Brucellosis And Its Management on Elk Feedgrounds
Brucellosis (\textit{Brucella abortus})

- Bacterial disease normally associated with cattle that causes abortion.
- Wildlife hosts: Bison and elk
- Susceptible hosts: Broad range of wild and domestic animals
- Zoonotic disease
Brucellosis in Elk/Bison/Cattle

- Transmission: Contact with infected fetuses, fluids, milk
- Clinical signs: abortion, usually in the 3rd trimester, hygromas
- Can cause significant fetal losses in livestock (“abortion storms”)
- Treatment is impractical
- Vaccination in cattle generally prevents disease (not effective in elk)
Brucellosis and Human Health

- Serious zoonotic disease
- Worldwide disease
  - 500K/year reported
- Undulant fever
- Malaise, fatigue, night sweats, depression, muscle and joint pain
- 6-8 week course of oral antibiotics usually clears symptoms (70% if treated early)
- Chronic infections with delayed treatment
Brucellosis & Human Health

Low risk during hunting season

• Bacteria not “active”
  • Can be found in bursa (joints) and lymph nodes
• Normally not found in meat
• Easily killed by cooking

Health risks after February 1st

• Bacteria becomes active in 3rd trimester of pregnancy
  • Fetus and associated fluids become infected
Why is Brucellosis a Problem for the Livestock Industry?

- Decreased production
  - Abortions as well as weak calves
- Transmission to other livestock (e.g. horses)
- Federal/State regulations for positive herds
  - Quarantine (can be very expensive)
  - Test and slaughter of positive animals
    - Loss of valuable animals/genetics
    - Increased testing/veterinary expenses
- Zoonotic
Brucellosis and the Livestock Industry

• A federal/state program began in 1934 - goal of eradication by 1998
  • Except for the GYA, the United States is free of cattle brucellosis

• 2010 establishment of the Designated Surveillance Area (DSA)
  • Within the GYA, ~2.6 cattle/domestic bison herds exposed each year
    • Transmission from elk
Managing Brucellosis in the DSA

• Early detection in “high risk” herds
  • Movement restrictions
  • Increased testing (blood)
  • RB51 Vaccination
    • No silver bullet
    • Prevent abortion, but blood test positive following exposure
  • Quarantine exposed herds
• State maintains “Brucellosis Free” status
Brucellosis in Elk and Bison of the Greater Yellowstone Area
Background Terminology

• Serology (blood tests) measure serum antibody levels
  • Cannot determine if infected – only exposed
  • Seropositive/seroprevalence = antibodies present in blood
  • Live animal test
• Culture confirms presence of *B. abortus*
  • Culture of fetal tissues or lymph nodes
  • Low sensitivity
  • Post mortem (“dead animal” test)
Brucellosis in Elk and Bison

- Introduced into GYA around civil war
  - First detected in bison in 1917, elk in 1930
- Loss of the first calf after infection
  - ~82% abortion rate in bison
  - ~61% abortion rate in elk which leads to ~24% reduction in reproduction of exposed animals (short and long-term effects).
Brucellosis and Feedgrounds

- Seroprevalence on feedground elk averages ~25%-30%
- Seroprevalence in bison ~65% (NER)
Management of Brucellosis on Feedgrounds
WGFD Brucellosis Management

- Integrated approach
  - Surveillance
  - Elk/Cattle Separation
  - Habitat Enhancement
  - Feedground Management
  - Vaccination
  - Adaptive Management
Brucellosis Surveillance in Non-Feedground Elk

- Monitor brucellosis outside of feedgrounds
- Surveillance focused on hunter-killed cow elk
  - 8,000-10,000 blood collection kits mailed to hunters in target elk hunt areas (limited quota)
  - ~1,200–1,400 useable samples (32% successful hunters)
- Statewide coverage every 4-5 years
  - Yearly focus on DSA border
- 30 years of surveillance data (19,500+ samples)
The results of surveys such as this will improve game management through a better understanding of disease in wildlife populations. If you have any questions, please contact the Wildlife Disease Laboratory at 307-745-3885. We appreciate your help and support.

Please complete all information

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<tr>
<th>Hunt Area</th>
<th>Harvest Date</th>
<th>Cow</th>
<th>Calf</th>
<th>Branch Antler</th>
<th>Spike</th>
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Ear Tag #’s (if present)

Kill Location (BE AS SPECIFIC AS POSSIBLE: lat/long, UTM, township/range/section, major drainage, or ranch name)

(5/11)
Brucellosis Surveillance in Non-feedground Elk

Brucellosis Seroprevalance In Cow Elk by Geographic Area 1996-2020

North HU's (Clarks Fork, Cody, Gooseberry, Wiggins Fork)

South HU's (South Wind River, West Green River)
Brucellosis Surveillance in Feedground Elk

Feedground Surveillance
- Monitor brucellosis in feedground populations
- 3-5 Feedgrounds each year
- Seroprevalence over time
Feedground Seroprevalence

Dell Creek 1998-2020

Test & Slaughter – Muddy Cr

During Slaughter

Post Slaughter

% Seroprevalence
Separation of Elk and Cattle

- Winter feeding
- Elk hazing
- Stack yard fencing

FRONT VIEW

- 6” x 12’ Treated Post
- Gate
- 3” x 16’ Barked Pole Brace
- Corner Post
- 94” above ground
- 36” below ground
- 15’ center to center
- 2 rolls 47” woven wire (9 gauge below, 12.5 gauge above)
- Barbed Wire (optional)
Habitat Enhancement
Feedground Management

Carcass Removal

Feeding on clean snow
Strain 19 Vaccination

- Began in 1985; discontinued in 2015
- Vaccinated ~2,500 calves annually
- Total vaccinated 1985-2015
  - 91,145 juveniles (99% avg. vacc/yr)
  - 19,336 adults (67% avg. vacc/yr)
Adaptive Management

March-May is Peak Transmission Period

Longer feeding season = more disease
Adaptive Management

Truncation of feeding season in spring reduces the duration of high concentration.

![Graph showing end date comparison between Dell Creek and Fall Creek pre and post intervention. The graph indicates a reduction in the duration of high concentration post intervention.](image)
Adaptive Management

Disease transmission at the feedline

Adaptive Management

Traditional Feedline Low-Density

75% Reduction in elk-fetus contacts
Elk/Cattle Brucellosis Transmission Risk Assessment

9 years of data from over 700 GPS collars from feedgrounds
Elk locations

- Transmission period (Feb 1 - Jun 15)
- High risk transmission period (Mar 1 - May 15)
Questions?