

Wildlife Health Update

Nevada Wildlife Commission
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Overview

The wildlife health program consists of a veterinarian and a wildlife health biologist

The program is responsible for the investigation and management of wildlife health issues in Nevada

Chronic Wasting Disease

Surveillance and Response Plan





What is Chronic Wasting Disease (CWD)?

- ▶ A fatal neurologic disease of cervids (deer, elk, moose, and caribou).
- ▶ Caused by a misfolded protein called a “prion”.
- ▶ Disease is a transmissible spongiform encephalopathy (TSE)
- ▶ Similar to scrapie (Sheep) and mad cow disease(cattle).
- ▶ Prions are shed in tissues, urine, feces, saliva, and collect most densely in nervous tissues

What is Chronic Wasting Disease (CWD)?

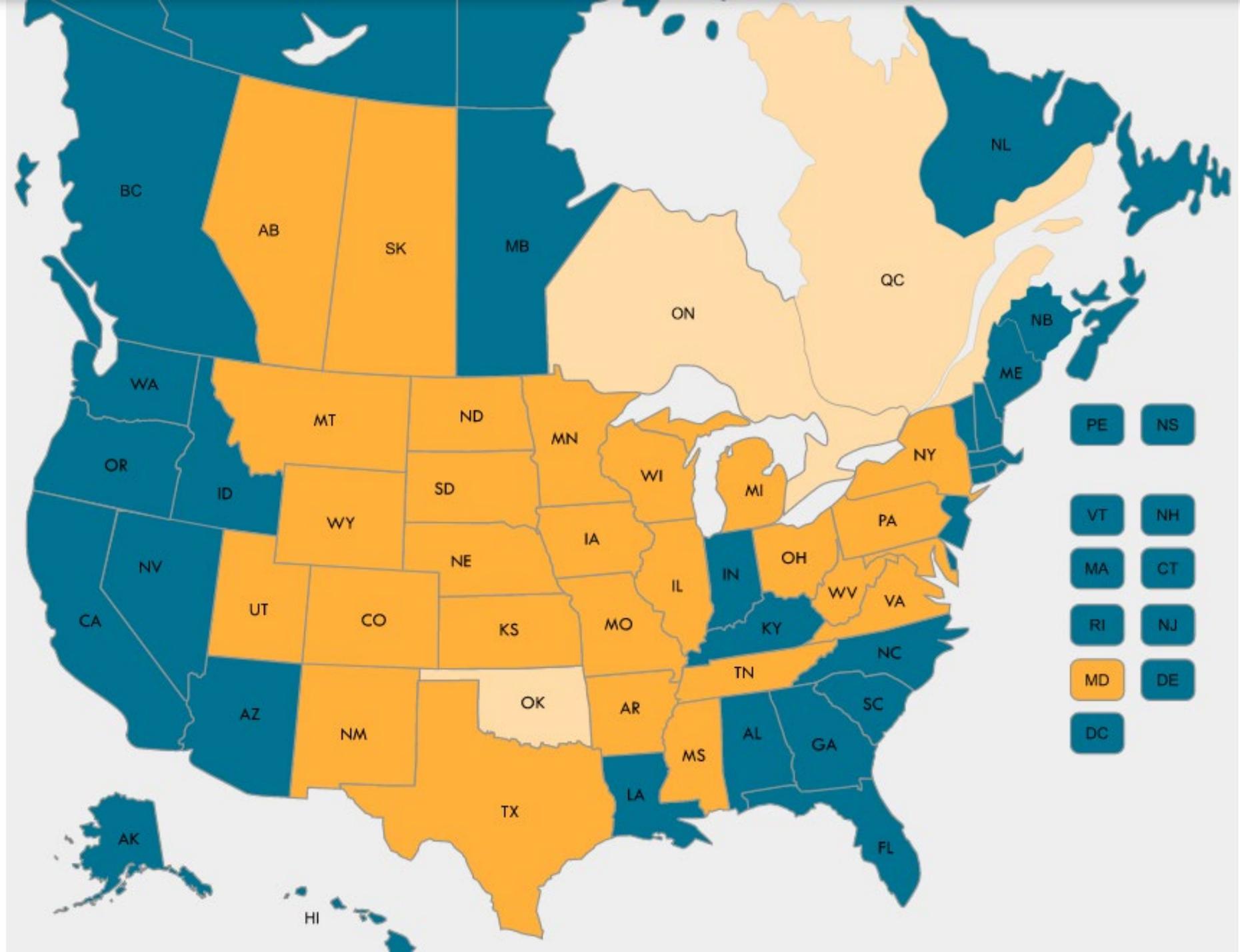


- Prions are incredibly hardy and can last for years on the landscape
- Infection to clinical signs averages 16 months
- Clinical signs to death averages 4-9 months
- 100% fatal



What is Chronic Wasting Disease (CWD)?

- ▶ Was first Identified in Colorado
- ▶ Has spread across much of the US and continues to expand its distribution.
- ▶ Once it enters a state, eradication is almost impossible
- ▶ Prevalence can be greater than 40% in some areas in mature bucks
- ▶ Areas with very high prevalence have seen populations declines

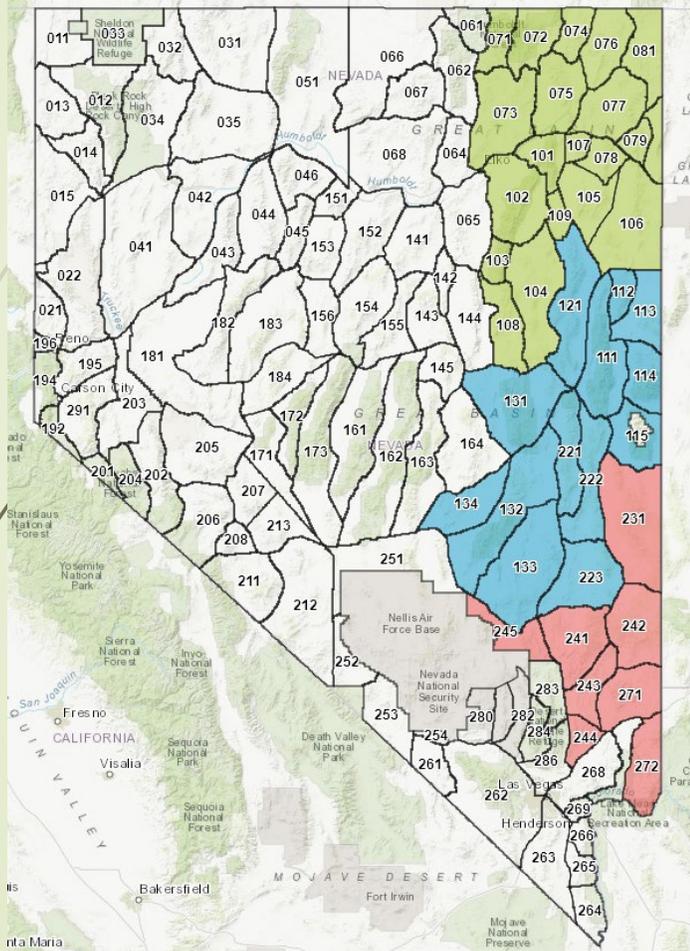




What is the current status of CWD in Nevada?

- ▶ Nevada has never had a confirmed case of CWD
- ▶ In FY21 we sampled 206 Mule Deer and 49 Elk, all were negative
- ▶ Based on FY21 our statewide detection prevalence (the prevalence of disease above which we would expect a positive) was: **1.5% for deer, 5.7% for elk, and 1.2% combined**
- ▶ When we take in the last 2 years of data the detection prevalence was **0.75% for mule deer, 3% for elk, and 0.6% combined.**
- ▶ This give us good confidence that Nevada is CWD free.

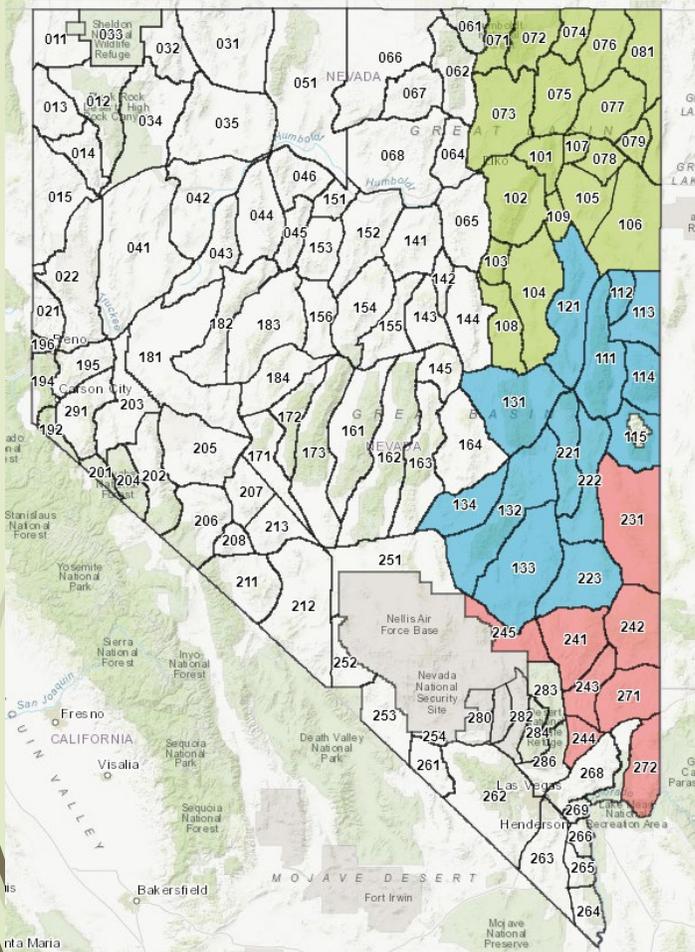
Sampling by Region



➤ For FY 21

Region	Mule Deer	Elk	% Negative
North East	69	18	100%
Central East	40	15	100%
South East	20	9	100%
Rest of State	77	7	100%
Total	206	49	100%

Sampling by Region



► Confidence of Freedom

Point analysis from CWD sampling from last 2 years					
	Points	Population	Confidence	Maximum Prevalence	Maximum Affected
North East					
Total	125.9	29950	0.95	2.38%	713
Elk	29.45	4950	0.95	10.17%	504
Mule Deer	96.45	25000	0.95	3.11%	776
Central East					
Total	129.1	20530	0.95	2.32%	476
Elk	27.6	5630	0.95	10.85%	611
Mule Deer	101.5	14900	0.95	2.95%	440
South East					
Total	65.03	5450	0.95	4.61%	251
Elk	15.8	610	0.95	18.96%	116
Mule Deer	49.23	4840	0.95	6.09%	295
Rest of Nevada					
Total	168.58	41075	0.95	1.78%	730
Elk	24.81	1590	0.95	12.07%	192
Mule Deer	139.57	39485	0.95	2.15%	848
Total State					
All	488.61	97005	0.95	0.61%	595
Elk	97.66	12780	0.95	3.67%	332
Mule Deer	386.75	84225	0.95	0.77%	652



CWD Action Team

- ▶ These are team members that are responsible for creating a surveillance plan and will be responsible for coordinating any response
- ▶ Members include:
 - ▶ Game Division Administrator
 - ▶ Mule deer and elk staff specialists
 - ▶ Wildlife health staff specialist
 - ▶ Game Division Regional Supervisors
 - ▶ Conservation Education PIO
 - ▶ Biologists with responsibility in area of CWD detection



Part 1: Prevention Strategies



Current Prevention Strategies

- ▶ Pre-detection surveillance
 - ▶ Legislation and policies to limit potential for introduction
 - ▶ Improvement in disposal of cervid waste products
 - ▶ Education and outreach to stakeholders
- 



1) Pre-detection Surveillance Efforts

- ▶ Targets eastern Nevada where CWD is most likely to show up first due to presence of CWD in Utah
- ▶ Includes opportunistic sampling from across the state to provide broader coverage
- ▶ Uses a point system to score samples based on likelihood of having CWD.
 - ▶ Examples:
 - ▶ Hunter harvest mule deer buck – 1.0
 - ▶ Roadkill mule deer buck – 2.0
 - ▶ Suspect mule deer buck – 11.5
- ▶ Yearly goals are 450 mule deer points and 105 elk points.
 - ▶ Previously we have targeted 300 samples per year
 - ▶ This will take increased funding and outreach to reach



2) Legislation and Policies

➤ **Senate Bills 85**

- Passed in 2019
- Prohibits the importing of cervid carcasses except for parts that are less likely to lead to CWD prions on the landscape
 - Taxidermy mounts
 - Meat with no spinal column
 - Clean skull plates with antlers
 - Antlers and upper canine teeth

- Allows for the seizure and destruction of prohibited parts



2) Legislation and Policies

- ▶ **NAC /NRS**

- ▶ NRS 571.210 prohibits the live import of any CWD susceptible species
- ▶ NDOW is using the NAC simplification process to update NACs to bring them more in line with best practices for CWD management



3) Disposal of Cervid waste products

- ▶ Surveys are being conducted to understand how taxidermists and meat processors dispose of materials
 - ▶ Landscape disposal of legal parts of out of state deer through gut piles / carcass pits is a potential loophole through which CWD prions could be introduced.
 - ▶ NDOW plans to improve outreach and education
- ▶ For prohibited parts NDOW has identified incinerators and will incinerate any parts that are seized or voluntarily turned over



Part 2: Response Plan



Objectives for CWD detection response

- ▶ Minimize effects of CWD on ungulate populations
 - ▶ minimize spread among herds
 - ▶ maintain low prevalence in infected herds
- ▶ Maximize recreational opportunities
- ▶ Minimize health risks of CWD for humans
- ▶ Maintain public trust and support
- ▶ Use Adaptive Management to evaluate management effectiveness
- ▶ Minimize cost



Phase 1: Initial Response

- ▶ Notification of the following will occur
 - ▶ CWD Action Team
 - ▶ Area Biologist
 - ▶ Directors' office
 - ▶ Nevada Department of Agriculture
 - ▶ Governor's office
 - ▶ Wildlife Commission
 - ▶ The Game division administrator will be the incident commander and the response will follow an incident command structure
- 



Phase I:

Step 1) ID initial response area (IRA)

- ▶ The IRA will be approximately a 10-mile buffer around the initial detection
- ▶ This may be expanded based on understanding of herd dynamics and migration.
- ▶ Herd size, distribution, age ratios, and sex ratios will be determined for the IRA



Phase I:

Step 1) ID initial response area (IRA)

- ▶ A transport restriction (TRZ) will also be established beyond which movement of cervid parts as identified in Senate bill 85 will be prohibited
- ▶ The TRZ will be large enough to allow for animal processing and prohibited parts disposal
- ▶ If a positive is identified more than 5 miles from the initial case, the IRA will be expanded.



Step 2) Establish prevalence within IRA

- ▶ Establishment of prevalence and distribution within the IRA will guide management actions
- ▶ This may be accomplished by:
 - ▶ 1) Regular season hunts
 - ▶ 2) An emergency management hunt
 - ▶ 3) Other
- ▶ All animals killed in the IRA will be required to tested



Step 2) Establish prevalence within IRA

- ▶ Emergency hunts:
 - ▶ NDOW may use the authority presented in CR 19-05 to initiate the hunt and will notify the commission
 - ▶ The hunt may need to begin before an official presentation to the commission can be given
 - ▶ Depending on the distribution and prevalence of CWD there may be a need to expand the emergency hunt beyond 2000 animals.
 - ▶ If greater than 2000 animals need to be harvested NDOW will seek approval from the commission through the formal process.



Step 2) Establish prevalence within IRA

- ▶ Emergency hunts:
 - ▶ NDOW will track harvest through mandatory check ins
 - ▶ NDOW will determine when sufficient animals of each sex and age class have harvested to satisfy surveillance efforts
 - ▶ Existing hunts will not be affected although it is possible that an emergency hunt will be held prior to other hunts. In this case hunters with tags will be notified of the emergency hunt so they can turn in coveted tags.
 - ▶ Dumpsters will be provided at access points for hunters to dispose of parts that cannot be taken out of the TRZ



Step 3) Evaluate surveillance efforts from Phase 1

- ▶ The distribution of CWD will be used to determine if the current established IRA and TRZ are appropriate
- ▶ Once distribution and prevalence is determined, Phase II will be initiated.



Phase II: Long-term management plan

- ▶ If distribution is limited to a small area with low prevalence (<2%) eradication may be attempted, but this situation is unlikely
- ▶ Long-term management will seek to prevent the spread of CWD and keep prevalence below 5%
- ▶ If the prevalence is already >10%, reduction to below 5% may not be possible without unacceptable density reductions
- ▶ As bucks have higher risk for CWD, reduction in buck ratios may be a key component of long-term management.



Phase II: Possible management actions

- ▶ Post-emergency hunt long term management actions may include:
 - ▶ Increased harvest, especially of antlered animals. This could manifest as expanded opportunity for all age/sex classes.
 - ▶ Hot spot targeted removal in limited areas around CWD detections. This may be used especially post an initial detection if prevalence is very low.
 - ▶ Expanded transport restrictions. NDOW will work with processors and taxidermists to help enforcement and to destroy infectious material
 - ▶ Reducing cervid aggregations within a management area by removing or fencing highly localized attractants, hazing, etc.



Evaluation of program efficacy

- ▶ Management programs will be evaluated for each management area (if more than one separate detection occurs)
- ▶ Management plans will be re-written every 5 years to determine if the management actions are having their desired effect and in response to new research
- ▶ Large scale CWD management and surveillance is expensive, and NDOW will seek additional funding to cover this cost.



Communication and Educational outreach

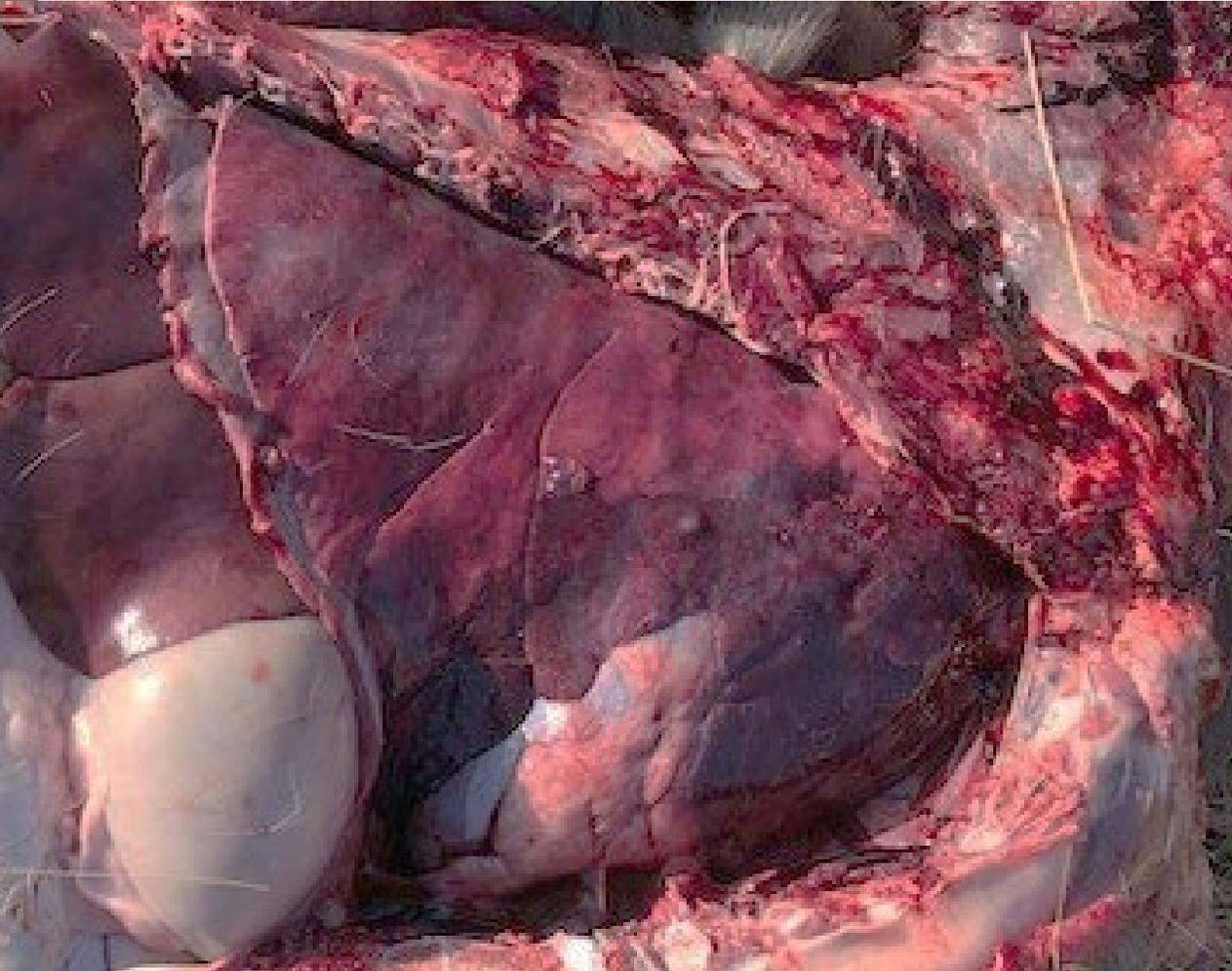
- ▶ Communication is essential in all stages of the plan.
- ▶ We will conduct outreach to the general public, sportsmen/women, processors/taxidermists, stakeholders, and other agencies
- ▶ A CWD specific communication plan will be developed as a cooperation between the Game and Conservation Education Divisions
- ▶ The current communication target is improving awareness and adherence to carcass import requirements and encouraging hunters to get their harvest tested.



Bighorn Sheep Disease



Bighorn Sheep Pneumonia



Pneumonia continues to be the main limiting factor for bighorn herd performance across Nevada.

Mycoplasma ovipneumoniae (*M. ovi*) is a bacteria that initiates a cascade of infection that causes pneumonia.

M. Ovi was historically introduced by domestic sheep and was the major cause of declines throughout their range.



Bighorn Sheep Pneumonia



After introduction, the disease causes an all age die off.

After the die-off, some animals may remain chronically infected.

Chronically infected animals may infect lambs yearly, causing lamb die-offs and a failure of recruitment



Bighorn Sheep Pneumonia



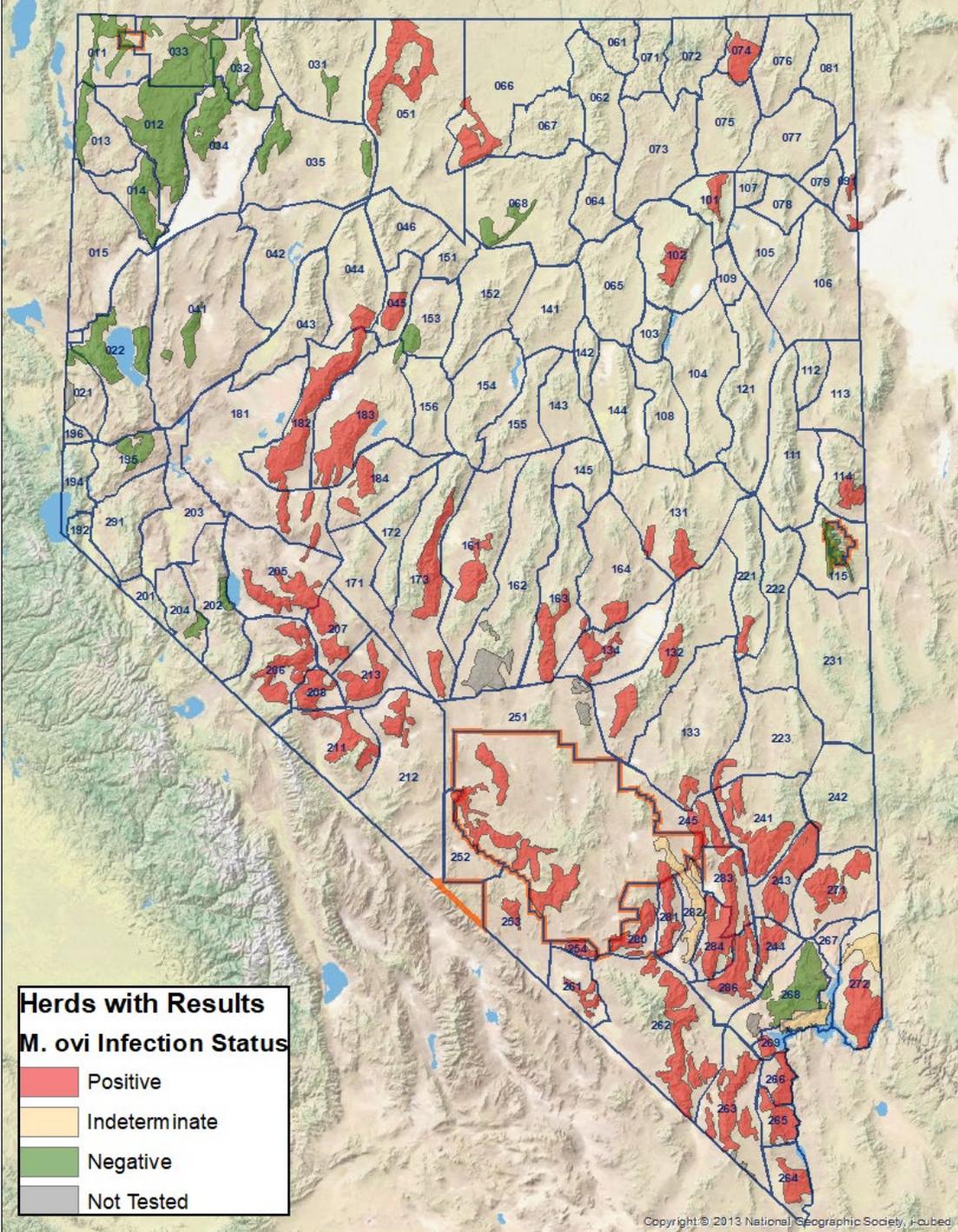
Over the years the lack of recruitment means populations fail to recover from the initial die-off and either stagnate or decline further.

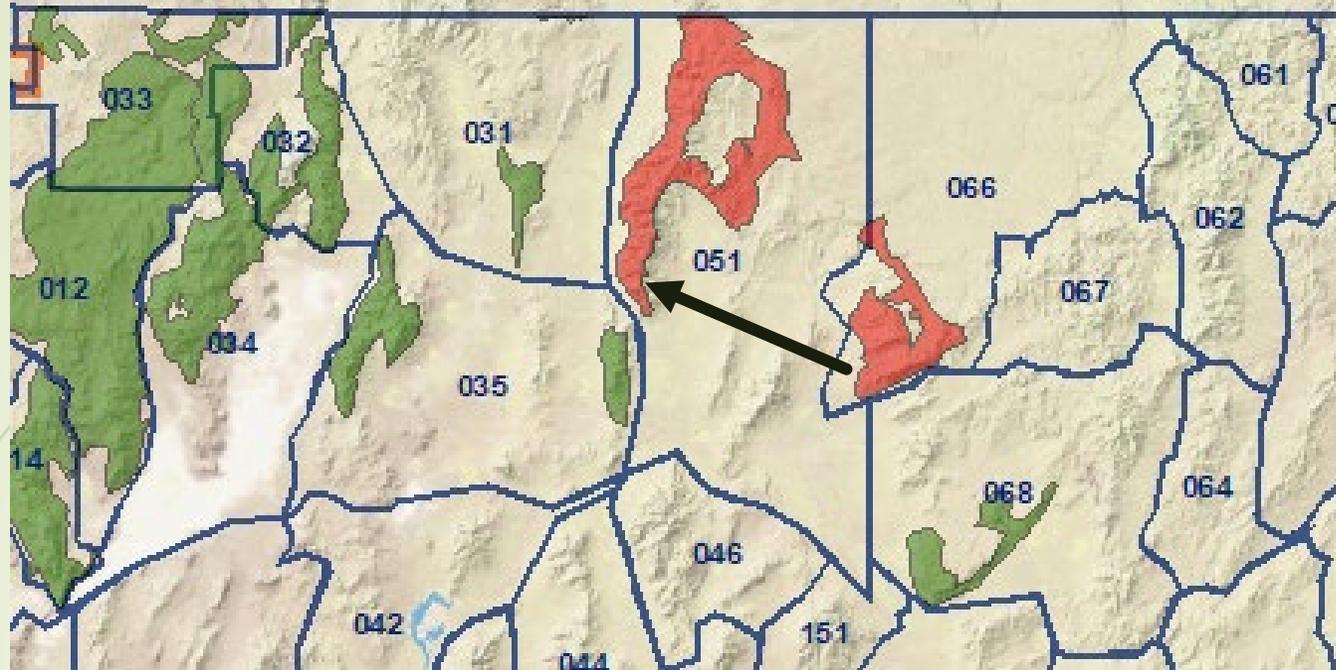


Bighorn Sheep Pneumonia

Current *M. ovi* infection status of herds in Nevada

Strain seems to have a significant effect on herd performance

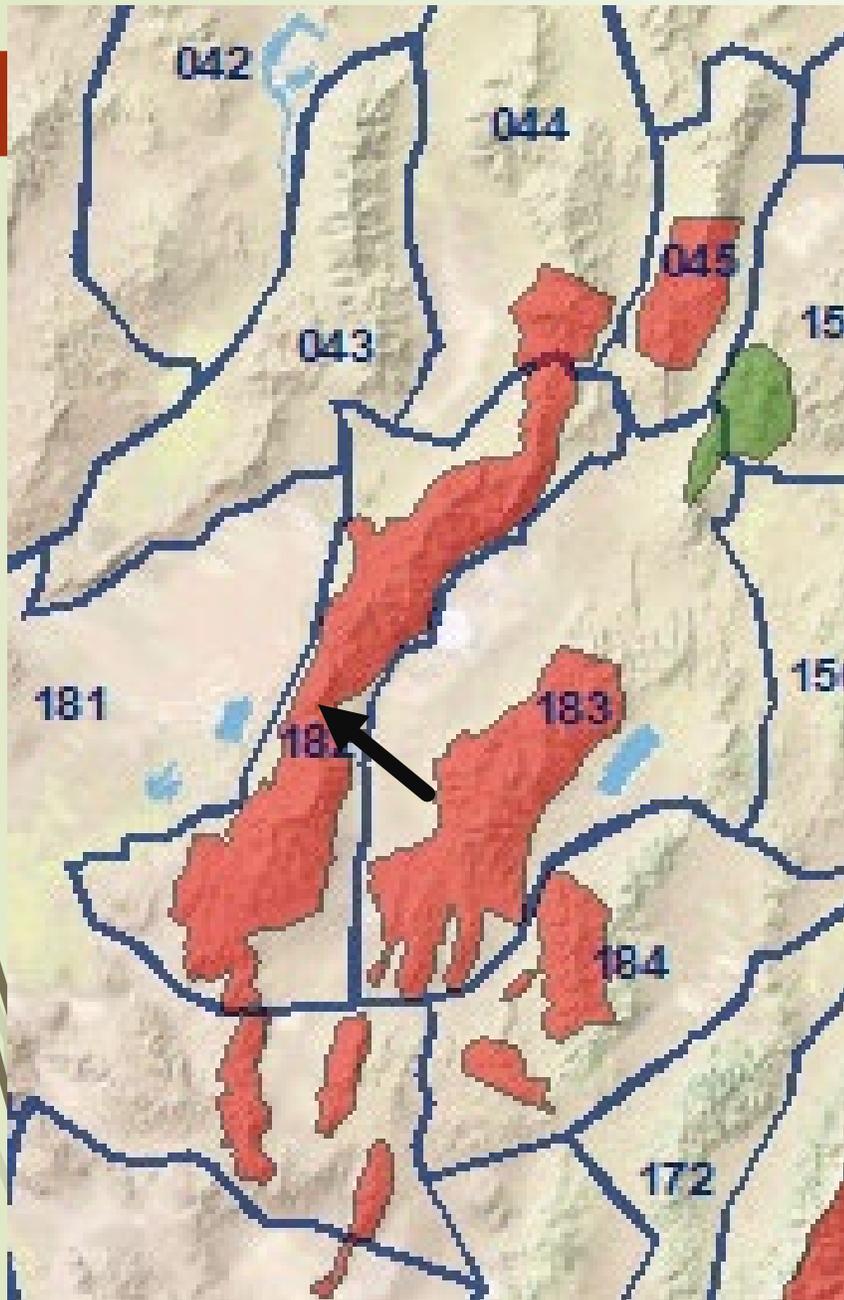




Recent disease movements

Snowstorm strain introduced to the Santa Rosa range in Spring 2021.

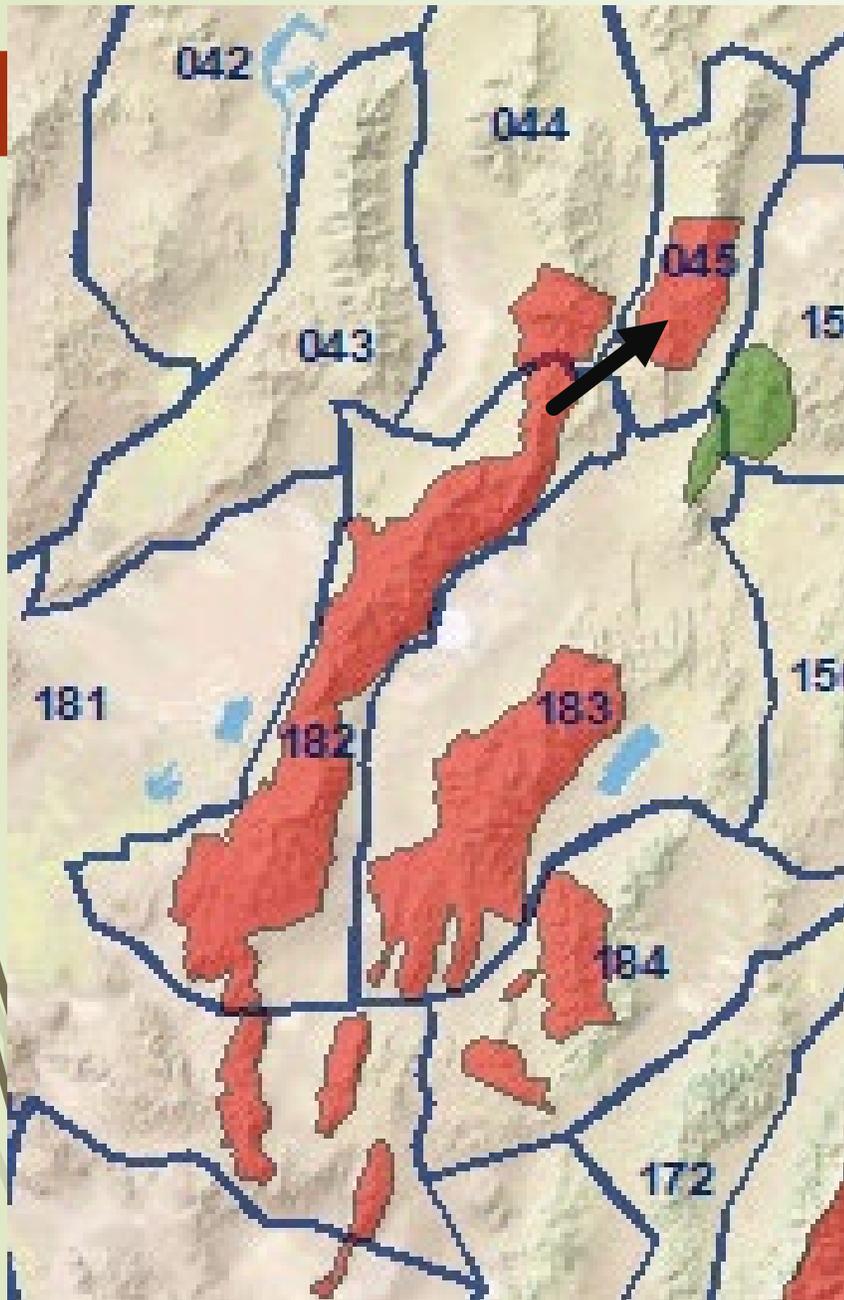
Impact on herd performance is unknown at this point.



Recent disease movements

Fairview slate strain introduced to the Stillwater Range in 2019-20.

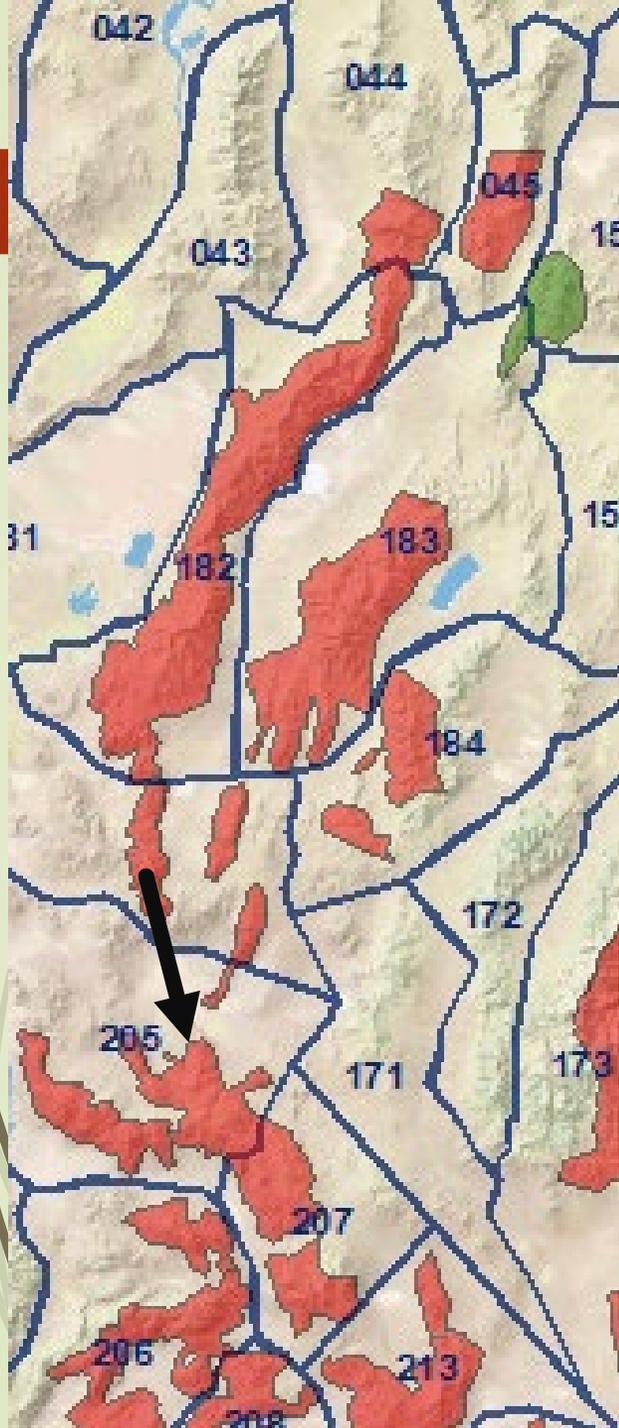
Mortality rate estimated at 35-40%



Recent disease movements

Fairview slate strain introduced to the Tobin range in 2020.

The Tobin range has experienced an all-age die-off of approximately 55% of the herd



Recent disease movements

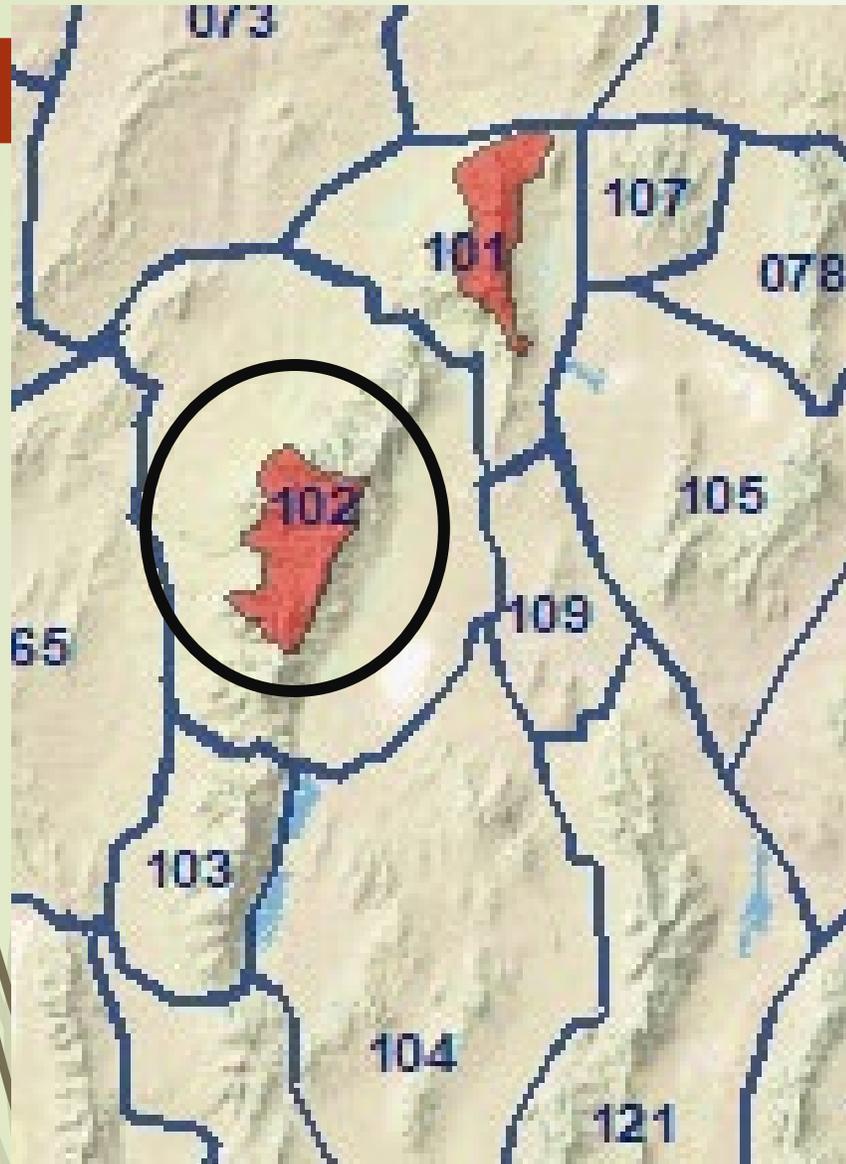
The Fairview slate strain has also moved south into the Gabbs Valley Range in 2020.

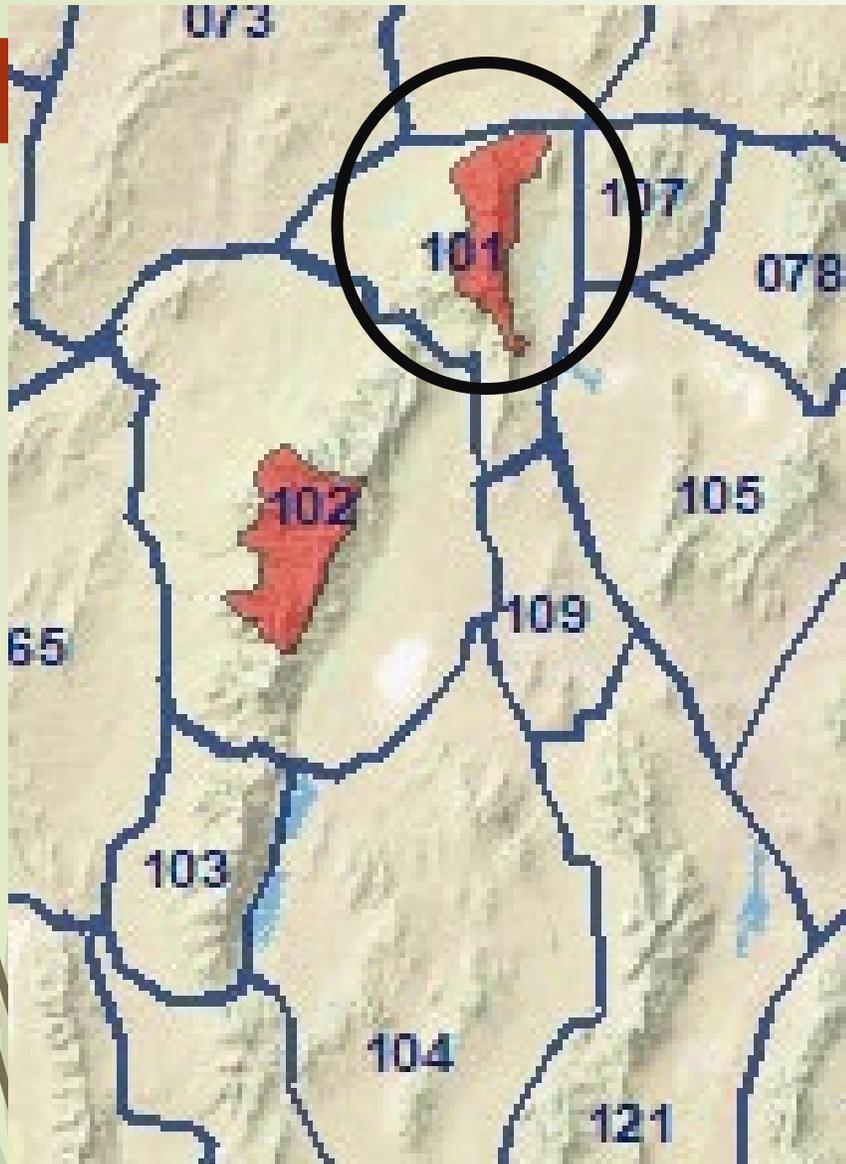
This puts it in easy movement of many more herds.



Good News

2020 captures of Ruby Mountain bighorn in 102 did not pick up exposure to *M. ovi*. This suggests this herd might have cleared *M. ovi*.





Good News

2021 captures of Mountain Goats in unit 101 in the East Humboldt mountains also showed no evidence of exposure, suggesting this herd may also have cleared *M. ovi*.



Current actions

NDOW continues to investigate reports of mortality in bighorn sheep and commingling events between domestic sheep and bighorn

NDOW also uses yearly captures to investigate diseases status of bighorn herds and strain type

NDOW is working on several test and cull projects



Test and Cull Basics

Chronic shedding sheep are the cause of continued lamb mortality

Removing chronic shedding sheep can allow lamb recruitment to recover

This has been tried in several places in North America with varying success

In most instances animals are tested twice for *M. ovi*, at least several months apart.

Animals that test positive in both instances are culled.



Snowstorms test and cull

M. ovi was introduced in 2011 via domestic sheep that strayed into the Snowstorm range

Initial all-age die-off was followed by classic summertime lamb mortality

Herd failed to clear *M. ovi* and a test and cull project was initiated in 2016 with the first round of testing of adult ewes

In 2017 7 animals were removed that were shedding in 2016 and 2017. Six were sent to a university for research.



Snowstorms test and cull

The summer of 2017 (post-removal) showed the best lamb recruitment yet with a ratio of 47:100.

2018 and 2019 also showed successful recruitment

In late 2019 captures several animals were positive including a 1-year-old ram that died with pneumonia.

Summer 2020 showed decreased lamb recruitment (23:100).



Snowstorms test and cull

In 2021 we recaptured all animals positive for *M. ovi* in 2020 and 15 additional animals.

Two animals from 2020 were positive again and were lethally removed

No other animals were positive.

It is too early to know about recruitment for 2021 but we are hopeful we have removed the last of the positive animals.



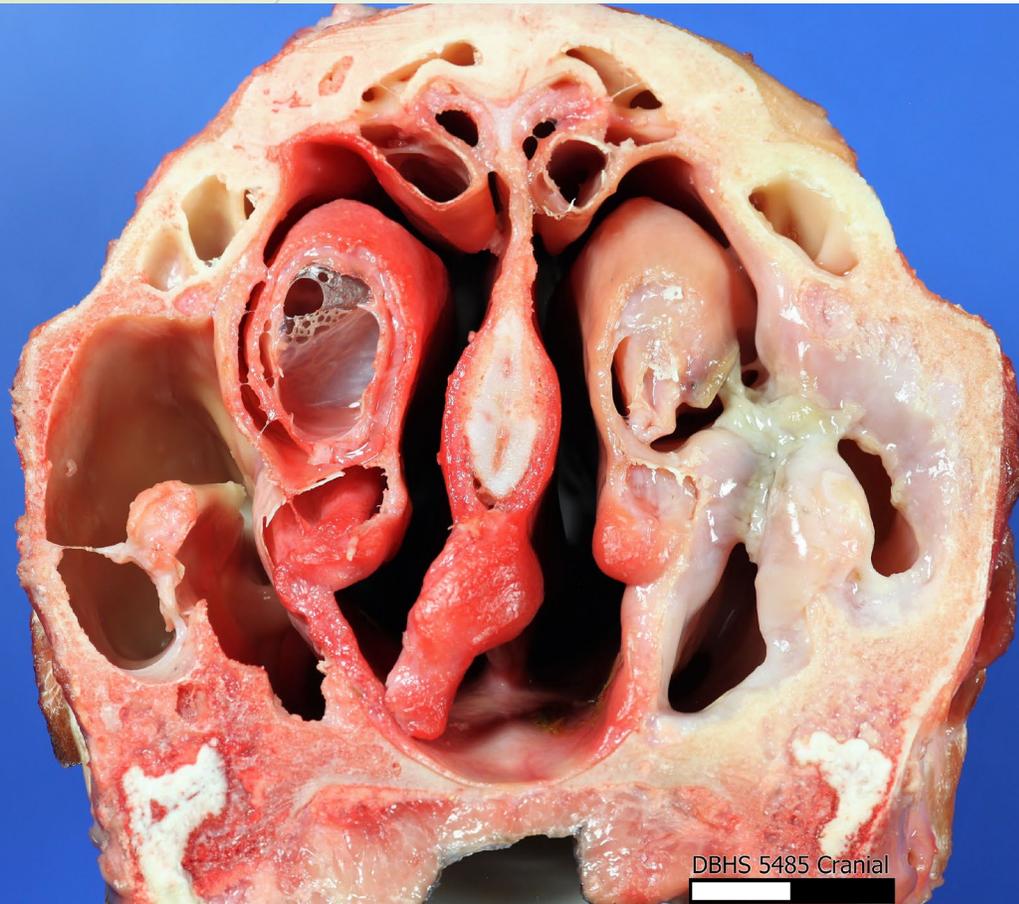
Santa Rosa Range test and cull planning

Unfortunately, in spring 2021, prior to the final test and removal in the Snowstorms, captures revealed the presence of the Snowstorm strain.

In order to prevent the spread of the strain within the Santa Rosas and to prevent the strain from returning to the snowstorms we are embarking on a test and cull project in the Santa Rosa range.

The first captures will begin in late August 2021 in the area where the Snowstorm strain was present.

Bighorn Sheep Sinus Tumor

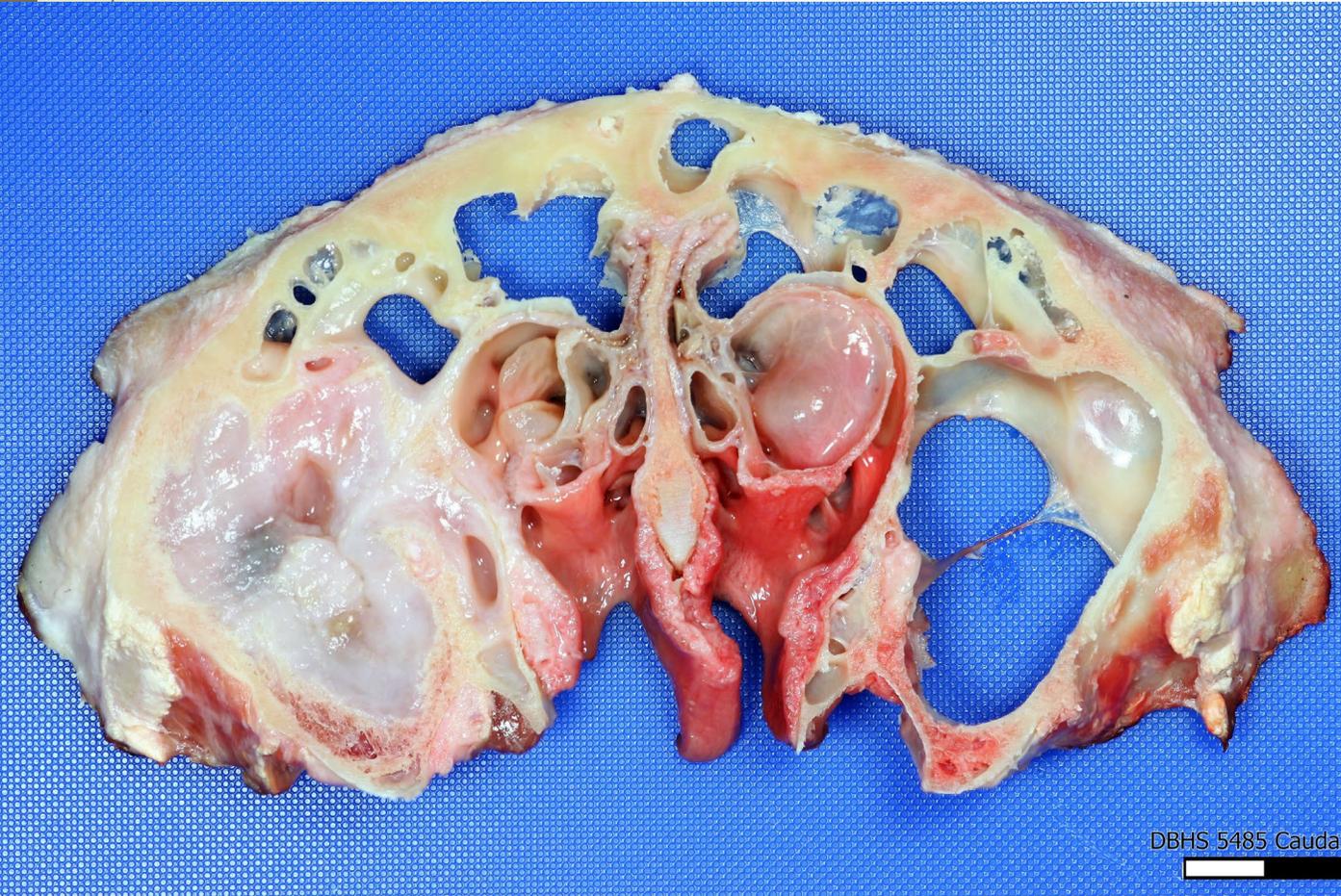


Tumors affect the sinus lining and expand into the sinus cavities.

Tumors are contagious but the pathogen is unknown

The presence of sinus tumor may inhibit the clearance of *M ovi*.

Bighorn Sheep Sinus Tumor

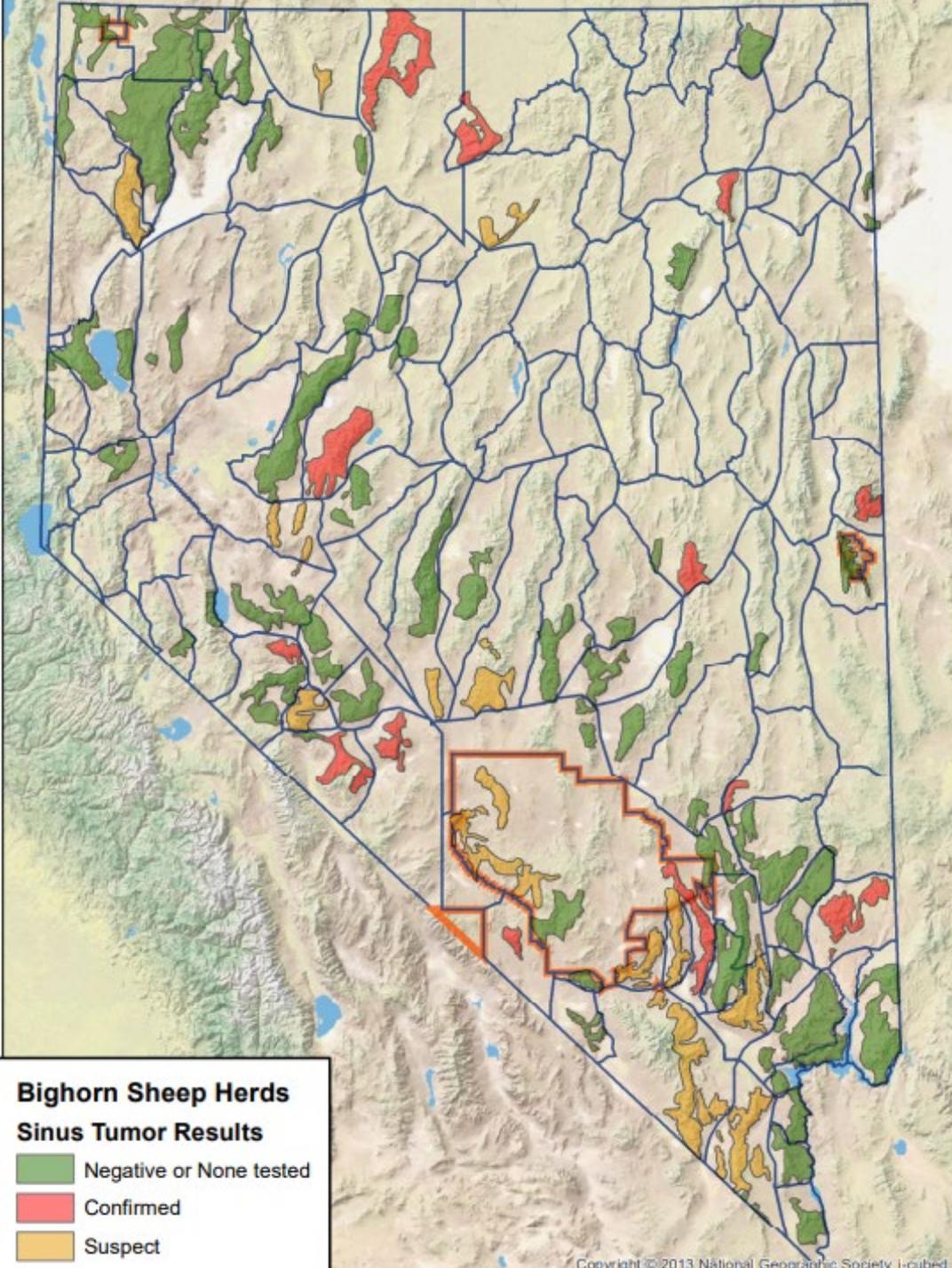


NDOW is further investigating the role sinus tumor plays in *M. ovi* outbreaks and chronic shedding

NDOW is also currently investigating the distribution and prevalence of sinus tumor among bighorn herds.



Current Distribution of Sinus Tumor in Nevada





Bighorn Sheep Sinus Tumor

Initial data collected by NDOW has shown a higher incidence of *M. ovi* shedding in hunter harvests in those with sinus tumor.

4/7 (57%) vs 0/16 (0%)

There may be bias based on herds sampled and it is too small of a sample size to make conclusions yet.

We are continuing to sample heads submitted by taxidermists and from mortality investigations.



Domestic Sheep Investigations

Presence of domestic sheep is a great risk to bighorn herds and prevents us from re-introducing sheep to many historic ranges in Nevada

NDOW is currently working with Nevada woolgrowers and academic partners on initiating research into *M. ovi* dynamics in domestic sheep

The end goal of this project is to determine if domestic herds can be cleared of *M. ovi* to reduce this risk of transmission to bighorn.



Rabbit Hemorrhagic Disease



RHDV2 overview



RHDV2 (Rabbit Hemorrhagic Disease Virus 2) is a foreign animal disease that was introduced in the US in March 2020.

The disease first appeared in eastern Arizona and western New Mexico and has seen spread throughout the west.

The disease causes >80% mortality in domestic rabbits.

The mortality rate in native lagomorphs is unknown but appears to be lower.

Cottontails, jackrabbits, and pygmy rabbits are susceptible. The susceptibility of pikas is unknown.



RHDV2 overview



The impact of RHDV2 on native rabbit populations is unknown.

NDOW is currently investigating rabbit populations through annual surveys.

The impact of RHDV2 versus drought is difficult to discern.

There are concerns about significant impacts to ecological systems due to the loss of prey base.

RHDV2 distribution nationally



USDA 2020-21 Rabbit Hemorrhagic Disease -- Affected Counties as of July 8, 2021



Legend

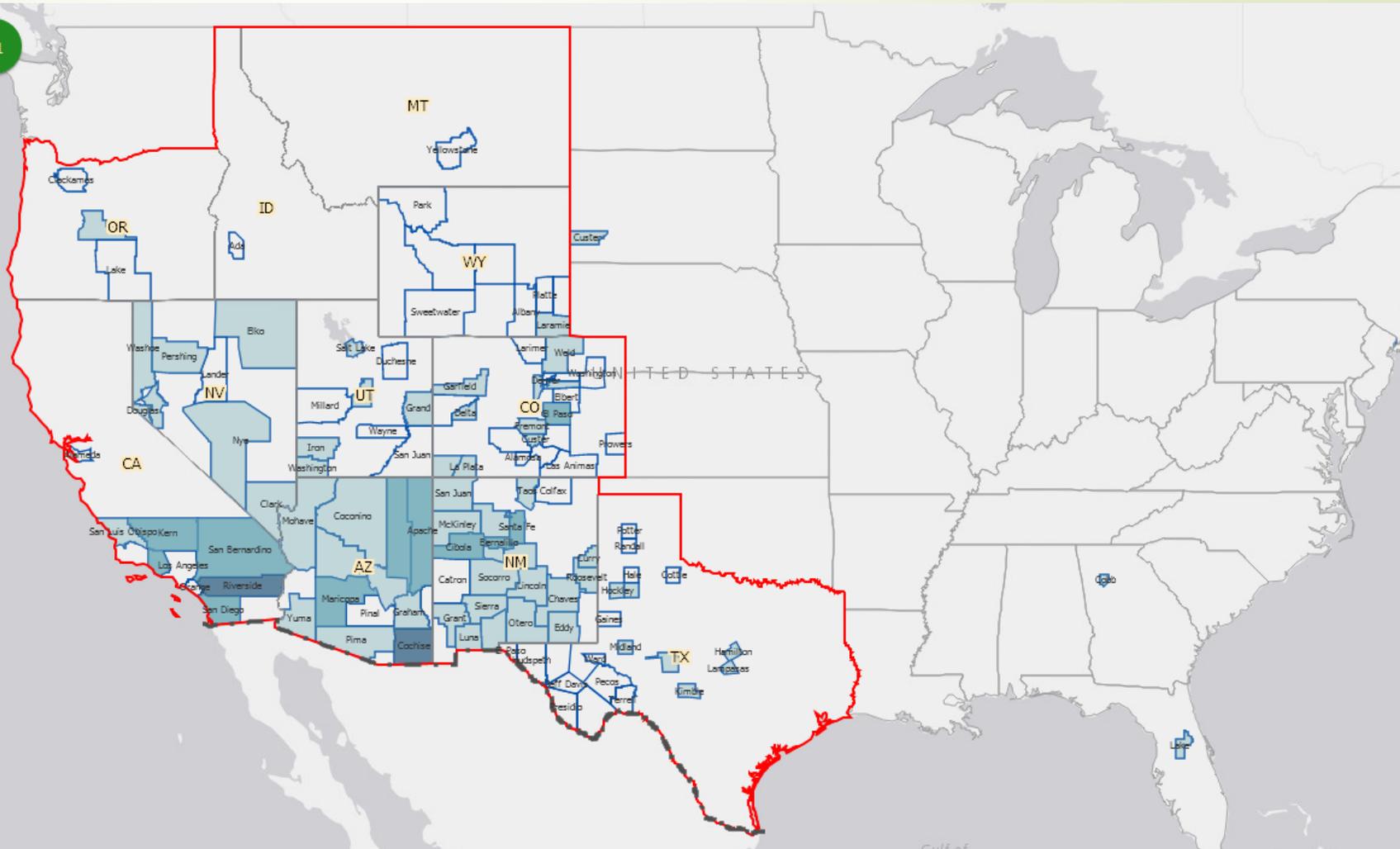
Stable-Endemic Area

Domestic Cases Summary Mar 2020 - July 8, 2021

Domestic Cases to Date

- 8 - 15
- 4 - 7
- 1 - 3

Affected Counties Domestic and Wild



Pacific Ocean

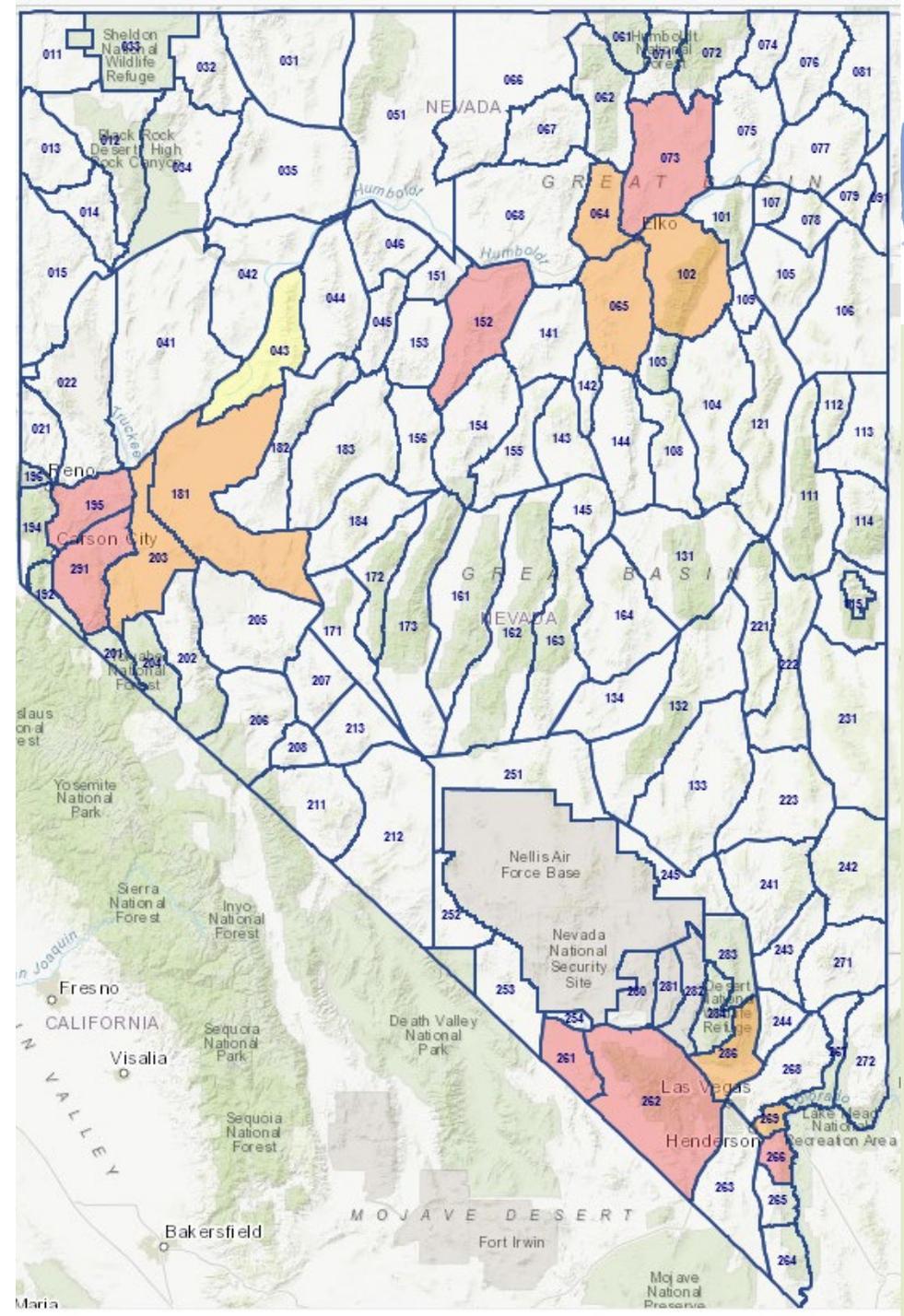
Gulf of



RHDV2 current distribution in Nevada for wild rabbits

Units RHDV2

-  Confirmed
-  Suspect
-  Ferals only confirmed
-  Other





Efforts to control RHDV2

Once on the landscape there are no major ways to control RHDV2

Control on the disease has focused on informing the public to not move rabbits or rabbit products and to clean shoes and equipment used where dead rabbits are found.

Disposal of rabbit carcasses on private properties via burial or municipal waste can help.

We have more information available at:

http://www.ndow.org/Nevada_Wildlife/Health_and_Disease/Rabbit_Hemorrhagic_Disease_Virus-2/



Encephalitis of Black Bears



Black Bear Encephalitis Overview



A condition in bears causing encephalitis (inflammation of the brain) was first noticed in Nevada in 2014.

Affected bears are usually small, undersized, and malnourished yearlings.

Bears may have obvious neurological signs (i.e. head tilt), may be lethargic, and often appear to be overly habituated.

While discovered in Nevada, more cases have occurred in California



Black Bear Encephalitis Overview



NDOW and CDFW have launched an investigation to find out the cause of this encephalitis.

Work with Oregon State University has demonstrated several previously unknown viruses, but the role they play is unknown.

Current work is focusing on other causes of encephalitis as well as work up of all cases.

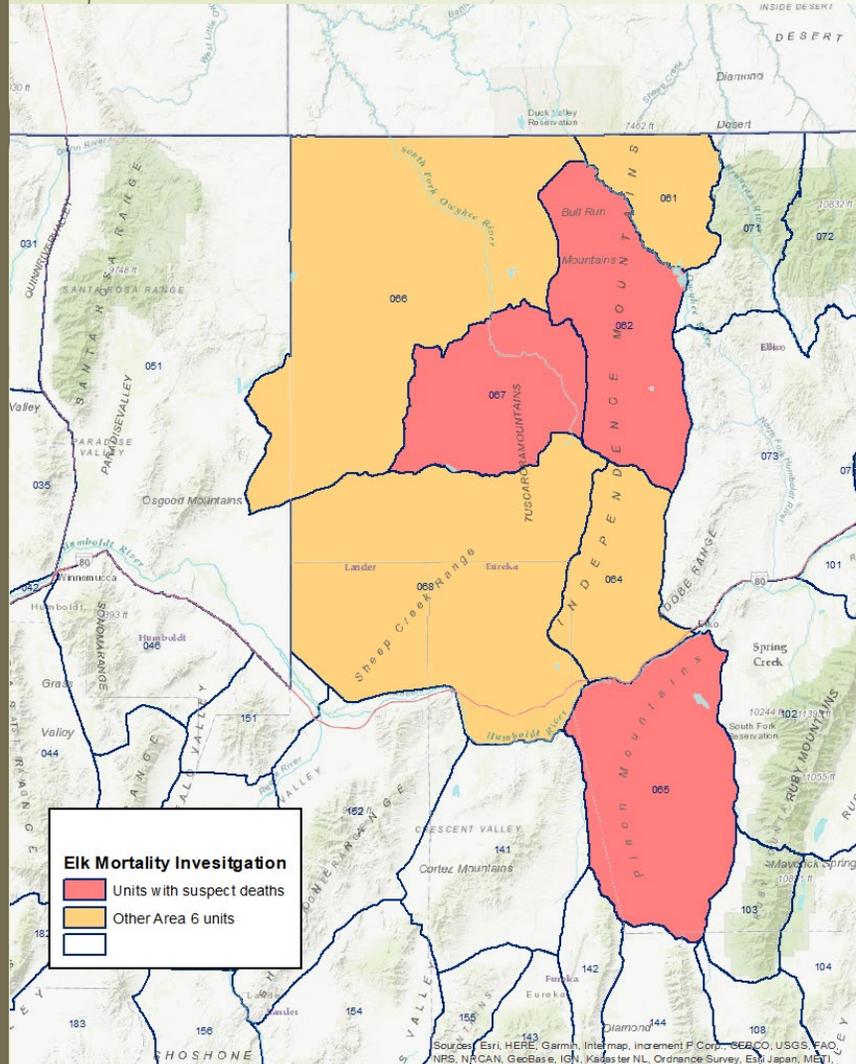
At this point it is unlikely the disease has any affect on population performance



Investigation of Elk Mortality in Area 6



Area 6 elk deaths



Since 2015 an increased number of elk mortalities have occurred in Area 6.

Many of these have shared similar signs – with pericardial effusion and inflammation of the heart.

Starting in 2017 use of rumen transmitters demonstrated that animals have fevers prior to death.

Initial suspects focused on plant toxins, however to date this has mostly been ruled out.



Area 6 elk deaths



Recently we have been able to determine that animals that die have inflammation of blood vessels in the heart and lungs.

Tests for the normal suspects for vasculitis in cervids have been negative.

NDOW is working in conjunction with Washington State University diagnostic lab to add more in-depth testing for a possible culprit.

Currently the most likely cause is an infectious agent, but toxins have not been completely ruled out.



Area 6 elk deaths

NDOW is planning on putting out additional collars this winter with the hope of gaining more insight into mortality.

While other factors are most likely at play as well, this mystery syndrome appears to be contributing to the poor performance of the Area 6 elk herd.

Mule deer or moose do not appear to be affected.





Mule Deer Disease Investigations



Mule Deer Investigations



Mule Deer herds are in decline across the state.

It is unclear if disease plays a role in any of these declines

NDOW tests deer for exposure to a variety of diseases during yearly captures

Further analysis of these results and focused testing is planned to understand the role disease may play in herd performance.



Mule Deer Investigations

NDOW has identified several diseases for further investigation:

Deer have high levels of exposure to BVD (Bovine Viral Diarrhea) in areas with high contact rates with cattle including Areas 6, 7, 10, and 13.

Hemorrhagic diseases such as EHD, BTV, and Adenovirus are also causes for concern and are being investigated across the state. EHD and BTV exposure is high in Areas 1, 3, and 7 especially.



COVID-19



COVID-19

COVID-19 has represented an unprecedented challenge, including for the wildlife field

Several North American species have been shown to be susceptible to SARS-CoV-2, including:

Felids

Mustelids (Mink and Ferret)

Canids (to a lesser extent)

White-tailed deer (and presumably other cervids).

COVID-19



NDOW has responded by placing limitations on NDOW staff and contractors handling wildlife including:

Requiring wearing of masks when handling felids, mustelids, and canids.

Stopping all bat handling out of an abundance of caution during the worst months of the pandemic.

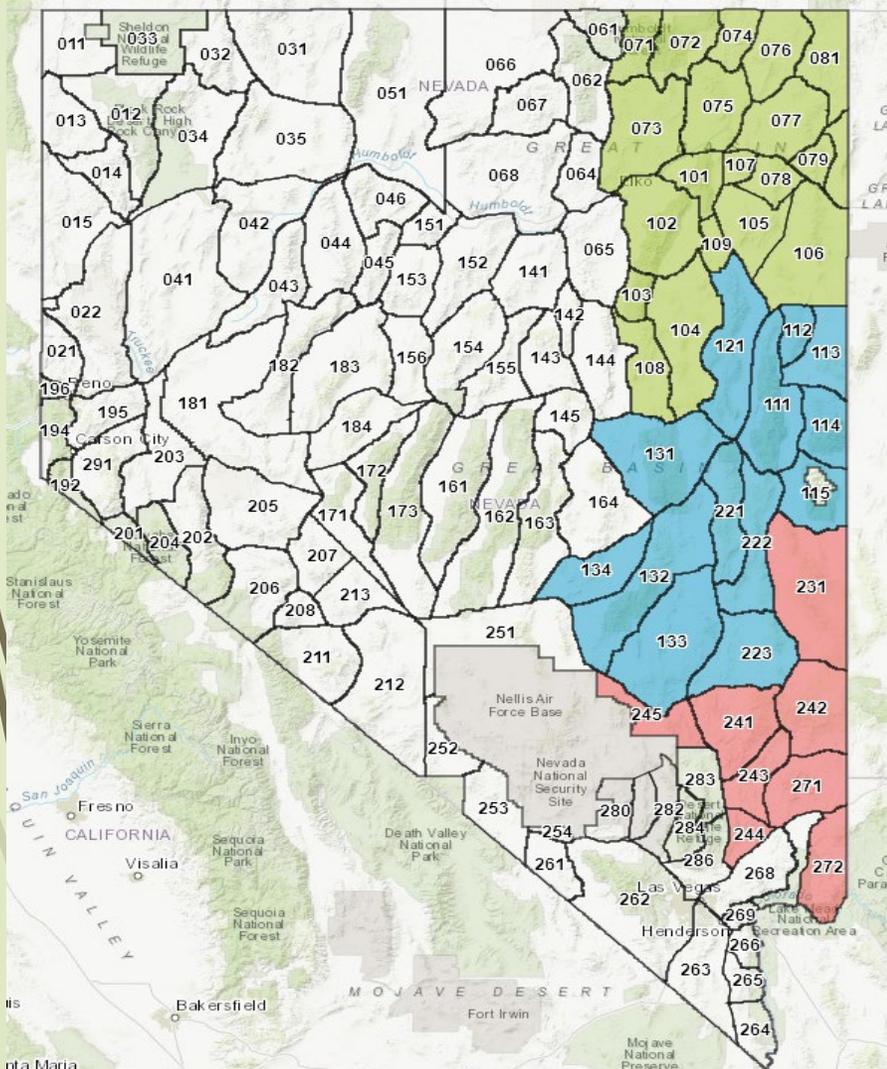
Bat handling has now resumed for work of high importance.

Questions?





CWD report 2021



In FY 21 NDOW collect 248 CWD samples from across the state.

All samples were negative.

Based on confidence of freedom calculations that maximum statewide prevalence that would go undetected is 1.2%.