



# Mule Deer Management

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# Mule Deer Management



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# Mule Deer Ecology

- Mule deer are found throughout Wyoming ranging from desert sagebrush ecosystems to high elevation steep mountain slopes
- Important mule deer habitats include mountain shrublands, sagebrush-grasslands, woody drainages, wet meadows, and aspen stands





## Mule Deer Need

- Quality habitat to support a specialized diet
- Fat reserves to survive winter
- Connectivity between seasonal habitats





# Mule Deer Diet

- **Need plants that provide concentrated and highly digestible nutrients**
- **Not as efficient at digesting fibrous material as cattle and elk**
- **Specific types of bacteria in their rumen are required to aid in digestion**
- **Difficulty adapting to dietary changes**





# Body Fat Reserves

- **Body fat can provide up to 30% of a deer's winter energy requirements**
- **Reproductive success is highly dependent upon body condition**
- **Directly attributed to the health of summer and transitional ranges**





# Seasonal Ranges

- **Mule deer have different needs throughout the year**
- **Summer ranges – important for replenishing fat reserves and raising fawns**
- **Transitional ranges (between summer and winter ranges) also key**
- **Winter ranges – allow deer to escape deep snows while accessing important winter foods (shrubs)**
  - WGFD defines winter and crucial winter ranges





# Seasonal Range Connectivity

- **Connectivity between all seasonal ranges is vital**
- **Not all mule deer migrate – year-round residents and some move short distances between high elevation summer range and lower elevation winter range**
- **Some Wyoming mule deer migrate long distances – up to 150 miles from summer to winter ranges**
  - Migrations may take multiple months





# Mule Deer in Wyoming

## Current Status





# Population Decline

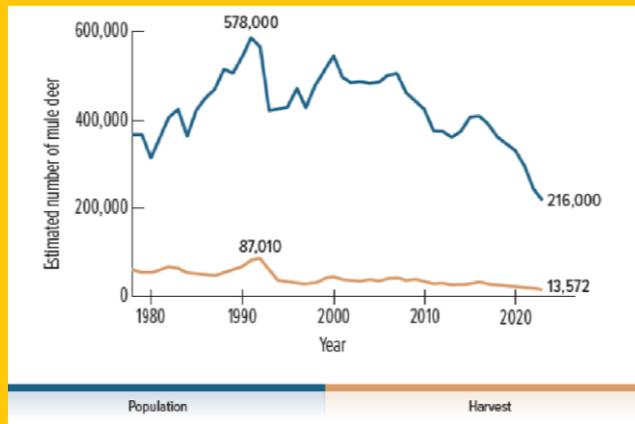
- **Mule deer numbers in the 1960s – 1980s were unsustainably high**
  - Likely higher than prior to European settlement
- **Landscape-scale conversion of habitats as the West was settled**
- **Decades of intensive predator control dating back to early 1900s**





# Population Decline

- Mule deer have been declining in Wyoming and across the West for past 25+ years
- 47% decrease since 2000
- 2024 estimated statewide population of ~231,000 mule deer
- 50% below statewide objective





# Population Decline

- **Fawn survival below what is needed to maintain populations in 18 of past 25 years**
- **Despite low overall mule deer numbers, buck ratios remain strong**
  - Statewide average of 32:100
- **Hunter harvest has dropped by 66% since 2000**





# Factors Affecting Mule Deer

- Variable and changing weather
- Deteriorating habitat conditions
- Increased human development
- Highway collisions
- Disease
- Predation





# Variable Weather

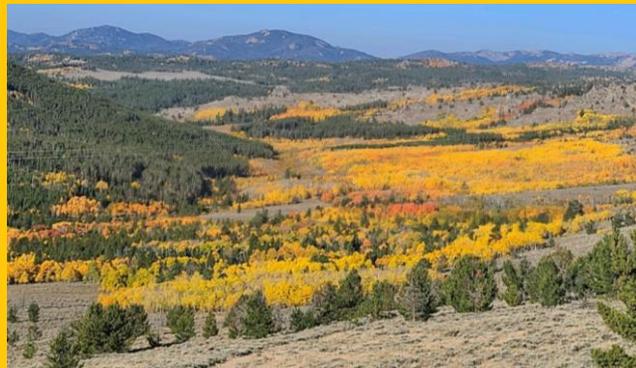
- **Frequent and prolonged drought conditions reduce forage production**
  - Leads to poor female body condition, low fawn birth weights and survival
  - Disease outbreaks – EHD and bluetongue
- **Severe winters can cause substantial die-offs**
  - Periodic severe winters throughout state, especially in western Wyoming
  - Difficulty accessing forage, moving, and navigating fences





# Habitat Conditions

- **Late seral stage aspen and shrub communities**
  - Interruption of natural fire regimes
  - Conifer encroachment in riparian areas and aspen
- **Invasive annual grass infestations**
  - Competes with native shrubs, grasses, and forbs
  - Dries landscape out
  - Can lead to unnatural wildfire cycles





# Fire Suppression

- **Fire is generally good for plant communities important to mule deer**
- **Aspen depend on periodic fires to remove invasive trees**
- **Half of Wyoming's aspen stands have been lost over the past century due to fire suppression**





# Human Development

- **Rural subdivision is expanding across Wyoming**
- **Sprawling subdivisions typically occur in key mule deer habitats**
  - Mule deer winter ranges
  - Cottonwood or willow bottoms along rivers and streams
- **Results in extensive road networks, fencing, vegetation manipulation, horses, pets, motorized vehicles, and human presence**





# Human Development

- **Wyoming is one of the top energy states**
  - Oil and gas, mining, renewables, in-situ uranium, etc.
- **Top state for potential wind development**
- **Infrastructure can impact and fragment habitat if placed in vital habitats**





# Human Development

- **Development pressures continue in Wyoming**

- Oil and gas development occurs on crucial winter ranges in many parts of Wyoming
- Numerous industrial-scale wind developments in various stages of permitting, some of which also occur in key mule deer habitats
- Various transmission lines, small mines, gravel quarries, uranium, pump-backed storage, etc.





# Human Development

- **Leads to cumulative impacts – habitat loss, increased human presence, roads, fences, traffic, noxious weeds, etc.**
- **Mule deer are unable to change their selection for critical habitats or migration routes to adapt – “hard-wired”**
  - Difference between urban and “wild” mule deer
  - Habitat loss through attrition





# Highway Vehicle Collisions

- ~5,500 mule deer per year are hit on Wyoming highways each year
  - Mule deer comprise 85% of all wildlife-vehicle collisions
  - Figure likely conservative
- **Highways can serve as a barrier to long distance migrations and daily or short distance movements**
  - Difficulty navigating ROW fences or high traffic volumes
- **Increased human development = increased road networks and traffic volumes**





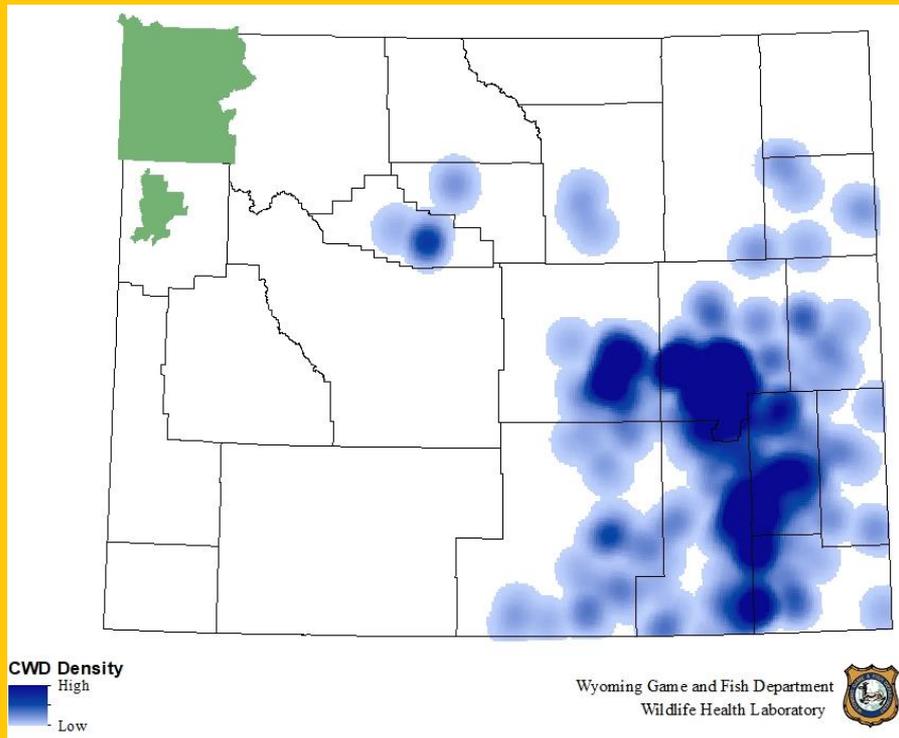
# Disease

- **Chronic Wasting Disease expanding across Wyoming over past 30 years**
  - 100% fatal disease
  - Having population level impacts in many herds
- **Epizootic Hemorrhagic Disease (EHD) and Bluetongue – can cause localized die-offs**
  - Occurs in conjunction with drought conditions
  - Affects white-tailed deer more

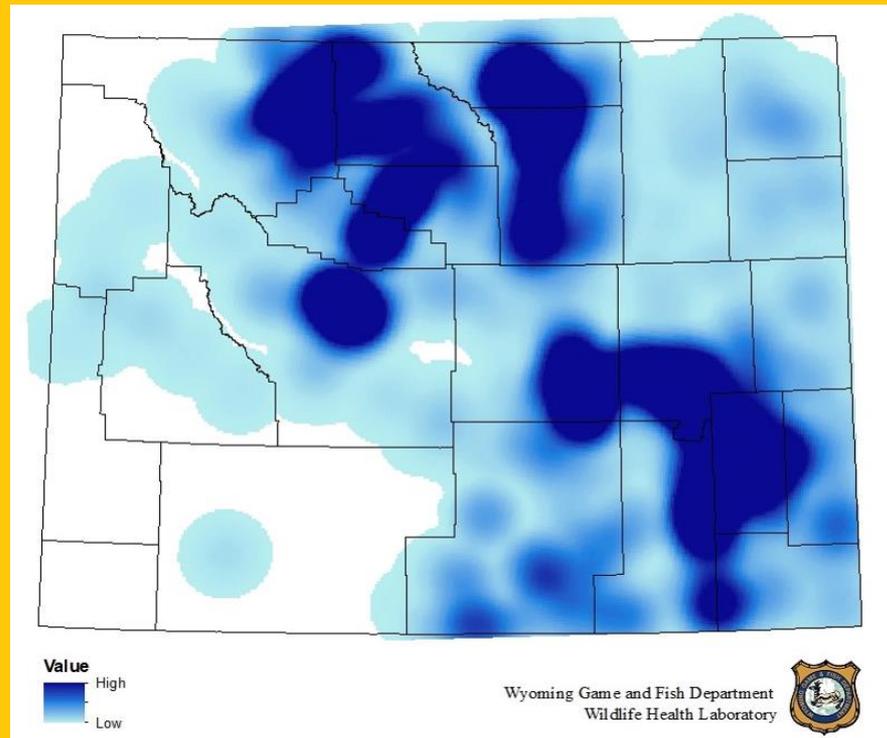




# CWD Density in Deer 1998 - 2024



1998 – 2005



2006 – 2024



# Competition

- **Expanding elk populations in much of Wyoming**
  - Central and eastern WY and Bighorn Basin
  - Elk occupying landscapes that were vacant 30 years ago
- **Expanding white-tailed deer populations in portions of Wyoming**
- **Effects of competition are very difficult to tease out**
  - Mule deer declines where there are no elk or WTD





# Predation

- **Predator populations have expanded over past two decades following long-term eradication efforts beginning in early 1900s**
- **Predation pressure on mule deer now reflective of more natural levels**
- **Plays a larger role in regulating mule deer populations especially when they are low to begin with**





# Population Monitoring and Research

- **WGFD and Commission continue to make considerable investments in mule deer**
  - **Population monitoring**
  - **Research**



# Population Monitoring

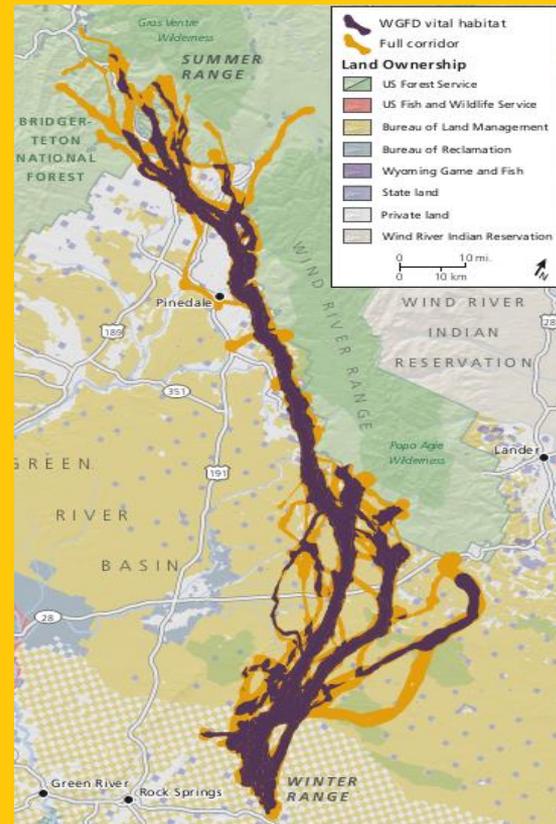
- **Sex/age composition surveys – proportion of bucks, does, and fawns**
  - Antler classifications
- **Sightability surveys – number of animals in a herd**
- **Number of animals harvested**
- **CWD prevalence**
- **Habitat conditions and weather data**
- **Population modeling / estimation**





# Mule Deer Research

- **Research designed to answer difficult ecological and management questions to better understand...**
  - Mule deer movements and migrations
  - Survival (how many animals live through year)
  - Causes of death
  - Disease – primarily CWD
  - Nutritional ecology
  - New survey techniques and technology





# Mule Deer Research

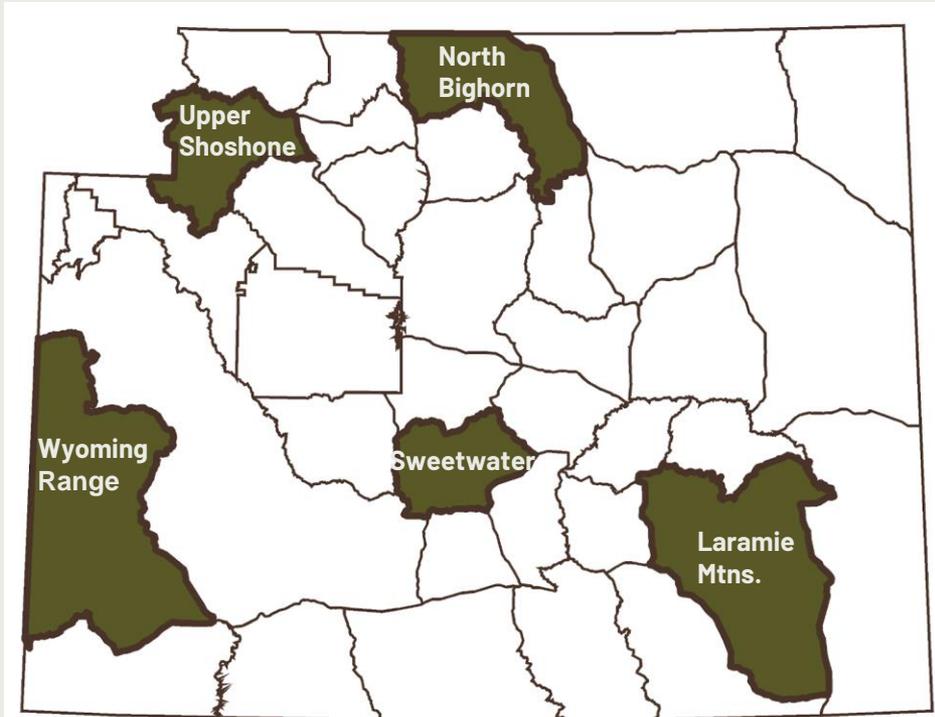
- **Research being conducted throughout Wyoming**
- **WGFD-led projects**
  - Focal herd project, migration work, movement and survival studies, CWD dynamics, habitat selection, etc.,
- **Collaborative projects with UW / universities**
  - Projects led by Dr. Kauffman, Dr. Montieth, Dr. Merkle, others
- **Projects led by other agencies or consultants**
  - Dr. Sawyer, Dr. Middleton, USGS, others

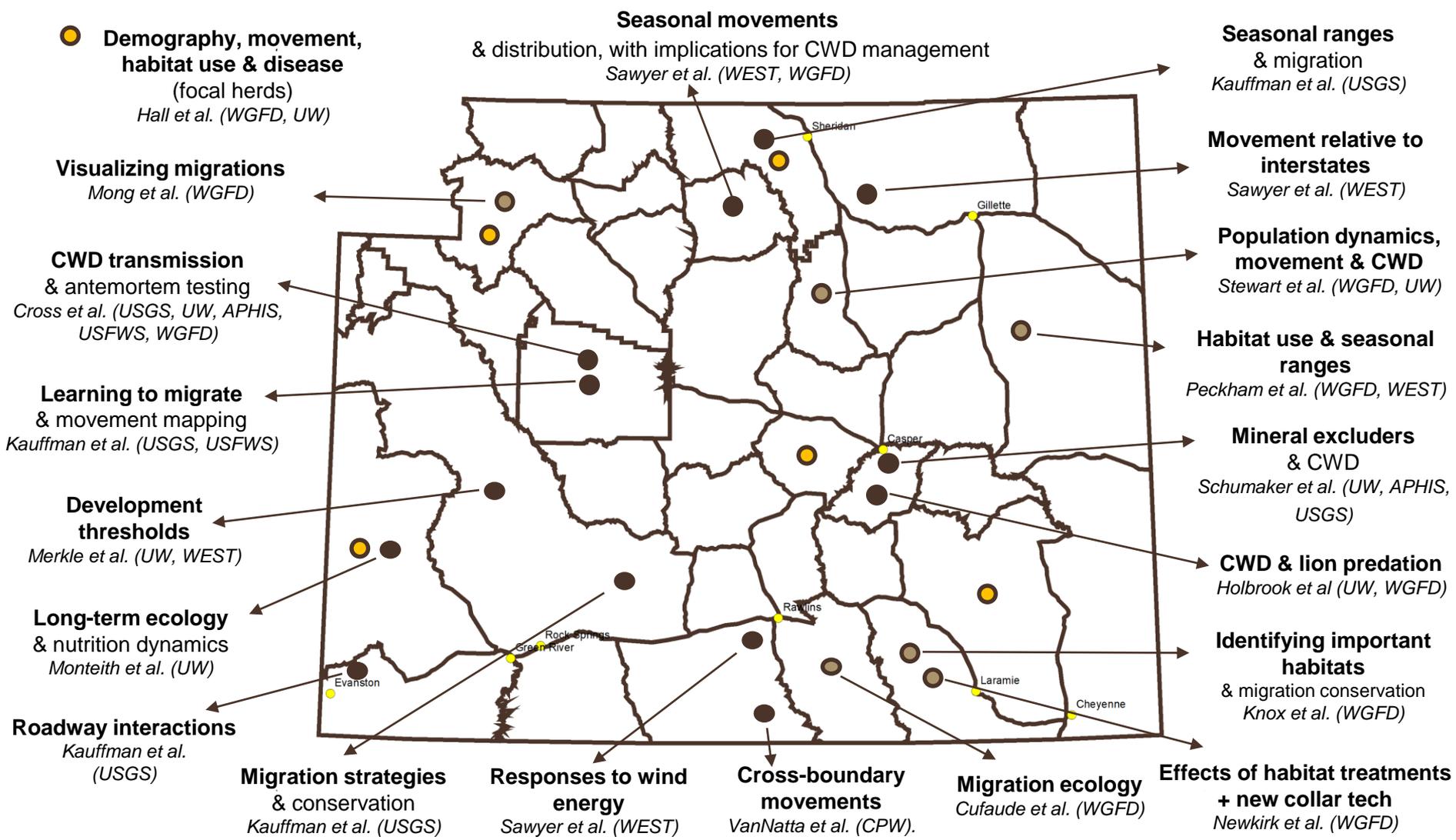




# FOCAL HERDS

Launched Nov 2022







# Mule Deer Management and Conservation

- **WGFD and Commission dedicated to long-term mule deer conservation**
- **Conservative hunting seasons and extensive public engagement**
- **Investment in habitat work, research/monitoring, and connectivity**
- **Understanding effects of development and habitat protection efforts**



# Hunting Seasons

- **Hunting seasons do not affect mule deer population trends in most of Wyoming**
- **Conservative male only harvest in most of state**
  - Provide buck harvest opportunities while balancing public sentiment and hunting quality
- **Very little female harvest permitted**
  - Agricultural damage and disease management





# Mule Deer Public Engagement

- Extensive public engagement on mule deer issues over past 20 years
  - Routine public interactions
  - Checking hunters in fall
  - Mule Deer Initiatives
  - Hunter Attitude Surveys
  - CWD Collaborative Process
  - 2024 Community Conversations

# 2023 Mule Deer Hunter Attitude Survey

- ❑ Survey invite sent to **77,762** resident hunters
- ❑ **7,487** valid responses (**10%**)
- ❑ Satisfaction with mule deer hunting is declining – correlates with mule deer numbers
- ❑ Hunters generally support the current framework with a mix of general and limited quota hunting opportunities





# Mule Deer Conservation

- **Habitat management projects**
- **Conservation easements**
- **Movement and migration studies**
- **Highway crossing projects**
- **Disease management**
- **Managing competition from other species**
- **Predator management**



# Habitat Management Projects

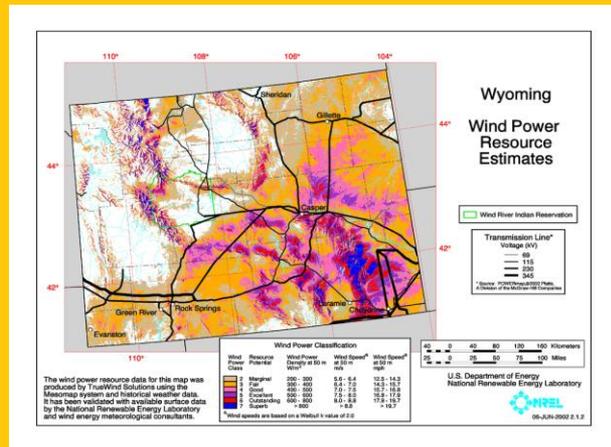
- Invasive annual grasses
- Prescribed fire
- Sagebrush mowing
- Improving aspen stands
- Enhancing riparian habitat
- Protecting and improving connectivity
  - Highway crossing projects
  - Wildlife friendly fence conversion





# WGFD Habitat Protection Program

- Develops recommendations to guide development practices and mitigation measures throughout WY
- Primarily for state and federal projects – oil/gas, wind, solar, mining, transmission, etc.
  - Large and small-scale NEPA projects
  - State-permitted projects via ISC, DEQ, etc.
- Also makes recommendations for municipal and county governments when asked
- Best available science to guide recommendations





# Take Home Message

- **Widespread concern regarding mule deer populations throughout the state and interest to conserve mule deer and their habitats**
- **The Department continues to intensively monitor mule deer populations and take proactive conservation measures where possible**
- **The Department utilizes the best available science to inform development and mitigation recommendations**



# Questions?

