

Boreal Toads in the Upper Arkansas River Basin



ALEX JOUNEY

SE NATIVE AQUATIC SPECIES BIOLOGIST

Background

- ▶ Boreal Toads (*Anaxyrus boreas*) are Colorado's only alpine species of toad
- ▶ Once very common in the mountains of Colorado
 - ▶ Extremely scarce these days – Chytrid Fungus
- ▶ Listed as State Endangered in 1993
- ▶ Chaffee County represents one of the last strongholds for these Toads
 - ▶ Many breeding sites are disappearing though



Natural / Life History

- ▶ Occupy habitat between 7,500 -12,500 ft
 - ▶ Occupy upland habitat for ~ 80% of their life
- ▶ Breeding occurs in early spring (May-June)
- ▶ Marshes, wet meadows, stream backwaters, beaver ponds, and shallow lake/pond margins all represent quality toad breeding habitat
- ▶ Overwintering
 - ▶ Rodent burrows, beaver lodges, slash piles, rock chambers, places that are insulated and moist
- ▶ Adult diet consists of a variety of invertebrates
 - ▶ Tadpoles feed on vegetation



Breeding

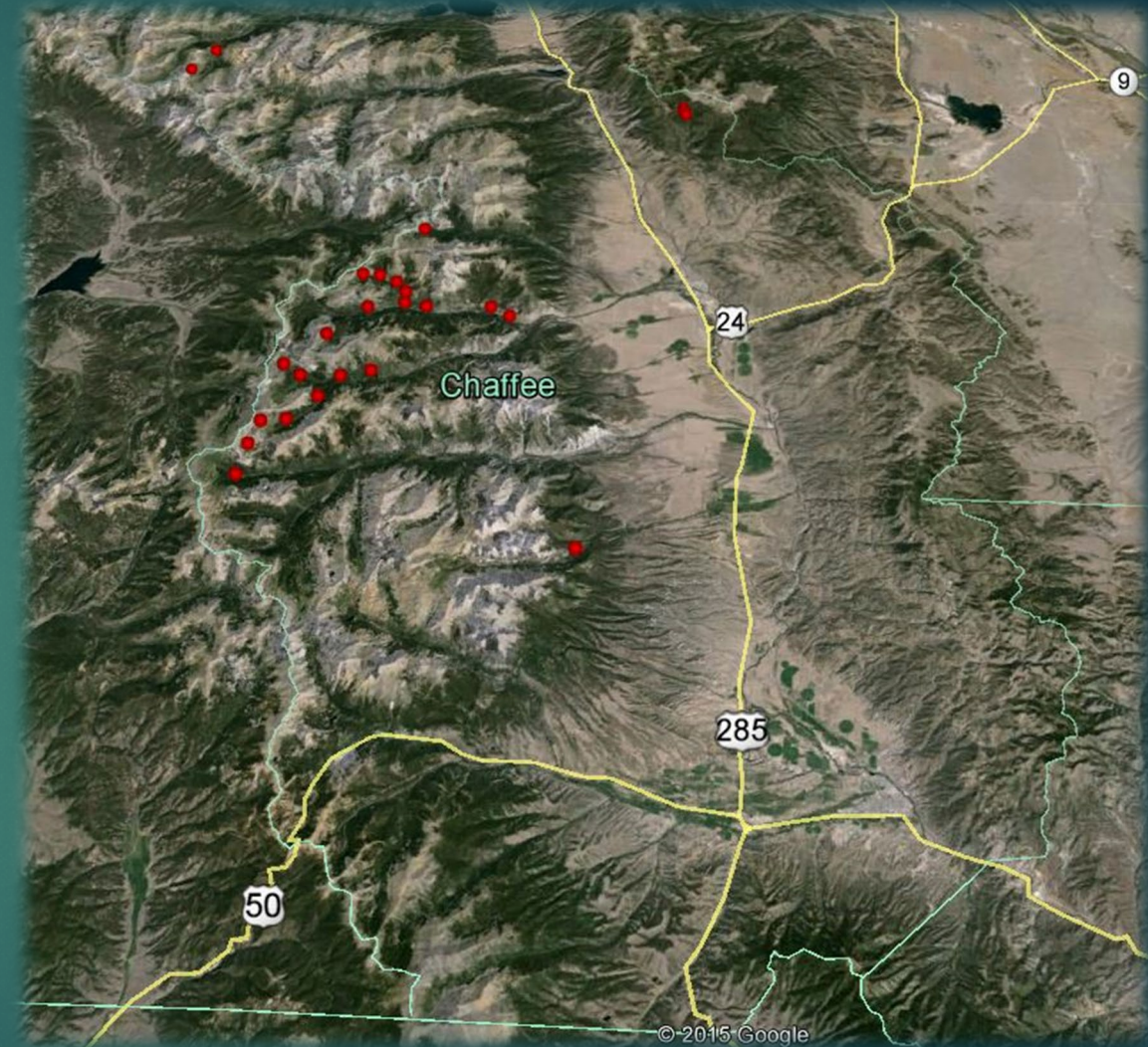
- ▶ Males typically return to communal breeding pools every year (Mature at 4)
- ▶ Females will reproduce every 2-5 years (Mature at 6)
- ▶ Eggs are laid in shallow water with dark substrate
 - ▶ Single strand of eggs laid by female
 - ▶ Male fertilizes those eggs as they are released (Amplexus)
- ▶ Tadpoles are jet black and often found in shallow pond margins during June and July
- ▶ Metamorphosis typically occurs in July/August
 - ▶ Juvenile toads tend to associate with their natal wetland for the rest of the season until overwintering



Photo: Liz Krone, CPW

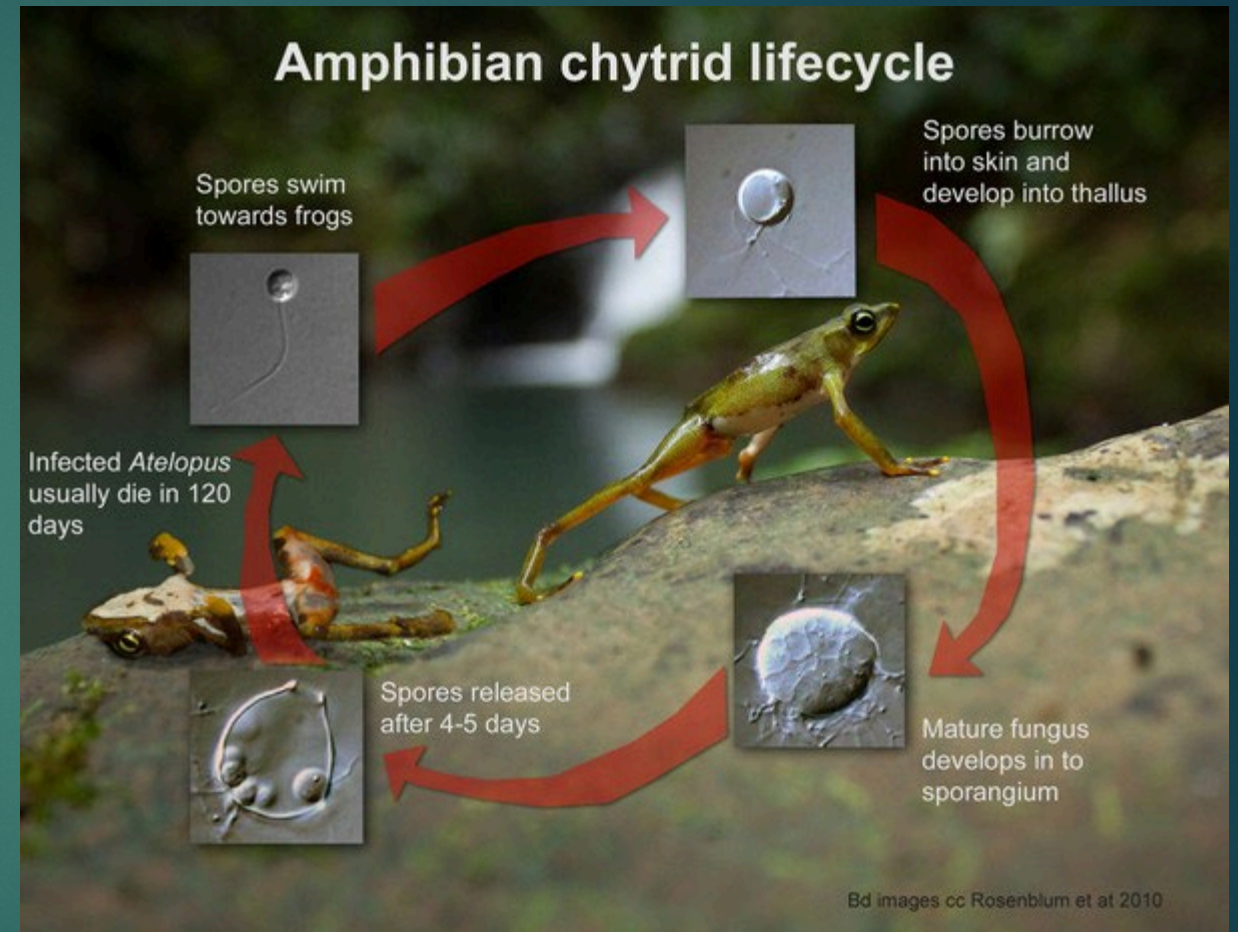
Historical Range

- ▶ Pre 1990s Toads were extremely common in Chaffee and Lake Counties (and around the state)
- ▶ Middle and South Cottonwood Creek
- ▶ Other sites throughout the Collegiate Peaks
- ▶ 29 Active Sites in the Ark Valley into early 2000s



Chytrid Fungus

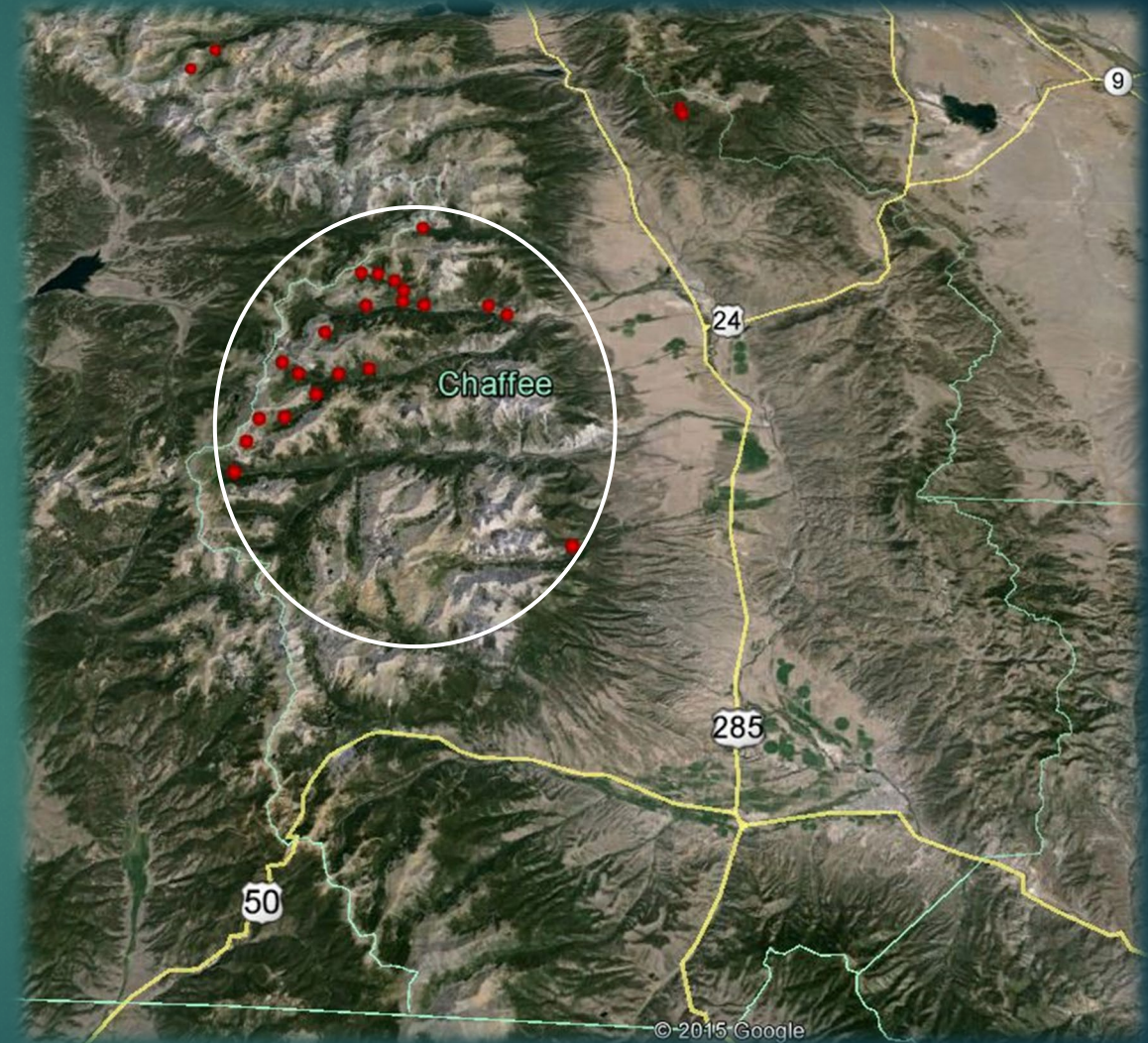
- ▶ Chytridiomycosis is an infectious fungal disease that can be fatal to amphibians
- ▶ Caused by two species of fungus native to Southern Asia
 - ▶ *Batrachochytrium dendrobatidis* and *Batrachochytrium Salamandrivorans*
 - ▶ *Bd* and *Bsal*
- ▶ These fungi have caused an epidemic among amphibian populations around the world
- ▶ Symptoms: Excessive shedding of skin, lethargy, imbalance, inability to regulate water and electrolytes in skin
 - ▶ Leads to heart failure in many cases



Brian Gatwicke – Amphibian Rescue and Conservation Project

Current Range

- ▶ Bd arrived in the Collegiate Peaks in 2013 and by 2018 spread to most of the breeding sites
- ▶ Unfortunately since 2013 most of these sites have been lost or have seen greatly reduced numbers
- ▶ Current Focus: More reintroductions, and finding other populations we may not know about
 - ▶ Testing all toads for Bd



Management

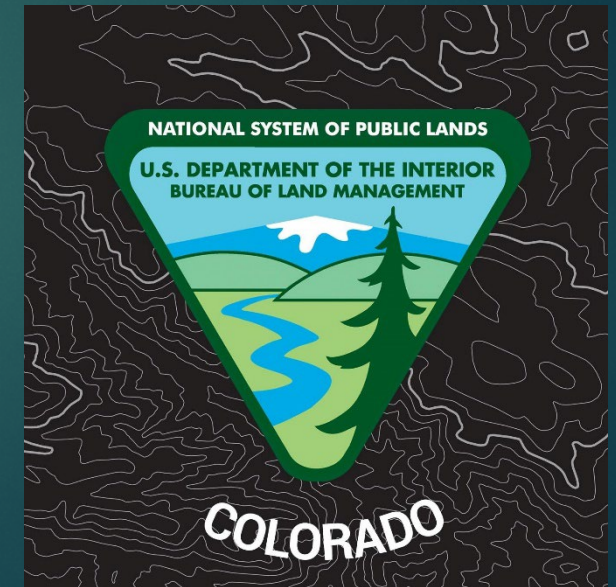
- ▶ Team Effort – Ark Basin Toad Team
- ▶ CPW
 - ▶ Focus on Boreal Toad reintroduction projects and exploratory sampling for new populations
 - ▶ Some breeding site monitoring
- ▶ CNHP
 - ▶ Breeding site monitoring
 - ▶ Exploratory sampling
 - ▶ Reintroduction Assistance
- ▶ USFS
 - ▶ Breeding site monitoring
 - ▶ Sampling / reintroduction assistance
- ▶ BLM
 - ▶ Breeding site monitoring
 - ▶ Sampling / reintroduction assistance



LIVE LIFE
OUTSIDE



Colorado Natural Heritage Program



Denver Zoo Role

- ▶ Captive Breeding Program
 - ▶ Hugely successful in the first few years
- ▶ Community Science
 - ▶ Aids biologists in monitoring breeding sites and scouting reintroduction areas
- ▶ Denver Zoo has been invaluable to our work the last few years and we look forward to continuing to work with them in the future!



Photo: Denver Zoo Webpage

Reintroductions in the Arkansas River Valley

- ▶ Active Reintroductions

- ▶ Titan Lake – Near Leadville

- ▶ Represents our first successful overwintering reintroduction in the Arkansas Basin!
 - ▶ Stocking effort will continue here for the next 4-5 years

- ▶ Brown's Creek – Near Buena Vista

- ▶ Multiple Reintroductions over the last 7 years

- ▶ No overwintering observed
 - ▶ Hopeful for the future
 - ▶ Metamorph stocking, and moving up the drainage to potentially better habitat

- ▶ More reintroductions to occur in the next few years

Reintroduction Site Considerations

- ▶ General Considerations
 - ▶ Unoccupied by Boreal Toads, or other amphibians
 - ▶ Bd Negative
 - ▶ Accessibility – has to be realistic for monitoring considerations
 - ▶ Within historically inhabited mountain ranges
 - ▶ Predator presence / abundance
 - ▶ No water quality concerns
 - ▶ pH, heavy metals, organic toxins, etc...



Photo: Melissa Butynski - CPW

Reintroduction Site Considerations

▶ Habitat Considerations

- ▶ Still water pond
- ▶ Gradual sloping shallows (1-12")
- ▶ Open, sunny, sparsely vegetated shorelines
- ▶ Aquatic vegetation forage
- ▶ Hydroperiod – May 1 → September 30
- ▶ Water Temperature
 - ▶ 11-16 C during breeding season
 - ▶ > 18 C during tadpole development
- ▶ Distance to upland forage and potential hibernacula – Ideally ¼ mile
 - ▶ Forage - Wet meadows
 - ▶ Hibernacula – Rodent burrows, downed wood, scree, slash piles etc...

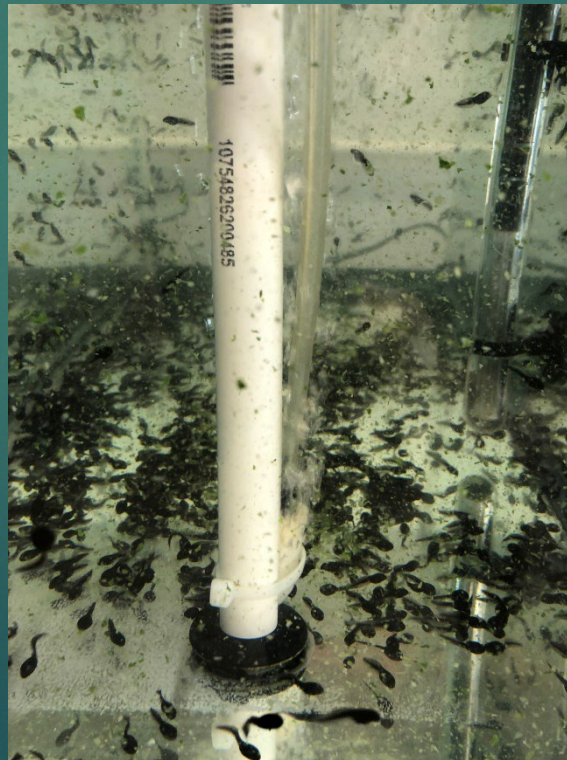


Sayre's Gulch

Eggs → Tadpoles → Toad Reintroduction

- ▶ Wild egg collection takes place at the nearest breeding site
 - ▶ Typically about 12in segments of multiple egg masses
 - ▶ These eggs have been shown to have the highest rate of success
 - ▶ Denver Zoo captive breeding program
 - ▶ NASRF captive breeding program
- ▶ Eggs are reared at hatcheries until late Gosner stages
 - ▶ Hind legs developed with digits
- ▶ Transported to the trailhead and packed into the site





Background

- ▶ 2012 Visit to West Tennessee Lakes searching for Boreal Toad Habitat
 - ▶ Part of randomized habitat surveys
 - ▶ Noticed great habitat below
- ▶ Consulted with Jeni Windorski (FS) and Greg Policky (CPW)
 - ▶ Scott and Brad (CNHP)
 - ▶ Ark Basin Toad Team
- ▶ Huge amount of interagency cooperation!



Background

- ▶ Six surveys from 2008-2020 – No Toads Observed
- ▶ Close to Longs Gulch breeding site – Discovered in 2019
 - ▶ Reintroduction at Titan could provide greater genetic diversity to this area
- ▶ Oct 2020 – Field survey to locate potential stocking sites in upper Tennessee creek basin
 - ▶ Titan and Dollywood ponds
- ▶ Nearest Neighbor
 - ▶ East Fork Homestake Creek*
 - ▶ Longs Gulch not viable for egg take





2021

- ▶ Collaborative effort between CPW, USFS, and CNHP
- ▶ June 11, 2021 – eggs collected from E. Fork Homestake Creek and transported to NASRF
- ▶ Tadpoles reared for 7 weeks to Gosner-37 (hind legs w/ digits)
- ▶ July 27th – 1,861 Tadpoles delivered to Trailhead
 - ▶ Loaded into bags and hiked 4.5 miles in
 - ▶ Tempered and released



Eggs being collected by Kira Paik at Homestake Creek



Devin Crowder receiving BOR eggs at NASRF



July 27th stocking at Titan Lake

2021

- ▶ Weekly Monitoring until late September



2022

- ▶ Overwintering Success!
 - ▶ First successful overwintering in SE Region
- ▶ Eggs collected from East Fork Homestake Creek by Forest Service
 - ▶ Reared at NASRF to Gosner-40
- ▶ July 19, 2022 – NASRF delivered 10,570 tadpoles to the trailhead
 - ▶ 41 Hikers hit the trail with bags of tadpoles
 - ▶ Tempered and released



Devin Crowder, Alex Townsend, and Chalk Cliffs Hatchery Technicians bag up toads at the trailhead



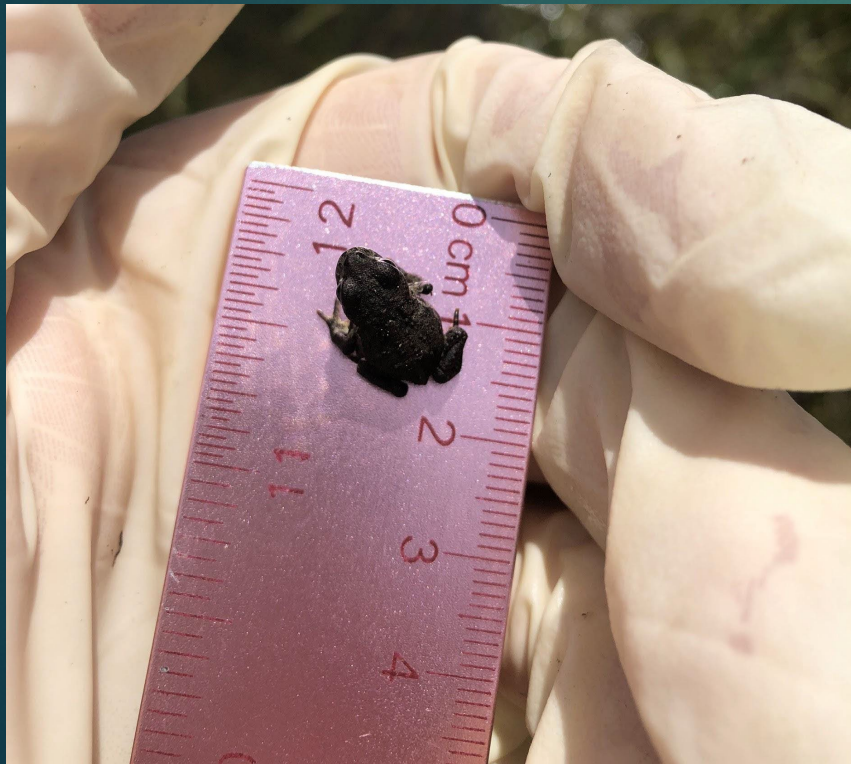
Paul addresses all of the hikers before they depart



Hikers tempering toads upon arrival to Titan Lake

2022

▶ Weekly monitoring
until late September



Looking Ahead – 2023 and Beyond

- ▶ Roll out a robust post-reintroduction monitoring program
- ▶ Shift to action based approach
 - ▶ More toads on the landscape!
- ▶ Titan Lake and W. Tennessee Drainage
 - ▶ Big survey effort in 2023 prior to stocking
 - ▶ Weekly check-ins post stocking
 - ▶ Stocking efforts will continue for 2-3 more years before reassessment
- ▶ Browns Creek
 - ▶ Another big survey effort planned for 2023 to determine stocking success
 - ▶ Four years and no documented overwintering...
 - ▶ Stocked metamorphs instead of tadpoles in 2022
 - ▶ Potential to move stocking efforts to the upper part of the drainage
 - ▶ 2022 Sentinel Toad was Bd Negative

What can you do?

- ▶ Zoo Program
- ▶ Decontaminate all of your gear
- ▶ Avoid sensitive toad habitat and watch your step
- ▶ Camp away from potential breeding areas
- ▶ Don't touch adults, tadpoles, or juveniles
- ▶ Report any sightings to CPW



Acknowledgements

- ▶ Arkansas Basin Toad Team
 - ▶ Paul Foutz and Alex Townsend – CPW
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 - ▶ Jeni Windorski, Stephanie Shively, Janelle Valladares, Kristen Meyer – USFS
 - ▶ Aaron Richter – BLM
 - ▶ Buffy Lenth – CCC
- ▶ Denver Zoo Program

Questions?

