

CITIZEN SCIENCE + AMPHIBIAN INFECTIOUS DISEASE!

JESSA L. WATTERS

DR. CAMERON D. SILER



Sam Noble Museum





REPTILES VS. AMPHIBIANS



Reptiles:

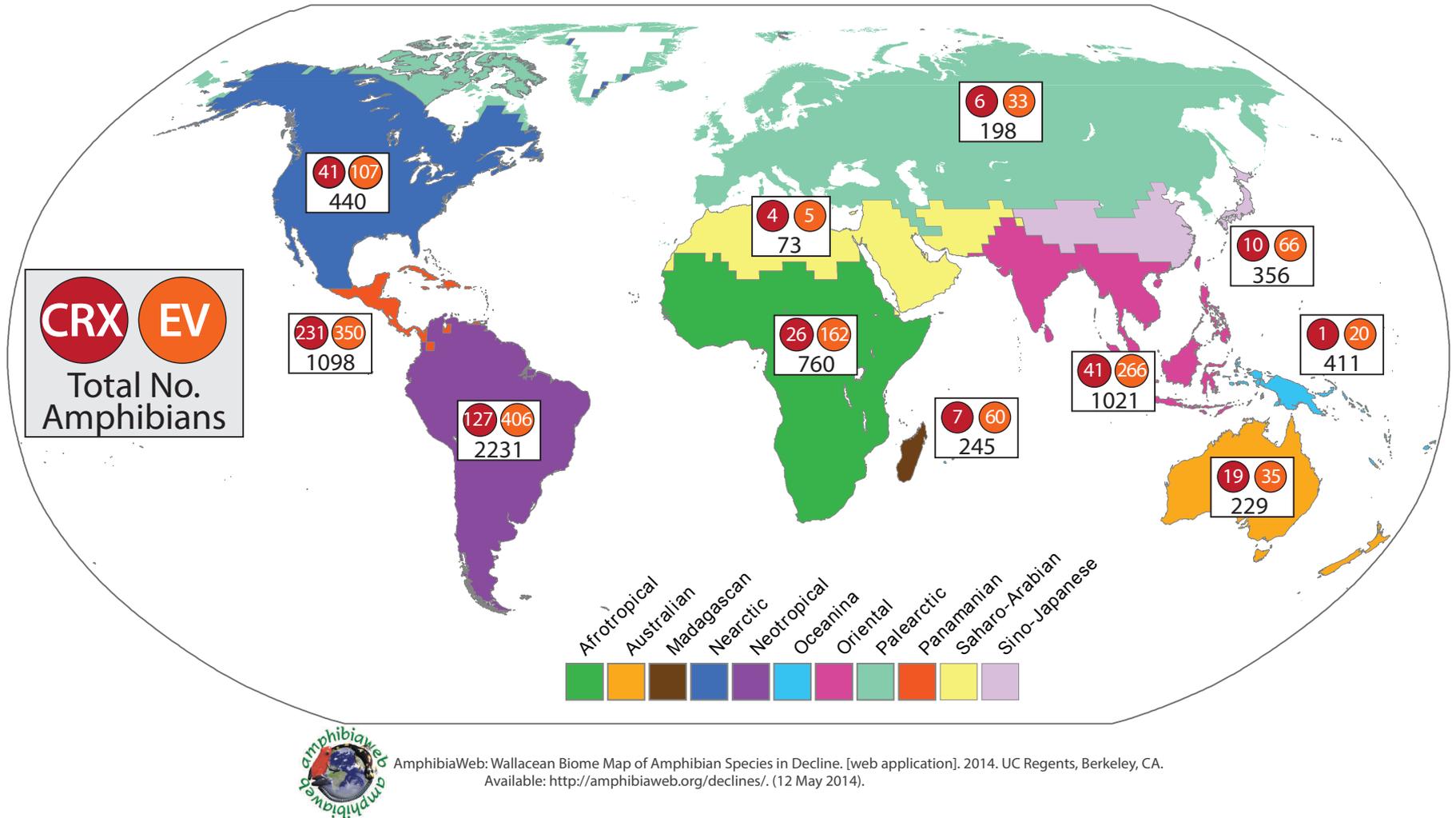
- Dry, scaly skin
- Lay hard-shelled or leathery eggs
- Breathe via lungs only
- Undergo no metamorphosis
- Examples: turtles, snakes, lizards, crocodilians

Amphibians:

- Smooth, moist, mucous-covered skin
- Lay soft, jelly-like eggs
- Breathe via gills, lungs, or through their skin
- Often go through metamorphosis
- Examples: salamanders, frogs, toads, caecilians

HERPETOLOGY = the study of reptiles and amphibians

GLOBAL AMPHIBIAN DECLINE



CRX = Critically Endangered or Extinct; EV = Endangered or Vulnerable

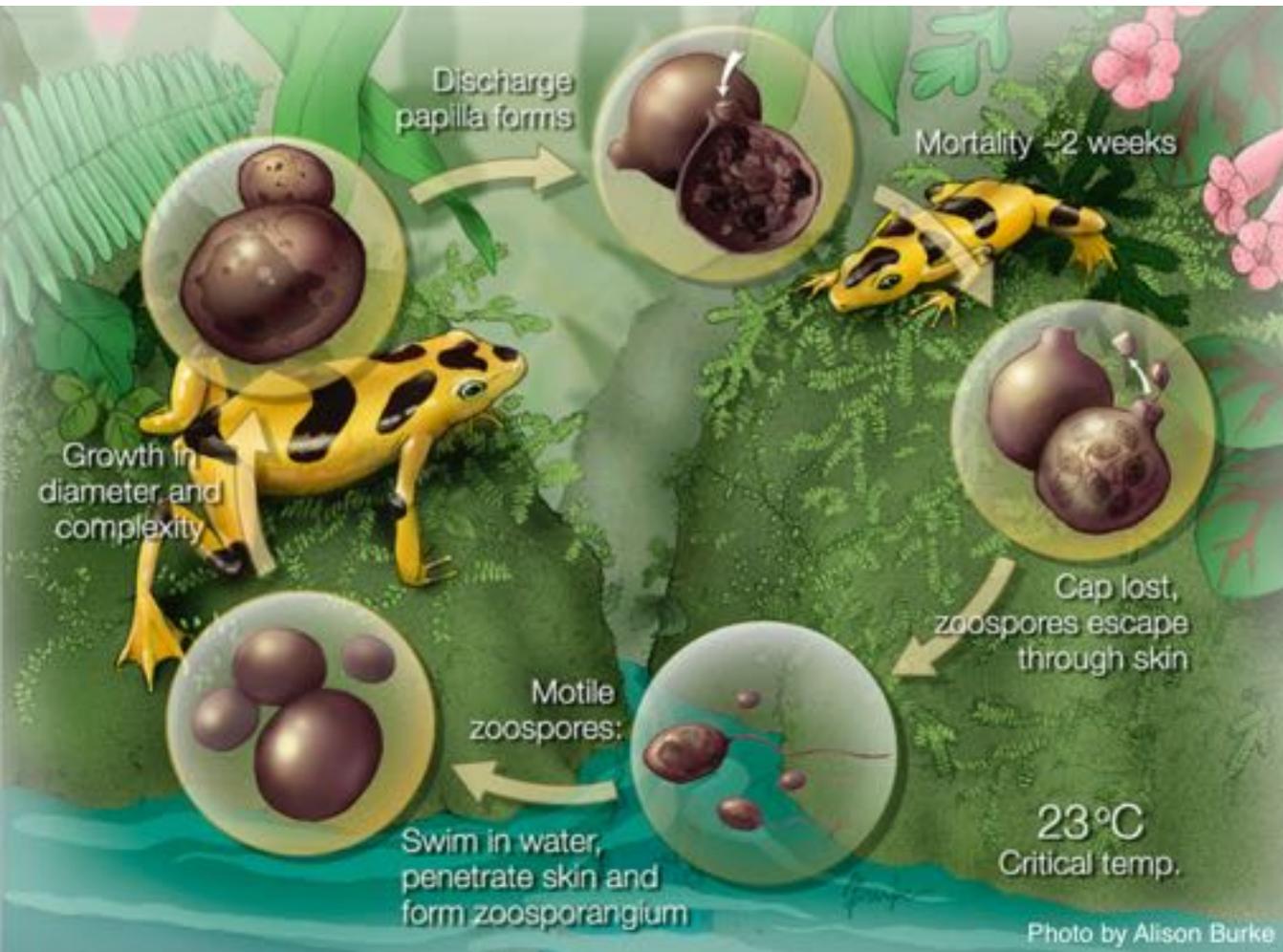
GLOBAL AMPHIBIAN DECLINE

Causes for decline:

- Habitat loss or modification
- Over-exploitation: pet trade and food
- Disease: Chytridiomycosis (chytrid; *Bd* or *Bs*) and Ranaviruses
- Environmental Pollutants
 - With an aquatic-based life cycle, amphibians are vulnerable to water contaminants at all life-stages.
 - Pesticides, heavy metals, acids, nitrogen
- Introduced Species
- Climate Change
 - Changes in breeding season of themselves or prey
 - Differing effects of disease
 - Drying out

SYNERGY!!!!

CHYTRID FUNGUS



- Fungal infection
- Affects skin and mouthparts
- Can be spread through direct contact or through contaminated water
- Can be test with a skin swab

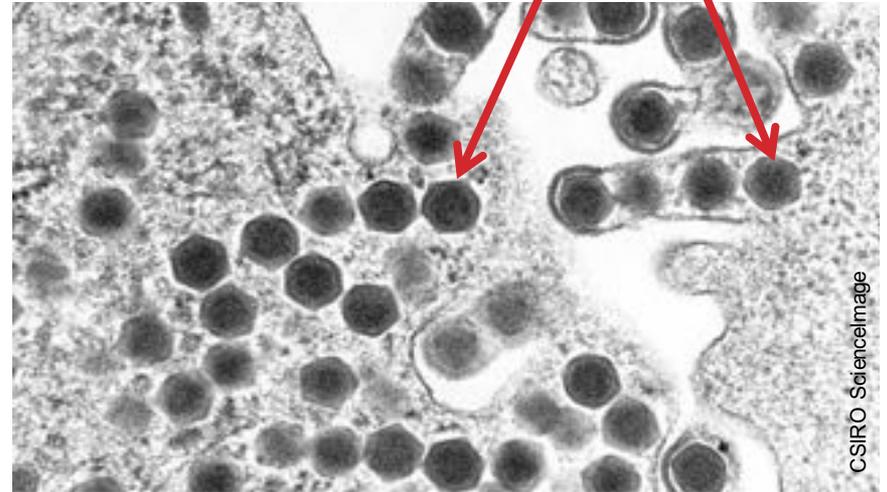
Batrachochytrium dendrobatidis (Bd)
Batrachochytrium salamandrivorans (Bsal)



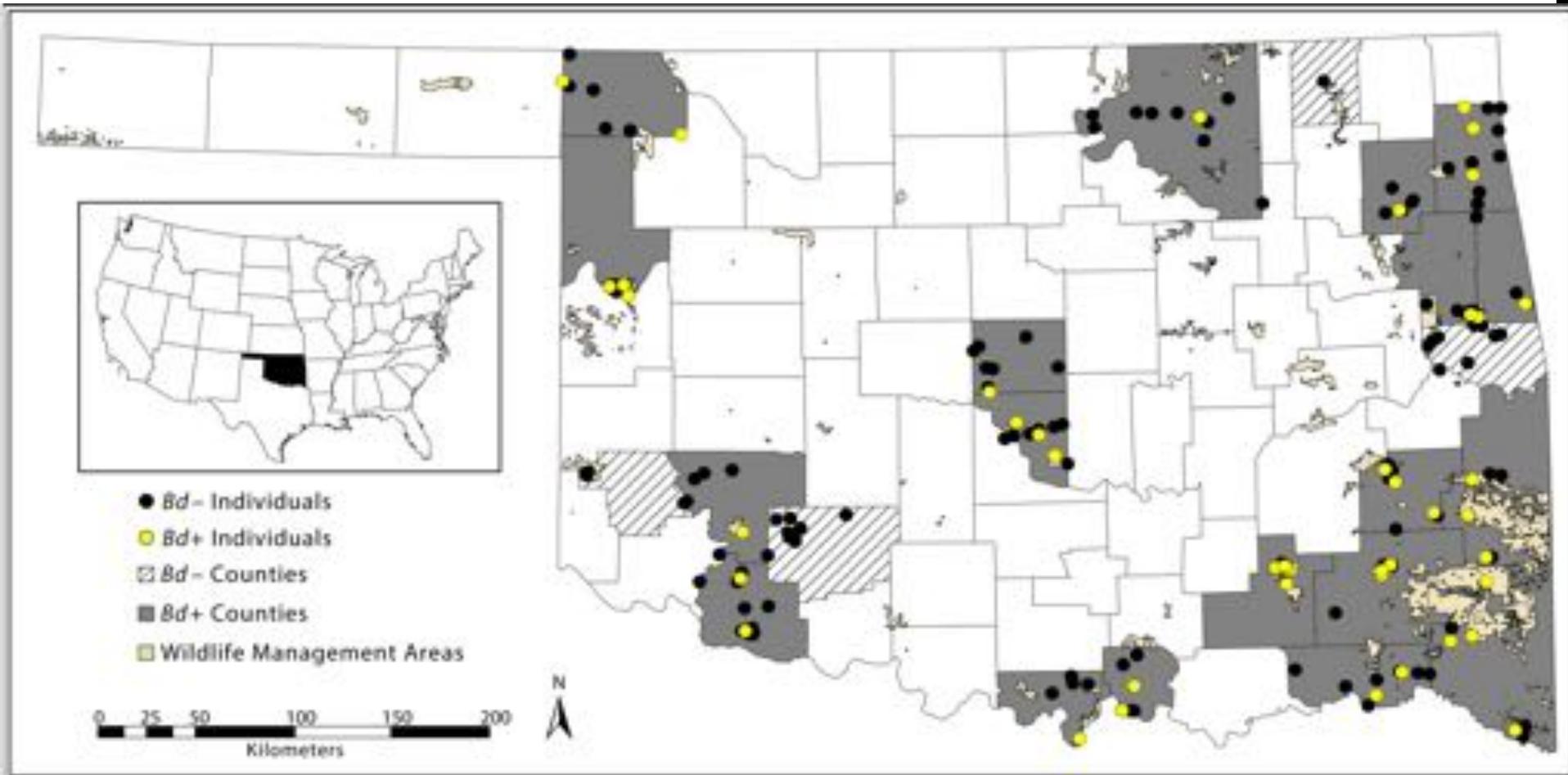
RANAVIRUS (RV)

- Systemic infection, can be found in all major organs
- Causes lethargy, hemorrhaging, and death
- Can be spread through direct contact or through contaminated water
- Can be tested only with a tissue sample from the animal

Ranavirus

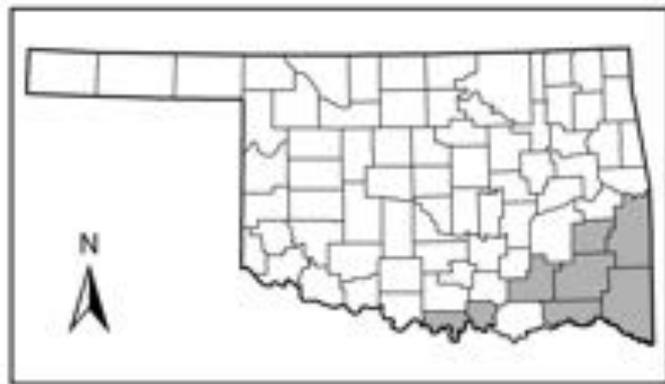


DISEASE RESULTS IN OK (MUSEUM SPECIMENS)

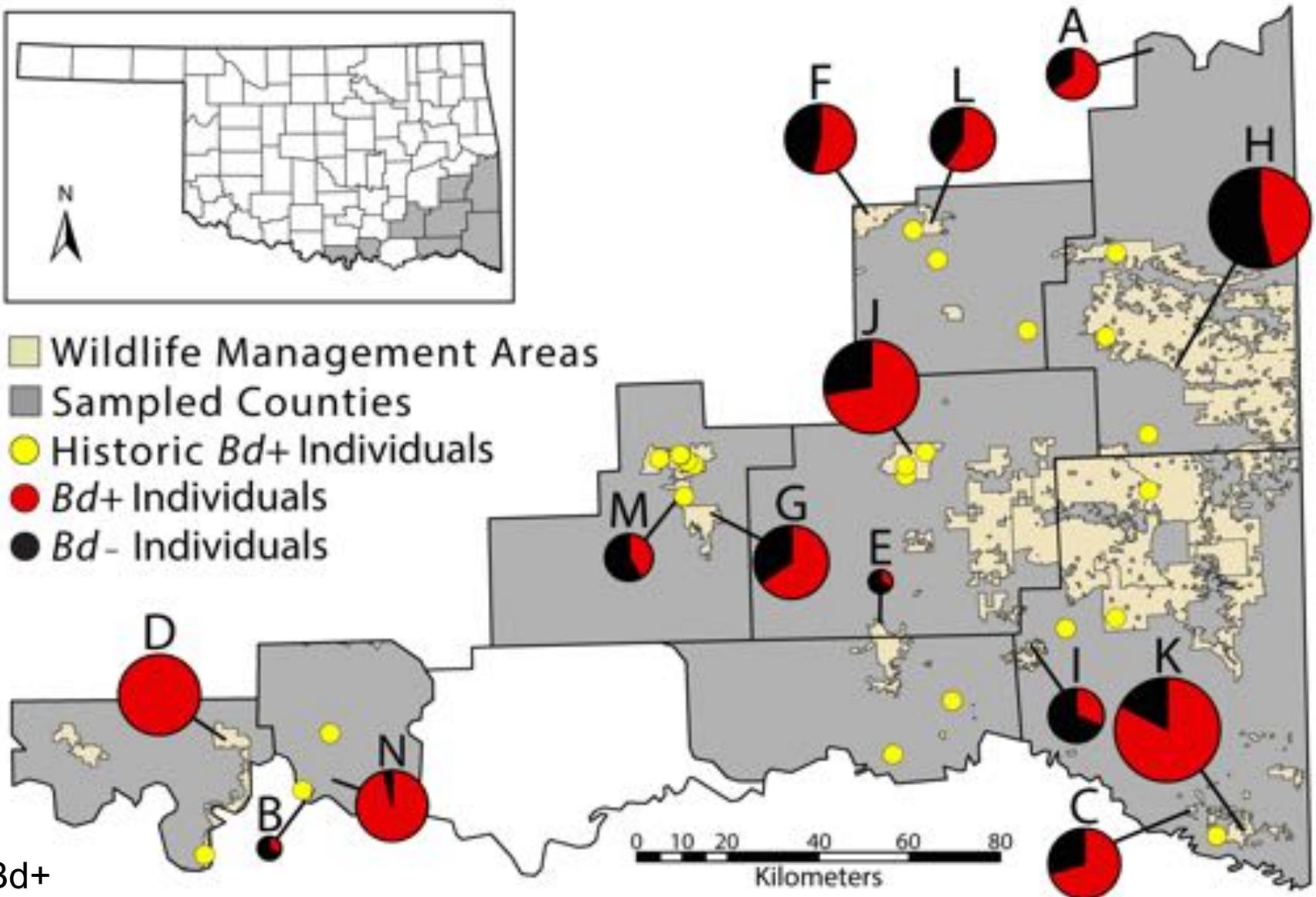


Chytrid remains found on museum specimens, throughout Oklahoma

SOUTHEAST OK (*Bd*)

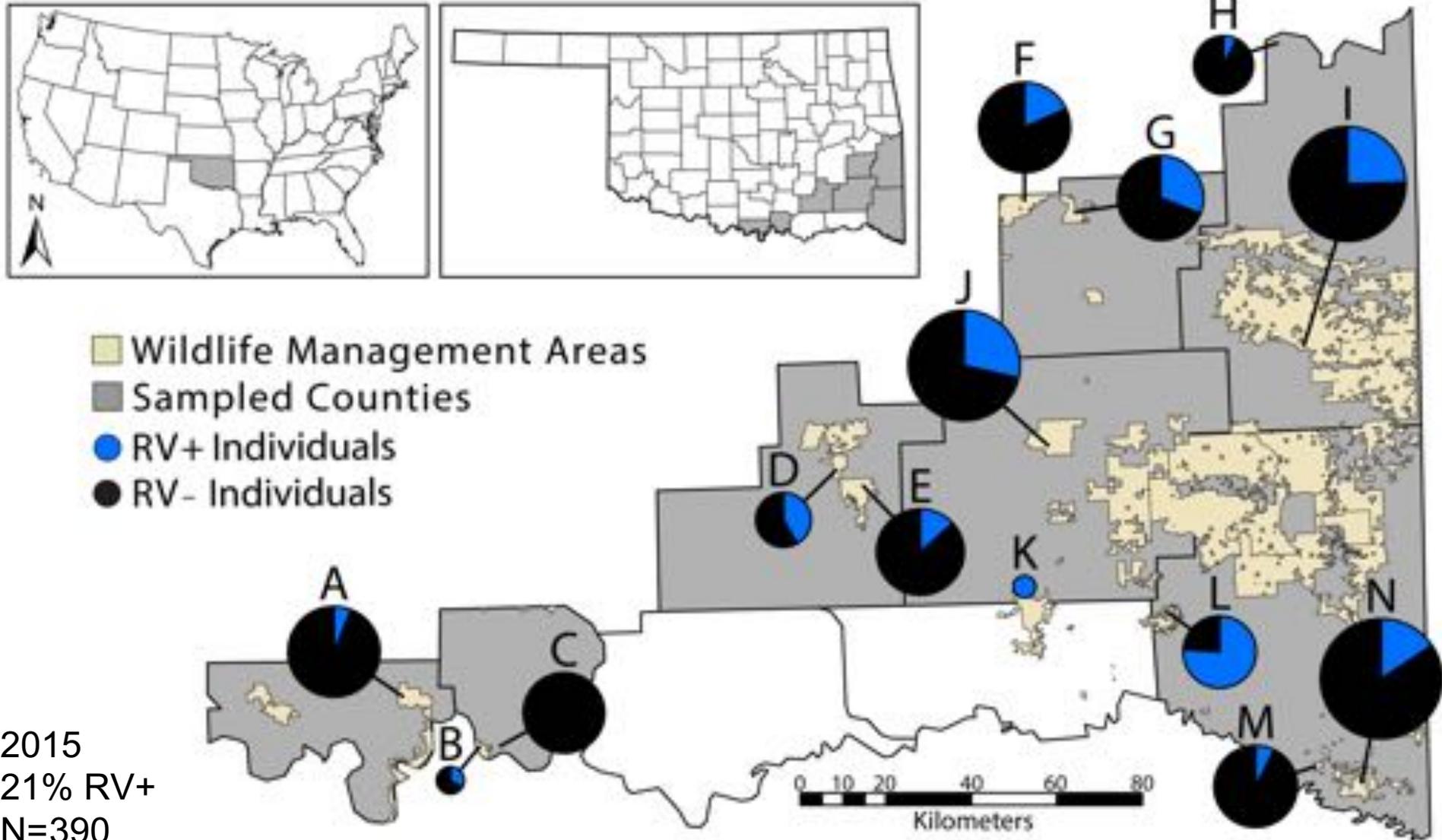


- Wildlife Management Areas
- Sampled Counties
- Historic *Bd*+ Individuals
- Bd*+ Individuals
- Bd*- Individuals



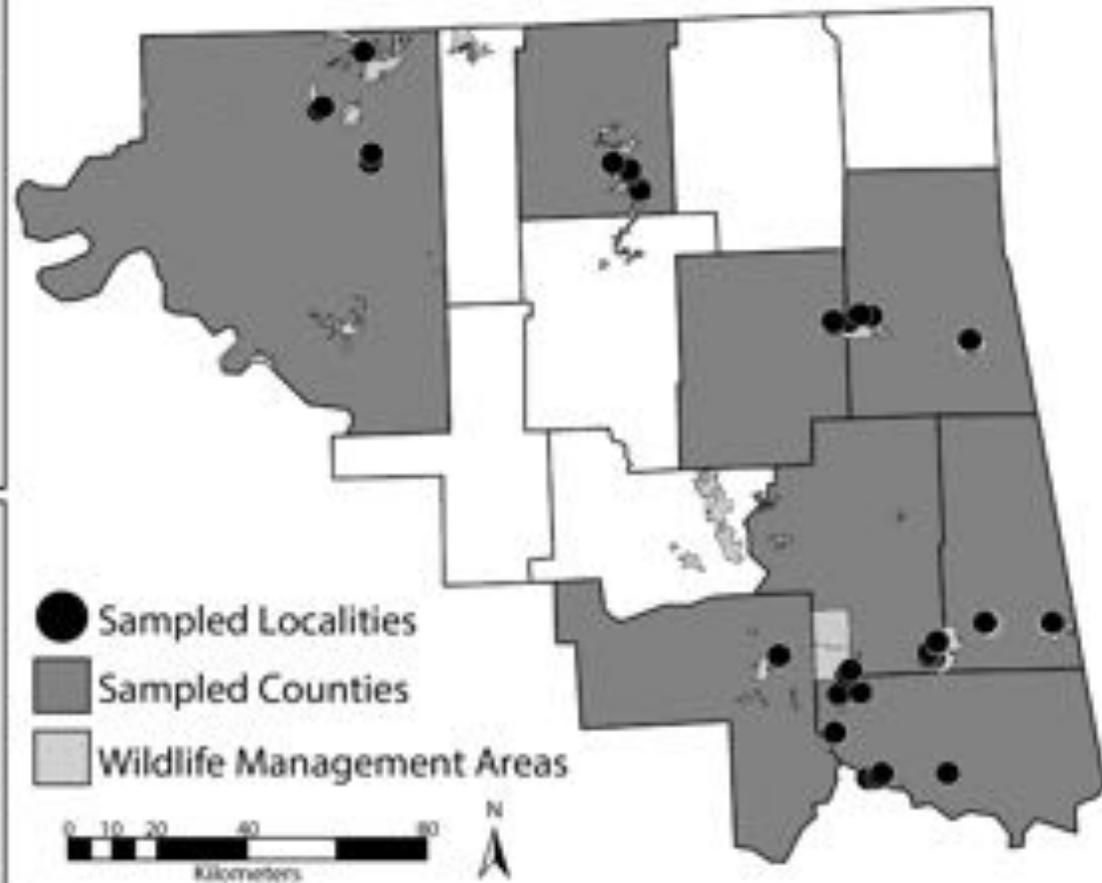
2015
68% *Bd*+
N=373

SOUTHEAST OK (RV)



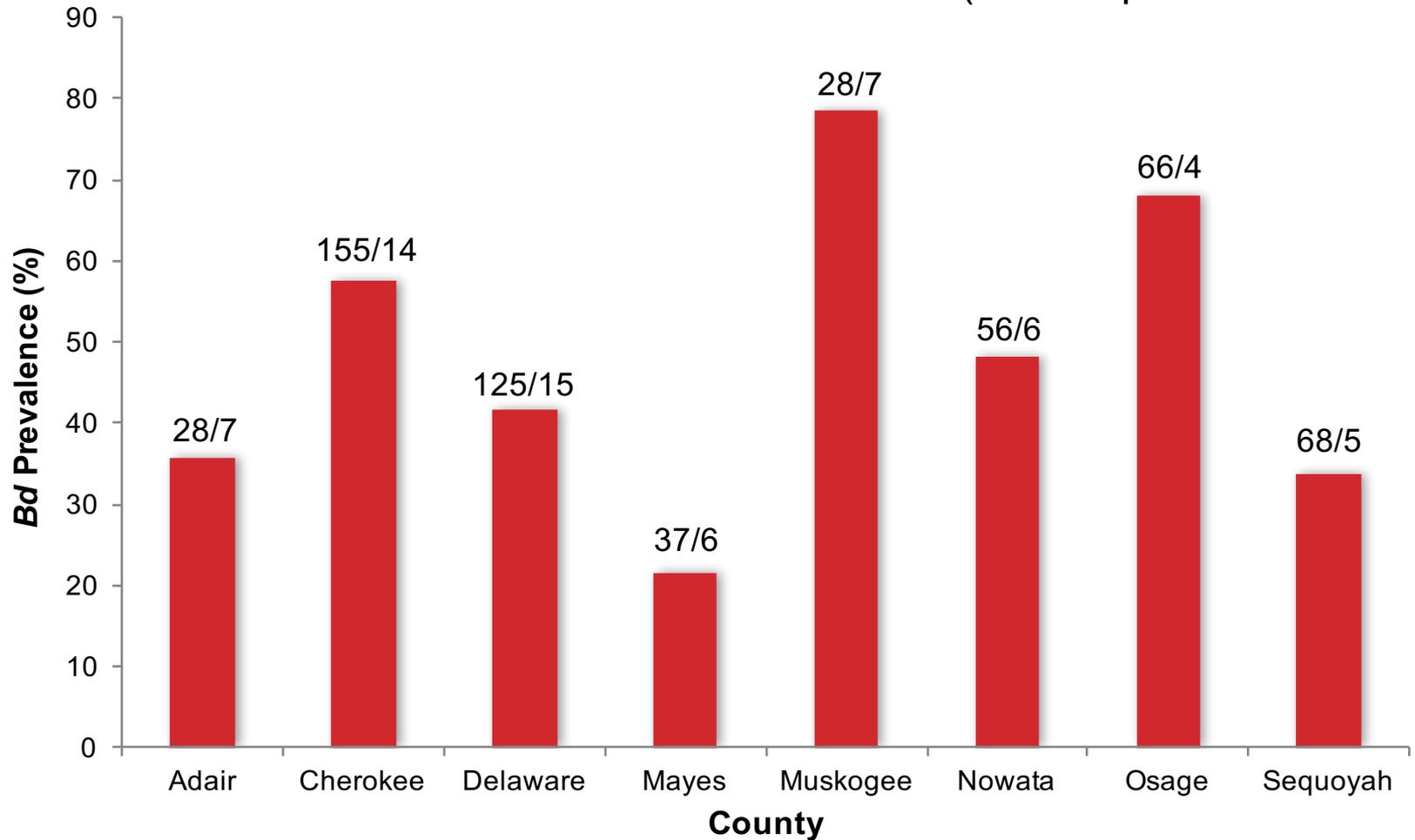
NORTHEAST OK (*Bd* & RV)

2015–2016

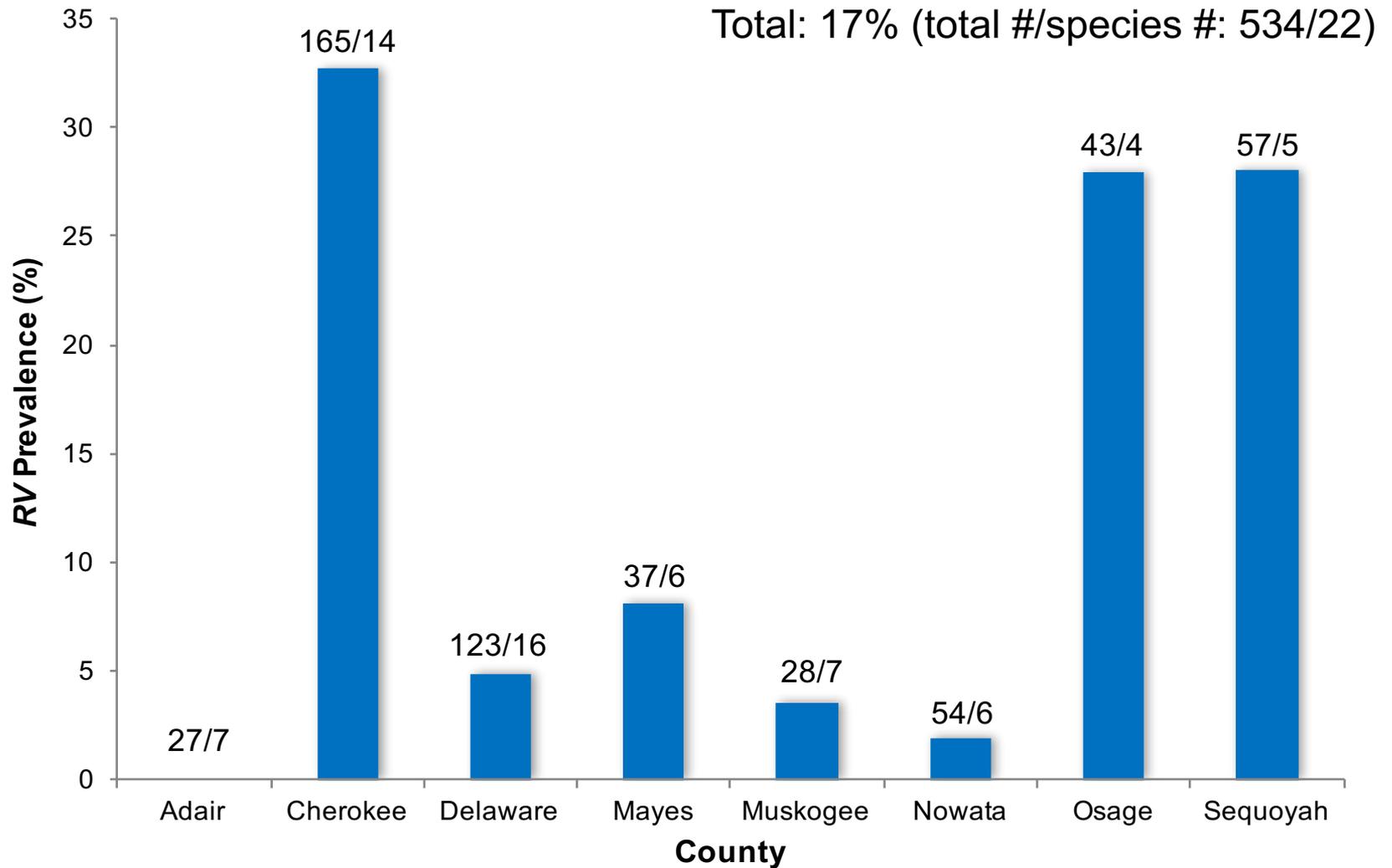


NORTHEAST OK (*Bd*)

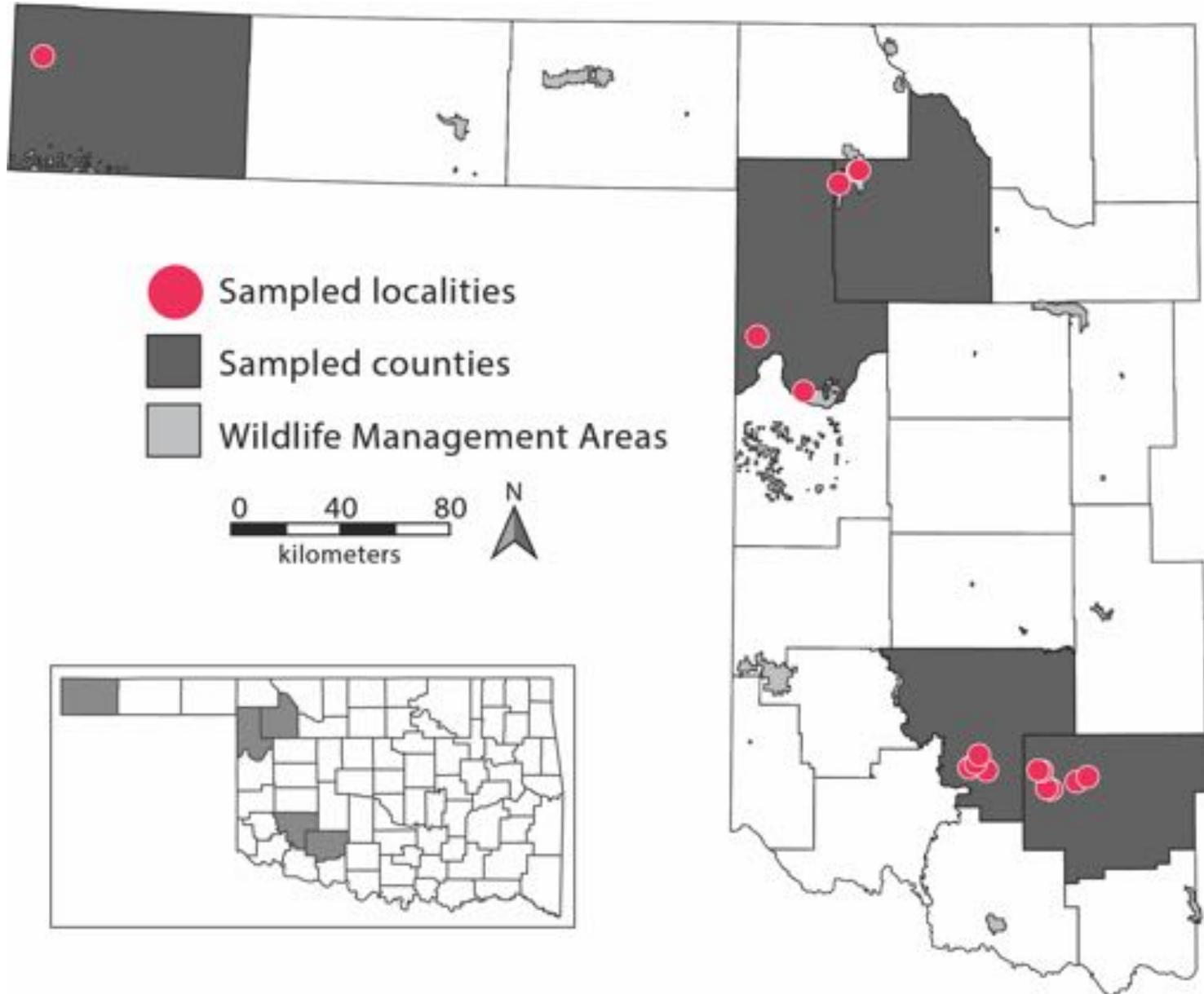
Total: 49% (total #/species #: 563/22)



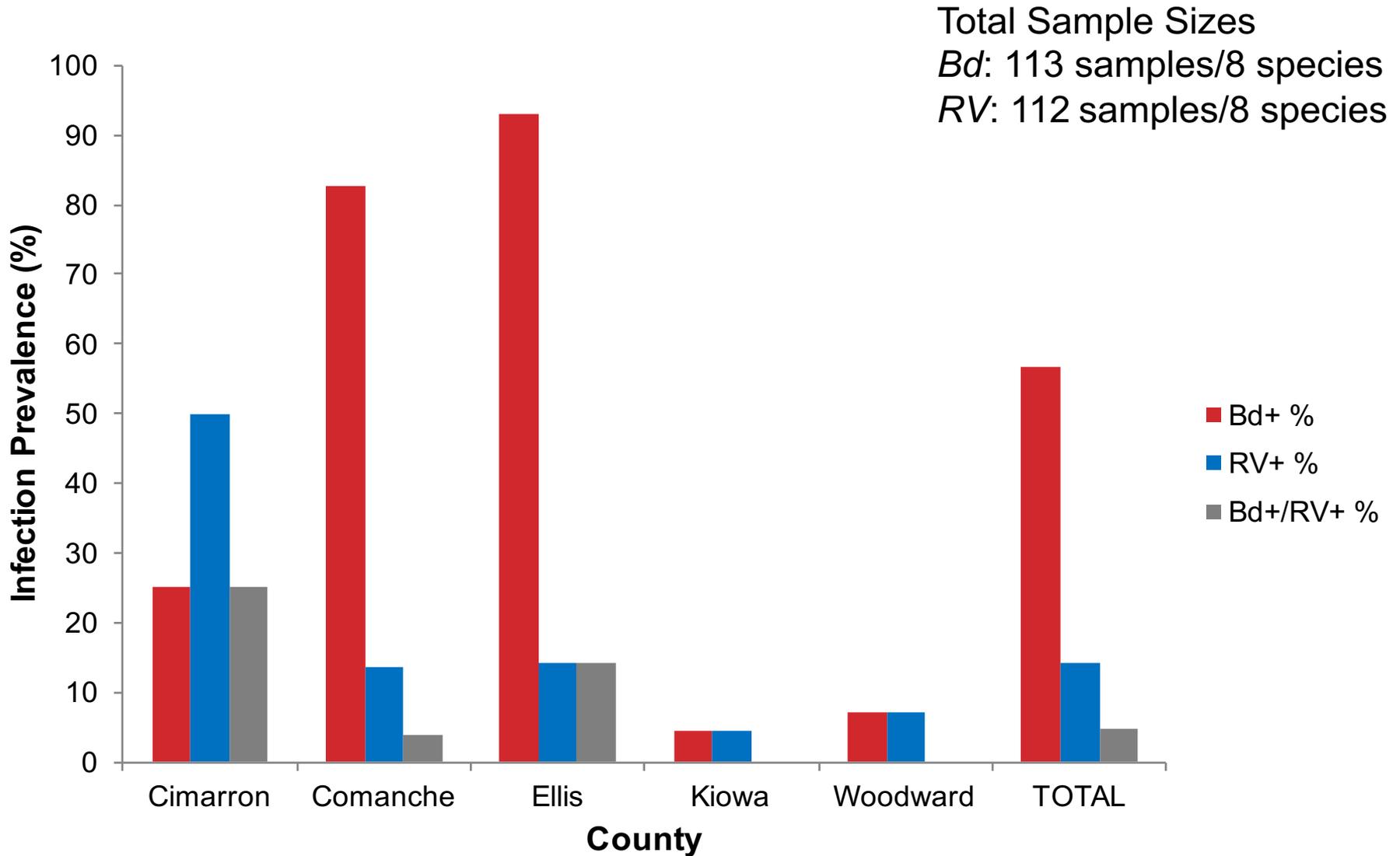
NORTHEAST OK (RV)



WESTERN OK (*Bd* & *RV*)



WESTERN OK (*Bd* & *RV*)



HUMAN IMPACTS

All of the activities below have the potential to spread fungal/viral spores to new aquatic locations or add stress to amphibians, reducing their immune response.



HUMAN IMPACTS IN OK

Total Sample Sizes

Number of sites: 45

Bd: 1514 samples

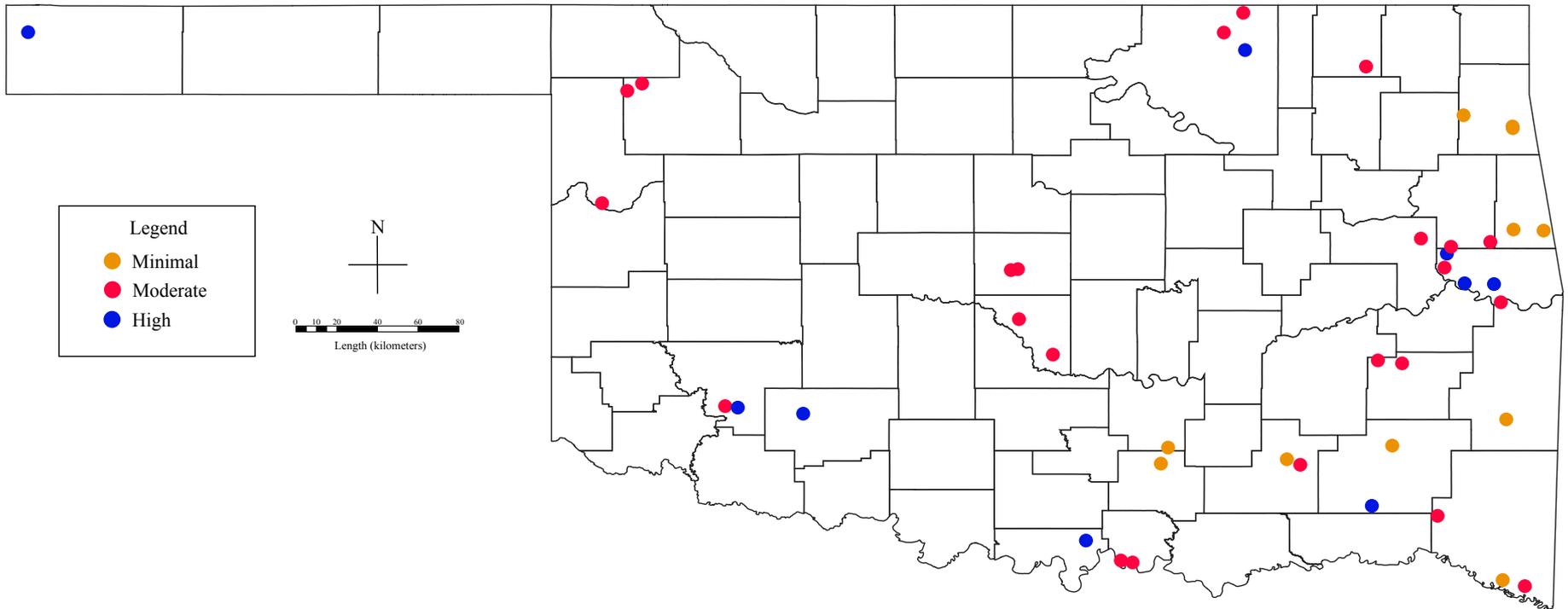
RV: 1526 samples

Sample Sizes by Category (*Bd*/*RV*)

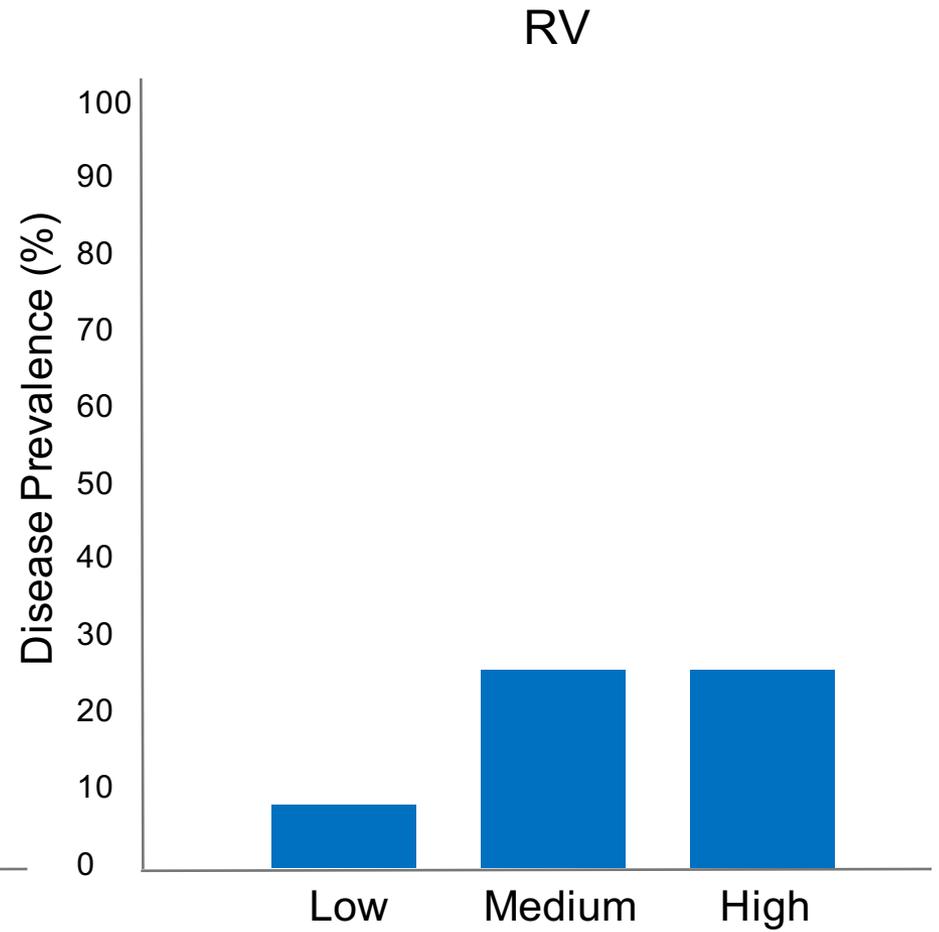
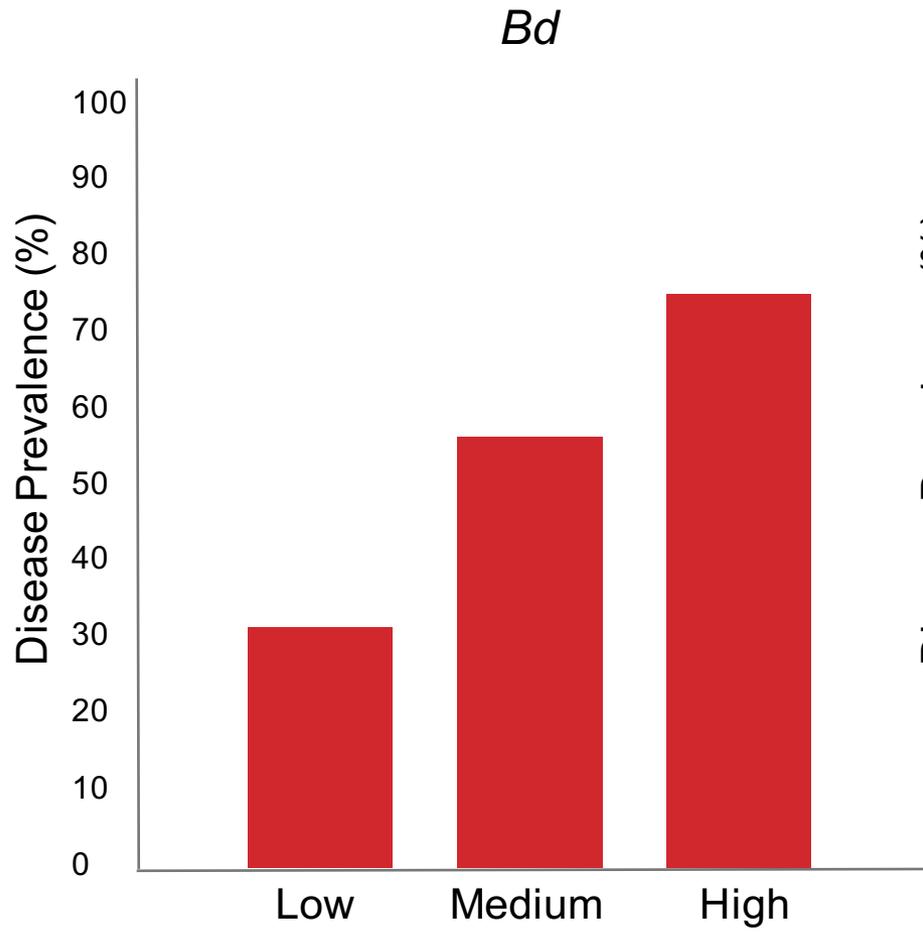
● Minimal: 11 sites (545/546)

● Moderate: 23 sites (788/821)

● High: 9 sites (181/159)



HUMAN IMPACTS IN OK (*Bd* & RV)



HOW CAN YOU HELP?

Clean ALL nets, waders, boots, etc. at the end of each day's activities by one of the following two methods:

1. Spray down equipment with 10% bleach solution and allow it to dry for one hr. before putting away.
2. Allow equipment to dry in the sun for a full day.

Avoid the use of felt-bottomed waders

Notify us immediately if you ever come across a water body with a large number of dead amphibians

HOW CAN YOU HELP?

Participate in our new Citizen Science Project to help screen for chytrid throughout the state of Oklahoma!!

Kit contents:

- 10 pre-sterile, individually packaged cotton swabs
- 10 pre-sterile, 1.5mL screwtop vials
- instructions and datasheets
- permanent marker
- Oklahoma frog identification guide
- links to additional online educational materials

HOW CAN YOU HELP?

General Procedures for Citizen Science:

- Find a pond or stream, get GPS coordinates
- Catch frogs at a pond
 - Identify them
 - Take photos
 - Swab their skin
- Send swabs back to us at the Sam Noble Museum
- View your results (and those of other schools and scientists) online!
 - www.cameronsiler.com/citizen-science

WHAT CAN A SWAB DO?

