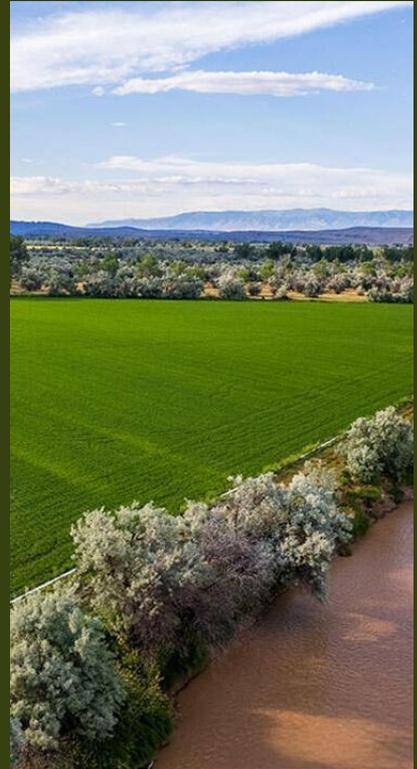


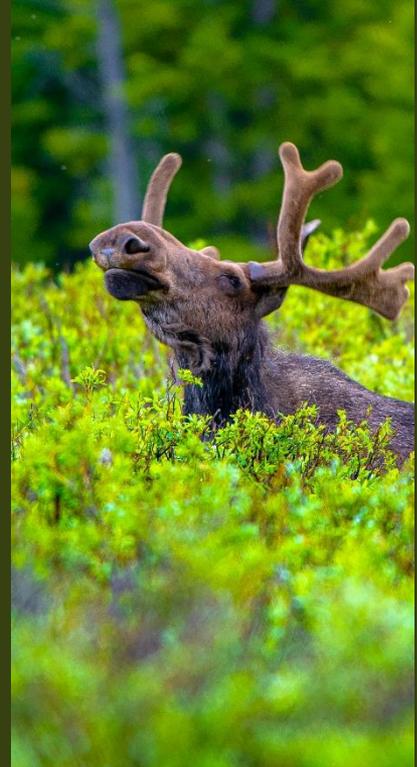


Wasting Away: Chronic Wasting Disease in the Big Horn Basin



Austin Wieseler
Regional Wildlife Biologist







Disease



Weather/Climate



Predation



Competition



Movement



Habitat



Highways/Roadkill



The Usual Suspects

Viruses

Bacteria

Parasites

Prions

A pathogen that is not technically “alive” in the traditional sense and is made of genetic material (DNA or RNA) wrapped in a protein coat. Viruses lack the ability to reproduce on their own hijacking a host’s cells to make copies of themselves

- Size: extremely small (measured in nanometers)
- Transmission: droplets from coughs/sneezes (airborne), contaminated surfaces, bodily fluids, contaminated food/water, and vectors like insects
- Examples: Epizootic Hemorrhagic Disease (EHD)/Bluetongue, Rabies, Distemper
- Treatment: vaccines/antivirals



The Usual Suspects

Viruses

Bacteria

Parasites

Prions

A pathogen that is often a single-celled, living organism that can survive in most environments. While many are beneficial (like those in your gut), "pathogenic" bacteria cause disease by releasing toxins or destroying tissue.

- Size: larger than viruses, visible under a standard light microscope
- Transmission: droplets from coughs/sneezes and dust (airborne), contaminated surfaces/food/water, bodily fluids, and even vectors like insects
- Examples: Brucellosis, Bubonic Plague, Tuberculosis, Anthrax
- Treatment: antibiotics/vaccines



The Usual Suspects

Viruses

Bacteria

Parasites

Prion

Organisms that live on or inside a host and get their food at the host's expense. Parasites can range from single-celled protozoa to multi-cellular worms or even insects like lice and ticks.

- Size: microscopic to several feet long
- Transmission: consumption of water/food with eggs/cysts, vectors like insects, and contact with contaminated soil and feces
- Examples: Sarcoptic Mange, Winter Tick, Trichinosis
- Treatment: antiparasitics



The Usual Suspects

Viruses

Bacteria

Parasites

Prion

A pathogen that is not an organism at all, but a misfolded and infectious protein. No genetic material. An outlier amongst pathogens.

- Size: molecular (the smallest of the four)
- Example: Chronic Wasting Disease
- Treatment: none

Blueprint vs. Glitch

Proteins

- **Functions:** structure, support, catalysis, replication, signaling, movement, & immunity
- **Shape:** folded neatly
- **Vulnerable:** recycled by the body

Prion Proteins

- **Formation:** spontaneously or “infected”
- **Shape:** misfolded (flat/jagged)
- **Infectious:** template to misfold proteins
- **Resistant:** difficult to get rid of (degradation)
- **Insoluble:** clump together (plaques/lesions)





The Prion Family

Transmissible Spongiform Encephalopathies (TSEs)

Humans

-Creutzfeldt-Jakob Disease (CJD)

Sheep and Goats

-Scrapie

Cattle

-Bovine Spongiform Encephalopathy (Mad Cow Disease)

Cervids

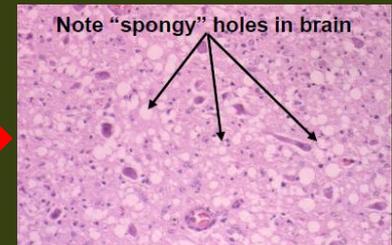
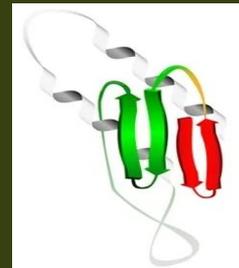
-Chronic Wasting Disease (CWD)

Normal Protein (nervous system cells)



Normal brain tissue

Abnormal and Misfolded Prion Protein



Note "spongy" holes in brain

Chronic Wasting Disease (CWD)



- Slow progressing, fatal neurological disease affecting the cervid family: deer, elk, moose, caribou
- Prions trigger normal cellular proteins to misfold, leading to brain tissue damage and eventual rapid, fatal cognitive/motor decline
- Named after the symptoms that appear in terminal stages of infection- “Chronic” and “Wasting Away”
- Always fatal with no treatment or cure





CWD- Clinical Signs

- Incubation period: ~ 18 – 24 months (varies)
- No clinical signs during incubation period
- Vast majority of CWD positive animals appear normal and healthy
- Terminal stage clinical signs: ~ 4 – 8 weeks (varies)
 - weight loss
 - excessive drooling
 - lack of general awareness
 - behavioral changes
 - hair/coat changes
 - droopy ears





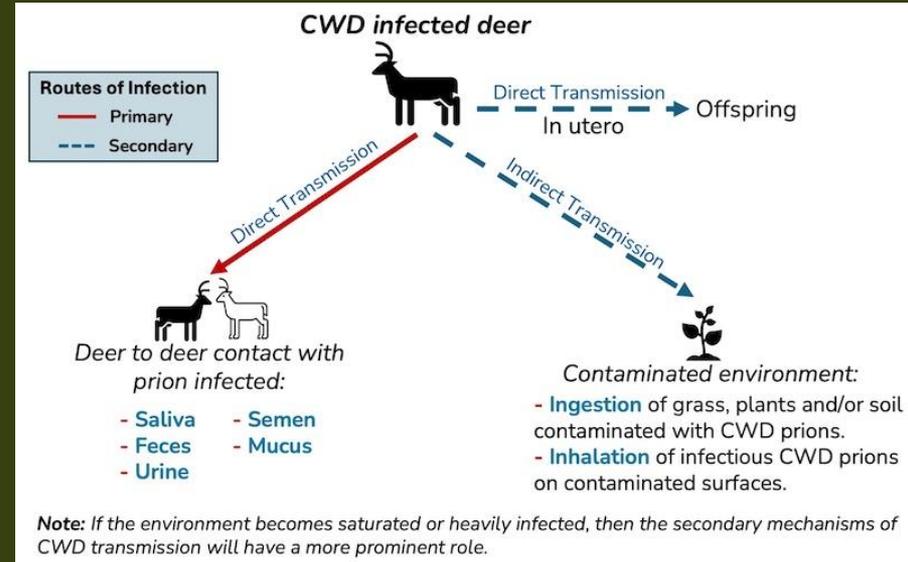
CWD- Transmission

Direct Transmission

- Animal to animal contact
- Saliva, feces, urine, bodily tissues/fluids
- Infected animals shed prions over the course of the infection

Indirect Transmission

- Prion-contaminated environment to animal contact
- Soil, plants, hay, mineral licks, feeders/troughs
- Environmental persistence of prions at least 2 years up to 16+ years (scrapie)



Credit: Nelda A. Rivera, Wildlife Veterinary Epidemiology Laboratory – INHS – PRI



Human Health & Disinfection



- **Laboratory Studies:** substantial species barrier (not absolute)
- **Public Health Data:** No link between human prion disease & ingestion of game meat
- CDC & WHO recommend NOT consuming CWD positive animals
- Disinfection/Sterilization
 - Prions not inactivated easily by heat (900+ °F)
 - 40% bleach for 5+ minutes

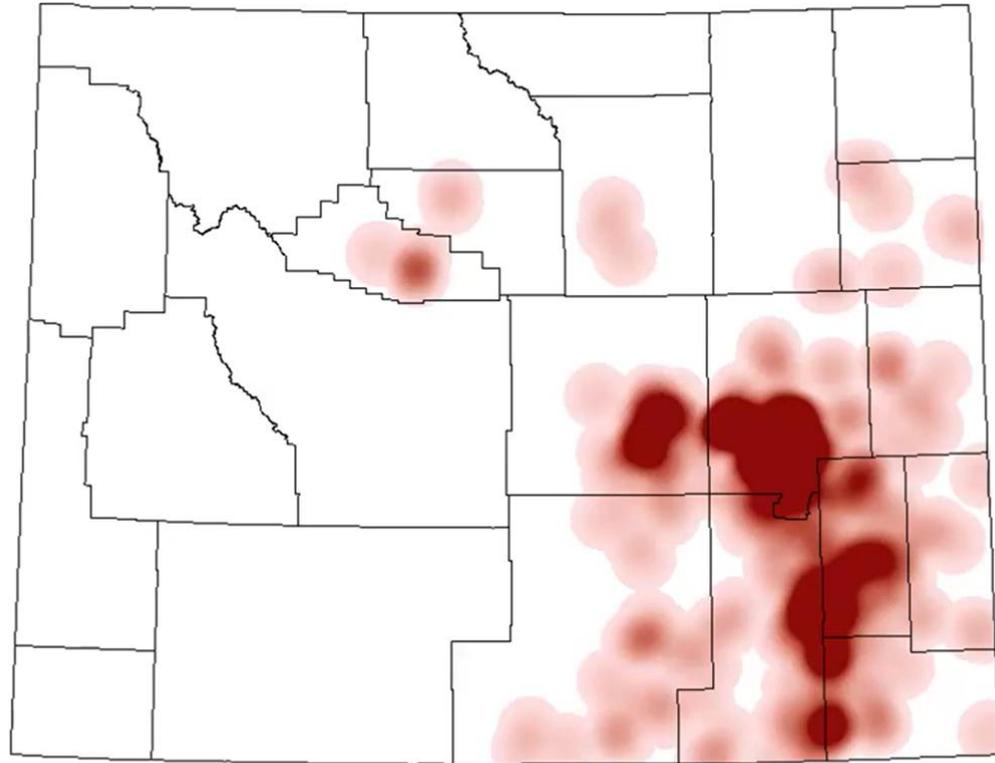
Chronic wasting disease (CWD)

Change in documented distribution in North America
2000 to 2024

CWD Distribution

- 36 U.S. States
- 5 Canadian Provinces
- Finland, Norway, South Korea, and Sweden

Deer CWD Density in Wyoming 1998- 2005



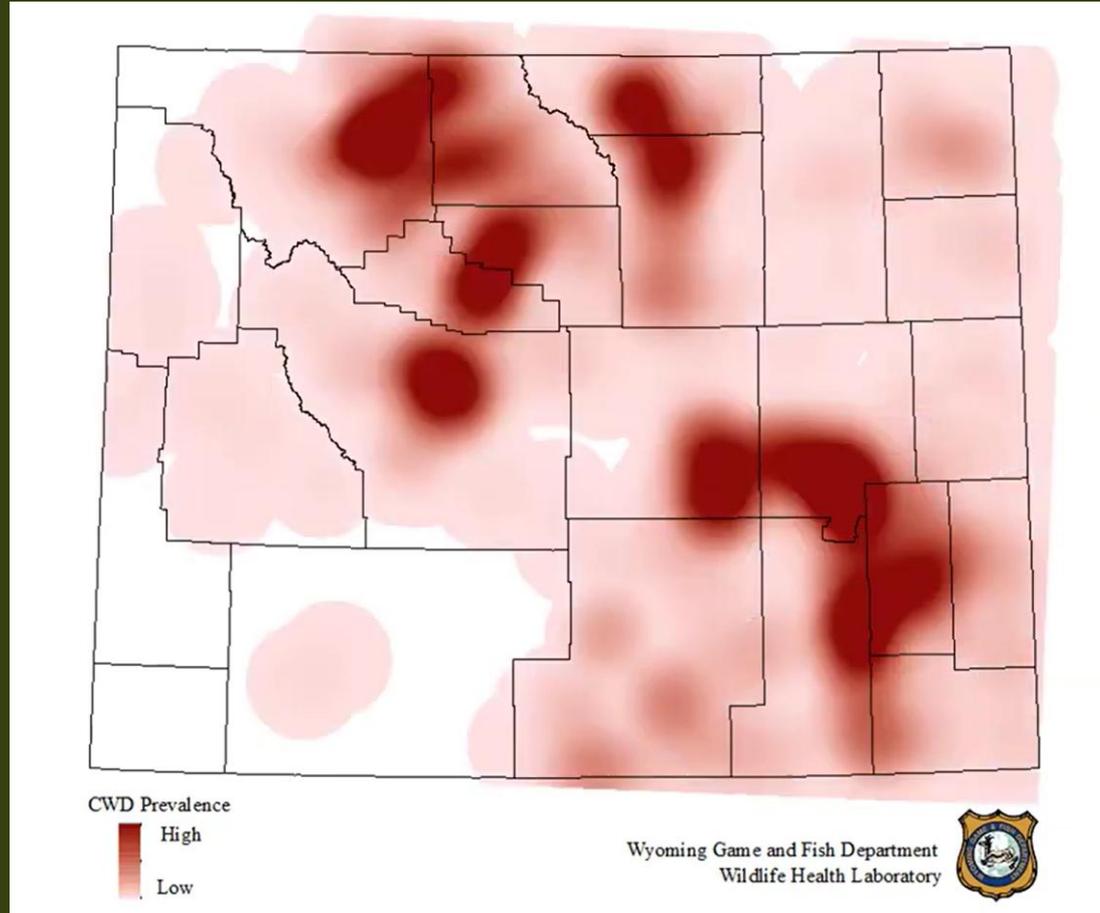
CWD Prevalence



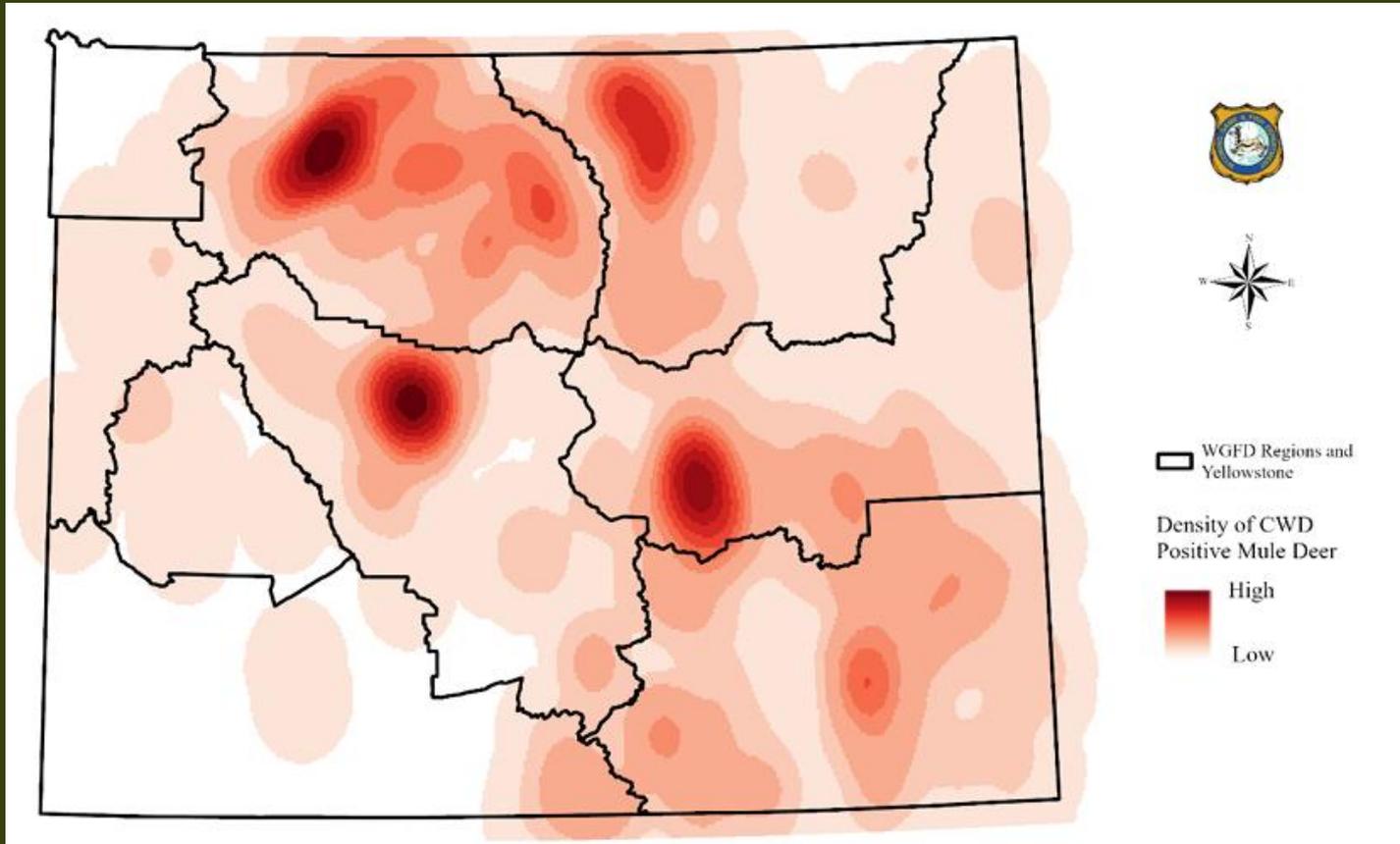
Wyoming Game and Fish Department
Wildlife Health Laboratory



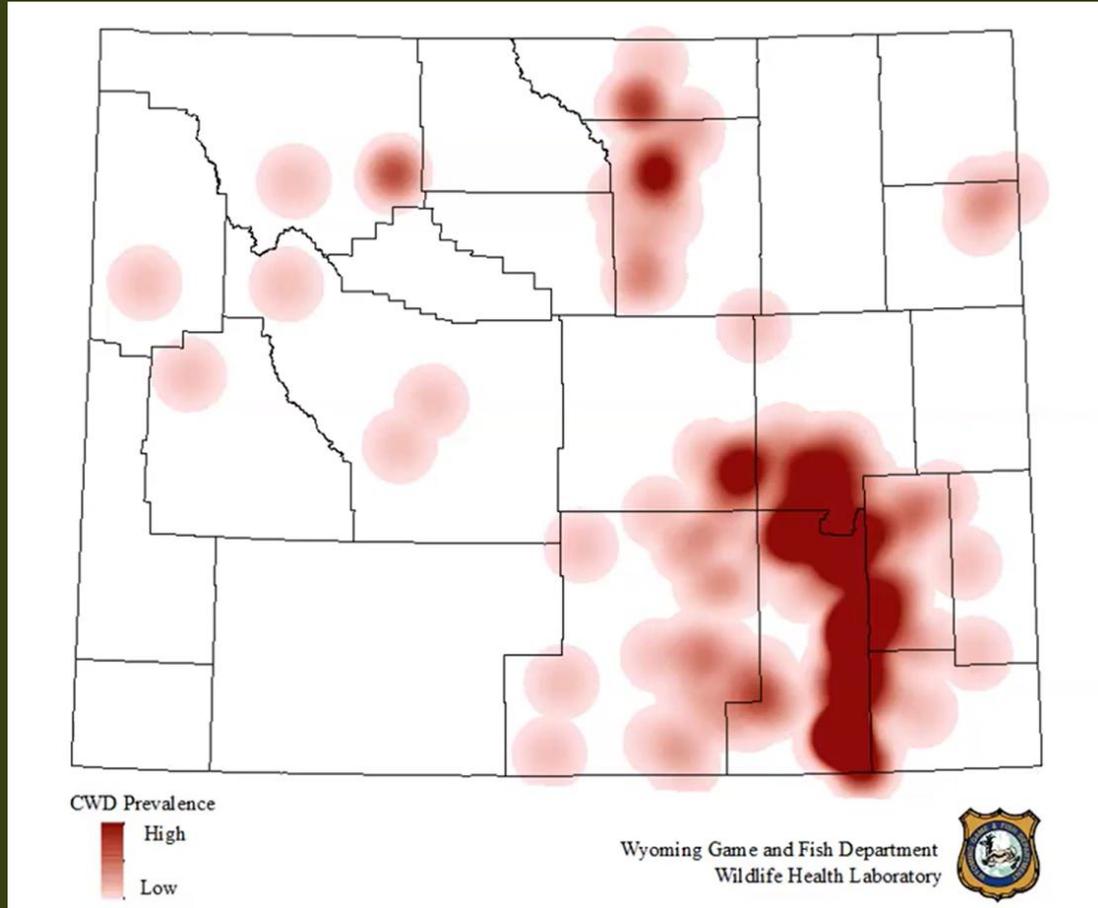
Deer CWD Density in Wyoming 2006-2023



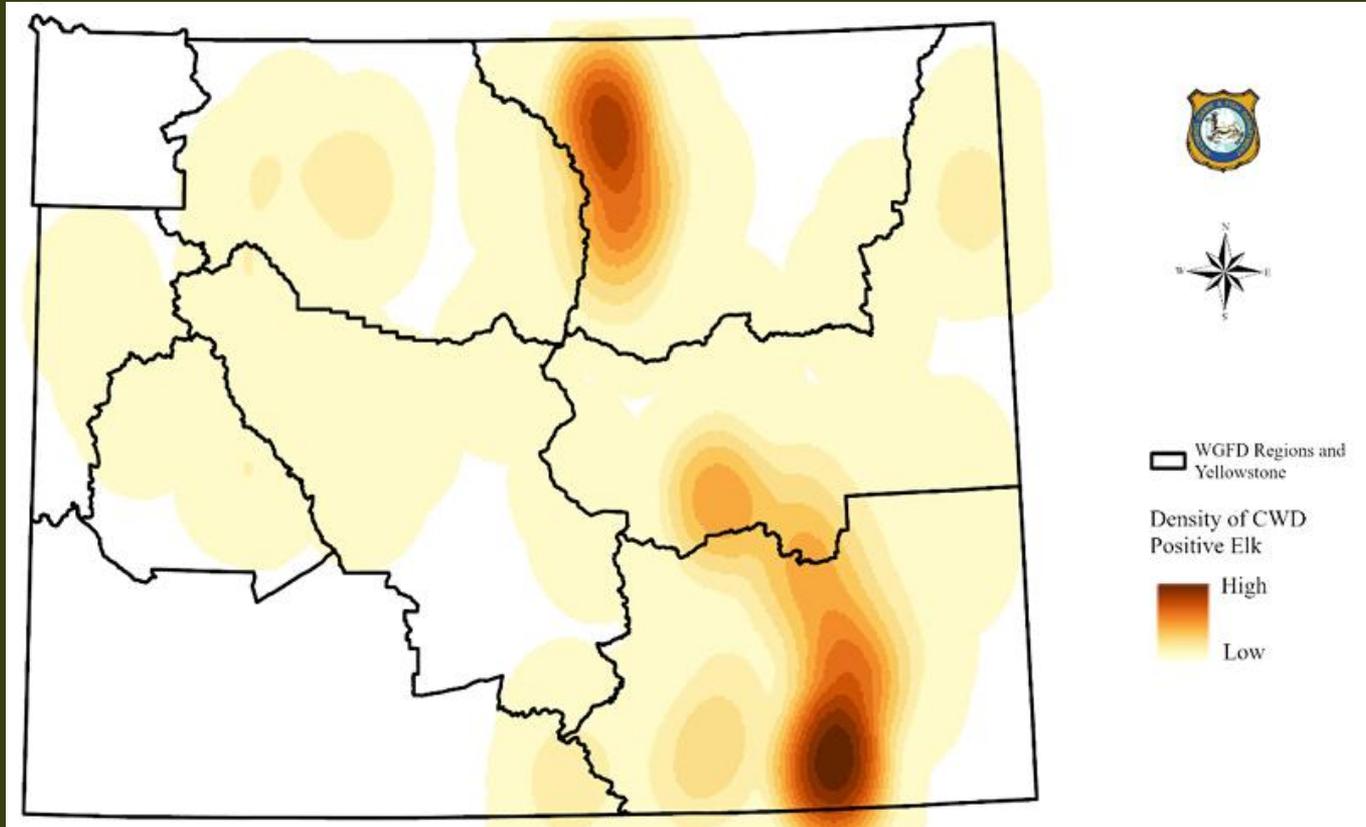
Deer CWD Density in Wyoming 2020-2024

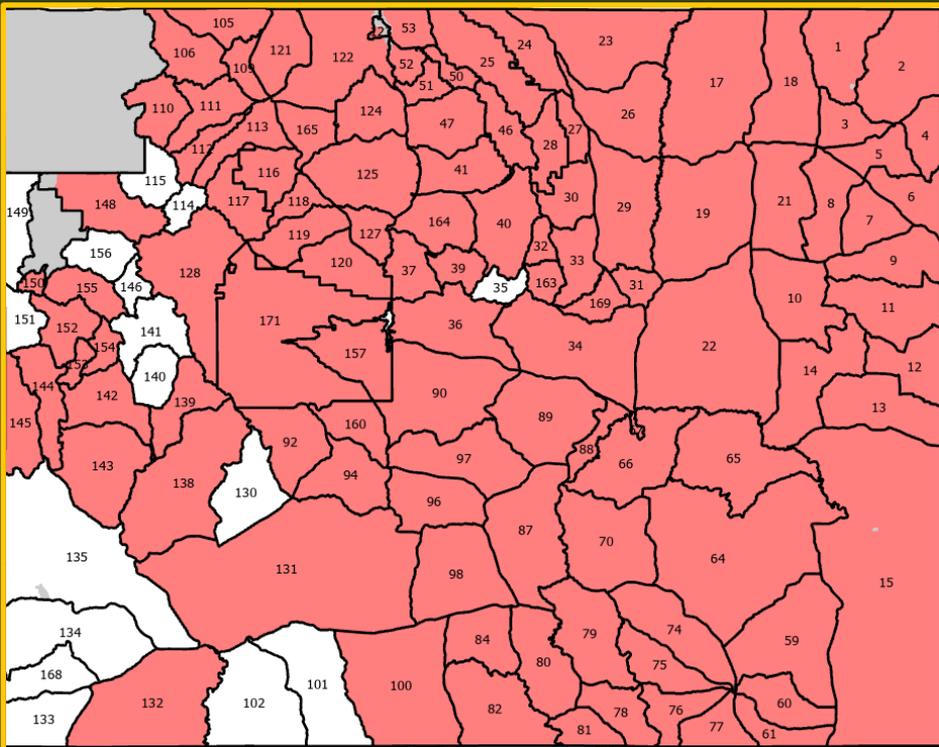


Elk CWD Density in Wyoming 2006-2023



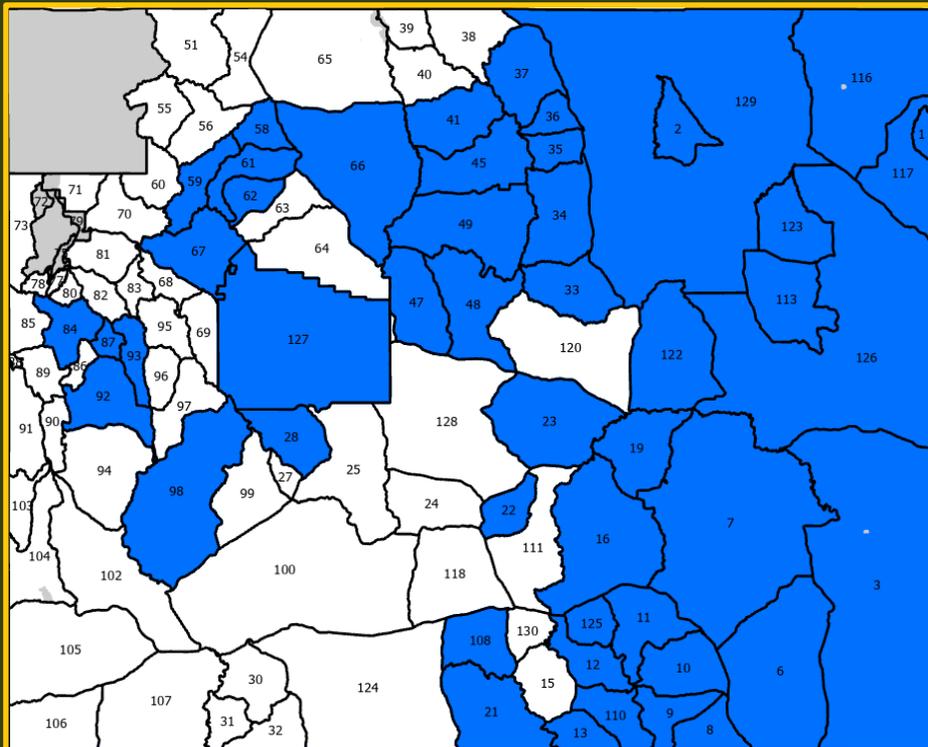
Elk CWD Density in Wyoming 2020-2024





WY CWD Distribution in Deer

- Identified in mule deer in 1985 (white-tailed deer 1990)
- Detected in 111 of 127 (87%) of mule deer hunt areas



WY CWD Distribution in Elk

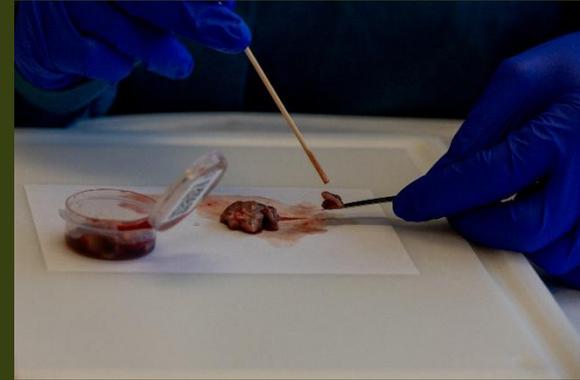
- Identified in elk in 1986
- Detected in 51 of 105 (49%) of elk hunt areas

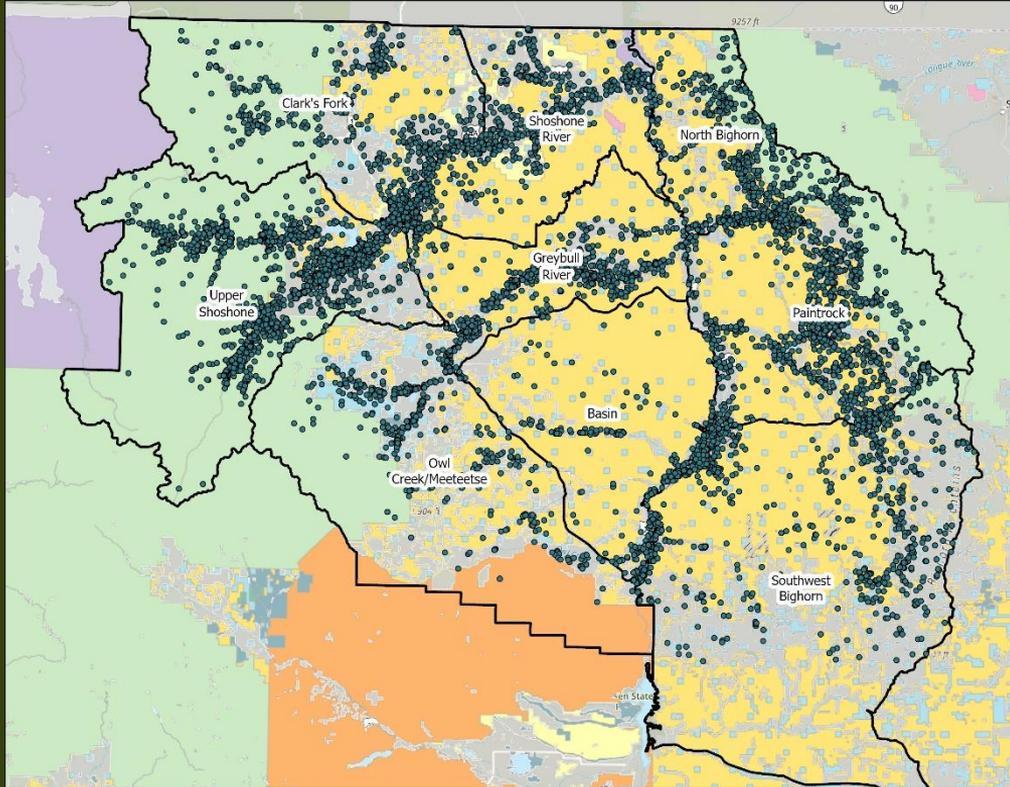
*Unknown origin or date of establishment- modeling suggests present since 1950's

Surveillance and Monitoring



- 5 year rotation
 - Annual focus on 1-2 herd units/region
- Sampling goal of 200 samples/herd unit collected in 1-3 years
 - Adult male mule deer and adult elk
 - Statistically significant sample sizes
- Opportunistic surveillance in CWD negative hunt areas
- Free testing statewide
- Sample collection of retropharyngeal lymph nodes or obex
- Laboratory turn-around in < 3 weeks

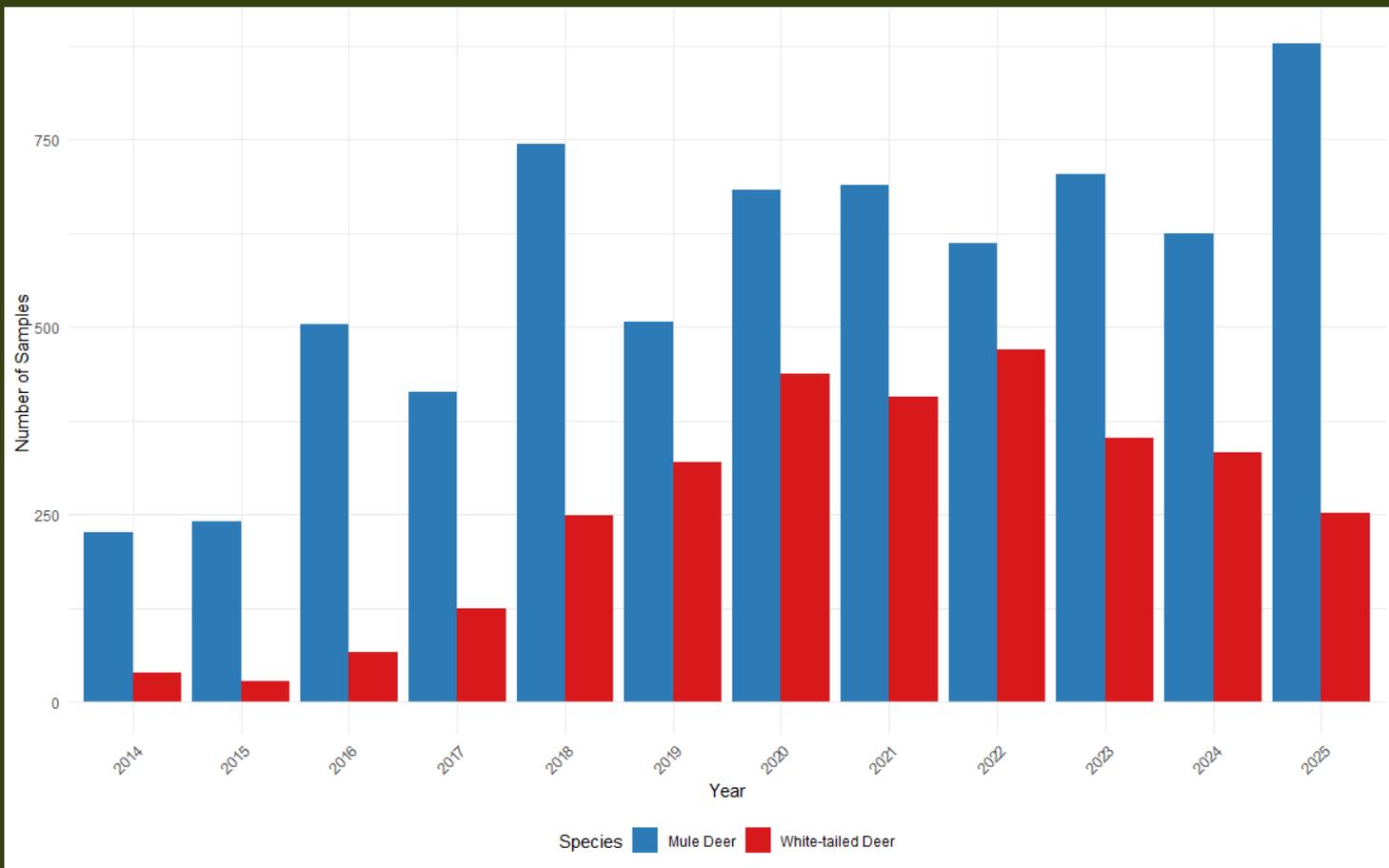




The Results

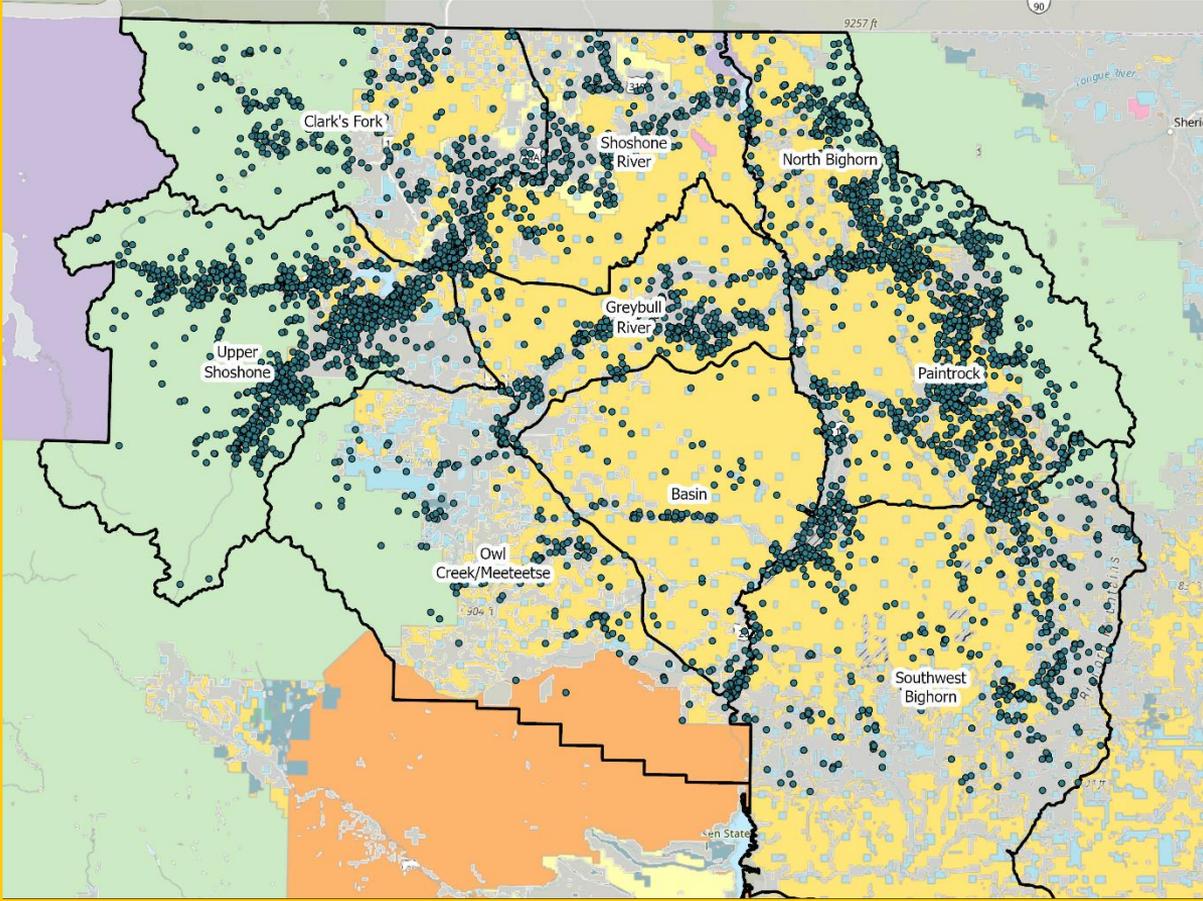
- Focused dataset 2014-2025 on mule deer and white-tailed deer
- Highlight distribution of positives and “hotspots”
- Overview prevalence estimates (positives/total sampled)

Mule Deer and White-tailed Deer CWD Samples (2014-2025)

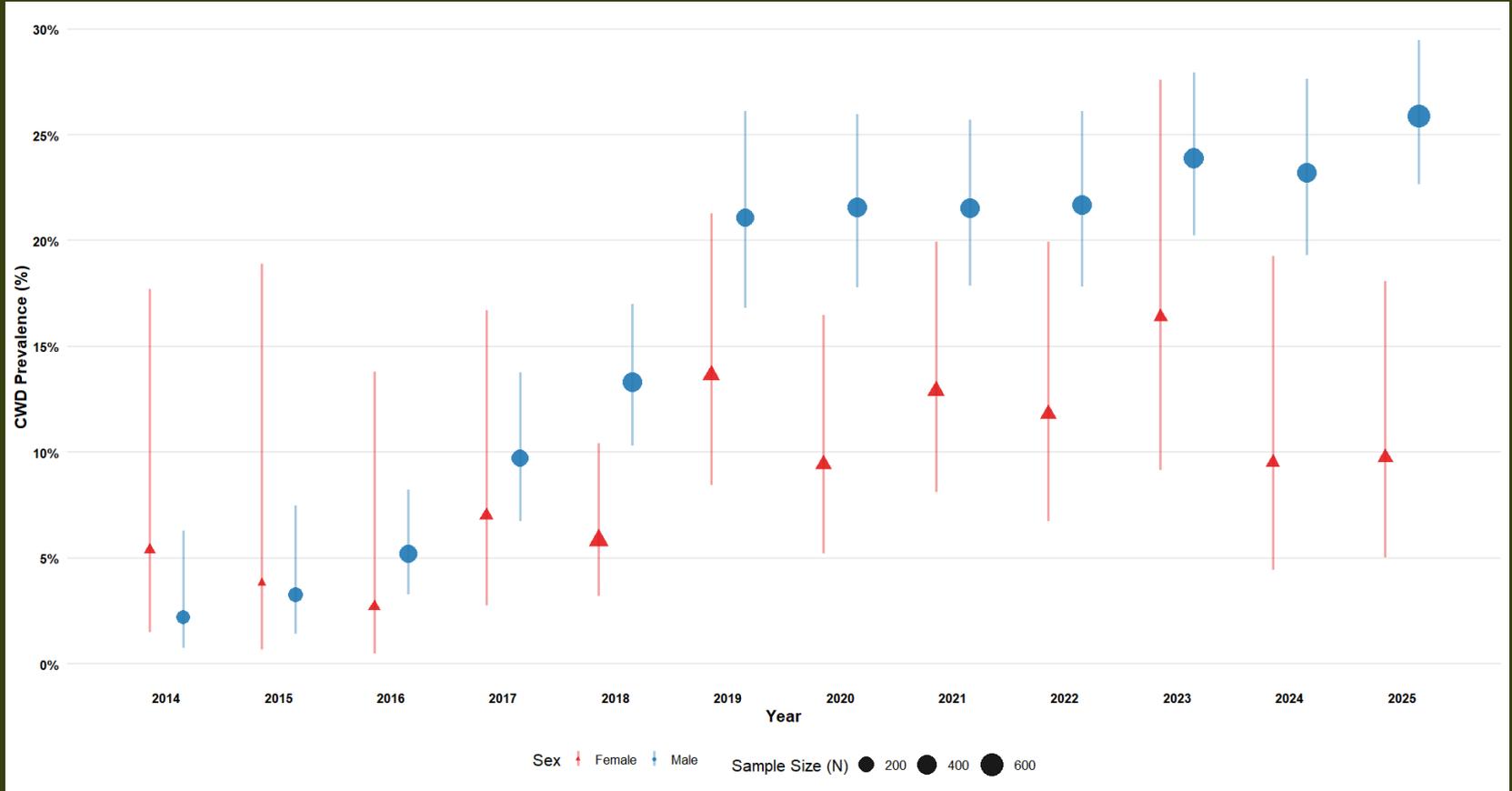




Mule Deer CWD Sample Distribution 2014 - 2024



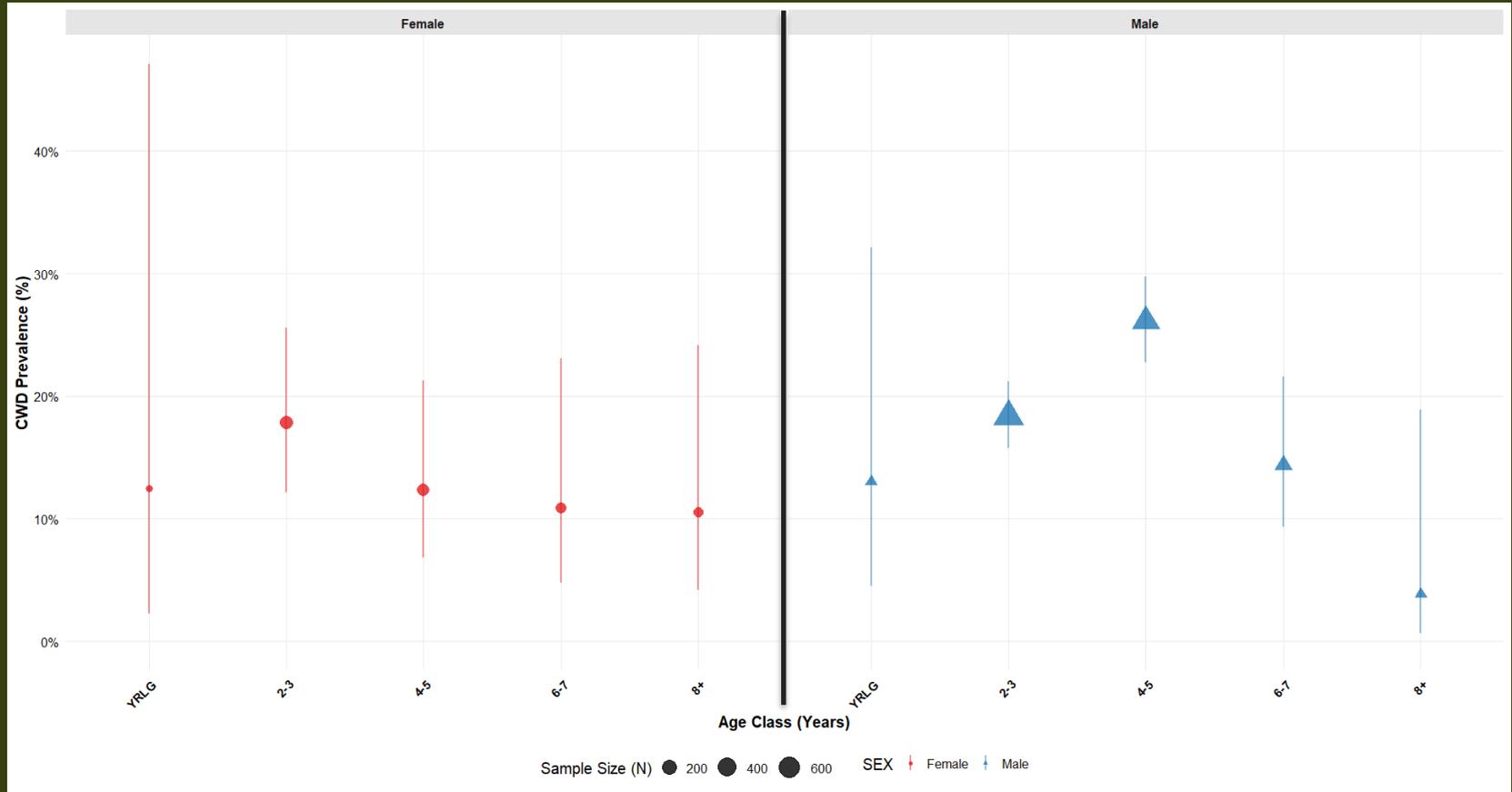
Males vs Females- Mule Deer Prevalence (2014-2025)



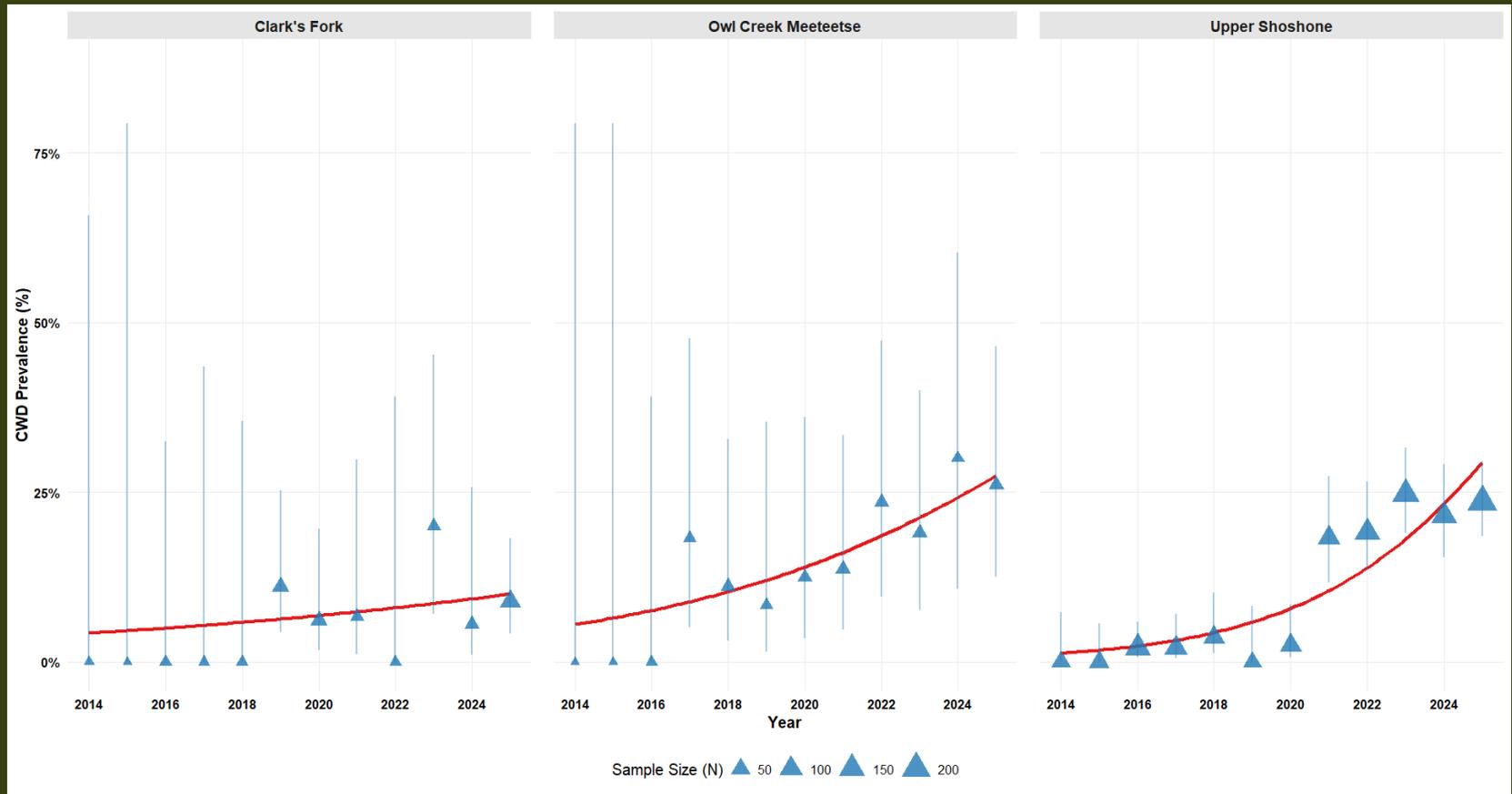
*Note: 95% confidence intervals

Preliminary Data - Subject to Revision - Not for Distribution

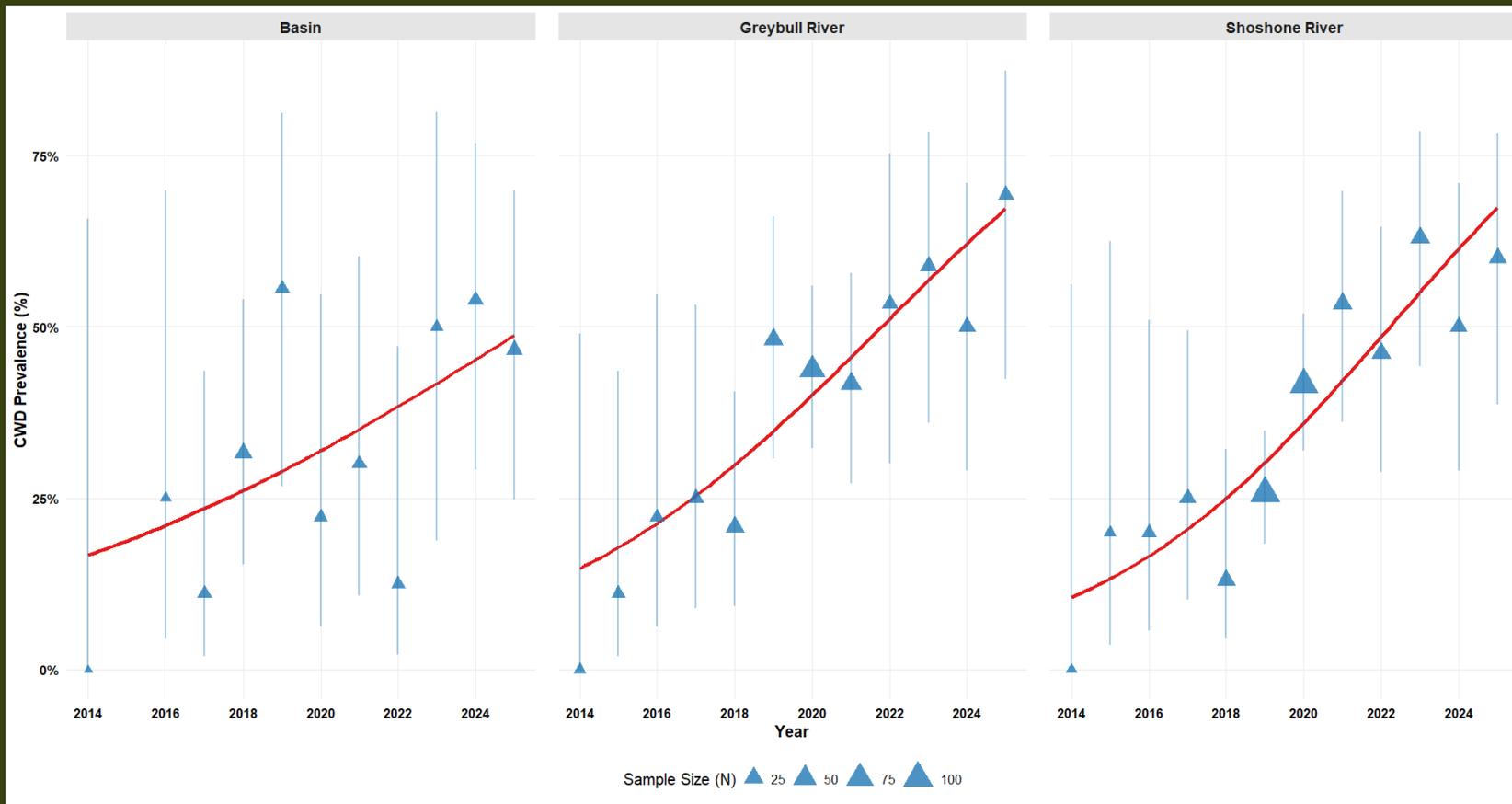
Males vs Females vs Ageclass- Mule Deer Prevalence (2014-2025)



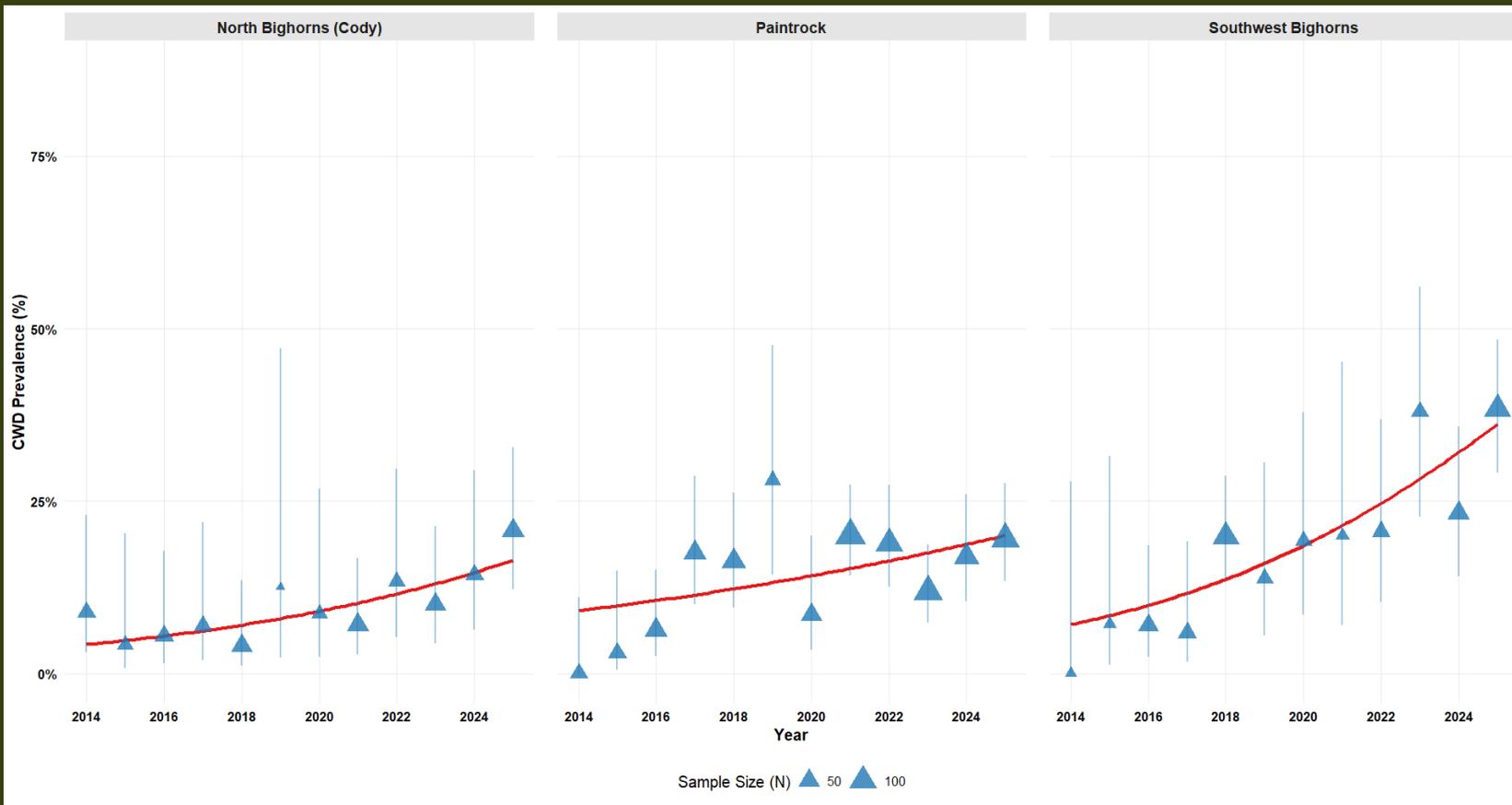
Western Big Horn Basin- Mule Deer Buck Prevalence (2014-2025)



Central Big Horn Basin- Mule Deer Buck Prevalence (2014-2025)

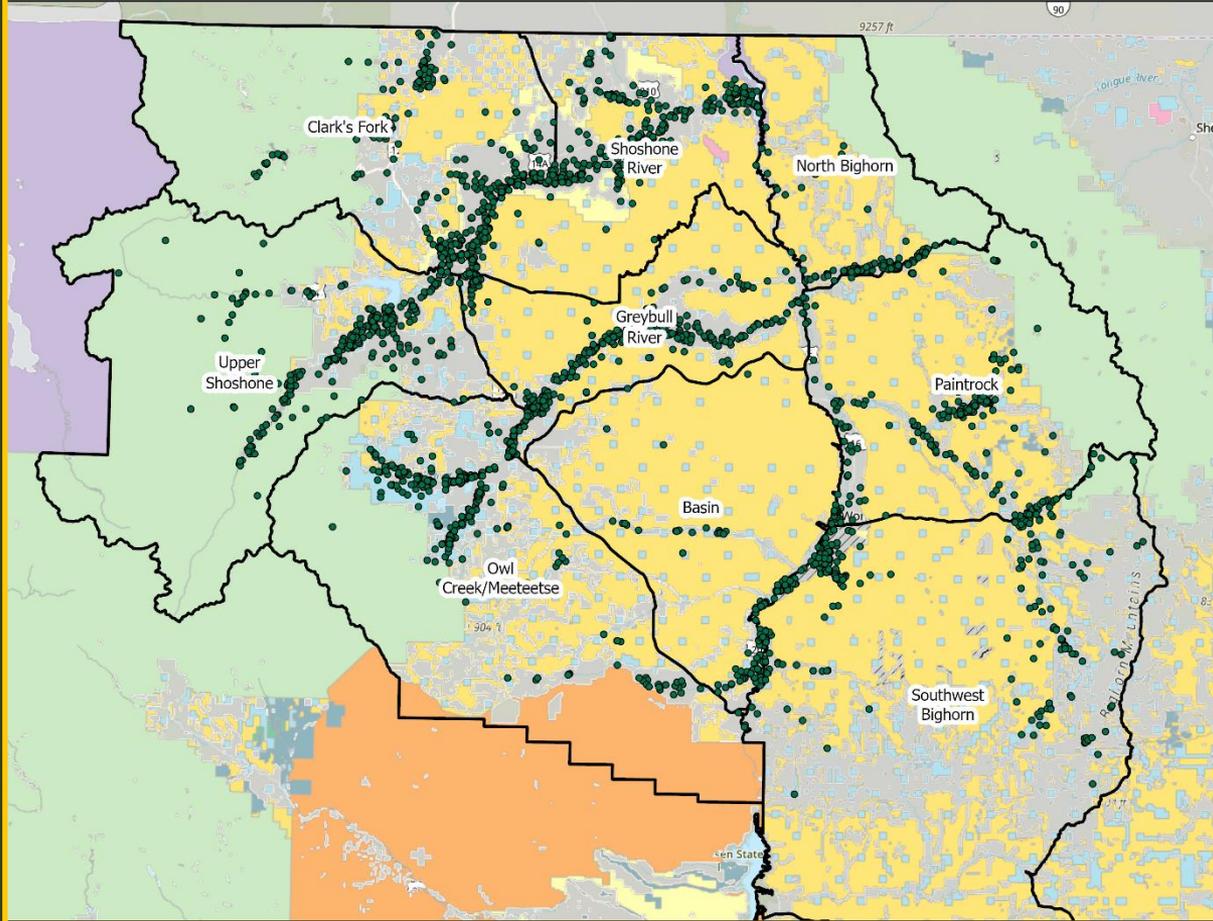


Eastern Big Horn Basin- Mule Deer Buck Prevalence (2014-2025)

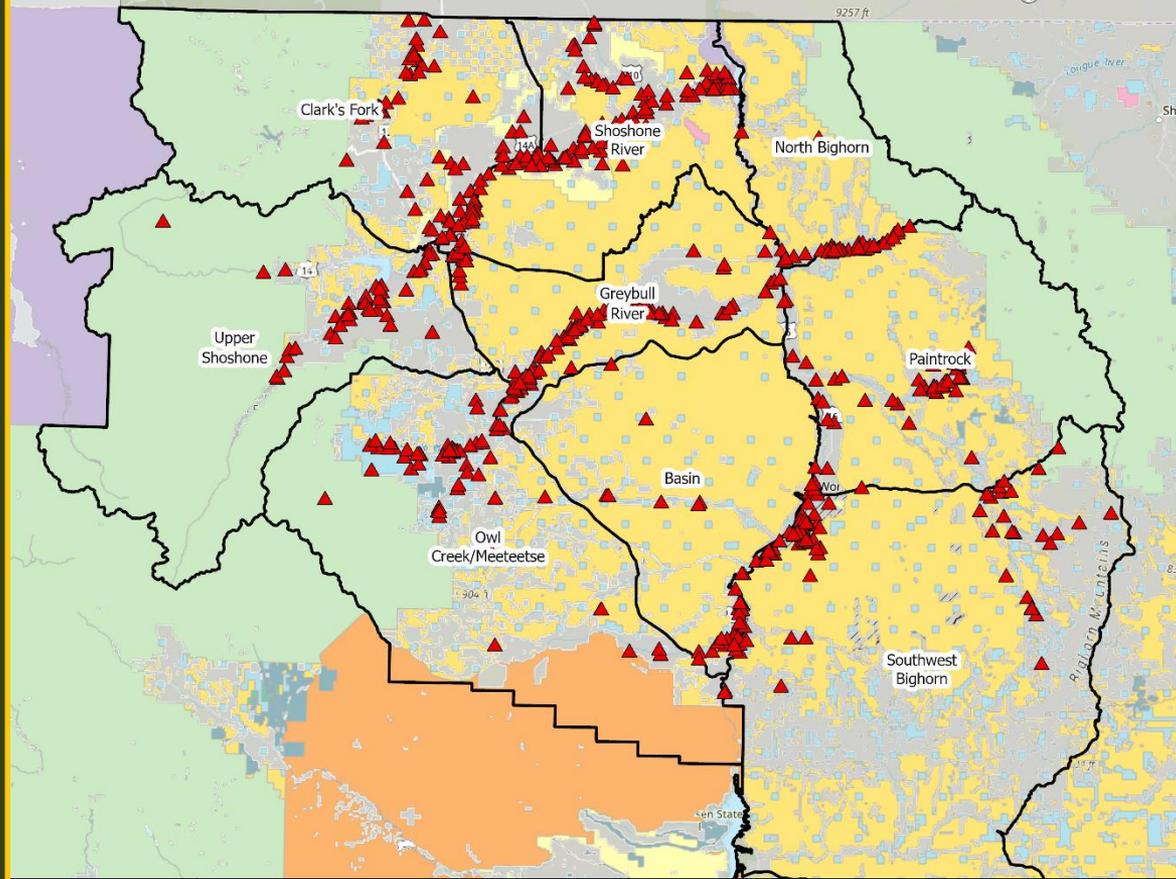




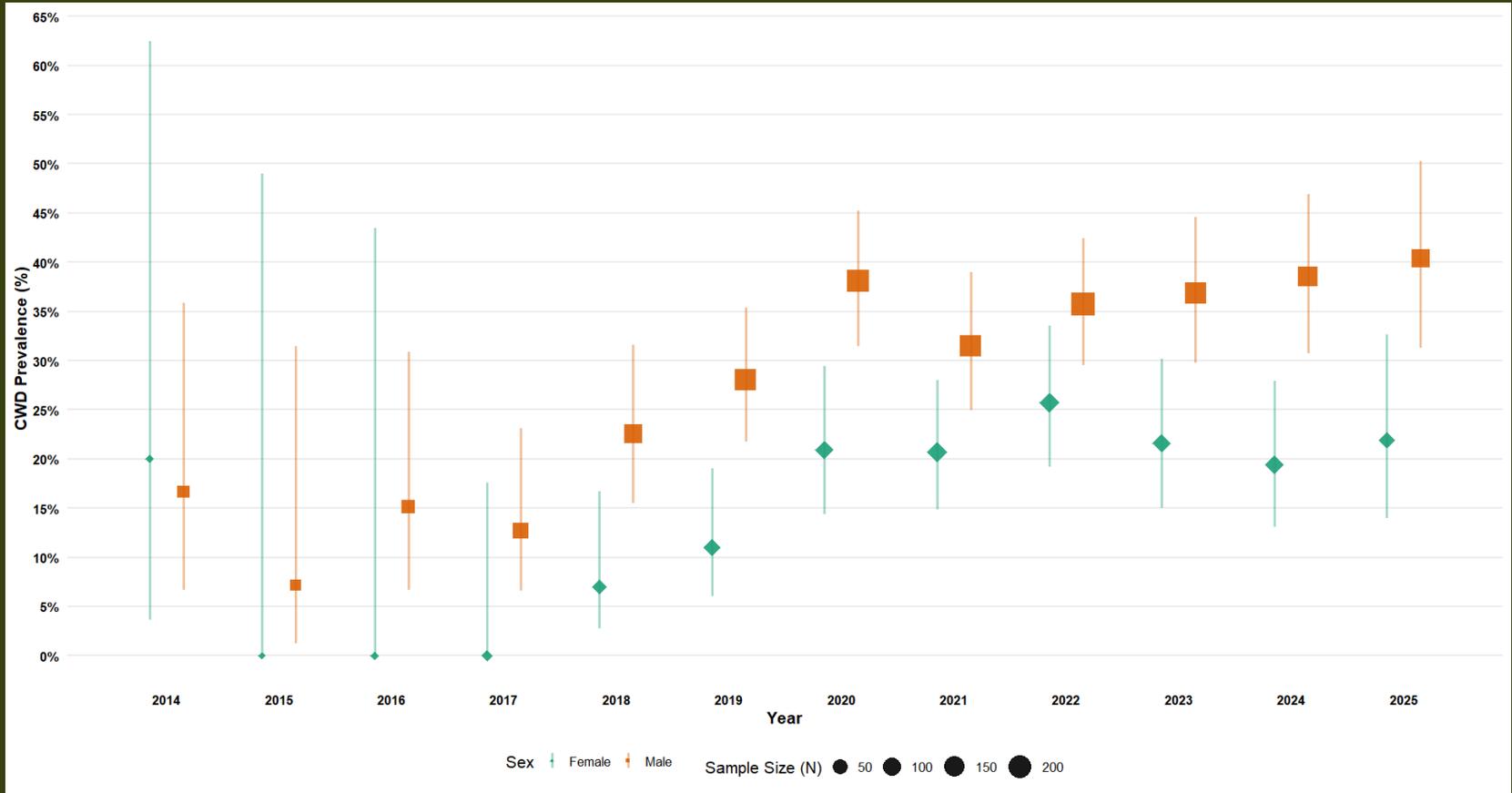
White-tailed Deer CWD Sample Distribution 2014 - 2024



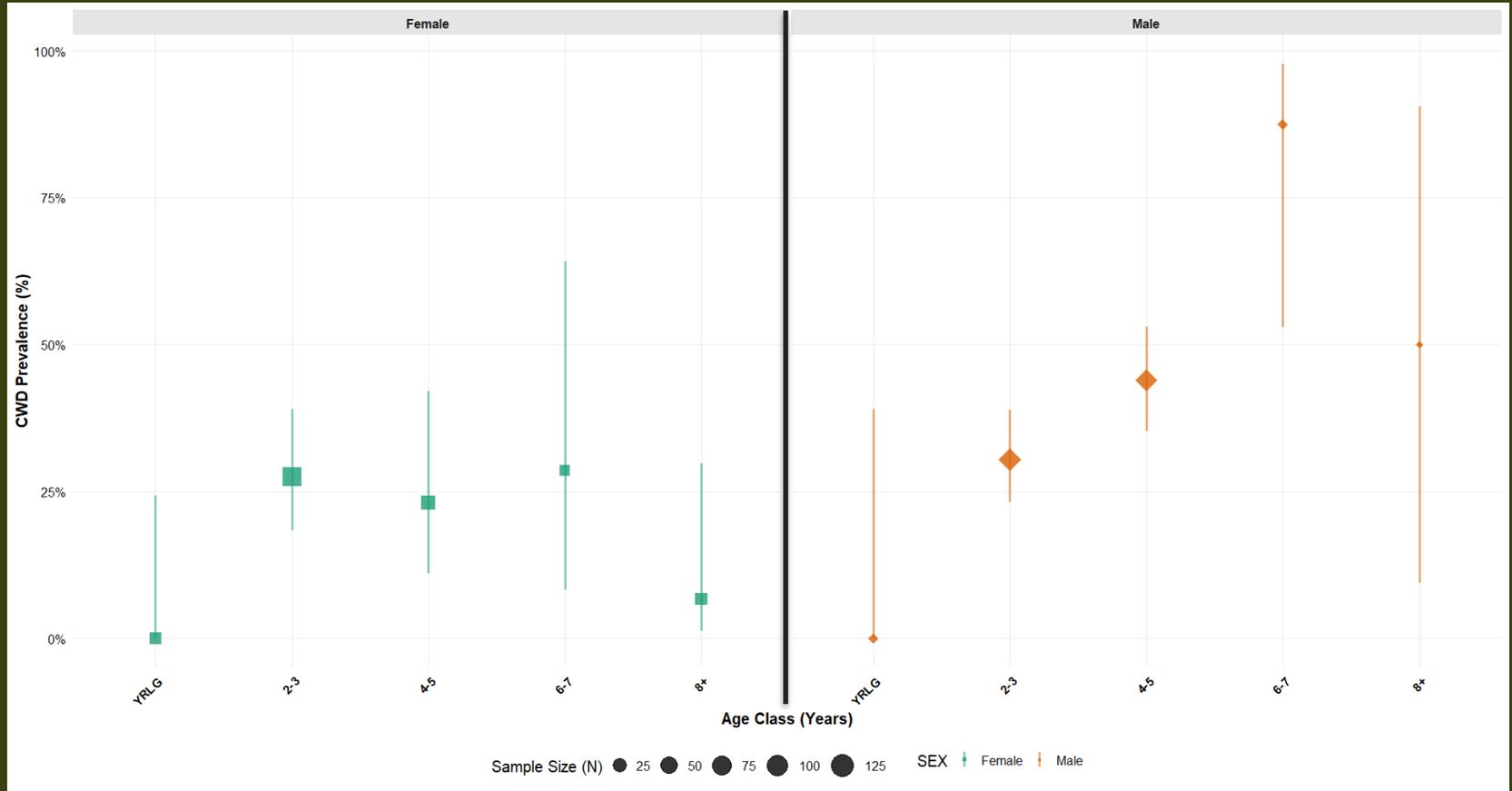
White-tailed Deer CWD Positives Distribution 2014 - 2024



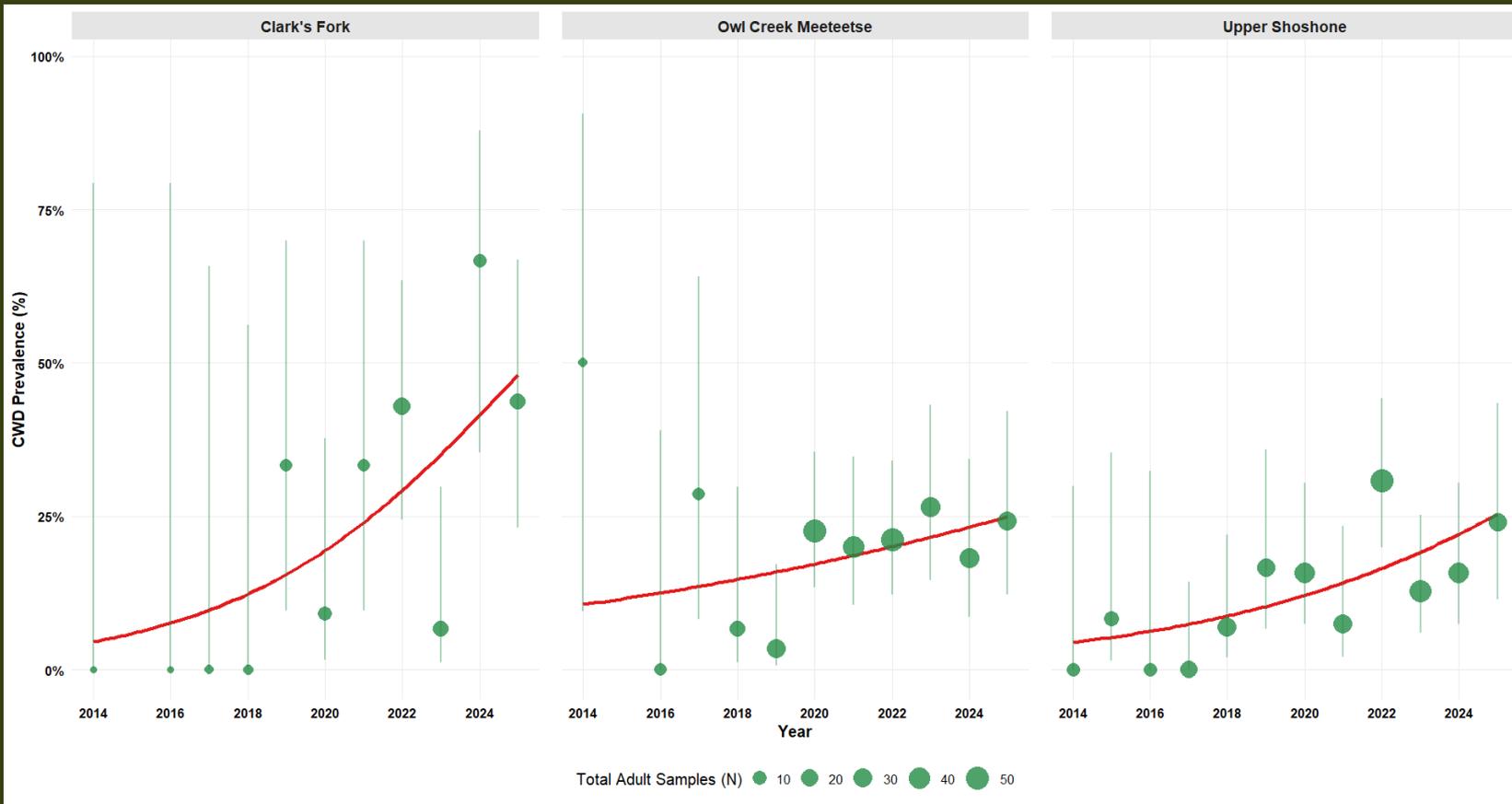
Males vs Females- White-tailed Deer Prevalence (2014-2025)



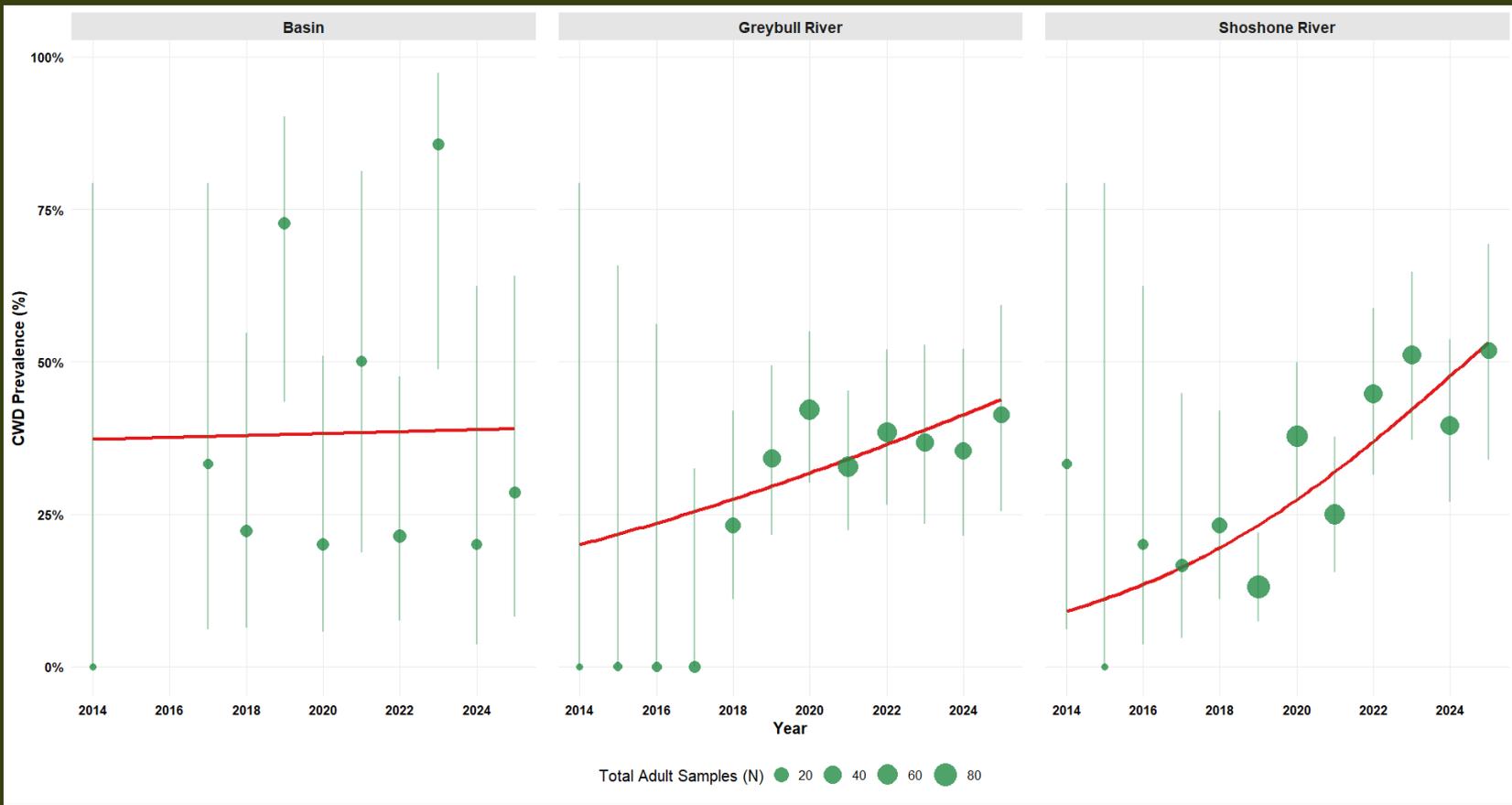
Males vs Females vs Ageclass- White-tailed Deer Prevalence (2014-2025)



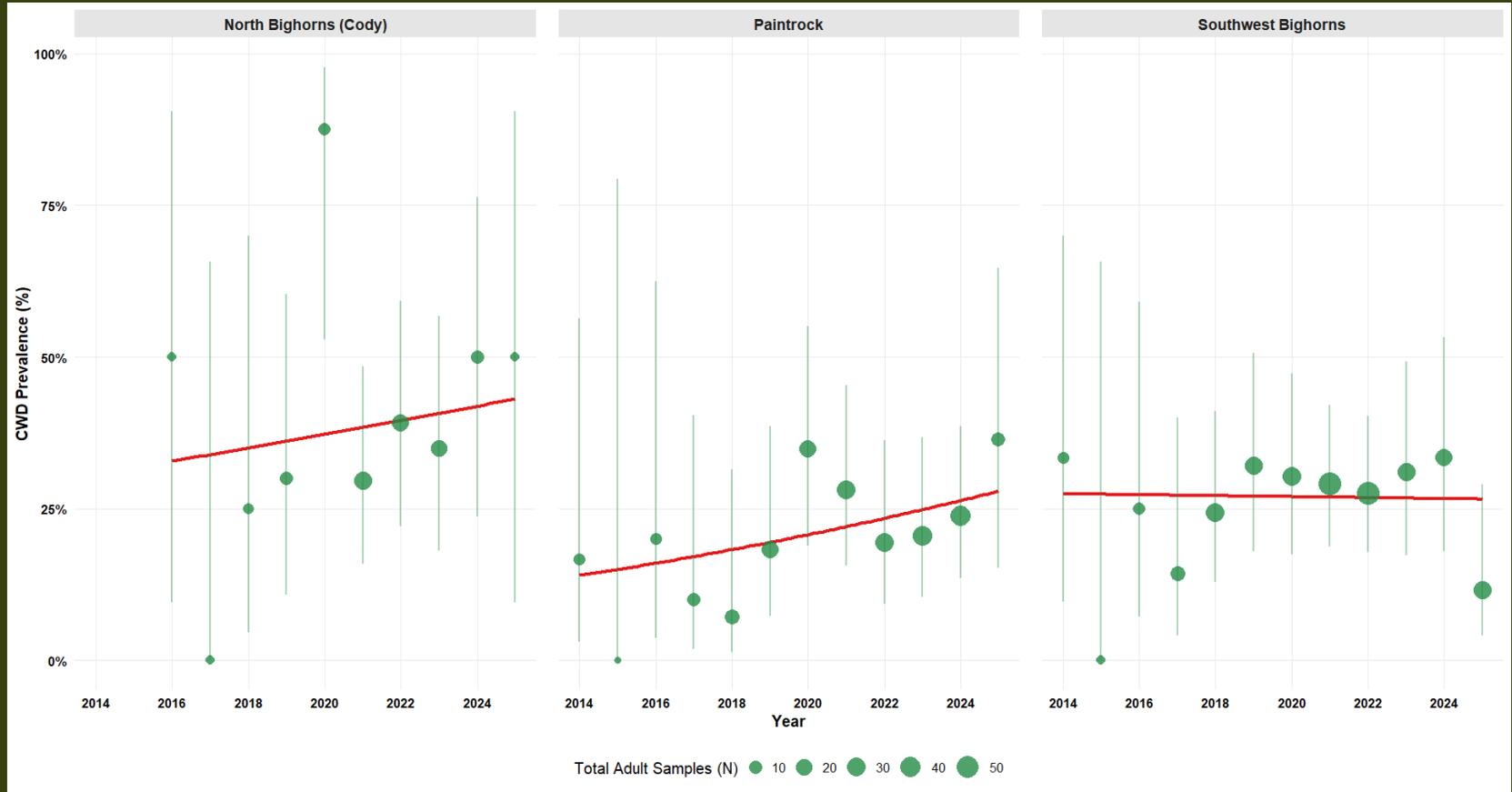
Western Big Horn Basin- White-tailed Deer Adult Prevalence (2014-2025)



Central Big Horn Basin- White-tailed Deer Adult Prevalence (2014-2025)



Eastern Big Horn Basin- White-tailed Deer Adult Prevalence (2014-2025)



Key Takeaways



Demographics (Sex and Age)

- Mule deer bucks higher prevalence than does
- CWD risk peaks in prime-aged mule deer males (4 - 5 year olds) and more consistent across female ages (2 - 8+ year olds)
- White-tailed deer bucks slightly higher prevalence than does
- Less of a pattern across white-tailed deer ages but slightly higher prevalence in older ages



Key Takeaways



Resident Herds and Year-Round Habitat: The “Hotspot” Effect

- Year-round resident herds higher prevalence (e.g., Shoshone River, Greybull River, Basin)
- Concentrated Transmission: agricultural areas lead to higher animal densities and increased contact rates
- Use of the same habitat year-round creates a cycle of indirect and direct transmission
- White-tailed deer primarily resident herds across the Big Horn Basin overlapping with resident and migratory mule deer herds

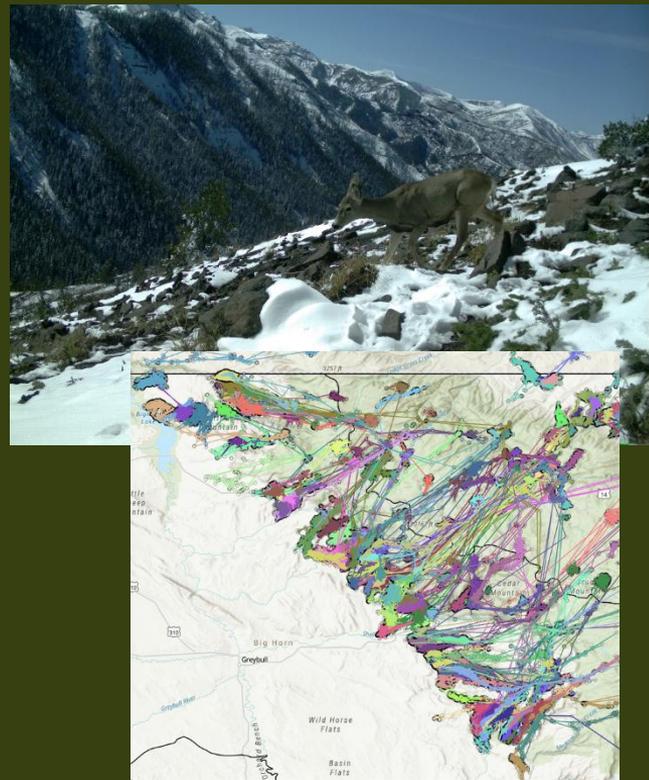


Key Takeaways



Migrations and Movement

- Herds using migration strategies lower prevalence but increasing (e.g., Clark's Fork, Upper Shoshone, Paintrock, SW Bighorns)
- Winter range bottleneck: higher densities on winter range transmission risk spikes
- Overlap with higher prevalence resident mule deer and white-tailed deer on winter ranges
- All migratory herds rising prevalence trends





Management- The Facts



- Emerging science and management data suggest some management strategies are promising
- Populations are being impacted
- Limited published information on effective management
- Prioritize hunting opportunities into management
- Adaptive management approach: learn and adapt over time
- CWD is a long-term disease; Management is no different

Enhanced Data Collection



- Continue surveillance and monitoring to accurately determine prevalence and distribution
- Identify “hotspots” of CWD for possible management
- Identify and pursue research to guide management- field and lab-based studies



Artificial Sources of Concentrations



- Reduce artificial concentrations of deer and elk (e.g., stackyards, silage piles, and feeding/attractants)
- Carcass disposal (e.g., provide dumpsters and access to landfills)
- Targeted removal and testing of cervids showing signs of CWD



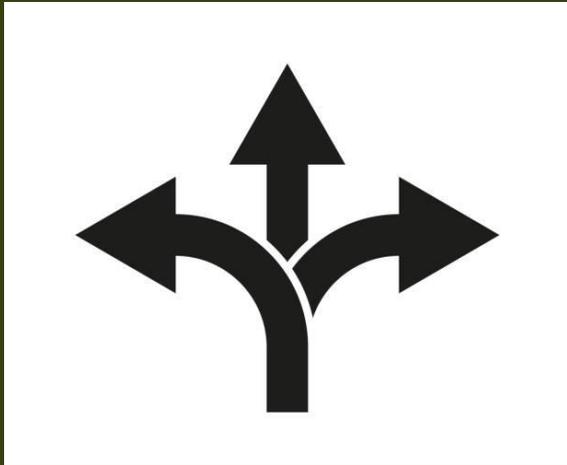
Harvest Management



- Use of hunter harvest strategies to decrease or stabilize CWD prevalence
 - Reduce buck ratios
 - Reduce high deer densities
 - Address “hotspots”
- Primarily focused on deer as elk herds under relatively liberal harvest framework (Big Horn Basin elk herds collectively < 3% prevalence)
- Challenges of implementing harvest management strategies during periods of declining mule deer populations
- Management actions can vary in scope and significance



The Path Forward



- A unique and resilient disease
- Growing distribution
- Herd and environmental persistence
- Limited but promising management

Your Role in Managing CWD:

- Stay informed and ask questions
- Practice responsible carcass disposal
- See something, say something
- Stop the spread at artificial sources
- Support testing and surveillance

Thank You!

