive to climate change due to changes in wildfire and hydrologic regimes



Audio by G. Nafis

SNYLF Diagnostic Characteristics

- Elevation: 3,500-12,000 feet (above 4,500 in ENF)
- Adults
  - 2-3 inches
  - Lower abdomen/underside of hind legs yellow or orange
  - Dorsal coloration varies from dark to light depending on habitat
- Juveniles
  - Less coloring on their legs
- Egg Masses
  - Up to 300 eggs laid in a globular mass
  - Mass is 1-2 inches in diameter
  - Attached to vegetation or stable bank in aquatic habitats

Photos by ENF Biologists

Yosemite Toad Distribution (*Anaxyrus canorus*)

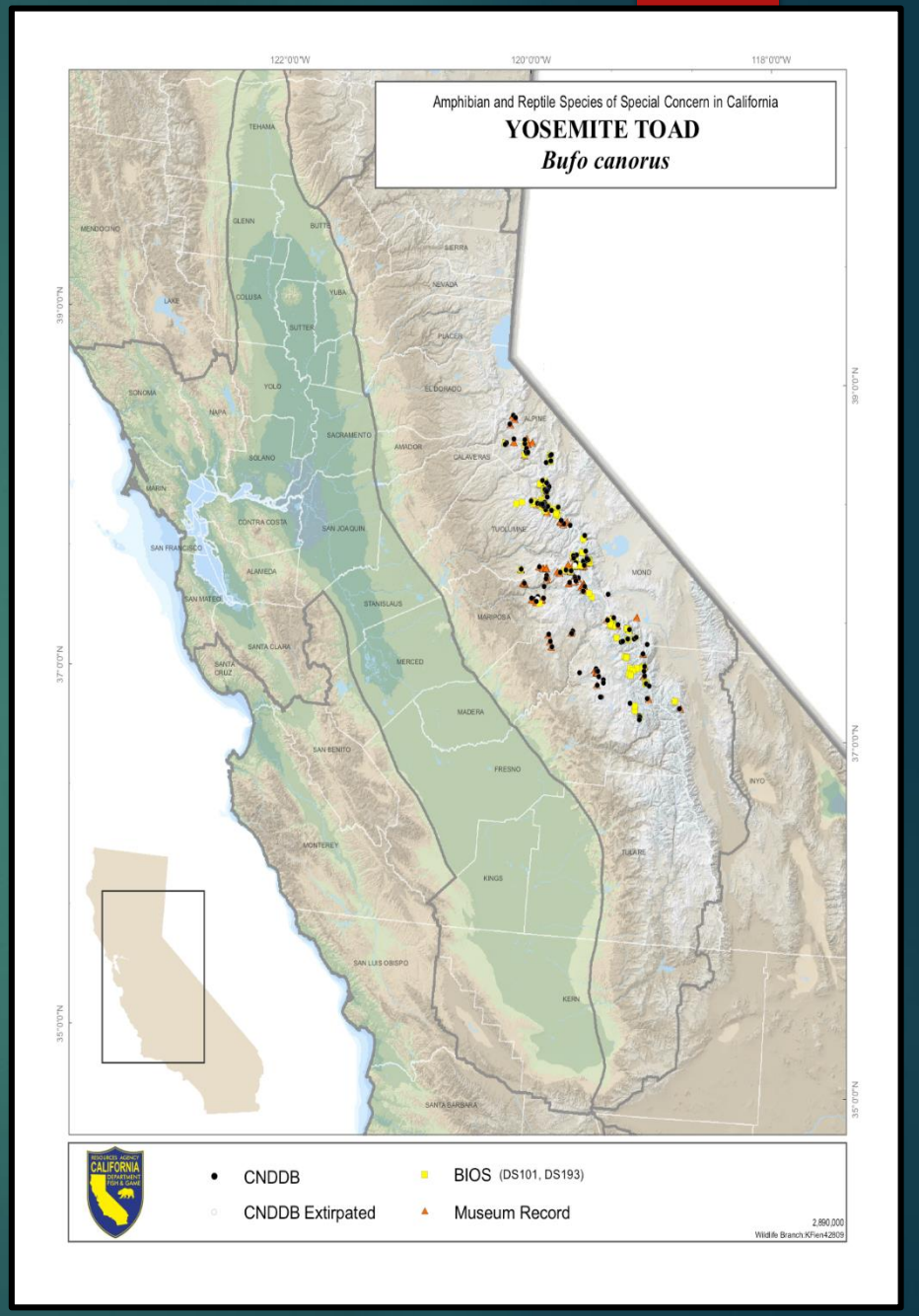
Limited to high alpine meadows in the Sierra Nevada's, relatively narrow elevational zone (**ENDEMIC**)

Status: **Threatened**

Population declines due to drought, predation and disease

Dependent upon ephemeral pools for breeding and therefore susceptible to changing hydrology in the sierra from altered snow loads, and habitat changes

Known to hybridize with Western Toads (*Anaxyrus boreas halophilus*)



* Photo & Audio by G. Nafis

YOTO Diagnostic Characteristics

- Elevation found 4,800-12,000 feet
- Adults
  - 1 ¼ - 2 ¾ inches
  - Parotoid glands are large, flat, and oval
  - Dorsal stripe is faint or absent
  - Sexually dimorphic
- Juvenile
  - No dorsal stripe present, bottom of feet are orange
- Egg Mass
  - Eggs are laid in string formation

Photos ENF Biologist & * G. Nafis

Male

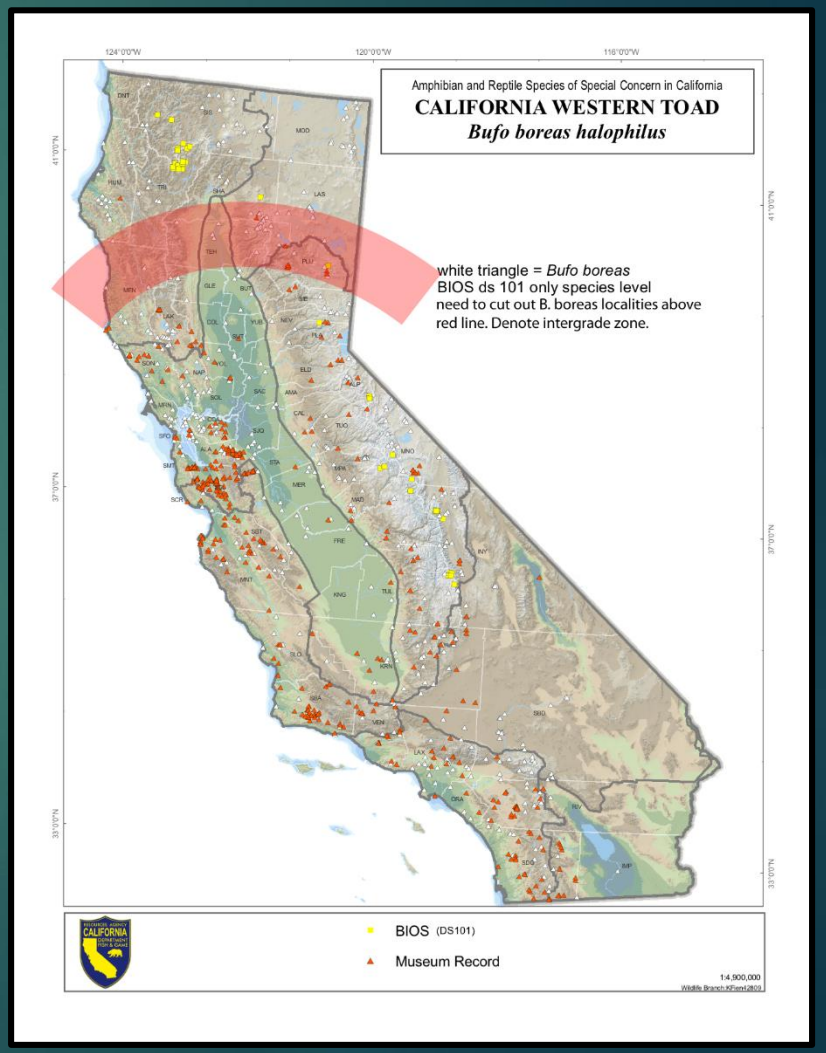
Female

Western Toad

Anaxyrus boreas halophilus

- Large distribution (northern CA to Baja)
- Faint, white dorsal stripe
- Parotoid glands not enlarged
- Egg masses laid in strands
- Adults 2-4 inches

* Photo & Audio by G. Nafis



Toad Comparison

Yosemite Toad

- Faint or no dorsal stripe
- Parotoid glands large & close together

Photo: G Nafis

Western Toad

- Dorsal stripe present
- Parotoid glands small, set far apart

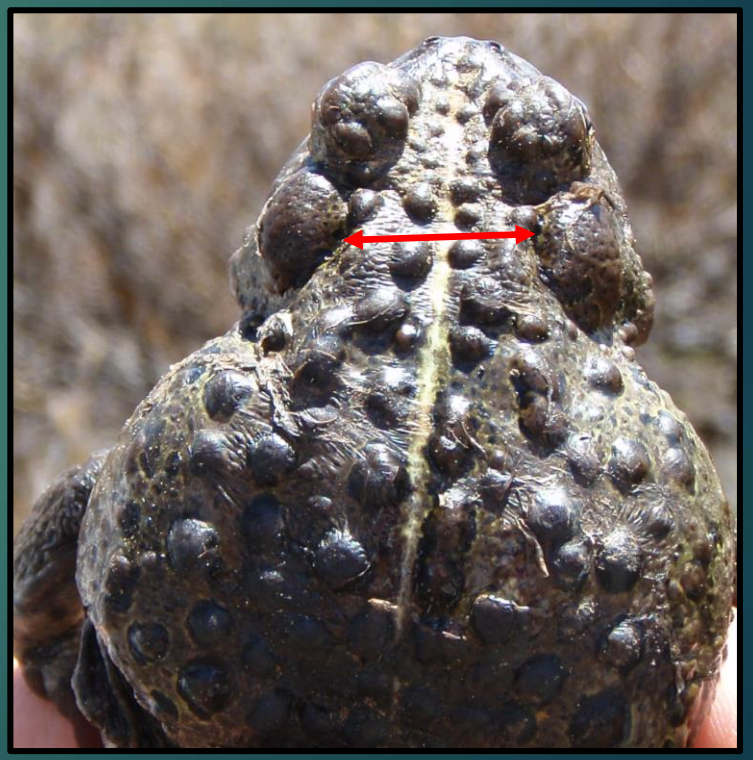
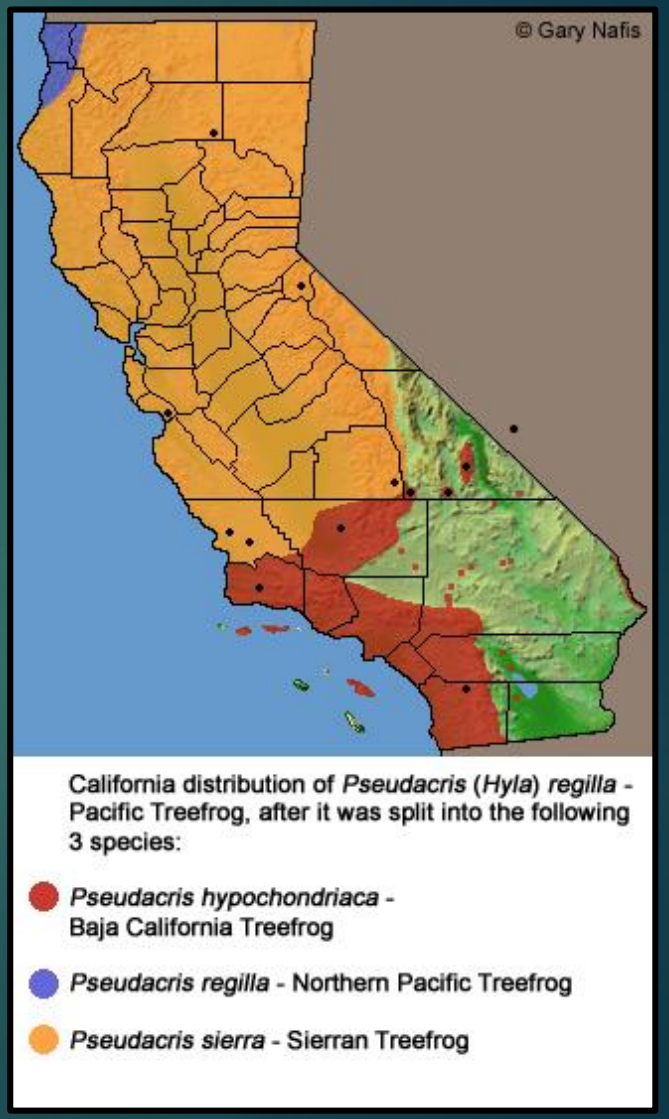


Photo: ENF Biologist

Sierran Treefrog, *Pseudacris sierra*

- Black stripe through eye
- Coloration varies: brown, copper, green, tan etc. and with or without marbling
- Adults are small, < 2 inches
- Very common



* Photo, Map & Audio by G. Nafis

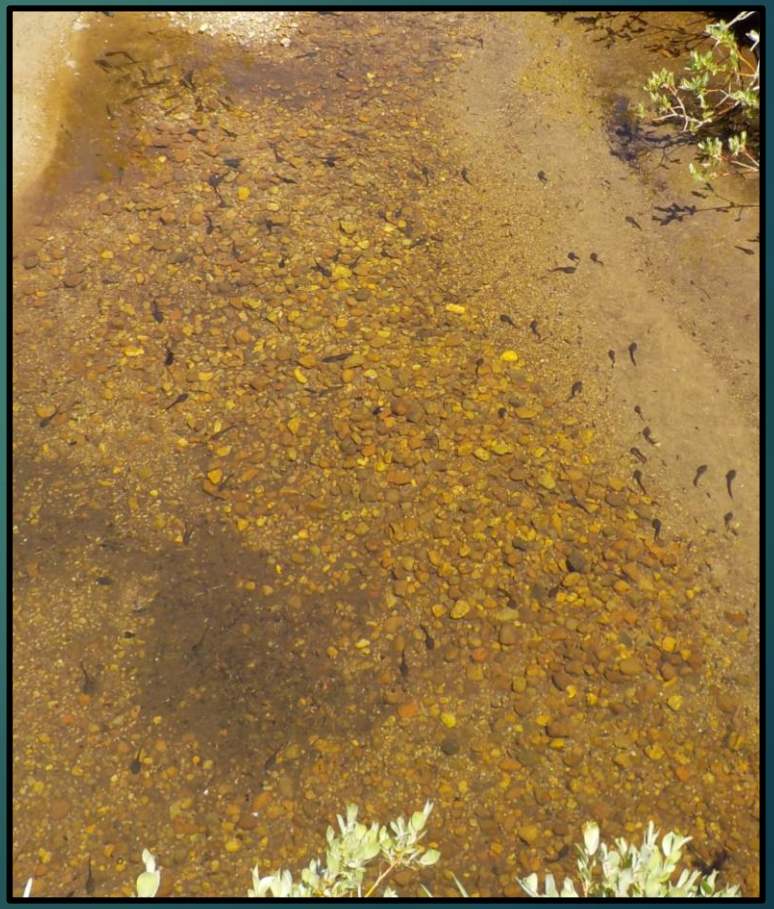
Tadpoles

Photos by ENF biologists

- Presence of tadpoles
  - SNYLF and YOTO tadpoles are large (in comparison) to other tadpoles
    - YOTO tadpoles – dark brown/black, 1.5 inches
    - SNYLF tadpoles – light brown, overwinter, up to 3 inches
  - Photograph (if possible with size reference, or make note of general size)
    - eg. <1 inch, 1-2 inches, etc.

YOTO Tadpoles

SNYLF Tadpoles



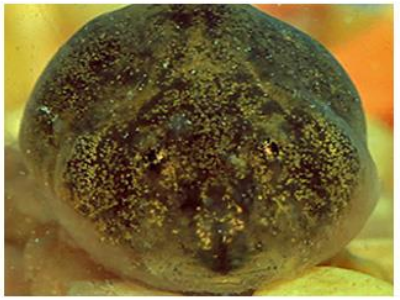
Treefrog vs. Other tadpoles

Rana cascadae - Cascades Frog - Eyes are located on top of the head.

Rana boylii - Foothill Yellow-legged Frog - Eyes are on top of the head.

Pseudacris regilla - Pacific Treefrog - Eyes are at the edge of the head

Treefrog Tadpole (*Pseudacris regilla* group)
Eyes are located at the edges of the head.



Toad Tadpole (*Anaxyrus boreas*)
Eyes are inset from the edges of the head.

Photos Cal Herps

American Bullfrog

Lithobates catesbeianus

- **INVASIVE**
- Removal programs
- Adults
  - 3.5-8 inches
  - Large tympanic membrane
- Tadpoles
  - Speckled
  - Up to 6 inches

Map & Audio G. Nafis

Salamanders & Newts

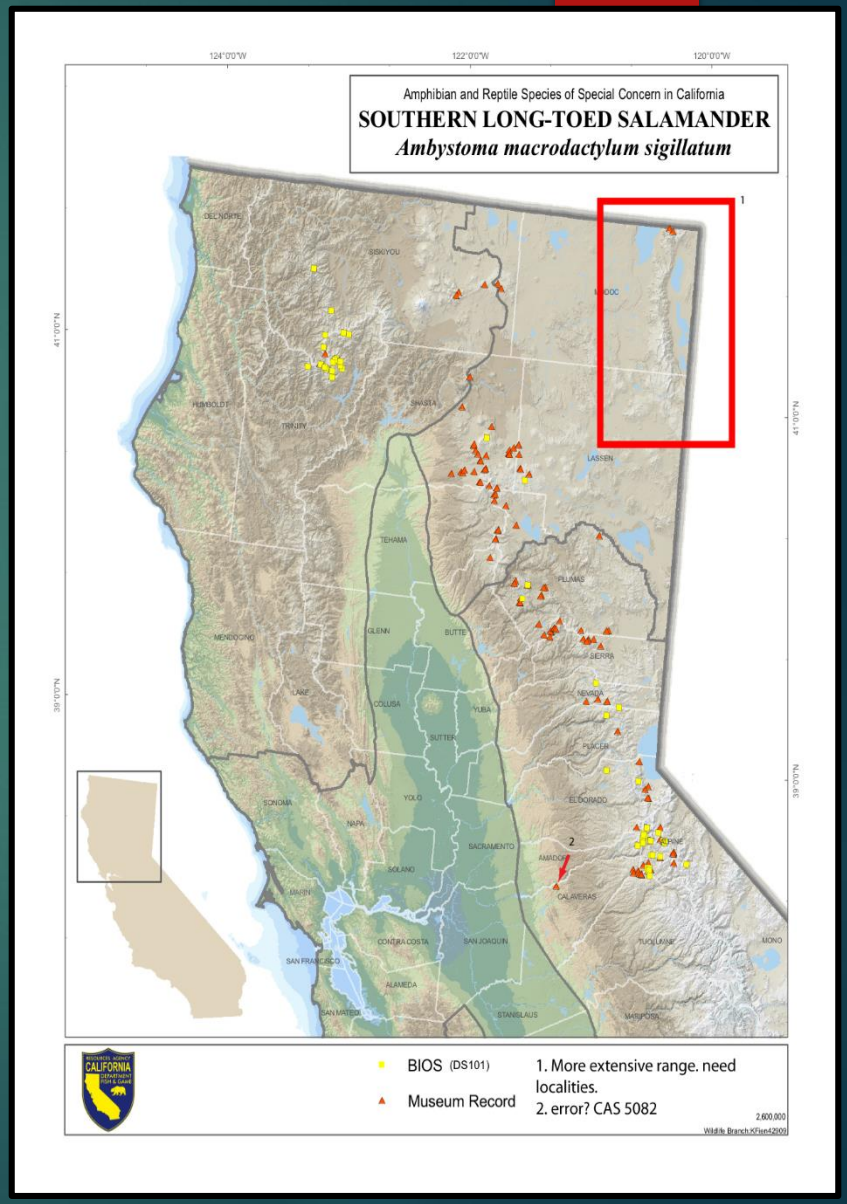
Artwork by Matt Patterson

Long-toed Salamander

Ambystoma macrodactylum sigillatum

- Adults are nocturnal
- Larvae commonly seen in alpine lakes
- 4th digit on hind feet are diagnostic in adult identification
- Fish introduction has impacted habitat range, historically bred in fishless ponds/lakes
- CDFW has ranked this species as a Level 2 Species of Concern

* Photo G. Nafis



LTS Diagnostic Characteristics

- Elevation found up to 10,000 feet
- Adults
  - 1 ½ - 3 ½ inches in length
  - Broad round head, blunt snout, small protuberant eyes
  - Dark base coloration with yellow dorsal stripe with black blotches
- Larvae
  - Aquatic with external filamentous gills
  - Resemble tadpoles, but forelegs develop first in salamanders
- Egg Mass
  - 90-400 eggs in clusters, can be attached to woody debris or unattached on bottom substrate


*


*

Adults are rarely encountered

* Photos G. Nafis

Sierra Newt

Taricha sierrae

Adults are active during breeding season where they are seen migrating to aquatic habitats, stream mainly (**ENDEMIC**)

Poisonous skin secretions are used to repel predators

No threats to *T. sierrae* have been reported, but coastal *Taricha* have been impacted by the introduction of mosquitofish, crayfish, and bullfrogs all which prey on larvae and eggs

Threats to habitat in the form of the destruction of breeding ponds, and sedimentation from wildfires may lead to declines in the future

Non-breeding form

S-Newt Diagnostic Characteristics

- Elevation found to 6,500 feet
- Adults
  - 5-8 inches long
  - Yellowish-brown dorsally, ventral side is orange
  - Skin is rough/grainy
    - Breeding males develop smooth skin, flattened tail for swimming, swollen cloaca, nuptial pad on feet
- Larvae
  - Aquatic, light yellow, with 2 dark narrow bands dorsally
- Egg Mass
  - 7-47 eggs are laid in several spherical masses that are attached to substrate or are free on aquatic substrate

Photos G. Nafis

Breeding Form

Mount Lyell Salamander

Hydromantes platycephalus

- Small, stocky salamander (**ENDEMIC**)
- Webbed feet, short tail aid in climbing
- Flattened head and body
- Grey or brownish, granite rock coloration to aid in camouflage
- Not aquatic

Photo S. Zimmerman

Photo G. Nafis

Snakes & Turtles

Garter Snakes, *Thamnophis* spp.

- Indicators that amphibians may be in the area
- Three species
  - Mountain garter snake (terrestrial)
  - Sierra garter snake (aquatic)
  - Valley garter snake (aquatic)
- Difficult to identify
- Generally found below 8,000 feet
- Adults range in length's of 18-52 inches

Valley garter snake eating a California Red-legged frog (photo J. Maughn)

Mountain Garter Snake
(T. elegans elegans)

- **ENDEMIC**
- No red markings
- 3 light stripes
- Terrestrial

Photo G. Nafis

Sierra Garter Snake
(T. couchii)

- **ENDEMIC**
- Drab coloring
- Faint stripes
- Aquatic

Photos G. Nafis

Valley Garter Snake
(T. sirtalis fitchi)

- **ENDEMIC**
- Yellow dorsal stripe
- Red blotches above lateral stripes

ENF Biologist photo

Photo G. Nafis

Western Pond Turtle

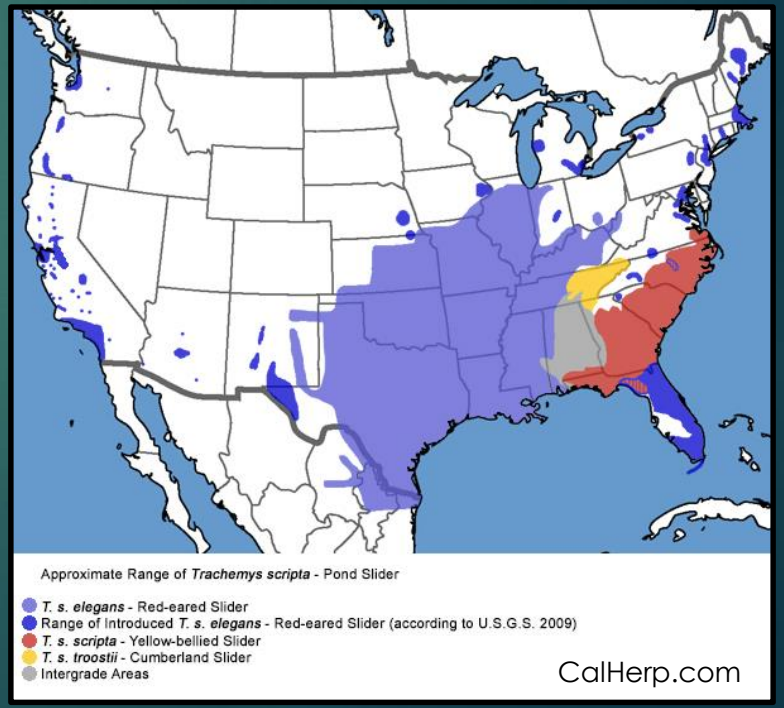
Actineymys marmorata

- Two sub species
  - Northwestern
  - Southwestern
- Primary turtle in CA
- Long neck, with mottled/speckled coloration
- Doro/ventrally flattened

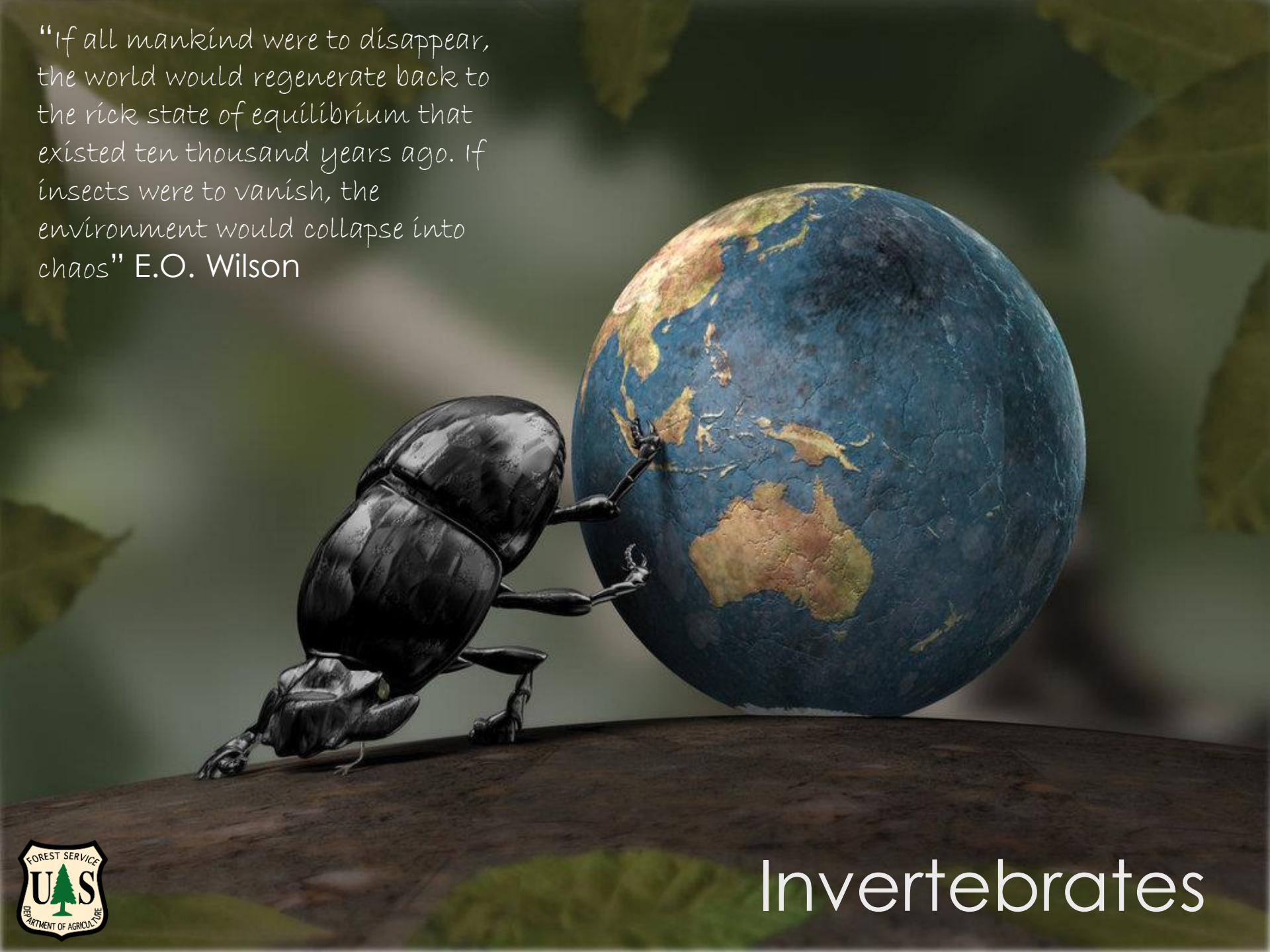
* Photo by G. Nafis

Red-eared Slider

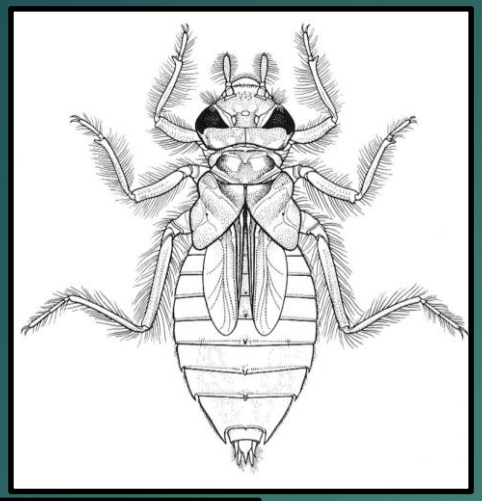
Trachemys scripta elegans

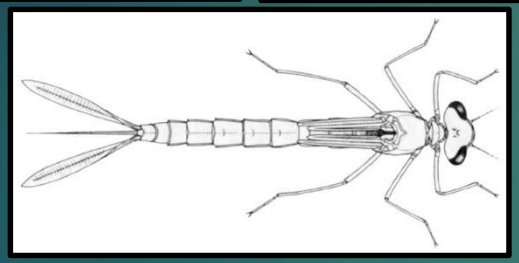


- **INVASIVE**
- Red-ear on sides of head
- Popular pet trade turtle


"If all mankind were to disappear, the world would regenerate back to the rick state of equilibrium that existed ten thousand years ago. If insects were to vanish, the environment would collapse into chaos" E.O. Wilson
FOREST SERVICE
US
DEPARTMENT OF AGRICULTURE
Invertebrates

Aquatic Invertebrates





Odonata "Dragonflies & Damselflies"

Hemiptera
Belostomatide
"Toe Biter"

Corixidae "Water boatmen"

Coleoptera "Beetles"
Predaceous Water Beetle (*Cybister* sp.) Adult & Larvae

Notonectidae "Back Swimmer"

Fairy Shrimp

Order Anostraca

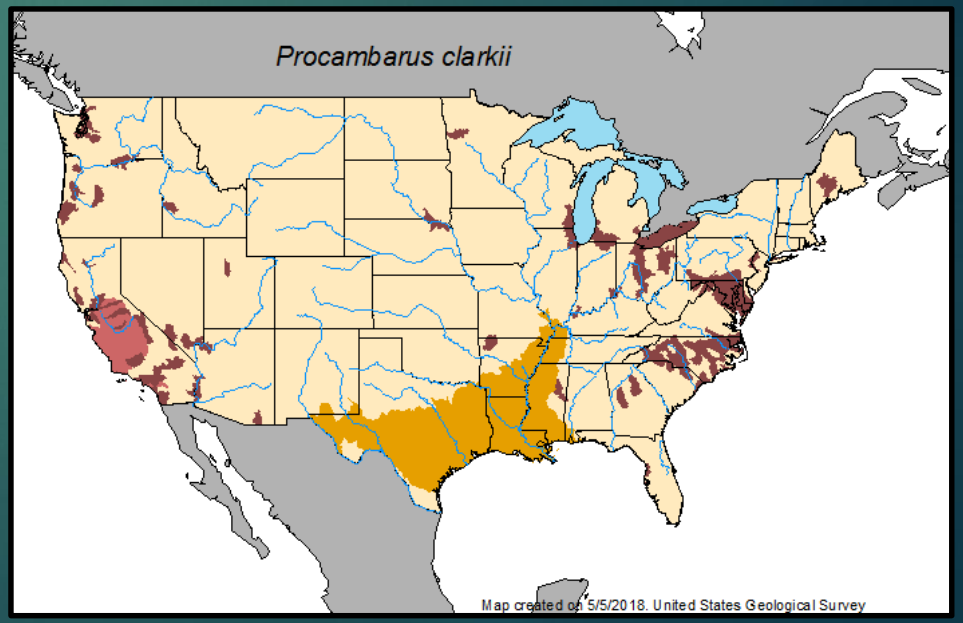
- Live in vernal pools
- Swim upside down
- Filter feeders or Scrapers
- 6-25 mm (<1 inch) length
- Some can have green, blue, red coloring

Photo iNaturalist

Red Swamp Crayfish

Procambarus clarkii

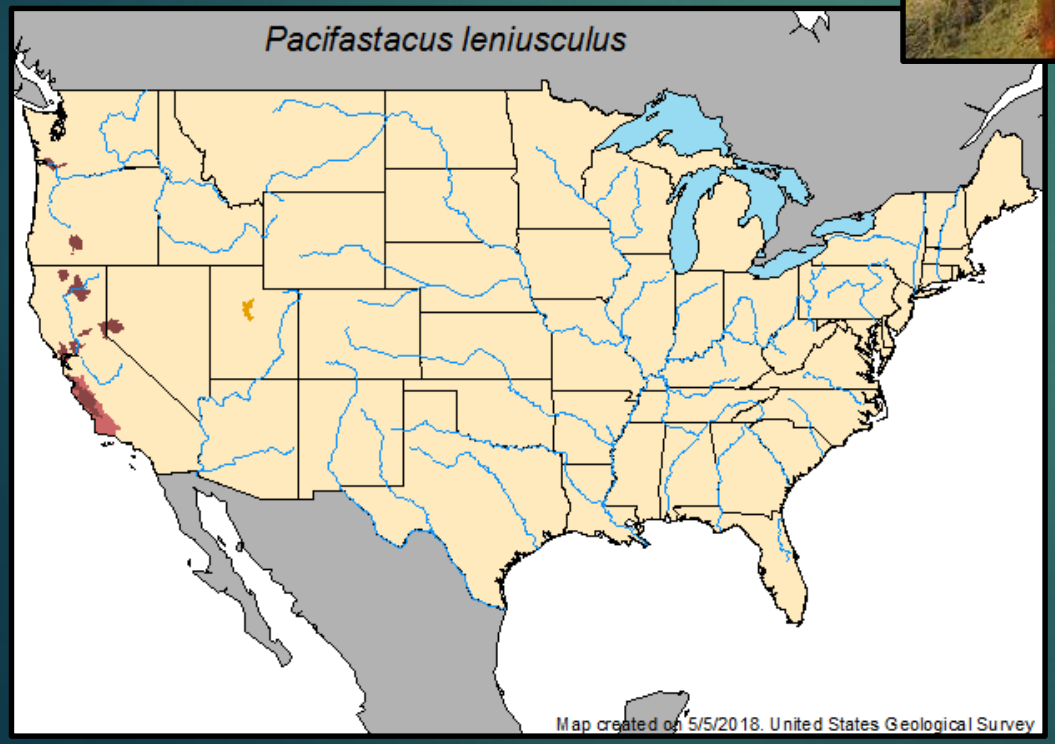
- **INVASIVE**
- Feed upon larvae & juveniles of native fish and amphibians
- Introduced as food source, bait, pet trade
- Adults red to brown
- Juveniles grey



Signal Crayfish

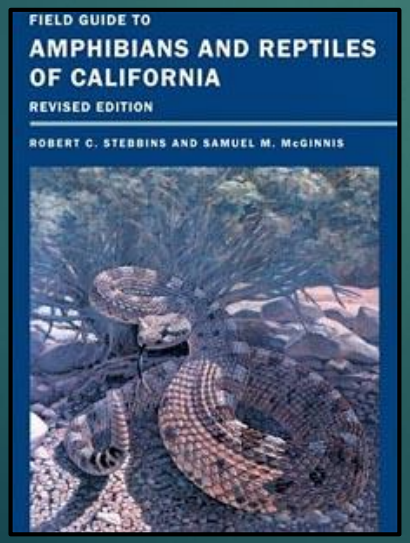
Pacifastacus leniusculus

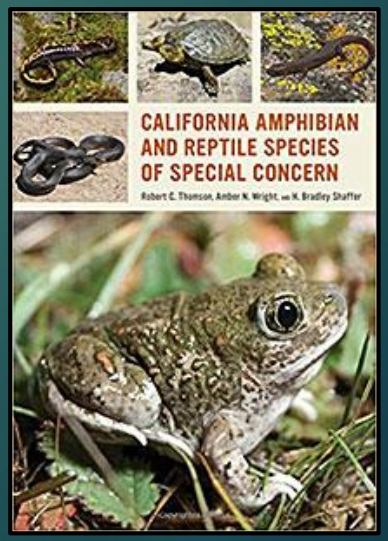
- Introduced in CA in 1912 (**INVASIVE**)
- Due to its opportunistic feeding habits it can impact macroinvertebrates, benthic fish, and aquatic plants.
- Lake Tahoe, Lower Sacramento, Truckee, Upper Bear drainages have reporting's – total of 11 drainages in CA occupied



Helpful Resources & Tools

- Resources
  - CaliforniaHerps.com
  - Books
    - *Field Guide to Amphibians and Reptiles of California* by Stebbins & McGinnis (2012)
    - *California Amphibian and Reptile Species of Special Concern* by Thomson, Wright, and Shaffer (2016)
    - *A Field Guide to Snakes of California* by Gulf Coast Publishing (1997)
- Tools
  - Binoculars
- Northern California Herpetological Society





Questions?

Acknowledgements

- Intro slide: Roland Knapp http://knapplab.msi.ucsb.edu/research/research.html
- Slide 2 Artwork: https://www.amazon.com/Muzagroo-Art-Painting-Stretched-Decoration/dp/B00VDVHEF4
- Slide 3 Frog protection: https://www.redbubble.com/people/gokingsgo/works/11906781-frog-protection-fraud-protection?p=sticker
- Slide 4:
  - SNYLF - http://amphibiancare.com/gallery/the-sierra-nevada-and-california/,
  - YOTO - http://www.californiaherps.com/frogs/images/acanorusac7114.jpg
  - LTSM- https://www.youtube.com/watch?v=neBoP33mU3w
  - SNEWT- http://www.californiaherps.com/salamanders/images/ttsierraehh.jpg
- Slide 5
  - Frog: http://www.rubicon4wheeler.com/2013/11/saving-sierra-nevada-from-frogs-and.html
  - Map: ARSSC http://arssc.ucdavis.edu/species/species/frogs.html
  - Info: ARSSC http://arssc.ucdavis.edu/species/species/frogs.html
- Slide 8
  - All other photos are from ENF biologists
  - Male YOTO (http://www.californiaherps.com/frogs/images/bcanorusep706.jpg).
- Slide 10
  - Map: http://arssc.ucdavis.edu/maps/A_m_sigillatum.png
  - Adult: https://www.youtube.com/watch?v=neBoP33mU3w
  - Toes: http://www.californiaherps.com/salamanders/images/amsigillatumtoe.jpg
- Slide 11
  - Adults http://www.californiaherps.com/salamanders/images/amsigillatumx2.jpg
  - Eggs: http://www.californiaherps.com/noncal/northwest/nwsalamanders/images/ammacrodactylumeggswa055.jpg
  - Larvae: Flickr Martin Dollenkamp
- Slide 12
  - Map: http://www.californiaherps.com/salamanders/maps/tsierraemap.jpg
  - Adult - https://hiveminer.com/Tags/salamander%2Ctetrodotoxin/Recent
- Slide 13
  - Larvae: http://www.californiaherps.com/salamanders/images/tsierraelarva7112.jpg
  - Adult: http://www.californiaherps.com/salamanders/images/tsierraebu308.jpg, http://www.californiaherps.com/salamanders/images/tsierraebu3082.jpg
  - Egg; http://www.californiaherps.com/salamanders/images/ttsierrafr311eggs.jpg
- Slide 14 badge logo http://www.creativspark.com/works_branding.phpSlide
- Slide 16
  - Map http://www.californiaherps.com/frogs/maps/lcatesbeianusmap2.jpg
  - Adult https://nature.mdc.mo.gov/discover-nature/field-guide/american-bullfrog
  - Tadpole https://www.sdherps.org/species/rana_catesbeiana
- Slide 17
  - Treefrog: http://www.naherp.com/photo.php?v_id=75296, http://www.californiaherps.com/frogs/images/pregillasm308.jpg
  - Map: http://www.californiaherps.com/frogs/pages/p.sierra.html
- Slide 18
  - Map: http://arssc.ucdavis.edu/maps/B_b_halophilus.png
  - Adult: http://www.californiaherps.com/frogs/images/abhalophilusdorsalstripe307.jpg
  - Egg Mass: ENF ppt photo
- Slide 21
  - Map: http://www.californiaherps.com/snakes/maps/telegansmap.jpg, Photo: http://www.californiaherps.com/snakes/images/teeleganspl411.jpg
- Slide 22
  - Map: http://www.californiaherps.com/snakes/maps/tcouchiimap.jpg. Photo: http://www.californiaherps.com/snakes/images/tcouchiirp711.jpg, http://www.californiaherps.com/snakes/images/tcouchiitroutedgr612.jpg
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  - Map: http://www.californiaherps.com/snakes/maps/tsirtalismap.jpg; Photo: http://www.californiaherps.com/snakes/images/tsfitchifik.jpg

- Photo Permissions were given by Gary Nafis (California Herps) and David Littschwager to be used for educational purposes only.