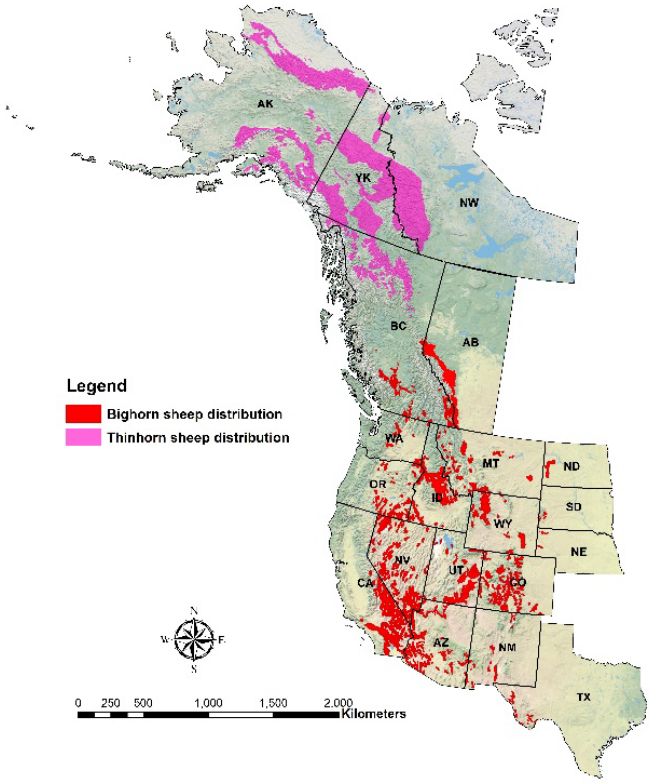
# 2025 RANGE-WIDE STATUS OF BIGHORN AND THINHORN SHEEP IN NORTH AMERICA

**Wild Sheep Initiative. Western Association of Fish and Wildlife Agencies** (ver. 060225)

***Abstract***: The purpose of this document is to provide a general overview of the current population status and general abundance trends for bighorn and thinhorn sheep throughout their range in North America. The Wild Sheep Initiative (WSI) consists of representatives from 20 state, territorial, and provincial agencies that comprise the Western Association of Fish and Wildlife Agencies (WAFWA).

The WSI's mission is to provide a collaborative approach to finding solutions to improve wild sheep conservation and management. The general population status and trajectory of wild sheep populations is commonly requested by stakeholders including agency leadership, NGOs, hunters, and the public at large. To provide a quick snapshot of the status of these species, the WSI assembled this information by having each agency representative provide the current population status, and harvest information (Tables 1 – 3) and disease status/management for their respective jurisdiction. All states and provinces use very different methods to survey and estimate population size and harvest. Some jurisdictions do not estimate population size but rather look at changes in trend using different metrics including harvest, hunter effort, or trend counts. Wild sheep populations are below management goals in most jurisdictions, due to a variety of factors of which disease, primarily pneumonia, harsh winter conditions, and climate are perhaps the most important. Wildlife managers, veterinarians, and researchers have been tirelessly seeking solutions to population decline with some success.





Bighorn sheep (Rocky Mountain and California BHS – Table 1 and Desert BHS – Table 2) populations are generally stable with a recent downward trend across most jurisdictions (Figure 1), however, British Columbia is reporting significant declines in California BHS populations through the past 5 years.

Thinhorn sheep population status data is incomplete. In Alaska, managers estimate that Dall's sheep have been stable with a recent dramatic, sharp decline due to extraordinarily harsh winter conditions. In British Columbia, Dall's sheep have been stable, but estimates were increased in 2019 resulting from new genetic information that expanded the range of that subspecies to include areas previously identified as Stone's sheep (Table 3, Figure 2). Stone's sheep estimates from British Columbia show a similar trend over the past 23 years with a modest decline in 2020 (Table 3, Figure 2).

*Table 1. Range-wide estimates of 2024 bighorn sheep (Rocky Mountain and California BHS combined) population size, number of hunting licenses issued, and number of rams and ewes harvested.* ***Click on a state/province/territory name to go directly to that jurisdiction.***

| | Estimated Population | Ram Licenses | Ram Harvest | Ewe Licenses | Ewe Harvest |
|---|---|---|---|---|---|
| Alberta | 6,000 | 2,285[1] | 160 | 114 | 38 |
| Arizona | 1,300 | 21 | 21 | 0 | 0 |
| British Columbia[2] | 4,300 | 193 | n/a | n/a | n/a |
| California | 0 | 0 | 0 | 0 | 0 |
| Colorado | 7,060 | 253 | 180 | 89 | 50 |
| Idaho | 3,780 | 98 | 78 | 0 | 0 |
| Montana | 4,723 | 79[3] | 90[4] | 50 | 28 |
| Nebraska | 220 | 2 | 2 | 0 | 0 |
| Nevada | 2,000 | 43 | 35 | 0 | 0 |
| New Mexico | 1,675 | 29 | 26 | 30 | 9 |
| North Dakota | 480 | 7 | 7 | 0 | 0 |
| Oregon | 5,800 | 84[5] | 83 | 40 | 29 |
| South Dakota | 282 | 10 | 10 | 0 | 0 |
| Utah | 1,609 | 65 | 64 | 5 | 4 |
| Washington | 1,470 | 22 | 22 | 7 | 7 |
| Wyoming | 6,702 | 184 | 148 | 40 | 37 |

[1]*Alberta – Includes licenses allocated to outfitters, and general and special (limited entry hunt) licenses sold to Alberta residents.*

[2]*British Columbia – data listed under licenses includes only the numbers of available draws/permits issued in Limited Entry Hunt Zones*

[3]*Limited entry hunt units only*

[4]*Montana – includes limited and unlimited hunting district ram harvest*

[5]*Includes controlled hunts, 1 auction tag, and 1 raffle tag.*

n/a – not available

*Table 2. Range-wide estimation of 2024 Desert bighorn sheep population size, licenses issued, and rams harvested provided by member agencies of WAFWA. Click on a state/province/territory name to go directly to that jurisdiction.*

| | Estimated Population | Ram Licenses | Ram Harvest | Ewe Licenses | Ewe Harvest |
|---|---|---|---|---|---|
| Arizona | 5,600 | 135 | 129 | 0 | 0 |
| California | 5,000 | 22 | 19 | 0 | 0 |
| Colorado | 500 | 15 | 14 | 0 | 0 |
| Nevada | 6,400 | 200[1] | 172 | 60 | 41 |
| New Mexico | 1,088 | 27 | 25 | 0 | 0 |
| Texas | 650 | 5 | 4[2] | 0 | 0 |
| Utah | 3,094 | 84 | 76 | 0 | 0 |

[1] Total ram tags including management ram hunt for one-horn ram

[2] Two outstanding tags at time of print; hunt season ends 30 September 2025.

n/a – not available

*Table 3. Range-wide estimation of 2024 Thinhorn sheep (Dall's sheep and Stone's sheep) population size, licenses issued, and rams harvested provided by member agencies of WAFWA. Click on a state/province/territory name to go directly to that jurisdiction.*

| | Estimated Population | Ram Licenses | Ram Harvest | Ewe Licenses | Ewe Harvest |
|---|---|---|---|---|---|
| **Dall's sheep** | | | | | |
| Alaska | Decline | 4,197 | 369 | 0 | 0 |
| British Columbia[1] | 700 | 39 | n/a | 0 | 0 |
| NW Territories | n/a | n/a | n/a | n/a | n/a |
| Yukon | 22,500 | 1781 | 234 | 0 | 0 |
| **Stone's sheep** | | | | | |
| British Columbia | 10,000 | 102 | n/a | 0 | 0 |
| Yukon | 100 | 0 | 0 | 0 | 0 |

[1]*British Columbia – data listed under licenses includes only the numbers of available draws/permits issued in Limited Entry Hunt Zones*

n/a – not available

*Figure 1. Bighorn sheep population trend throughout North America, 2000 – 2024.*

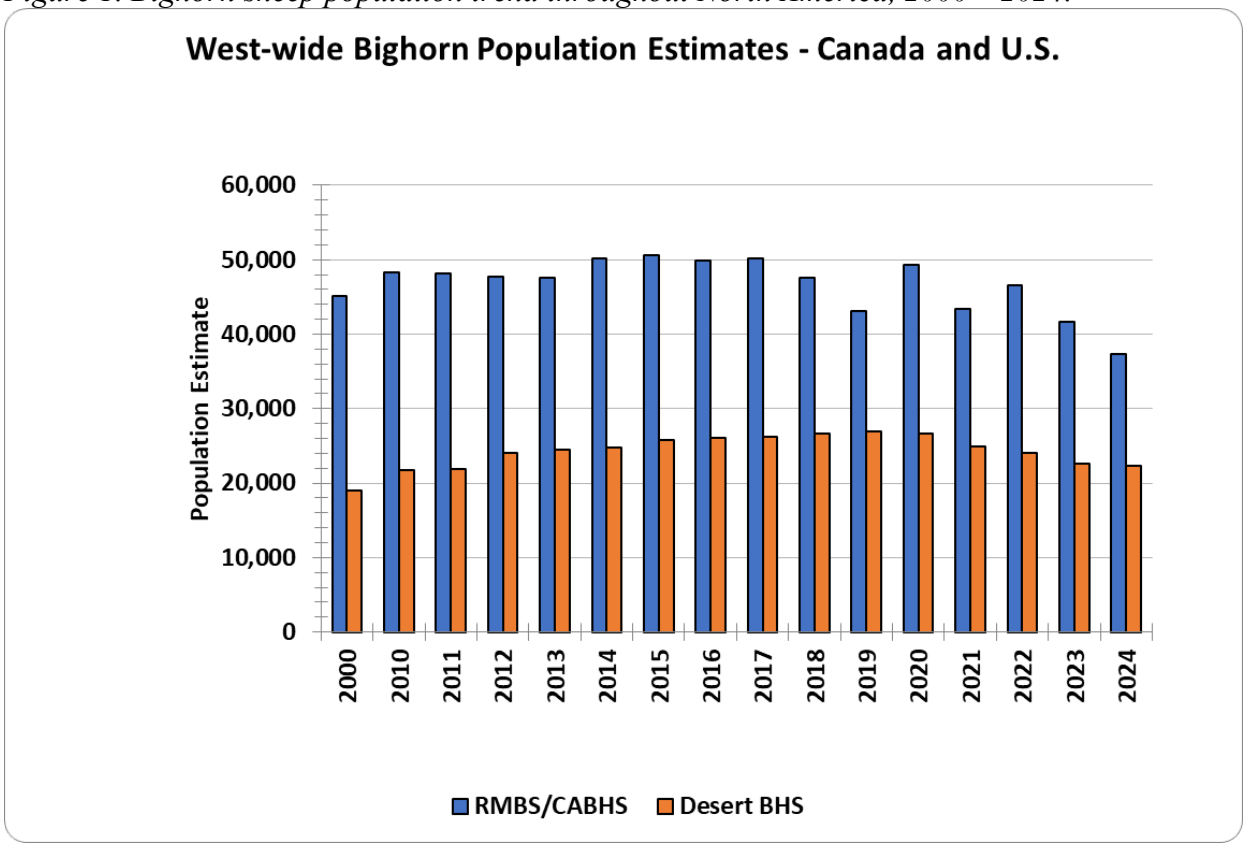
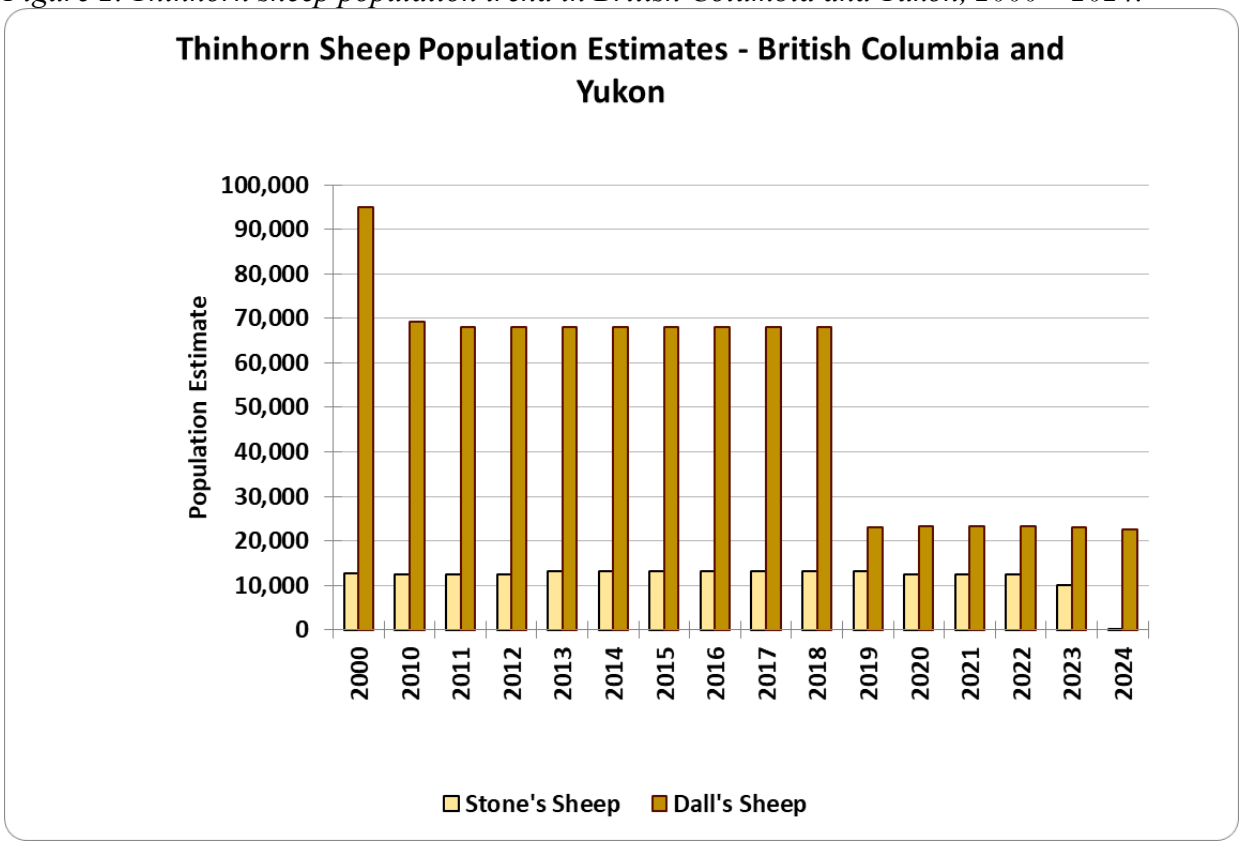



*Figure 2. Thinhorn sheep population trend in British Columbia and Yukon, 2000 – 2024.*



As sheep numbers decline, license availability and harvest follow suit. It is clear Dall's sheep provides the majority of wild sheep hunting opportunity based on license issuance (on average >60%). On average, bighorn sheep, desert bighorn sheep and Stone's sheep account for 35%, 5%, and 1% of wild sheep hunting licenses available, respectively (Figure 3). Interestingly, on average bighorn sheep and Dall's sheep provide about an equal amount of harvest at 35% and 38%, respectively. And, on average, desert bighorn sheep and Stone's sheep account for 16% and 11%, respectively (Figure 4).

*Figure 3. Thinhorn and bighorn ram licenses across Canada and U.S., 2000 – 2024.*

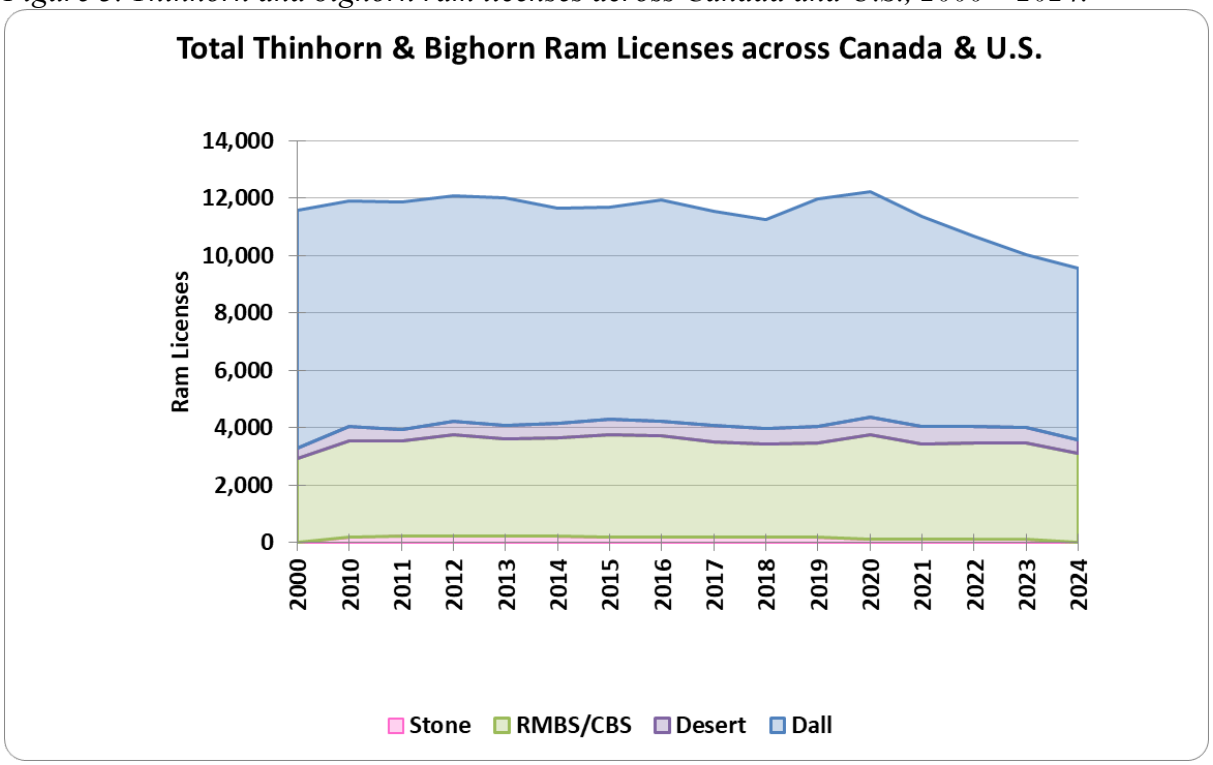
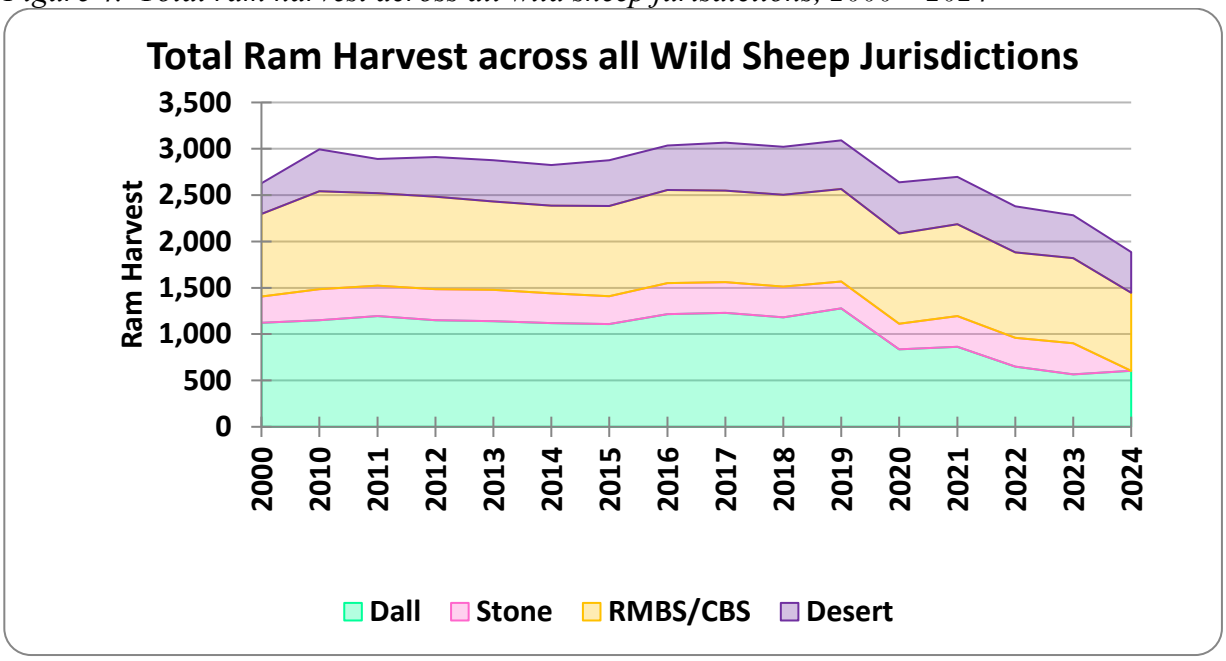



*Figure 4. Total ram harvest across all wild sheep jurisdictions, 2000 – 2024*



# State/Provincial Status Reports

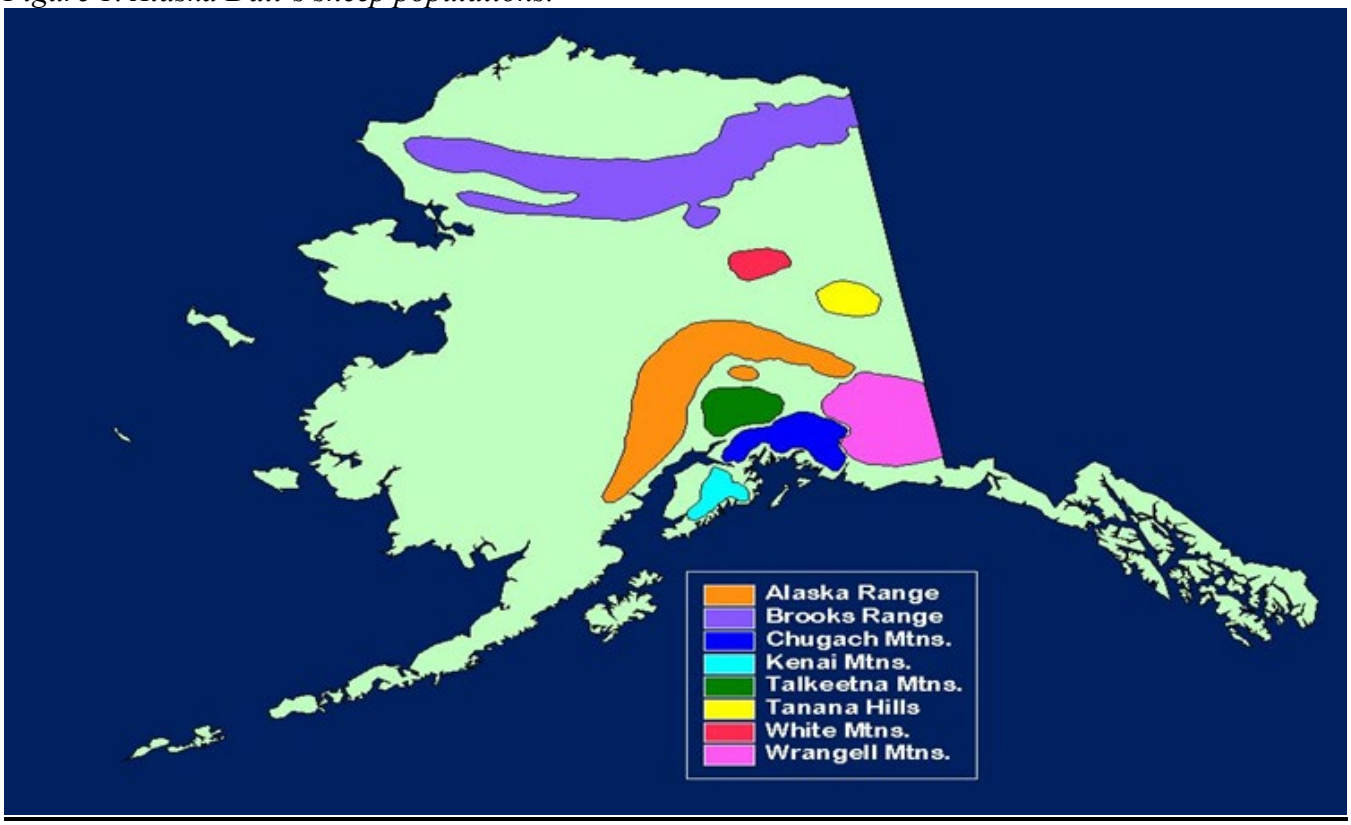
## Alaska

### Dall's Sheep

*Populations*

Dall's sheep populations inhabit 8 mountain ranges in Alaska (Figure 1). Populations are found through a mosaic of State, Federal and Native Lands. Throughout most of the state, managers have established minimum count areas for sheep. These areas are necessarily small, relative to the geographic scale of an entire game management unit. Data are not corrected for snow cover, shadows, sun angle, observer experience, or any one of several things that can affect how many animals are observed. Therefore, these minimum count surveys serve as a relative population index and are in no way a measure of absolute abundance. However, throughout the state sheep numbers have declined 40-70% from the most recent highs ca 2010. These declines are reported on both hunted and unhunted (e.g. National Park Service) lands, which strongly suggests that extreme weather events and not current harvest strategies are contributing to the current poor population performance.

*Figure 1. Alaska Dall's sheep populations.*




Alaskan Dall's sheep population declines are at least partially explained by a combination of poor lamb production and high adult mortality in several years between 2012 and present. Record winter snowfall in 2011-2012 and near-record levels again in 2012-2013 were accompanied by record low population pregnancy rates in those and following years. Indeed, it is hypothesized that in many cases, extreme winter conditions result in a carryover effect where low pregnancy rates and poor body condition persist for at least an additional year after stressful conditions are experienced. These effects were not limited to that two-year time frame: between 2009-2022, most female Dall's sheep handled and sampled in the Chugach and Talkeetna mountain ranges evidenced extremely poor body condition (1 -1.5 on a 0-6

scale).

Population pregnancy rates varied greatly from lows of 18, 21, and 44% in some years up to as high as 96% in others (ADFG, 2022). For reference, most healthy ungulate populations see consistent pregnancy rates of 85-100% in adult females.

Poor lamb production during 2012-2014 was also exacerbated by poor adult survival between 2019-2022. Although mortality curves for Dall's sheep have been published by multiple researchers, in general mortality is low for sheep ages 2-8. However, overwinter mortality rates were much greater than expected during those three winters. In the winter of 2019-2020, 34% of all radio collared sheep in the Talkeetna mountains died from a variety of causes ranging from avalanches, predation, disease, falls, and malnutrition. During the winter of 2020-2021, and 2021-2022, 19% and 29%, respectively, of all monitored adult sheep, in the Talkeetnas also died from the same causes (ADFG, 2022). In comparison, data from radio collared sheep in the Chugach, Wrangell, and Talkeetna mountains between 2008-2019 show that in most winters, overall adult survival rates are between 88-92%. This is similar to what Arthur reported in the Brooks Range (77-88%) (Arthur, 2013) and Alaska Range (85%) (Arthur 2003).

Poor lamb production and overwinter survival was not limited to populations south of the Alaska Range, as declines of similar magnitude were noted in aerial surveys in other game management units and on National Park Service lands; Rattenbury et al. (2018) reported that lamb production was negatively related to the annual timing of the end of the continuous snow season and was near zero in arctic areas in 2013. The 2013 event was also associated with ~40–70% declines in overall sheep numbers in arctic areas, indicating adult survival was also impacted.

That said, population cycles have occurred before. In Murie's book, *The Wolves of Mount Mckinley* (1944), they speak of robust sheep numbers in the park until a drastic die off associated with heavy snowfalls in the late 1920's and into the early 1930's. A more contemporary example is observed in GMU 20A (Figure 2). Dall's sheep populations and harvest in this GMU was high until a weather-related population decline during the winter of 1992-1993. Managers chose to keep this hunt structured as general harvest open to both residents and nonresidents. Although it took 15-20 years to rebuild, Dall's sheep populations and harvest returned to pre-decline levels, peaking in 2016 until the recent population decline.

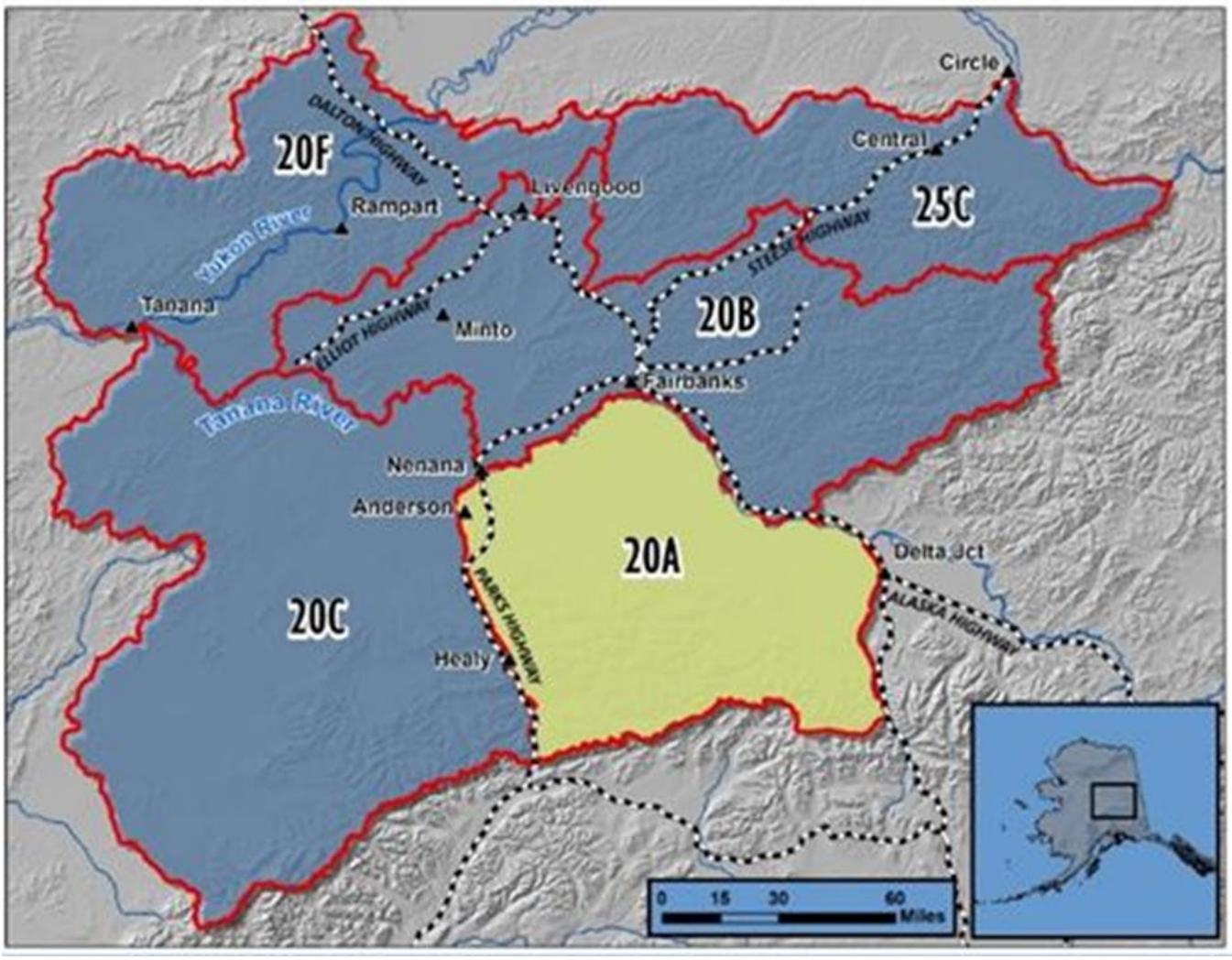
There is concern that with a warming environment in Alaska we may be witnessing a paradigm shift in Dall's sheep densities. The Arctic is warming at twice the rate of lower latitudes, temperatures are predicted to rise by 3–6°C by 2080 (5-11°F) (Callaghan et al. 2004, Olsen et al. 2011). Recently published literature suggests that adult sheep survival is negatively associated with increased wintertime freeze-thaw events (Van de Kirk et al. 2020). Furthermore, there is evidence for increased shrubification in the alpine with warm temperatures which would decrease the amount of suitable habitat for Dall's sheep (Dial et al. 2016) leading to decreased carrying capacity in many ranges.

*Licenses and Harvest*

Throughout the State Dall's sheep are managed through a combination of General Season, Draw and registration hunts. For the most part the state operates under a general season, full curl harvest strategy, except for a small number of registration and limited entry drawing permit hunts that operate under alternate strategies such as any ram hunts. Harvest tickets for Dall's sheep were first issued in 1962. Between 1962 and 2024 the average number of Dall's sheep harvested each season has been 916 with a range of 340-1454. Harvest was between 700-800 for much of the 2000s but has declined substantially beginning in 2020, with 627 rams taken. Initial declines in 2020 were followed by further decreases in

statewide harvest, with 487 rams taken in 2021, 424 in 2022 and 340 reported for the 2023 season (Figure 3). There was a slight uptick in harvest for the 2024 season with 369 rams being reported taken to date. Comparing current harvest to the long-term average is confounded because: 1) early harvest happened before Alaska National Interest Lands Conservation Act , thus more area was open to hunting, 2) some areas have gone from general harvest to draw hunt, thus limiting opportunity, and 3) hunter participation has decreased. Between 1980 – 2000 there was an average of 3,097 sheep hunters per year, and between 2001-2024 there was an average of 2,413 hunters per year (Figure 4). For 2024 we have a preliminary report of 1565 Dall's sheep hunters. Harvest success rates were largely stable for both resident and non-resident hunters until the recent population declines (Figure 5).

*Figure 2. Game management unit 20A, central Alaska Range, Alaska.*



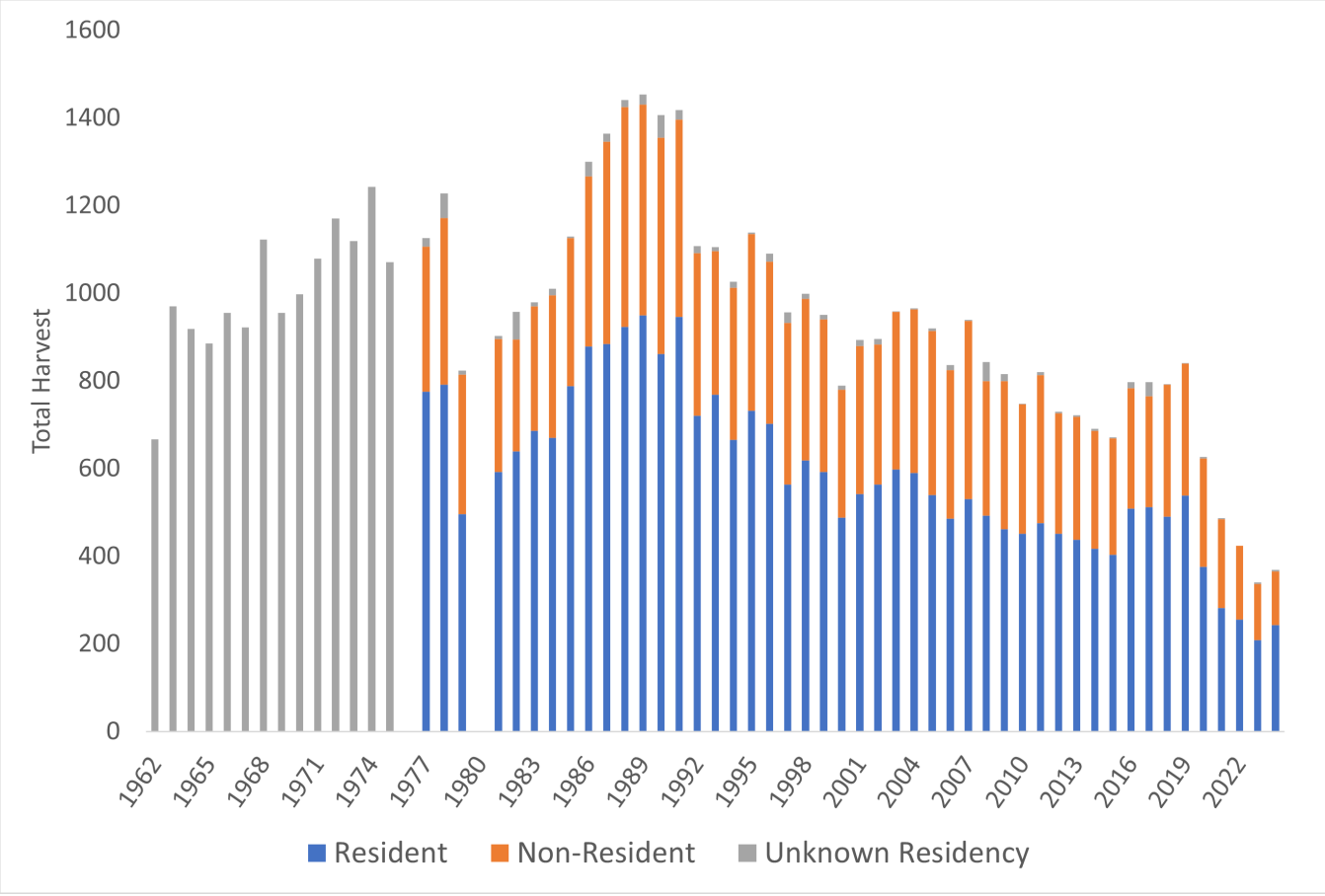

*Disease and Herd Health*

The state has active and/or upcoming research projects in the Brooks and Alaska Ranges, current research ongoing in the Chugach, and recently completed projects in the Talkeetna and Wrangell mountains. Traditional palpations are used to estimate body condition on most captured sheep. Blood, nasal and tonsil swab samples are collected by an ADF&G wildlife veterinarian or experienced personnel. Samples are handled, stored and analyzed at laboratories in accordance with the WAFWA Wildlife Health Committee 2014 Bighorn Sheep Herd Health Monitoring Recommendations. These samples are used to assess Alaska/thin-horn sheep pathogens and parasites of concern and health biomarkers as determined by the

Alaska Wildlife Health and Disease Surveillance Program veterinarian. A blood sample from any ewes handled in late winter is also collected to quantify pregnancy rates via pregnancy specific protein B analysis from serum and obtain individual DNA. Feces are collected and submitted for parasite analysis.

Surveillance for bacterial respiratory pathogens from hunter harvest and research samples identified bacterial DNA of *Mycoplasma ovipneumoniae* (M. Ovi) along with other mycoplasma species with close genetic relationships to M. ovi in healthy wildlife populations in Alaska (Lieske 2022). Of the areas surveyed, on multiple tests at multiple labs we have had positive detections of M. ovi presence in populations of Dall's sheep in the eastern Alaska Range, Talkeetna Mountains, and Wrangell Mountains, as well as Fortymile and Nelchina caribou, and we have had M. ovi detections in other areas and species on at least one test. Importantly, there may not be cross immunity for different genetic types so the presence of M. ovi in wildlife doesn't mean they are 'safe' or immune to 'new' types. Currently, ADF&G does not believe that wildlife populations are in danger due to M. ovi genetic types currently in Alaska's wildlife.

*Figure 3. Dall's sheep harvest in Alaska, 1962-2024*




*Test and Remove*

There are no test and remove programs in the State of Alaska.

*Figure 4. Total number of sheep hunters in Alaska, 1977-2024.*

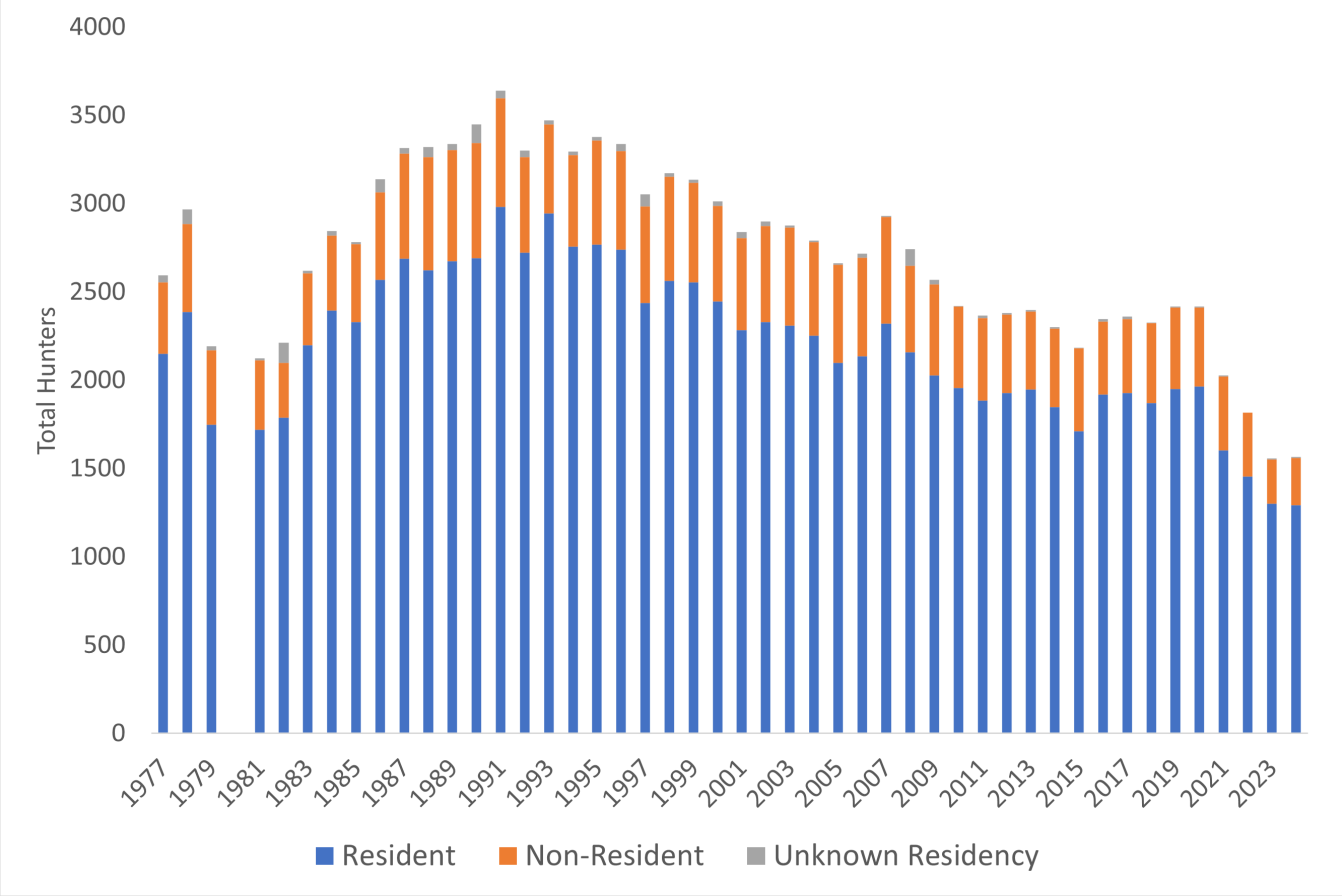
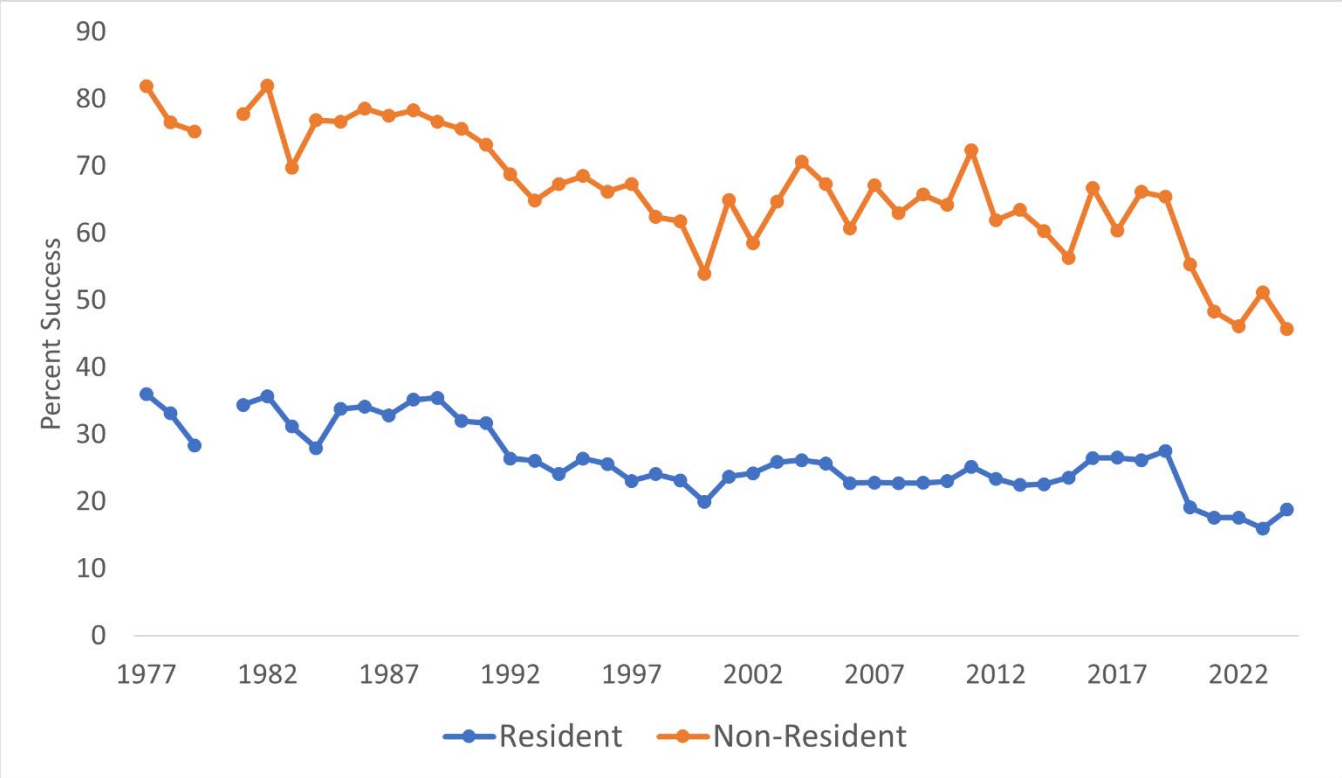



*Figure 5. Dall's sheep hunter success rates in Alaska, 1977-2024.*



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*Brad Wendling, Alaska Department of Fish and Game*

## Alberta

### Rocky Mountain Bighorn Sheep

*Populations*

There is an estimated 9,000 Rocky Mountain Bighorn Sheep in Alberta (2024), of which 6,000 occur on

provincial lands and 3,000 in federal National Parks. This estimate is based on minimum aerial survey counts conducted every 2-5 years on known winter ranges. Overall, the provincial population has been stable to slightly decreasing since 2000.

*Licenses and Harvest*

To be legal for harvest, rams must meet or exceed a 4/5 curl ('Trophy Sheep') or full curl requirement ("Full-curl Trophy Sheep"). In 2024, there were 58 special licenses available to Alberta residents through a limited entry draw / lottery system, as well as 114 outfitter allocations. In addition, 2113 resident Albertans purchased a general license to hunt rams. This license provides an "over the counter" hunting opportunity (with 1 license/hunter and an unlimited number of licenses available).

In 2024, 121 rams were harvested by resident hunters, consistent with the 10-year average of 124 rams. Overall, 160 rams were harvested in 2024 by all licensed hunters (resident, non-residents, non-resident aliens), down from 200 rams in 2023 but consistent with other years.

Hunter success is typically 5% for resident hunters and approximately 40-50% for hunters accompanied by an outfitter. Since 2010, the ram harvest rate has averaged about 2.6% of the estimated population on provincial lands (range 2.0 – 3.3%). Harvest in some sheep management areas exceeds 50-70% of available legal rams annually, with 70-90%+ of rams harvested the first year they become legal. The percentage of legal rams observed in aerial surveys in many areas has consistently been low (1-3%) for the last 10 years or so.

Ewes, or male bighorn sheep < 1 year of age, can be hunted under a special license (limited entry hunt) in non-trophy areas. These areas include 14 of a possible 31 wildlife management units (WMUs) with bighorn sheep. Approximately 135 non-trophy sheep licenses were available in 2024, down from the 5-year average quota of about 260. A total of 114 hunters purchased non-trophy licenses in 2024. The non-trophy harvest rate typically averages about 1% of the estimated population on provincial lands.

*Disease*

Prior to February 2023, there had not been a known pneumonia outbreak in Alberta since 2000. In February 2023, 9 rams were found dead in the Sheep River Provincial Park west of Black Diamond in southern Alberta. An additional 7 rams were observed coughing and were culled by wildlife managers to prevent transmission to a nearby group of 95 bighorn ewes and young animals. Fourteen of the 16 rams tested positive for *Mycoplasma ovipneumoniae* (M. ovi). Of the remaining two rams, samples were unavailable for one and necropsy revealed that the other had severe respiratory pneumonia.

A subset of bighorn sheep in the adjacent herd of 95 were subsequently tested for Mycoplasma spp. and all 42 were negative. Eight young rams in this herd were also radio-collared for several months to track their movements; none moved into areas with domestic sheep or goat farms.

Since the 2023 event, no pneumonia outbreaks have occurred, and all bighorn sheep tested for M. ovi have been negative.

*Anne Hubbs, Alberta Environment and Protected Areas*

**Arizona**

Arizona has Rocky Mountain bighorn sheep and two sub-species of desert bighorn sheep, with the Nelson's (*Ovis canadensis nelsoni*) bighorn sheep occupying the northern areas of Arizona and the

Mexican (*Ovis canadensis mexicana*) bighorn sheep occupying the central and southern areas of the state.

Through aggressive translocation and augmentation efforts over the past couple of decades, Arizona has reached record high population numbers and distribution through native bighorn sheep range after experiencing the same type of near-extirpation wildlife events that many western states witnessed in the early years of the twentieth century.

Since 1955, Arizona Game and Fish Department (Department) has captured and released ~1,397 desert bighorn sheep within and outside of the state establishing new herd units and augmenting existing herd units within identified native habitat. During this long-term effort, the Department has worked collaboratively with the Utah Division of Wildlife Resources to acquire desert bighorn sheep for conservation efforts. Arizona has also been the source population for augmentations in multiple locations within Colorado, New Mexico, Texas, and Utah, assisting with those state agencies management objectives.

Since 1979, the Department has released ~170 Rocky Mountain bighorn sheep within the state establishing new herd units and/or augmenting existing herd units and has worked collaboratively with Colorado and New Mexico to acquire bighorn sheep in the past. Most recently, in November 2022, the Department collaborated again with the Utah Division of Wildlife Resources and supplied 27 Rocky Mountain bighorn sheep for release on Antelope Island, Utah. Consistent movement of bighorn sheep out of the Morenci Mine area into other portions of Arizona continues.

## Rocky Mountain Bighorn Sheep

*Populations*

Rocky Mountain bighorn sheep populations throughout Arizona have increased since the late 2000s, primarily a result of translocations of "nuisance or at-risk" bighorn sheep within private land and mining operations in the eastern portion of the state. Several new herd groups have been established in Arizona native range, as well as providing a source population for other western state agencies to further conservation and recovery efforts. The current Rocky Mountain bighorn sheep population is estimated to be over 1,300 bighorn sheep (Figure 1).

*Licenses and Harvest*

The number of hunt permit-tag licenses offered, as established within the Department's Hunt Guidelines, is set at 15-25% of the estimated number of Class III (age 6-8 years old) and Class IV (age 8+ years old) rams determined through survey observations and population modeling.

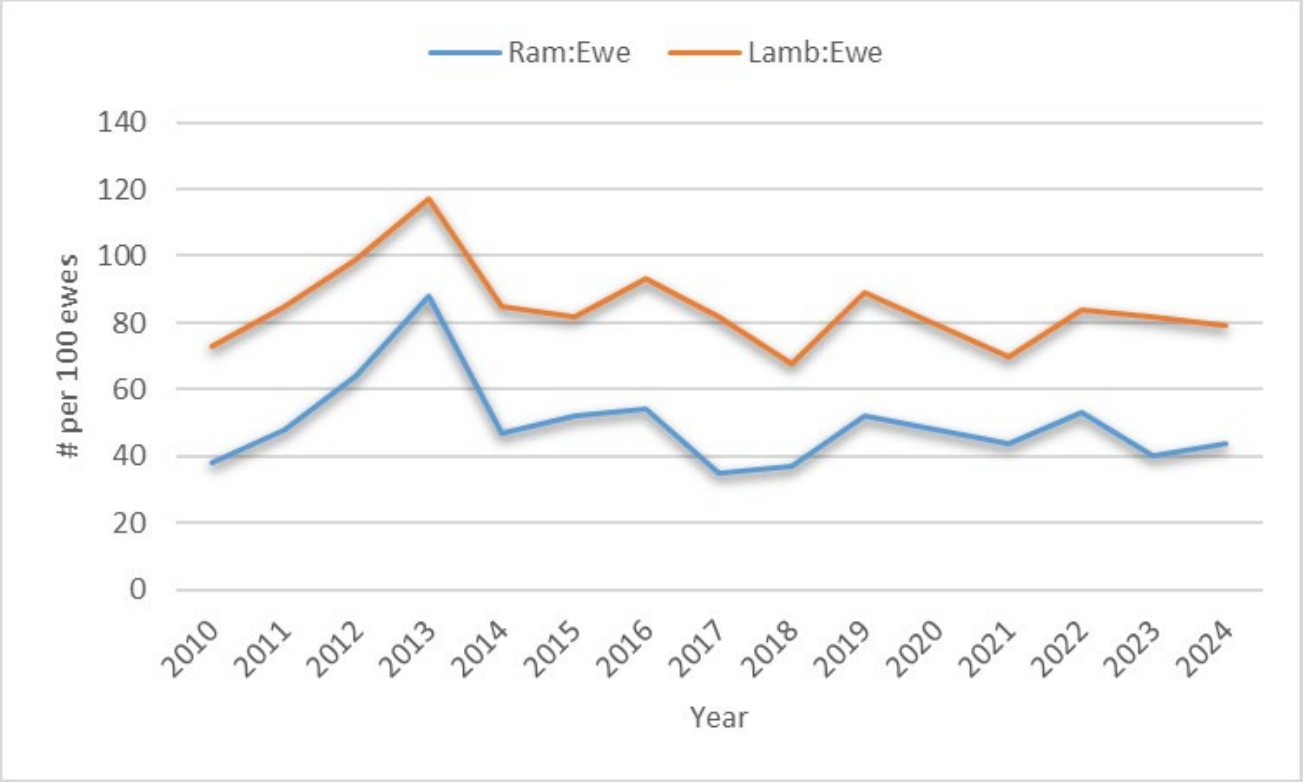
During the 2024 hunt season, 21 "Any-Ram" hunt permit-tags were offered. There was a total of 5,529 first choice applicants in the hunt draw process, which is a hybrid, bonus-point type draw system. Eighteen (21) mature rams were harvested, plus one (1) additional ram was taken under the Commissioner's Special-Tag statewide permit. The average age of the Rocky Mountain bighorn sheep rams harvested during the 2024 seasons was 8 years old with an average score of 170 4/8 (Figure 2).

The Arizona Game and Fish Commission has approved 20 permits yet approved permit-tags for Rocky Mountain bighorn sheep for the 2025 hunt seasons, with the introduction of a "pioneer one-horned" ram season with 1 Rocky Mountain bighorn sheep permit.

*Disease and Herd Health*

Biological samples are taken during capture efforts (includes collaring for population monitoring and/or translocations). We have sampled 2 different game management units/populations (Morenci, Gisela). No M. ovi has been detected.

*Figure 1. Historic Survey Ram and Lamb Ratios from Survey Data – Rocky Mountain Bighorn Sheep.*




*Test and Remove*

No test and remove efforts have been implemented to date. However, this management tool will be considered in response to any documented disease outbreaks in populations that may be conducive and receptive to a test and remove effort.

## Desert Bighorn Sheep

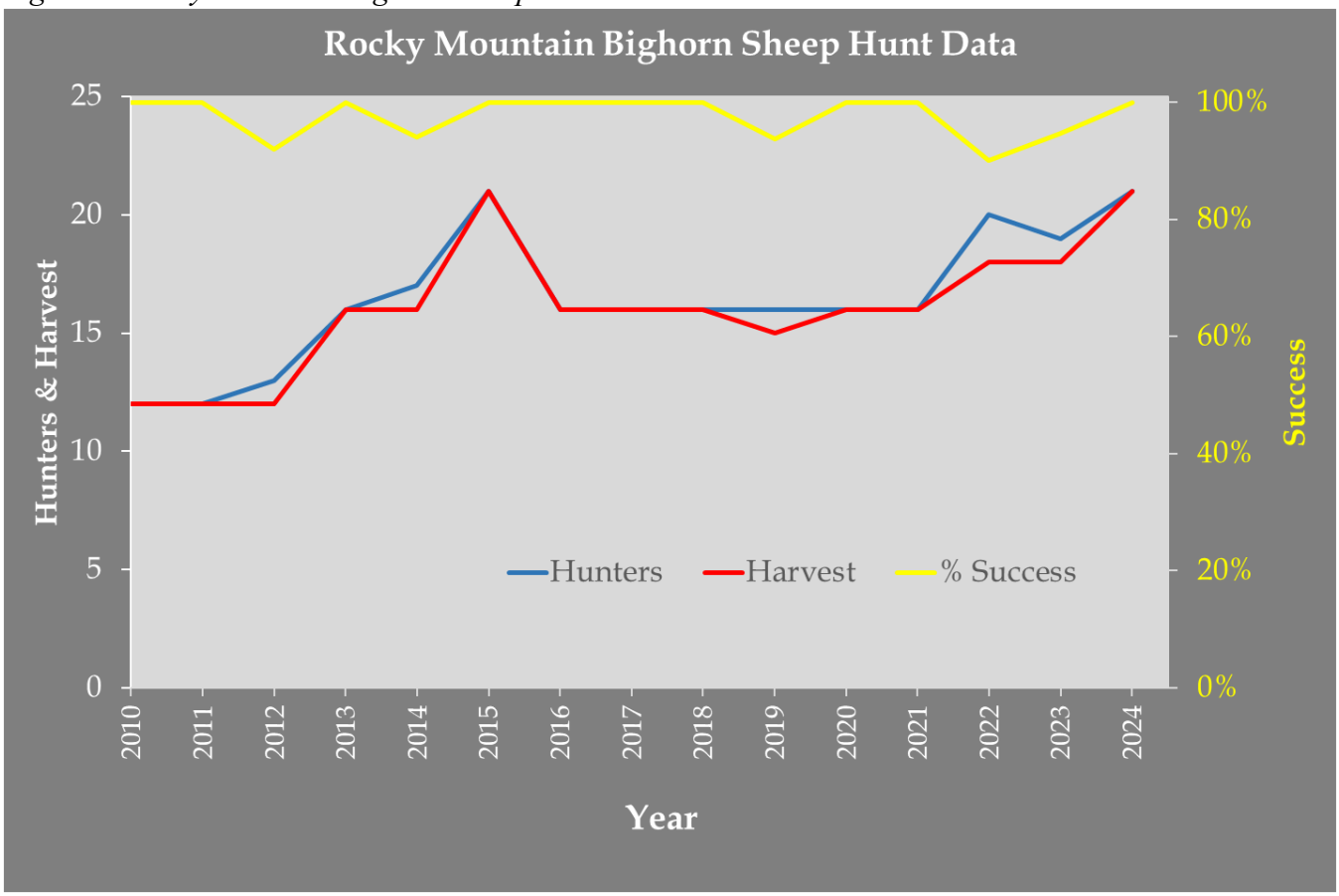
*Populations*

Desert bighorn sheep populations throughout Arizona have shown variability in population estimates as management units are typically only surveyed once every three years in most occupied habitat. Overall, populations have increased statewide. Currently, the statewide population is estimated to be over 5,600 bighorn sheep. A large portion of the documented increase is in the Kofa Mountains and adjacent mountain ranges in western Arizona. The Kofa National Wildlife Refuge population has increased from a total estimated population of 404 in 2012 to an estimated 941 bighorn sheep based on the 2021 aerial survey (Figure 3).

*Licenses and Harvest*

The number of hunt permit-tag licenses offered, as established in the Department's Hunt Guidelines, is set at 15-25% of the estimated number of Class III (age 6-8 years old) and Class IV (age 8+ years old) rams determined through survey observations and population modeling.

*Figure 2. Rocky Mountain Bighorn Sheep Hunt Data.*




During the 2024 hunt season, 135 "Any-Ram" hunt permit-tags were offered. There were 23,462 first choice applicants in the hunt draw process, which is a hybrid, bonus-point type draw system. There were 129 desert bighorn sheep rams harvested in 2024 regular seasons, plus two (2) additional rams taken under the Commissioner's Special-Tag permits. The average age of the desert bighorn sheep rams harvested during the 2024 seasons was 8 years old with an average score of 161 (Figure 4).

The Arizona Game and Fish Commission has approved 128 permit-tags for desert bighorn sheep for the 2025 hunt seasons, plus two additional "pioneer one-horned" ram permits.

*Disease and Herd Health*

Biological samples (nasal swabs) were collected during the mandatory check-out process from hunter-harvested bighorn sheep (N=51) and strain typing is pending for those samples testing positive for pneumonia. Preliminary positive samples were from management units 15C, 15D, 39W, 44B, and 46B.

Biological samples were taken during capture efforts (includes collaring for population monitoring and/or translocations) in the following desert bighorn sheep management units (Tables 2, 3, 4).

*Test and Remove*

No test and remove efforts have been implemented to date. However, this management tool will be considered in response to any documented disease outbreaks in populations that may be conducive and receptive to a test and remove effort.

*Figure 3. Historic Ram and Lamb Ratios from Survey Data – Desert Bighorn Sheep.*

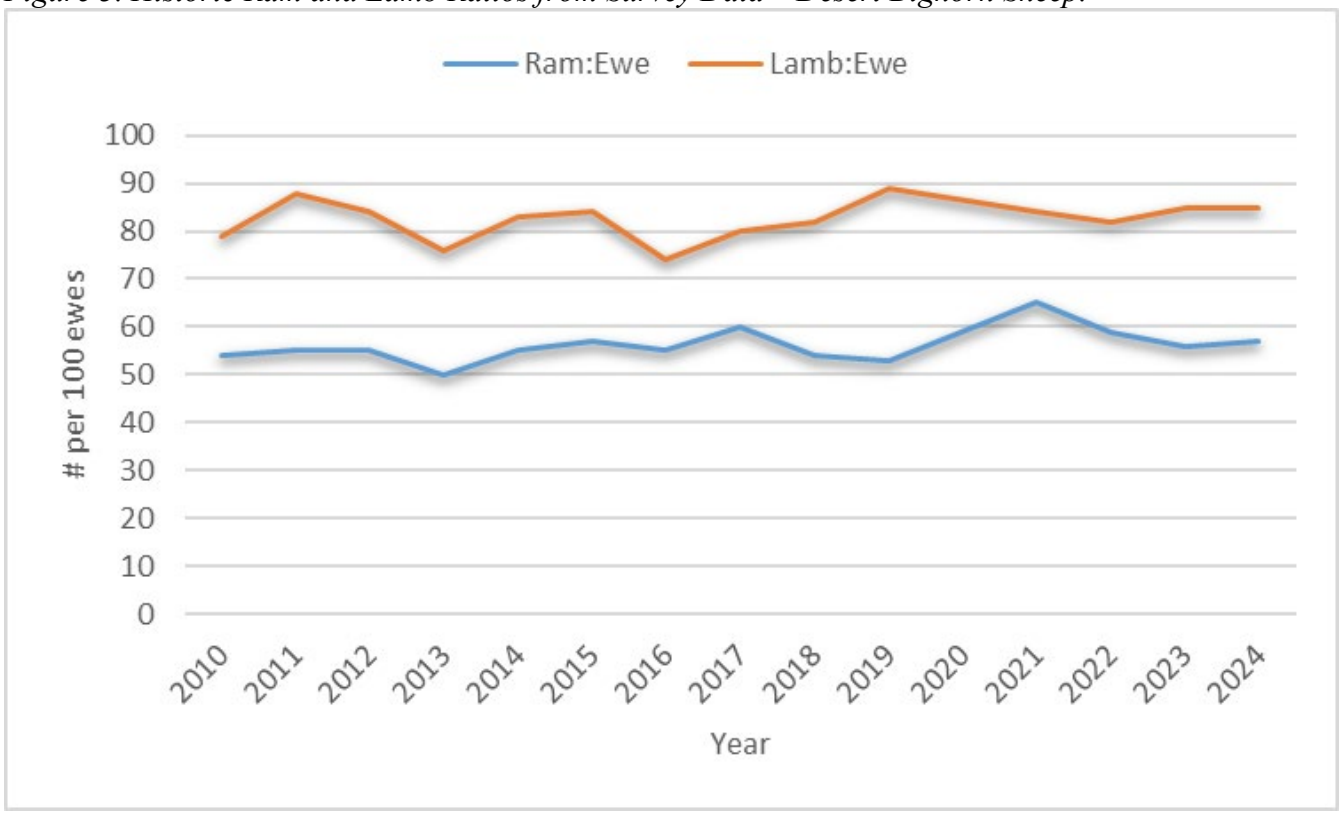



*Figure 4. Desert Bighorn Sheep Hunt Data.*

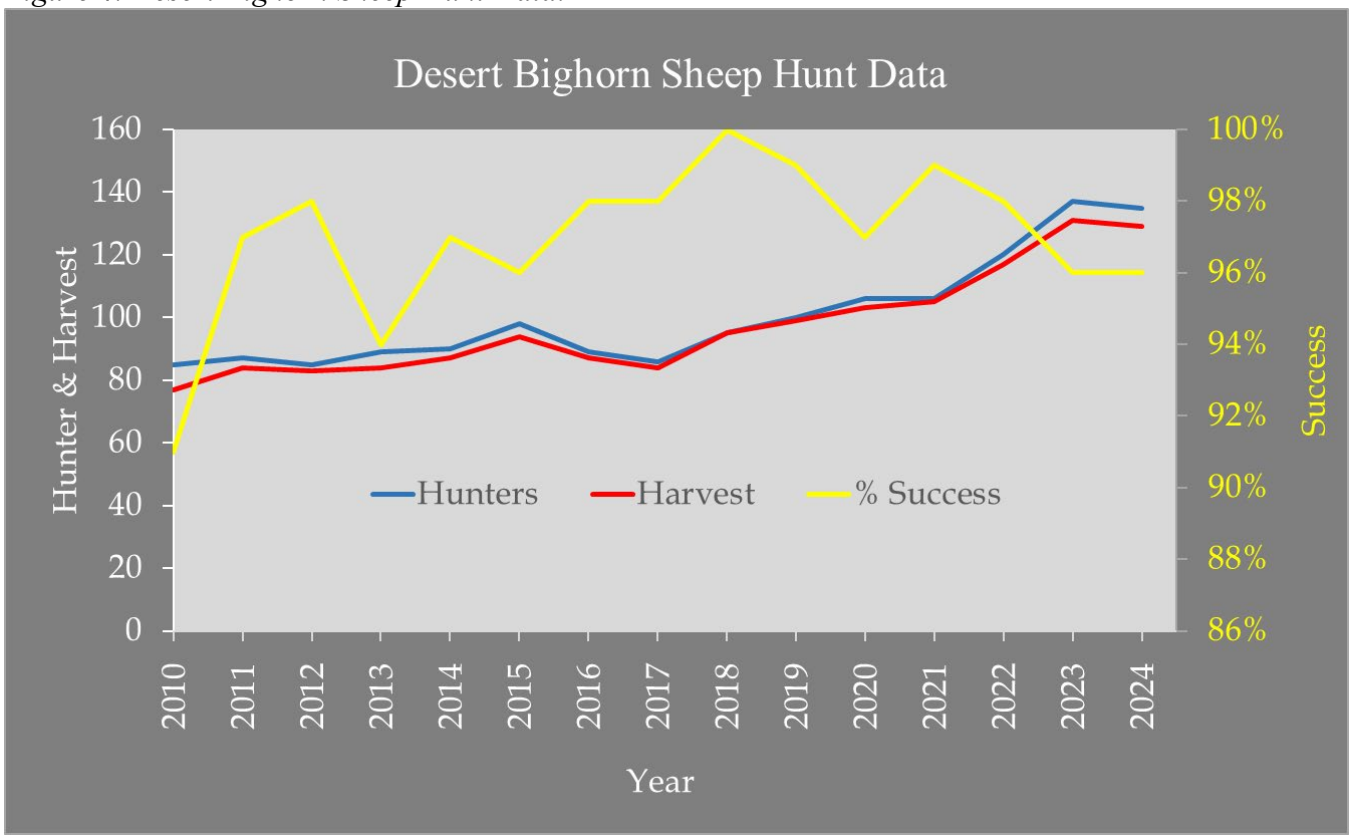


*Table 2: Serology results for bighorn sheep in FY20 expressed as number testing positive (%positive). Antibodies for bluetongue (BTV), bovine respiratory syncytial virus (BRSV), epizootic hemorrhagic disease virus (EHDV), Parainfluenza 3, and Mycoplasma ovipneumoniae (M. ovi) were detected. PCR was performed to detect M. ovi DNA and aerobic culture was used to detect Pasteurella sp.*

| Population | BTV | BRSV | EHDV | PI3 | M. ovi titer | M. ovi pcr | Pasteurella |
|---|---|---|---|---|---|---|---|
| **Vermillion Cliffs (12B)** | 9(60) | 0 | 9(60) | 0 | 13(87) | 6(40) | 10(67) |
| **Mineral Mtns (37B)** | 7(58) | 8(67) | 8(67) | 4(33) | 0 | 0 | 4(30) |
| **Bighorns (42)** | 0 | 1(10) | 0 | 0 | 8(80) | 1(8) | 3(23) |
| **Harcuvar (44A)** | 0 | 0 | 0 | 2(17) | 7(54) | 2(20) | 0 |
| **Galiuro Mtn** | 4(36) | 0 | 5(45) | 5(45) | 0 | 0 | 0 |

*Table 3: Percentage of bighorn sheep testing positive for diseases and pathogen exposure in 2021.*

| GMU | Number Tested | Blue T-E | EHD | BRSV | BVD | PI-3 | movi ELISA | Movi PCR |
|---|---|---|---|---|---|---|---|---|
| **16A** | 26 | 42.31 | 15.38 | 42.31 | 0 | 23.08 | 42.31 | 3.85 |
| **44A/B** | 24 | 8.33 | 4.17 | 25.00 | 8.33 | 20.83 | 75.00 | 25.00 |
| **37A** | 28 | 60.71 | 32.14 | 60.71 | NT | 71.43 | 0.00 | NT |
| **24A/B** | 9 | 88.89 | 44.44 | 33.33 | NT | 33.33 | 0.00 | NT |

*Table 4: Percentage of bighorn sheep testing positive for diseases and pathogen exposure in 2022.*

| GMU | Number | Blue T-E | EHD | BRSV | BVDV | PI-3 | Movi ELISA | Movi PCR |
|---|---|---|---|---|---|---|---|---|
| **16A** | 26 | 42.31 | 15.38 | 50.00 | 0.00 | 26.92 | 42.31 | 3.85 |
| **16B** | 4 | 100.00 | 100.00 | 0.00 | 0.00 | 0.00 | 100.00 | 75.00 |
| **40A** | 9 | 33.33 | 100.00 | 11.11 | 0.00 | 0.00 | 44.44 | 33.33 |
| **43B** | 33 | 33.33 | 51.52 | 45.45 | 0.00 | 12.12 | 72.73 | 21.21 |
| **24A** | 9 | 100.00 | 100.00 | 0.00 | 0.00 | 25.00 | 0.00 | 0.00 |

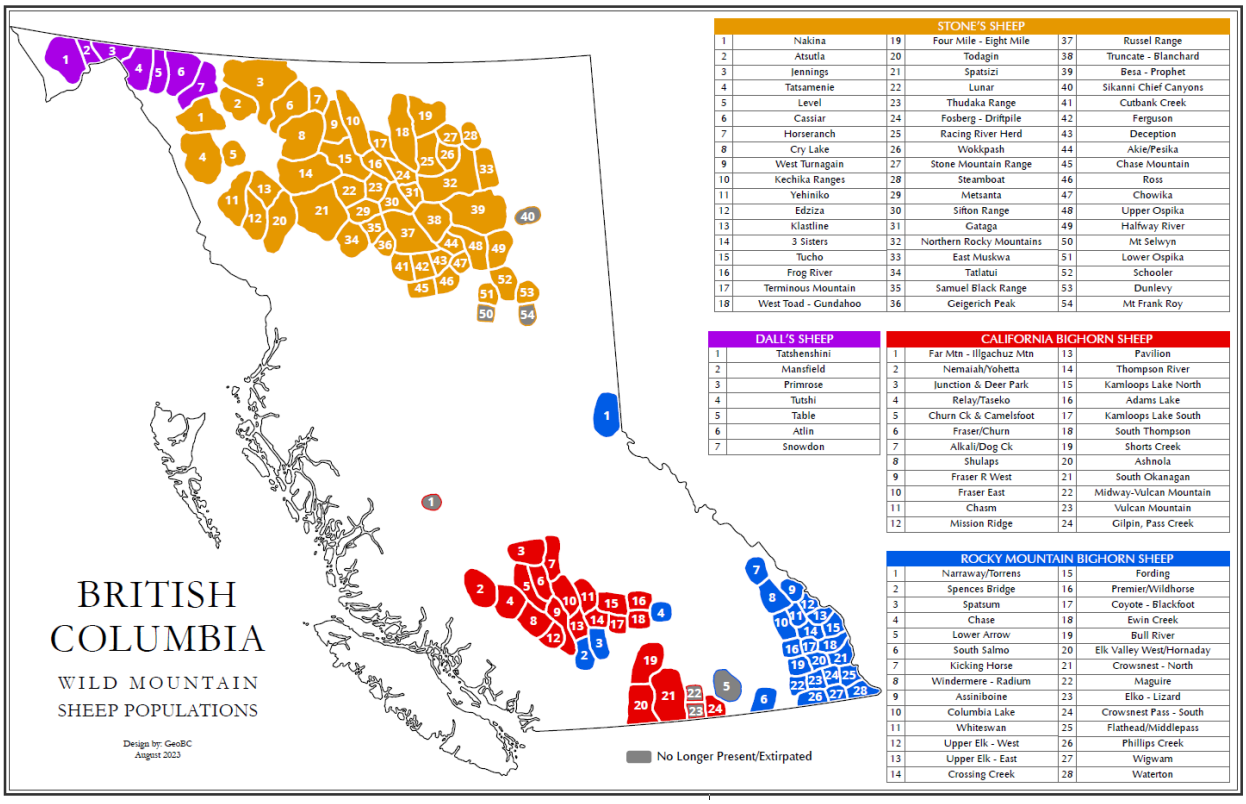
*Table 2 – Percentage of bighorn sheep testing positive for diseases and pathogens.*

| GMU | Actual Samples Taken | BTV | EHD | BRSV | BVDV | PI-3 | M.ovi ELISA | M.ovi PCR |
|---|---|---|---|---|---|---|---|---|
| **16A** | 26 | 42 | 15 | 50 | 0 | 27 | 42 | 4 |
| **16B** | 4 | 100 | 100 | 0 | 0 | 0 | 100 | 75 |
| **40A** | 9 | 33 | 100 | 11 | 0 | 0 | 44 | 33 |
| **43B** | 33 | 33 | 52 | 45 | 0 | 12 | 73 | 21 |
| **24A** | 9 | 100 | 100 | 0 | 0 | 25 | 0 | 0 |

*- Erin Butler, Big Game Management Program Supervisor*
*- Anne Justice-Allen, Wildlife Veterinarian*

## British Columbia

British Columbia has 4 native subspecies of wild sheep (Thinhorns: Dall's and Stone's; Bighorns: Rocky Mountain and California).




Harvest management for all species includes a combination of over-the-counter licenses for General Open Season (GOS) areas and Limited Entry Hunting Zone (LEH) draw-only hunting areas. The province currently only issues a general, non-specific sheep hunting species tag, so we are unable to report on specific numbers of licenses sold by subspecies (Figures 1 and 2).

*Figure 1. Harvest of wild sheep in British Columbia based on Compulsory Inspection data.*

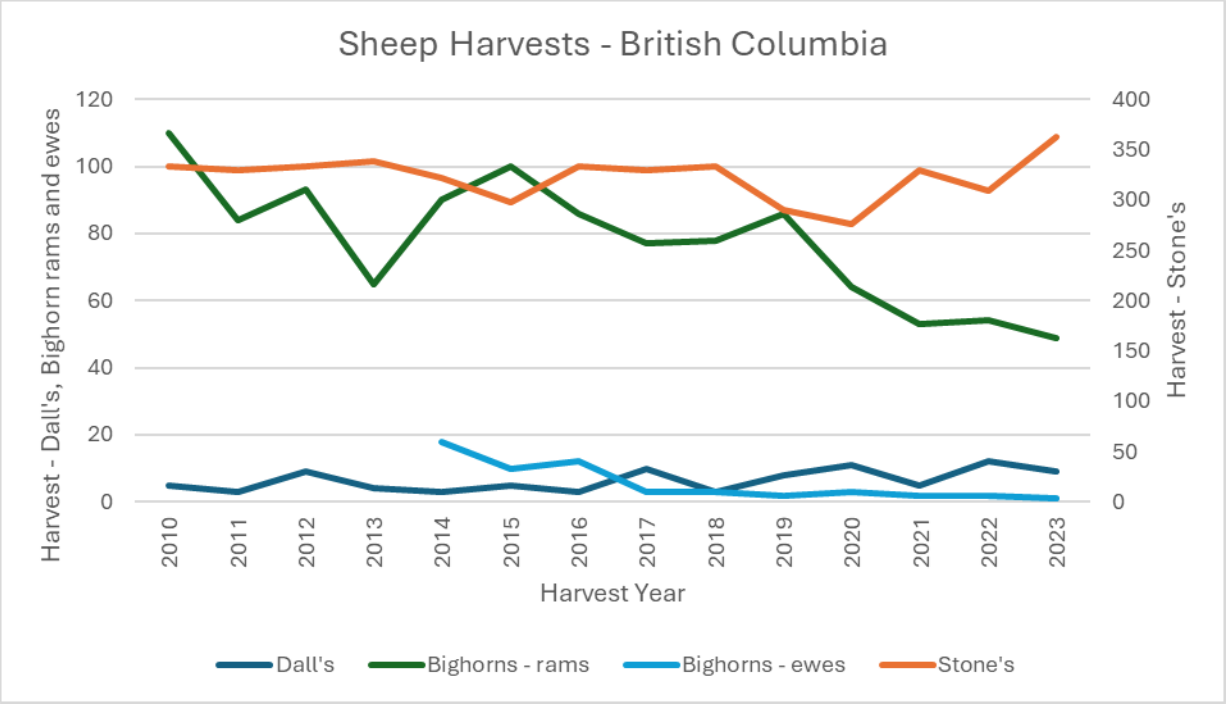
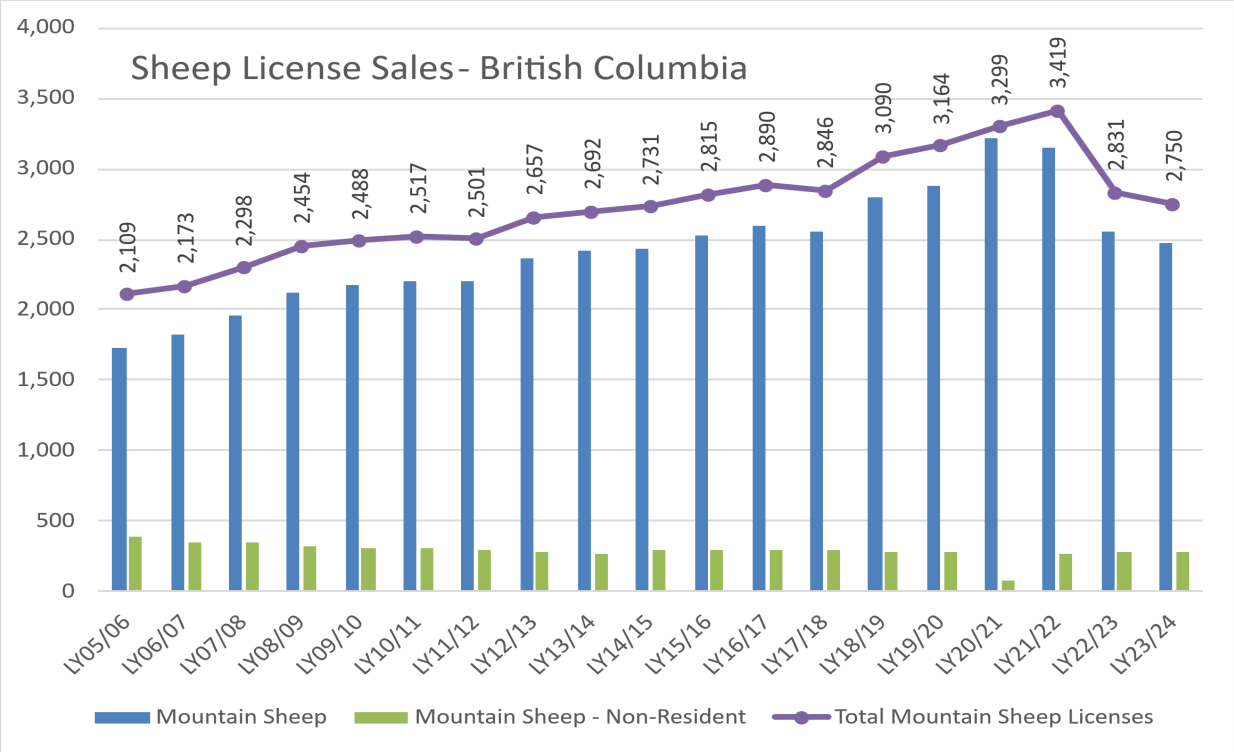



*Figure 2. Numbers of wild sheep licenses sold annually in British Columbia, by hunter residency type.*




## Rocky Mountain & California Bighorn Sheep

British Columbia (B.C.) uses a combination of ram and ewe GOS and LEH to manage hunter harvest in both California and Rocky Mountain Bighorn Sheep populations and has recently made changes to both GOS and LEH opportunities to mitigate population declines and address localized harvest pressure.

B.C. is reporting ongoing declines in California BHS populations over the past 5 years because of disease and health related losses. Affected populations include California bighorn sheep in Regions 3 (Thompson), 5 (Cariboo) & 8 (Okanagan). Ongoing Test & Remove projects are ongoing in the Fraser River metapopulation, with treated herds responding well despite their very low numbers. The 2024 provincial population estimate across all regions for California BHS was <2,000 sheep.

Rocky Mountain bighorn sheep (RMBS) remain at relatively low numbers in the Thompson region (~400). Since their introduction to the Spence's Bridge (1927) and Fraser Cayon (1970) areas, their distribution has expanded. Recent genetic analyses completed in 2024 are detecting RMBS genetic admixing in populations as far east as Kamloops Lake and north to Big Bar Creek (traditionally these were considered California populations). Region 4 (Kootenays) populations continue to show mixed outcomes with several populations remaining below management objectives. Region 4 GOS was shifted to LEH in 2022 to address harvest pressure related concerns and effects on populations.

The continent's most northern population of RMBS, is a cross-jurisdictional population located in Region 7B (Peace) and Alberta. Inventory information has confirmed that this population has steadily declined since 2015. The B.C. portion of this meta-population has also declined to <75 sheep, because of severe weather events and predation effects; hunter harvest is currently managed through the general open season. Harvest rate since 2022 is approximately 10%, significantly higher than the maximum rate of 3%. The region is currently considering changes to hunting regulations to reduce the harvest rate to more sustainable levels, consistent with provincial harvest management procedures.

The total provincial RMBS population estimate is ~2,400 individuals.

### Dall's Sheep

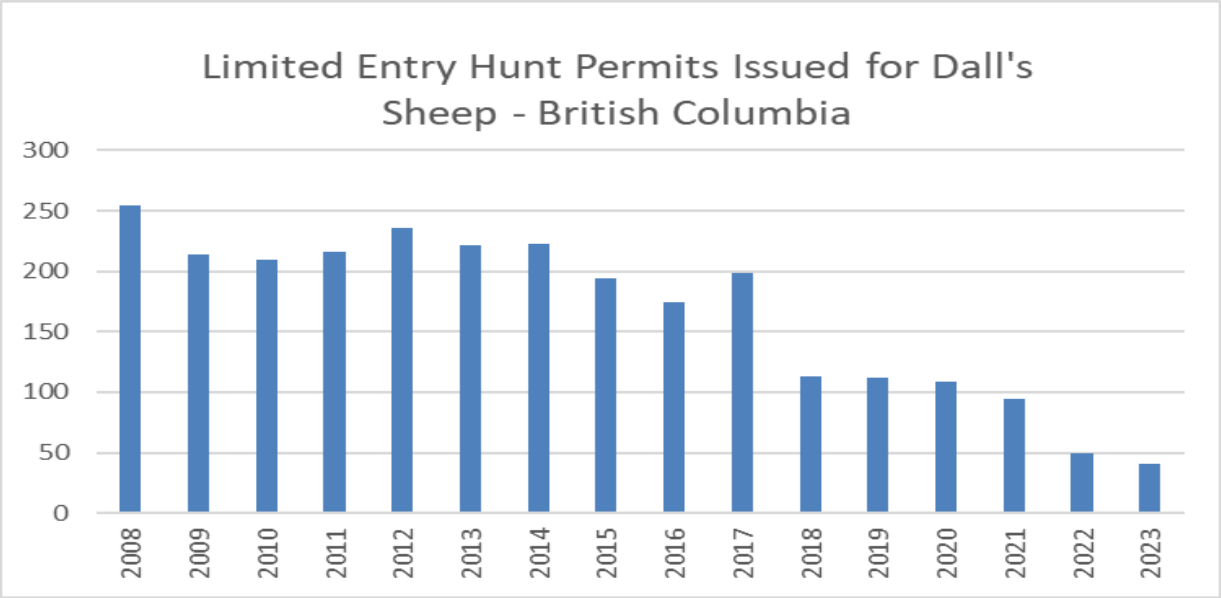
Recent genetic information has confirmed that the range of Dall's sheep in B.C. is larger than previously thought. B.C. provided revisions to the previous estimates provided to the WAFWA WSI data records to reflect this new information (i.e., we reassigned sheep previously included as Stone's into the Dall's category). The 2024 total estimated number of Dall's sheep in B.C. is ~700, with the new geographic distribution being identified as all populations west of the centerline of the Teslin and Taku watersheds. Approximately 60% of all Dall's sheep range in B.C. has been inventoried over the past decade so the population estimate is somewhat unverified.

Hunts for Dall's sheep in B.C. are predominantly managed through Limited Entry Hunting draw hunts (for white sheep), however, some of the newly defined areas immediately west of Teslin Lake that contain Fannin or dark-phased Dall's phenotypes, continue to be managed through GOS (these populations are still considered Stone's sheep by organizations such as Boone & Crockett) (Figure 3).

### Stone's Sheep

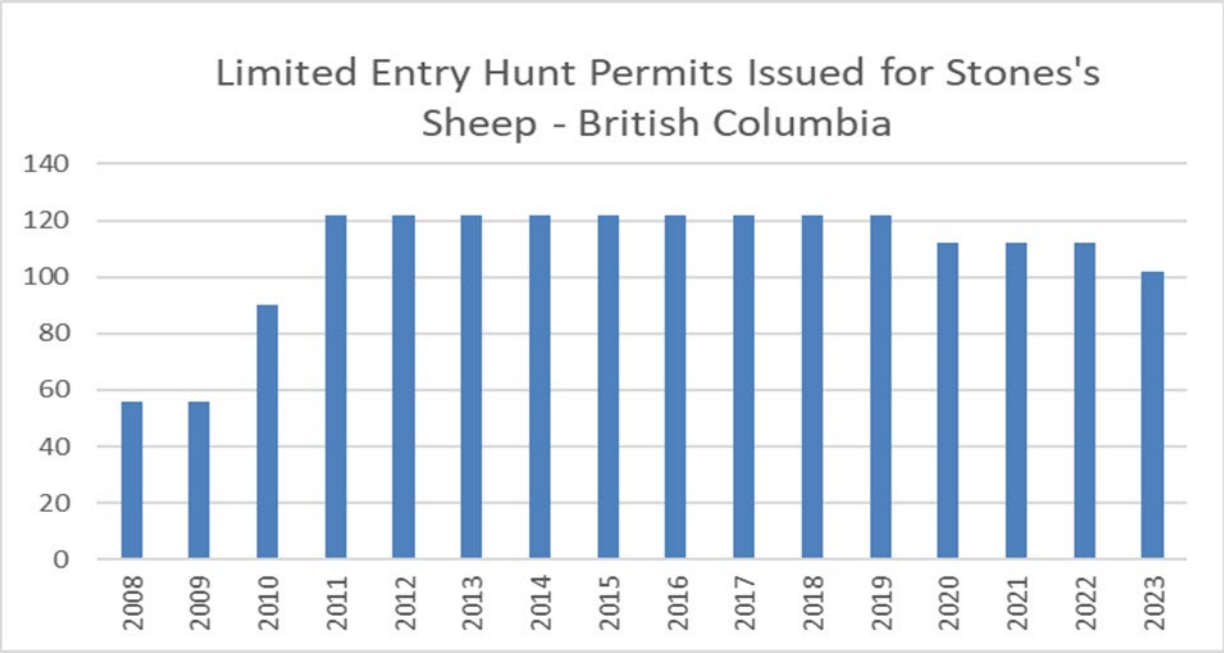
Genetic information has confirmed that the distribution of Stone's sheep in B.C. is smaller than previously thought. B.C. has provided revisions to past estimates provided to the WAFWA WSI data records to reflect this new information (i.e., we reassigned sheep previously included as Stone's into the Dall's category) and the new geographic distribution is identified as all Thinhorn sheep populations east of the centerline of the Teslin and Taku watersheds. The estimated number of Stone's sheep in B.C. is ~10,000, however only about 35% of known Stone's sheep range has had population level inventory work completed in it over the past decade; surveys conducted in the past 5 years indicate an estimated 13-50% fewer sheep than pre-2010.

*Figure 3. Dall's sheep LEH permits, 2008-2023.*




Hunting for Stone's sheep provides the bulk of the sheep hunting opportunity in B.C. with most areas managed through GOS; some smaller specific hunt areas overlapping provincial park areas are managed through LEH and there is one archery-only GOS hunting area. There are slightly fewer LEHs being issued for Stone's sheep in the past years (Figure 4) in response to inventory data that suggests a decline in populations. There is inventory occurring in February-March of 2025 focused on determining population status and understanding trends in several populations (Figure 4).

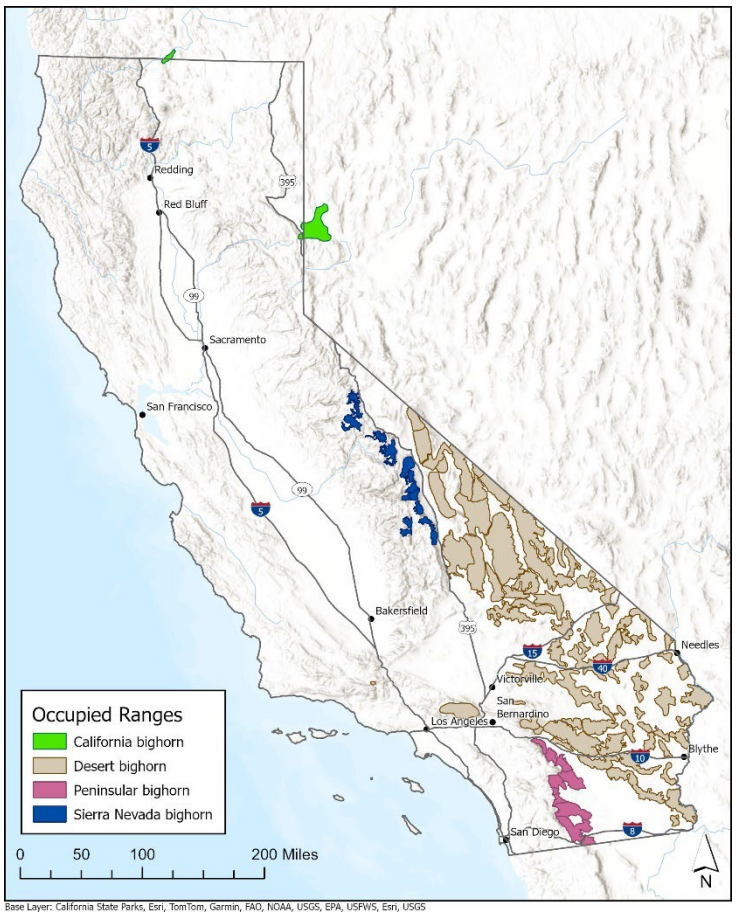
*Figure 4. Stone's sheep LEH permits, 2008-2023.*




*Bill Jex, British Columbia Ministry of Forests, Fish and Wildlife Branch*

## California

*Figure 1: Current distribution of bighorn sheep in California.*




California is home to two subspecies of bighorn sheep located in the southeastern part of the state- the Sierra Nevada (*Ovis canadensis sierrae*) and desert (*Ovis canadensis nelsoni*) (Figure 1). The SNBS are located in the Sierra Nevada mountains and are federally listed as endangered and managed under their own Recovery Plan. Similarly, the desert bighorn located in the Peninsular Range (known as Peninsular bighorn sheep (PBS)), east of San Diego and west of the Salton Sea, are considered a Distinct Population Segment and are federally listed as endangered and managed their own Recovery Plan. As of April 2025, the California Department of Fish and Wildlife (CDFW) released its Conservation and Management Plan for Bighorn Sheep in California; however, given the individual recovery plans, the statewide document focuses primarily on the non-endangered desert bighorn sheep populations. Historically, there were also bighorn sheep located in the north-eastern portion of the state, but those populations were extirpated. There are occasionally California bighorn sheep from neighboring states seen in northern California, but these populations are not actively managed or monitored by California Department of Fish and Widllife (CDFW). For 2024, CDFW estimates there are 5,400 bighorn sheep in California, including 400 Sierra Nevada, 750 Peninsular, and 4,250 non-endangered desert bighorn sheep.

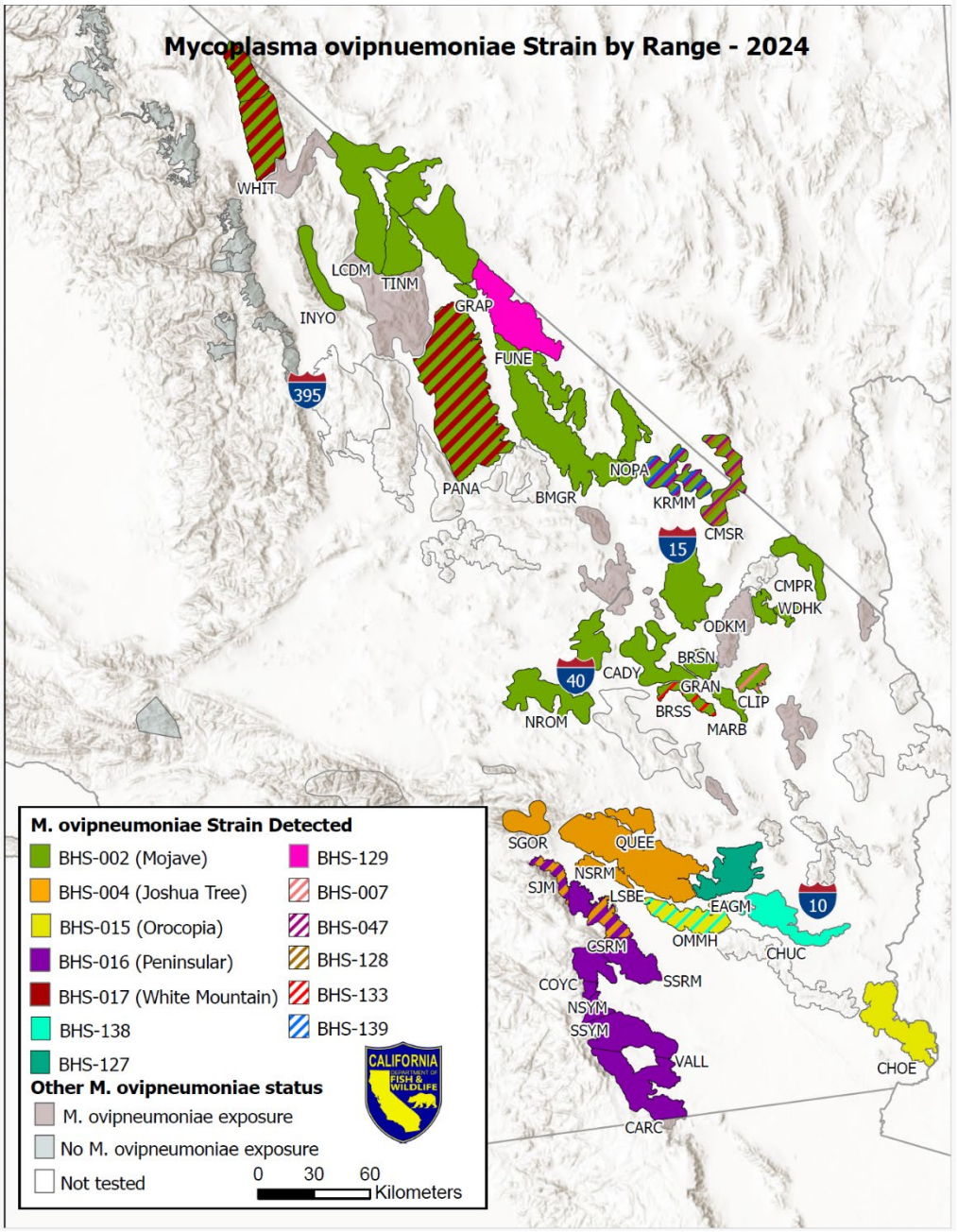
As of December 2024, CDFW has documented five primary strains of *Mycoplasma ovipnuemoniae* (M. ovi) and eight additional strains that appear to be localized within the desert bighorn sheep populations (Figure 2). The SNBS populations continue to test negative for the *M. ovi* pathogen and exposure to it and are the only population to consistently do so in the state. To date, no test and remove efforts have taken place in California.

### Sierra Nevada Bighorn Sheep

*Populations*

As of March 2025, the Sierra Nevada Bighorn Sheep Recovery Program estimates there are roughly 400 Sierra Nevada bighorn sheep including 159 adult females, 22 yearling females 101 lambs, 25 yearling males and a minimum of 89 adult males. Surveys are designed to target females and younger animals, so these categories are more accurate than the count of adult males, which often use different habitat. For this reason, the lamb:ewe ratio 101:159 is likely accurate while the ram:ewe ratio 89:159 is likely an

*Figure 2: Mycoplasma ovipneumoniae (M. ovi) status and strain types for bighorn sheep in California 2013-2024.*




underestimate. The Sierra bighorn population has been slowly growing since the record-breaking winter of 2023, in which we estimate 50% of females died. We are still in the process of determining presence or absence of some herds in which the collared animals died and locating small groups in the vast and complex Sierra Nevada habitat is difficult.

*Licenses and Harvest*

There is no legal harvest of this subspecies.

*Disease and Herd Health*

This population continues to test negative for *M. ovi* but is closely monitored and a subset of individuals are generally tested twice a year. The biggest impediments to this population's recovery are heavy snowfall during extreme winters, leading to avalanche- and starvation-related mortalities, and lion predation.

## Desert Bighorn Sheep

*Populations*

In 2023, California's population was estimated at 4,500 desert bighorn sheep (including Peninsular bighorn sheep), a reduction from 5,000 desert bighorn sheep due to severe drought and lowered recruitment in 2021 and 2022. The drought subsided due to heavy monsoonal moisture in the summer and fall of 2022, significant to historic rainfall in the winter of 2022-23, widespread moisture from Hurricane Hilary in August of 2023, and continued Pacific moisture in the winter of 2023-24. As a result, yearling and ram counts were high across nearly all ranges surveyed in 2024, enough to allow recovery from the drought, back to around 5,000 individuals.

Peninsular Bighorn

This Distinct Population Segment of desert bighorn sheep is managed under its own Recovery Program with nine Recovery Regions (RR) identified. The downlisting criteria requires 1) a minimum of 25 ewes present in each of the 9 RR for six consecutive years; 2) a range-wide population average of 750 individuals with a stable or increasing trend over 12 consecutive years; 3) regulatory mechanisms and land management commitments have been established that provide for long-term protection of PBS and all essential habitat. As of December 2024, a range-wide helicopter survey yielded a mark-resight estimate of 742 [95% CI: 656-829] adult and yearling Peninsular bighorn sheep. These results are consistent with the 2022 range-wide estimate of 745 [95% CI: 681-810]. While the overall range-wide average has maintained above 750 individuals for the last 12 years, there was a noticeable decline from 2010, although the last few years appear to have remained stable. However, there are multiple RRs that have not met the 25-ewe minimum for multiple years.

Non-endangered desert bighorn

California's non-endangered desert bighorn sheep metapopulation consists of 64 herd units spread across the state's southern mountain ranges. Historically, California's desert bighorn sheep formed one large metapopulation. Three freeways (I-15, 40, and 10) have divided this metapopulation into five fragments, or Bighorn Conservation Units (BCU), as clearly shown by both genetic and movement data (Figure 3). Re-establishing genetic connectivity remains one of the top priorities for desert bighorn sheep program.

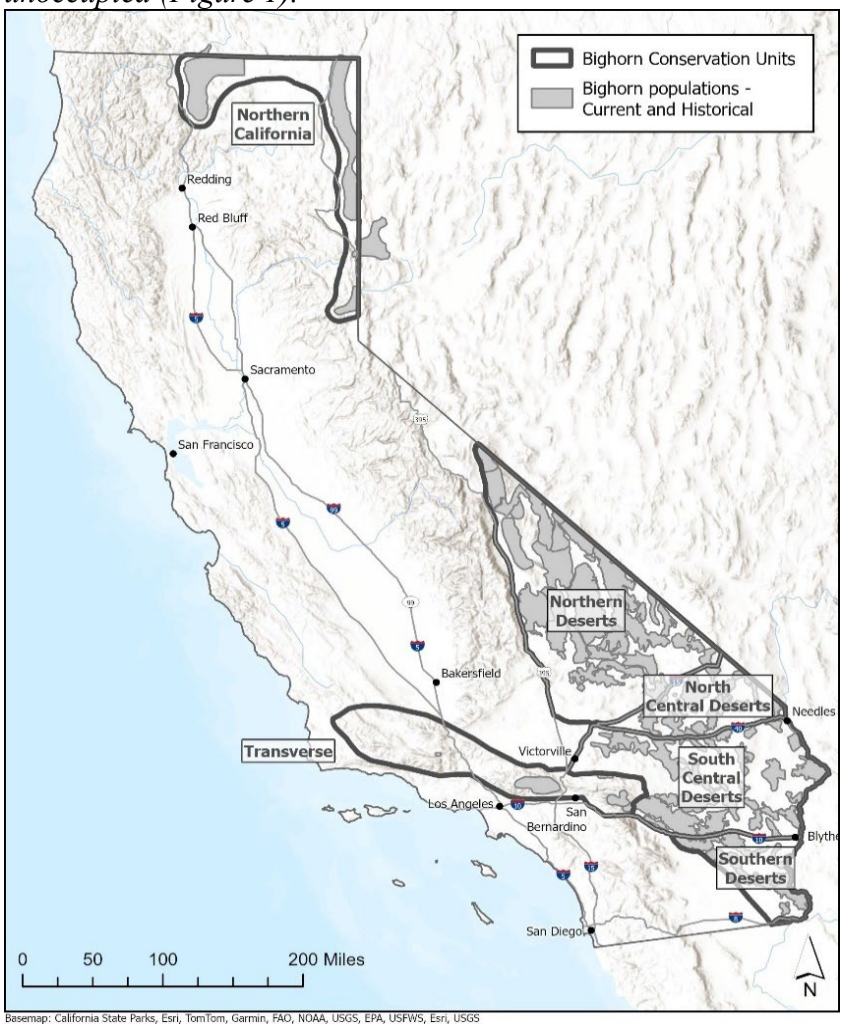
Construction is planned to start this year on three wildlife overcrossings traversing I-15, designed specifically to benefit the species.

*Licenses and Harvest*

Peninsular Bighorn

There is no legal harvest of this Distinct Population Segment.

*Figure 3: Bighorn Conservation Units (BCUs) for the non-endangered desert bighorn populations. Please note the Northern California BCU represents historic distribution of bighorn sheep but is mostly unoccupied (Figure 1).*




Non-endangered desert bighorn

Per California Fish & Game Code, hunting of desert bighorn in California is limited to rams. The California Fish & Game Commission may not adopt regulations authorizing hunting in a single year of more than 15 percent of the mature rams (Class III or IV) in a single management unit. Hunts usually have 100% success rate except in the high-altitude White Mountain Hunt Zone 7. In April 2024, the California Fish and Game commission voted to adopt several new desert bighorn sheep regulation changes which will be implemented starting July 01, 2025. The main changes include splitting Zone 10 into two winter seasons to allow for more harvest while reducing the number of hunters on the landscape; adding a winter

season to Zone 7; adjusting the boundary of Zone 6 to better reflect ram habitat; and allowing the Single Zone fundraising tags to be assigned on an annual basis (instead of being fixed). The 2025/2026 hunt season consists of 27 general tags and three fundraising tags (Figure 4*).*

*Figure 3: Previous success rates from the 2024-2025 season and the number of general hunt tags offered in each hunt zone for the 2024/2025 hunt season. In total there are 27 general tags, as well as 3 special fundraising tags (Open Zone, Zone 2, and Zone 10) are offered for the 2025-2026 season*

| Hunt Zone and Range | Hunt Code | 2024 Hunter Success (%) | 2024 Tag Quota | 2025 Tag Quota |
|---|---|---|---|---|
| Zone 1 Marble/Clipper Mountains | 501 | 100 | 1 | 1 |
| Zone 2 Old Dad/Kelso Peak Mountains | 502 | 100 | 2 | 3 |
| Zone 3 Clark and Kingston Mountain Ranges | 503 | 100 | 3 | 4 |
| Zone 4 Orocopia Mountains | 504 | 100 | 1 | 1 |
| Zone 5 San Gorgonio Mountains | 505 | - | 0 | 1 |
| Zone 6 Sheep Hole Mountains | 506 | 0 | 1 | 1 |
| Zone 7 White Mountains (Period 1) | 507 | 50 | 4 | 3 |
| Zone 7 White Mountains (Period 2) | 511 | - | - | 2 |
| Zone 8 South Bristol Mountains | 508 | 100 | 1 | 1 |
| Zone 9 Cady Mountains | 509 | 100 | 2 | 2 |
| Zone 10 Newberry, Rodman, and Ord Mountains | 510 | 100 | 6 | -- |
| Zone 10 Newberry, Rodman, and Ord Mountains (Period 1) | 512 | -- | -- | 4 |
| Zone 10 Newberry, Rodman, and Ord Mountains (Period 2) | 513 | -- | -- | 4 |

*Disease and Herd Health*

*M. ovi* continues to pose a significant threat to desert bighorn sheep herds in California. Antibodies to the pathogen have been found in individuals from every desert bighorn sheep herd tested.

Peninsular Bighorn

The PBS populations continue to test positive for *M. ovi* on ELISA and PCR, though the rates and distribution vary by Recovery Region and across years. The greatest risk of novel M ovi strain introduction to bighorn sheep populations is contact with domestic sheep, including those on hobby farms. In April

2024, a loose domestic ram was seen mingling with wild bighorn sheep in Recovery Region 7. Unfortunately, by the time a coordinated response could be made the domestic sheep was lost. Helicopter surveys were flown to try to find the domestic ram but were unsuccessful. Helicopter capture efforts in October collared and tested 26 animals between Recovery Regions 6-8 and resulted in zero *M. ovi* PCR positive detections.

Non-endangered desert bighorn sheep

Over the past decade, all age-class die-offs have been detected in the Old Dad, San Gorgonio, and South Bristol herds. Carcasses from the Old Dad herd sampled during the die-off tested positive for M. ovi. Carcasses from the San Gorgonio and South Bristol herds during their respective die-offs did not test positive for M. ovi; it is possible that the pneumonia in those herds was caused by a different, as-yet undetermined pathogen.

The Mojave strain of M. ovi indicated in the Old Dad die-off in 2013 reached the White Mountains in 2019. Between 2020 and 2024, there was a decline in the White Mountain population from approximately 400 to approximately 200 individuals, although 26 individuals captured in 2023 tested negative for M. ovi, and that herd appears to be recovering. In 2023 the Mojave strain was also detected with high PCR positive prevalence across Death Valley National Park (80% PCR positive in the Grapevine Mountains and 50% in Tin Mountain), where similar die-offs likely occurred, although population estimates capable of detecting trends were not available. All of these populations have since shown recruitment capable of sustaining or growing the current populations.

*Test and Remove*

To date, no test and remove efforts have taken place in California.

*Paige Prentice, Rick Ianniello, Danielle Glass, and Lacey Greene—California Department of Fish and Wildlife*

## Colorado

### Rocky Mountain Bighorn Sheep

*Populations*

The 2024 Colorado statewide post-hunt Rocky Mountain bighorn sheep (RMBHS) population estimate is 7,060. This is down from our contemporary peak population size of 7,500, which was reached in 2001 and 2022 (Figure 1). The statewide population has averaged 7,100 over the last 30 years. Approximately 6,470 RMBH occur in hunted populations and 590 in unhunted populations which are primarily in Rocky Mountain National Park. In 2024, we had 23 Game Management Units where population estimates went up and 15 went down.

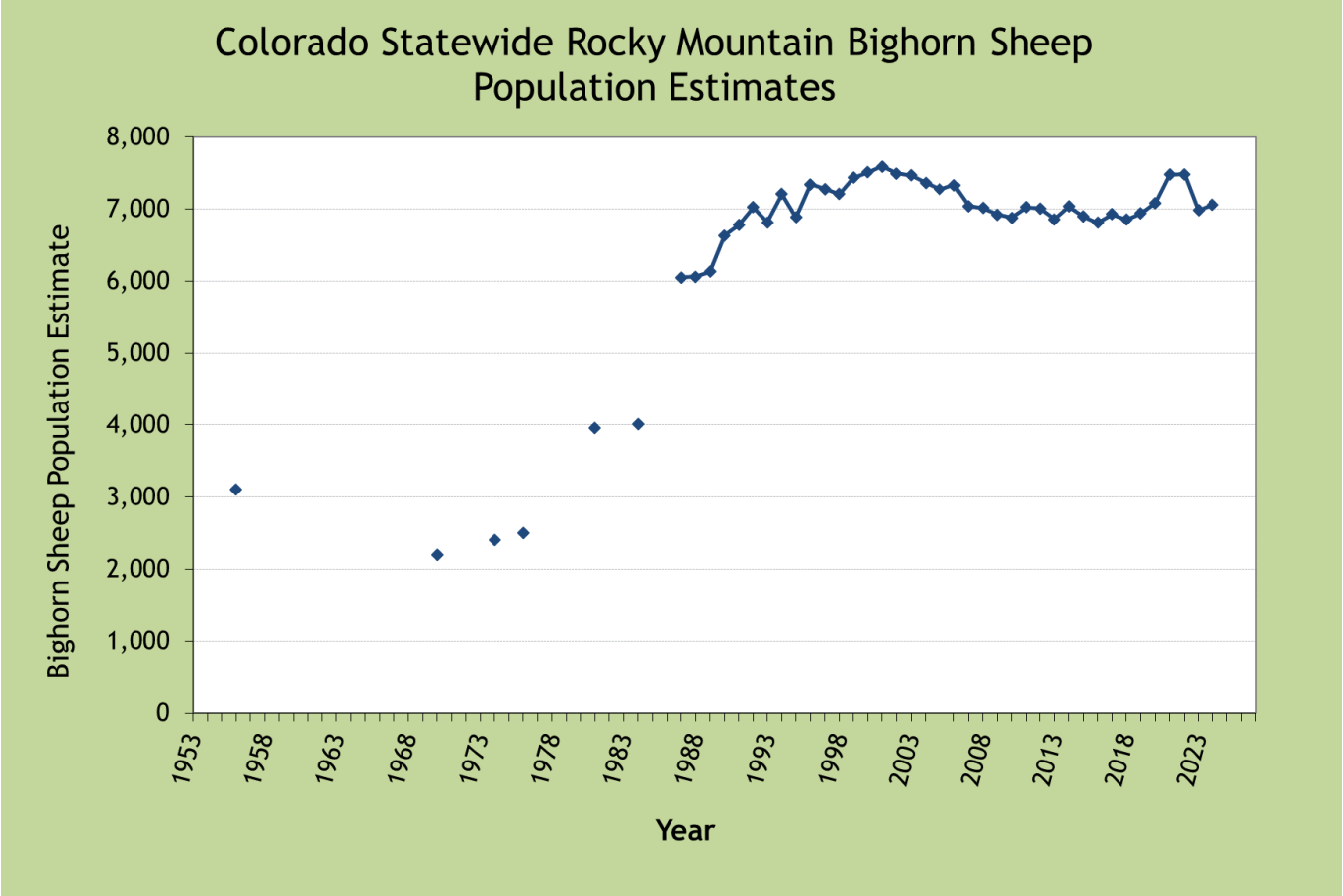
From 1945 to present, Colorado conducted approximately 150 translocations of 2,500 RMBHS. Most of these occurred during the 1980's and 1990's. Approximately 55% of current herds resulting from reintroductions. These transplants continue to this day but at a much lower rate because there are very few locations remaining that have both suitable habitat for bighorn sheep and that do not have domestic sheep or goats nearby.

*Licenses and Harvest*

Colorado has 39 designated RMBHS populations with 71 hunted Game Management Units (GMUs) shown in red in Figure 2.

For 2025, we reduced total licenses from 321 to 307 (-14) RMBHS statewide. Ram and either-sex licenses recommendations are reduced by 10, from 235 to 225 and ewe licenses are reduced by 4, from 86 to 82. Ram harvest rate averages about 2.3% of hunted population size while female harvest rate is much less than 1%. See licenses and harvest from 1990 to present in Figure 3.

*Figure 1. Rocky Mountain bighorn sheep population estimates.*




## Desert Bighorn Sheep

Between 1979 and 2001, Colorado conducted 12 transplant operations and translocated 218 desert bighorn sheep from Arizona, Nevada, and Utah. As a result of these significant and expensive transplant efforts, Colorado has 2 desert bighorn sheep herds, in 4 game management units (GMUs) shown in salmon inn Figure 2.

The 2024 DBHS population estimate is again 500 (Figure 4). Ram licenses for 2025 will be the same as 2024 at 15. No ewe licenses have been offered yet for DBHS (Figure 5).

*Figure 2. Colorado Rocky Mountain (tan) and desert bighorn sheep (salmon) game management units.*

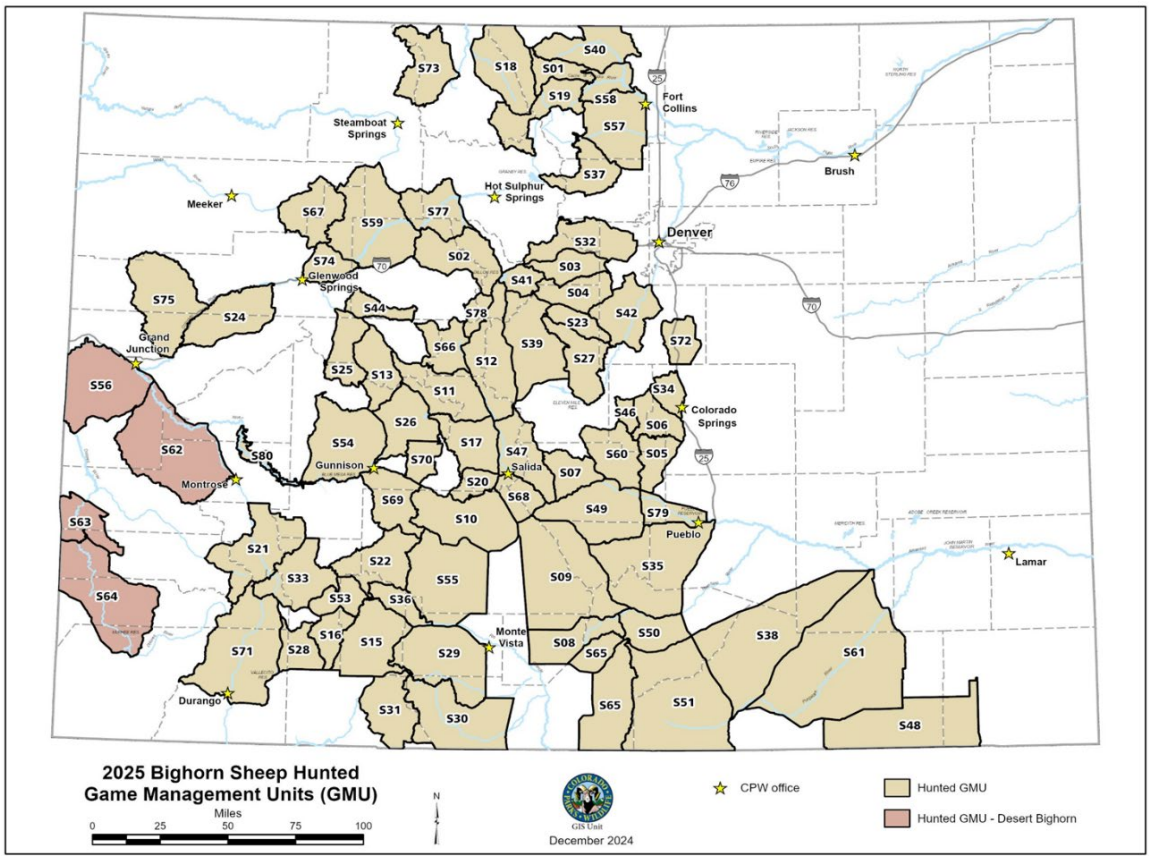
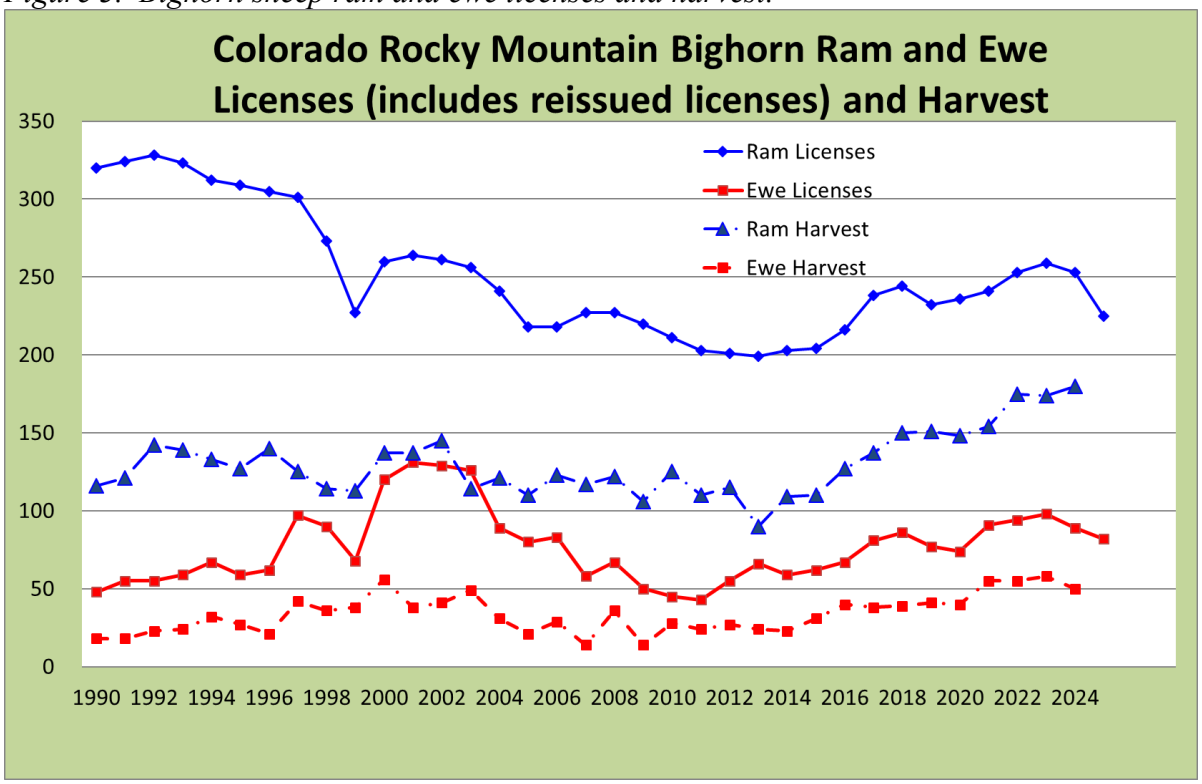



*Figure 3. Bighorn sheep ram and ewe licenses and harvest.*



*Disease and Herd Health*

This year was another poor year for bighorn sheep herd health. In 2024, CPW documented all-age mortality events in 4 herds and confirmed lamb mortality in 4 additional herds. In S32 (Georgetown), S37 (Saint Vrain), S57 (Big Thompson Canyon), and S58 (Lower Poudre Canyon) we are observing an all-age mortality event (mortality in lambs, ewes, and rams) with no lambs surviving to 1 year old in the entire Northern Front Range of Colorado. Currently co-infection of 3 pathogens, including the same strain of Mycoplasm ovipneumoniae (M. ovi) that has been present since 2021 in these herds. The same strain of M. ovi is operating in all 4 herds with all age die-offs.

Throughout the state we performed specific (PCR) testing for pathogens including Mycoplasma ovipneumoniae, leukotoxigenic Pasteurellaceae, and Pasteurella multocida. Necropsy of deceased bighorn sheep demonstrated bronchopneumonia, with variable concurrence of upper respiratory disease (including sinus tumor) and detection of leukotoxigenic Pasteurellaceae, Mycoplasma ovipneumoniae, and Pasteurella multocida. Chronic upper respiratory disease (sinus tumor) was detected in several Colorado bighorn herds. Sampling approaches were tailored to the individual project and included both serology and swab-based diagnostics. Mycoplasma ovipneumoniae, leukotoxigenic Pasteurellaceae, and Pasteurella multocida were detected in various combinations among the sampled populations. No new pathogens were documented through sampling efforts, but new strain types were discovered.

*Test and Remove*

No current test and removal programs were conducted in Colorado in 2024.

*Figure 4. Desert bighorn sheep population estimates.*

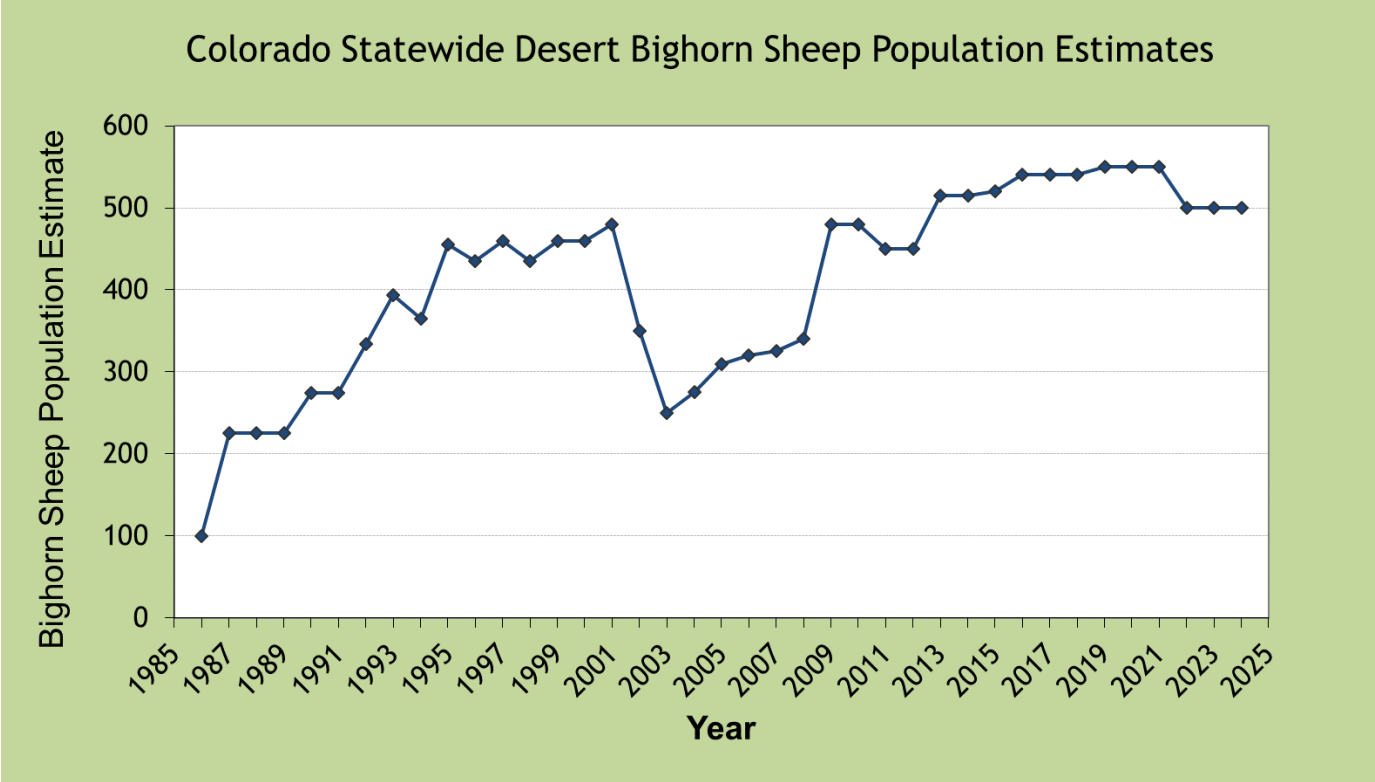
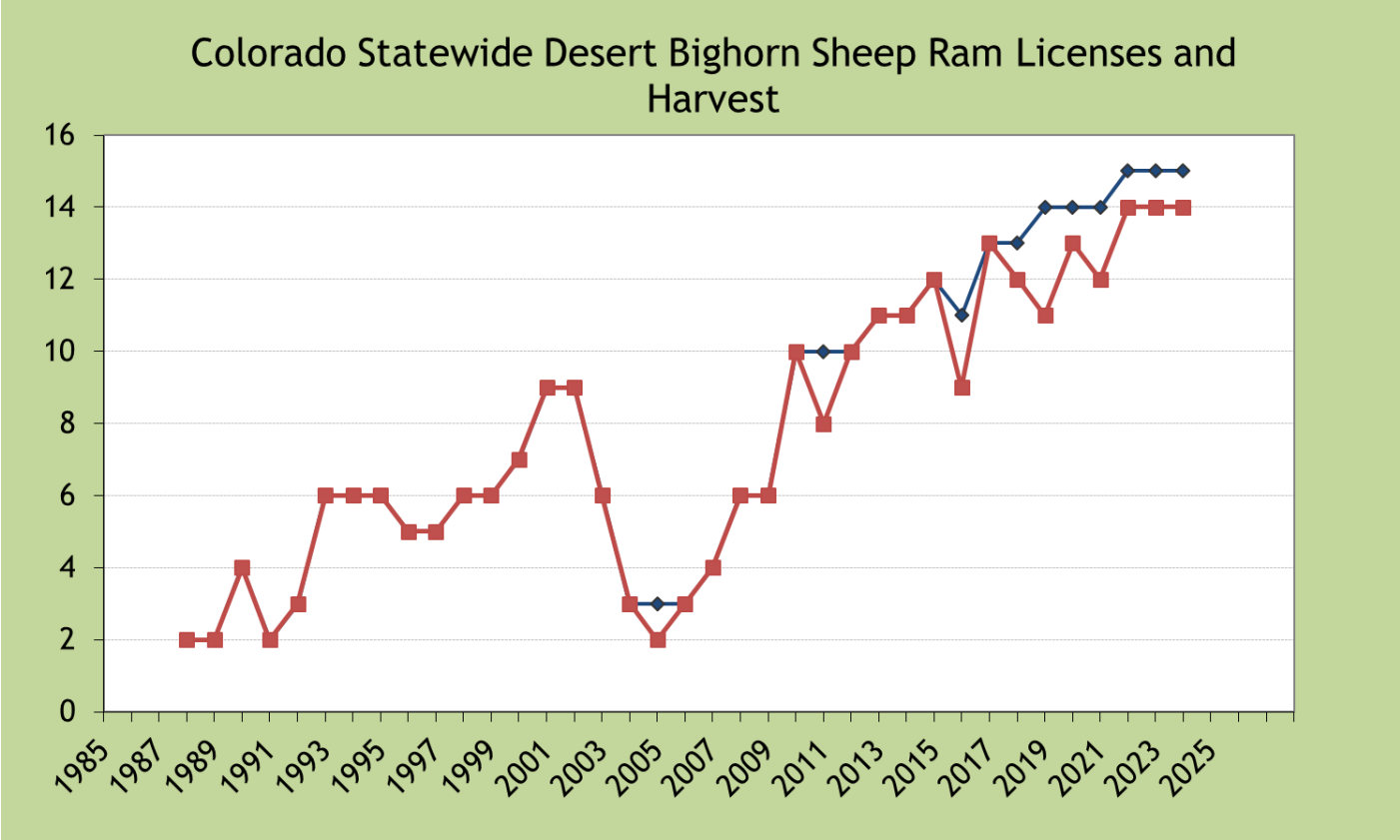


*Figure 5. Desert bighorn sheep ram licenses and harvest.*




*-Andy Holland, Colorado Parks and Wildlife*

## Idaho

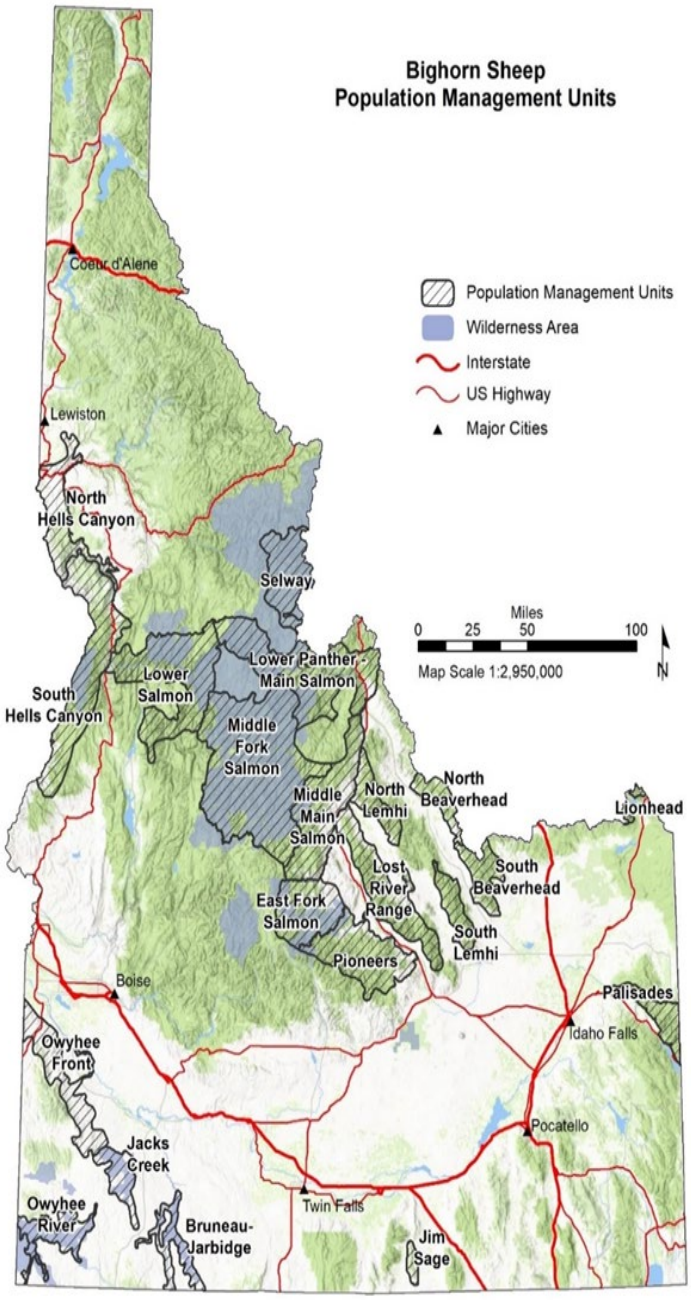
### Rocky Mountain Bighorn Sheep

In Idaho, bighorn sheep exist in both small, isolated populations and in interconnected metapopulations (Figure 1). For management purposes, these populations and metapopulations have been divided into 21 Population Management Units (PMUs). Currently, an estimated 3,780 bighorn sheep occupy about 15.5% of the state. Historical and recent data indicate that most PMUs can sustain higher populations of bighorn sheep and overall management direction will be to increase population levels where feasible. To attain this goal, IDFG will write an annual action plan to describe in more detail planned activities to address management directions and strategies in this plan.

*Populations*

Rocky Mountain bighorn sheep (approximately 3,380 animals) occur in 16 PMUs in central and southeastern Idaho (Figure 2). Fifteen out-of-state translocations and 16 in-state translocations were conducted between 1969 and 2005 to restore Rocky Mountain bighorn sheep populations to historically occupied habitat. Translocations have successfully expanded the distribution of bighorn sheep, but most of the largest populations are still native Rocky Mountain bighorn sheep that were never extirpated in the Salmon River drainage. In south-central and southwestern Idaho about 400 California bighorn sheep occur in 5 PMUs (Figure 2). Bighorn sheep were completely extirpated from this part of the state, and current populations are the result of 12 translocations with bighorn sheep from outside Idaho and 18 translocations with bighorn sheep from within the state between 1963 and 2004.

*Figure 1. Current distribution of bighorn sheep in Idaho, as defined by Population Management Units (PMU).*

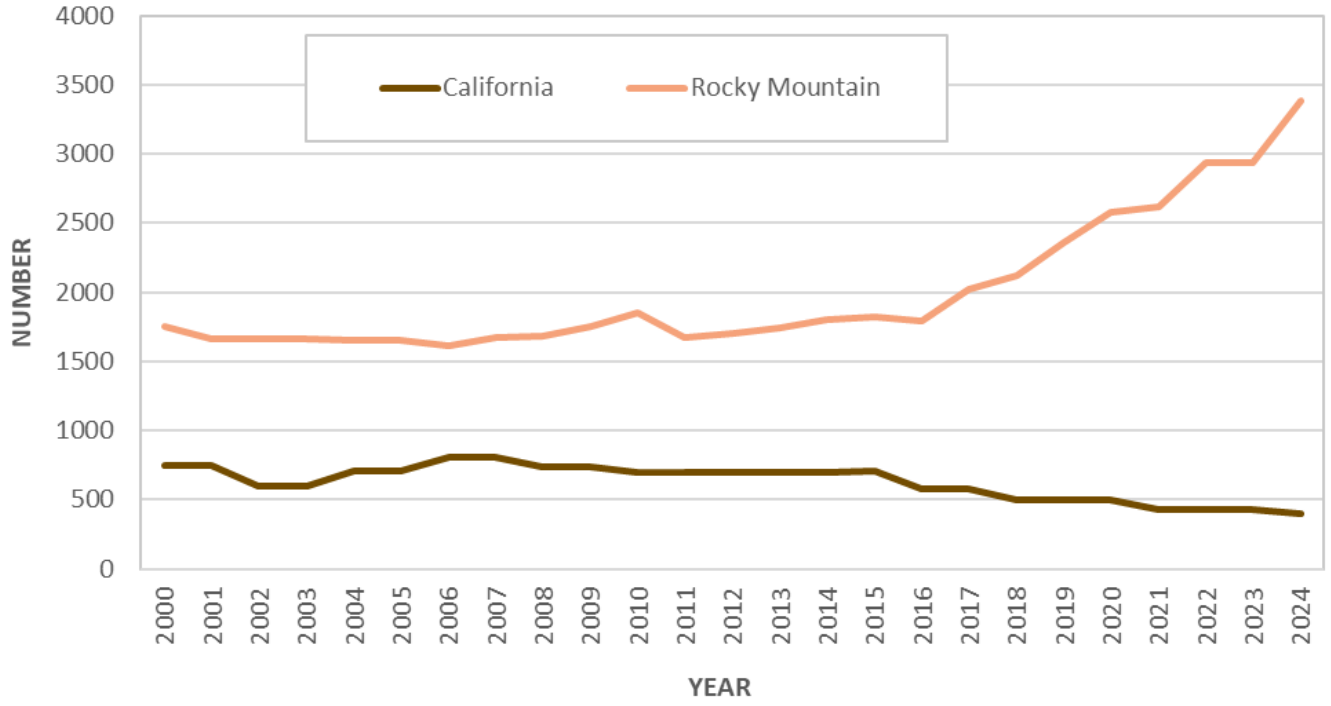



*Harvest Management*

Over the last 85 years, ram tags and harvest have varied considerably with changes in populations (Figure 3). Disease-related die-offs that have impacted large portions of Idaho's bighorn sheep populations typically resulted in large reductions in tag levels, followed by slow increases in tags if populations recovered.

Beginning with the 1991–95 bighorn sheep management plan, hunting was not recommended unless a population was estimated at >100 animals. However, a 100-animal minimum may preclude legitimate ram-only harvest opportunities in some smaller populations where habitat carrying capacity prevents achieving minimum population size or risk of catastrophic, all-age die-off is high.

*Figure 2. Statewide population estimates of California bighorn sheep and Rocky Mountain bighorn sheep in Idaho, 2000–2024. Statewide estimates are based on the most recent survey in each population management unit which may, or may not, reflect the year of the estimate.*



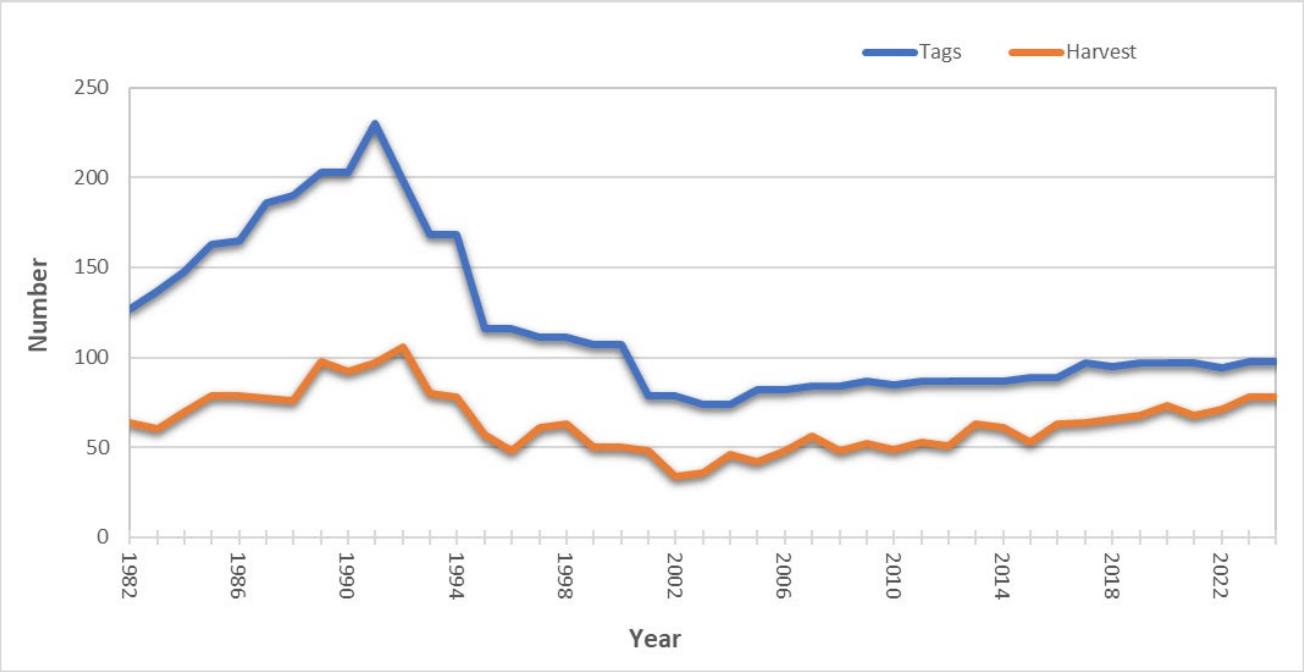

In Idaho, harvest was restricted to ¾-curl or larger rams from 1970–1983 and ¾-curl or larger rams or rams >4 years old (≥3 annual growth rings on horns) from 1984–2006. In 2007, regulations were changed to allow harvest of any ram. Data gathered since 1994 indicate this change had no effect on the average age of harvested rams in Idaho.

Since 1991, management direction is to set tag levels so that harvest is ≤20% of class III and IV rams (¾-curl or larger) observed during the most recent survey for each hunt area. This conservative harvest strategy ensures adequate mature rams for harvest and biological-behavioral requirements (social dominance hierarchy, genetics, mature male:female ratios, etc.).

The current timing of bighorn sheep seasons avoids hunting during the breeding season. Most bighorn sheep seasons start 30 August and continue until 8 October for California bighorn sheep and until 13 October for Rocky Mountain bighorn sheep. Some late-season hunts exist; for example, some hunts for Rocky Mountain bighorn sheep extend through 31 October.

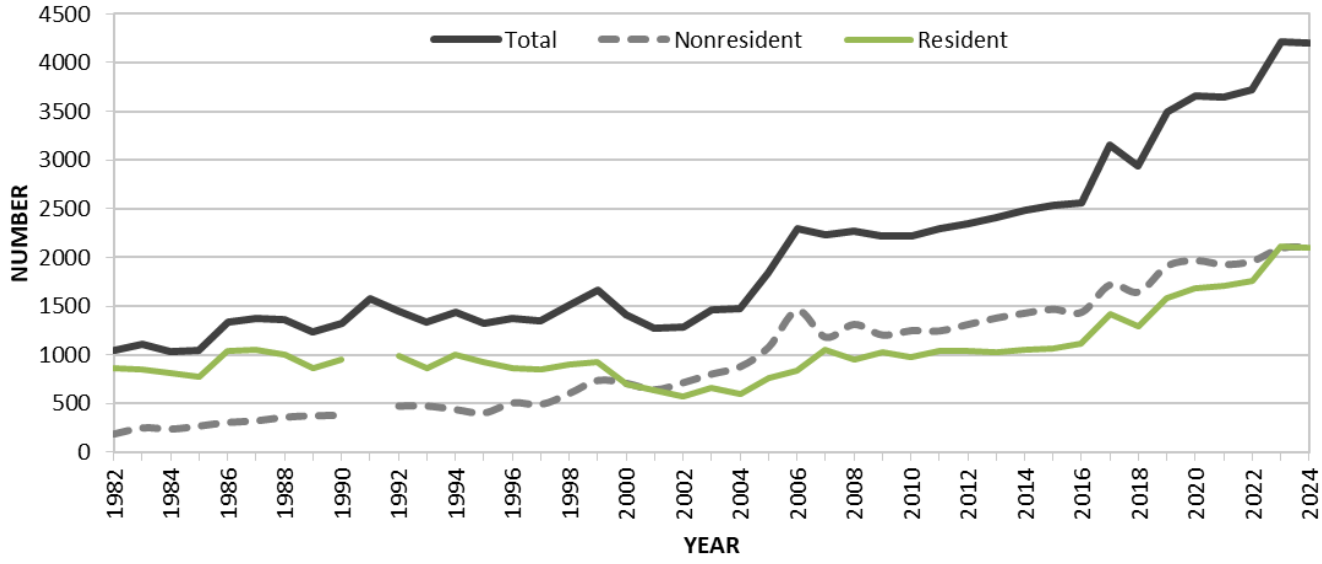
Reduction of ewe numbers may be necessary when sheep numbers have increased above population objectives, including when habitat degradation is possible due to overpopulation or bighorn sheep move into habitat with an increased risk of contact with domestic sheep and goats. Removal of ewes can be accomplished through capture and translocation (in-state or to other jurisdictions) or regulated harvest. Ewe removal is generally not recommended when populations are below habitat carrying capacity, newly reintroduced, or suppressed by a mortality factor (e.g., disease). There is currently no ewe harvest in Idaho.

*Figure 3. Bighorn sheep tags (issued) and harvest 1982–2024, Idaho.*




All bighorn sheep hunting in Idaho is allocated via a controlled hunt (random drawing) system. Currently, nonresidents are limited to ≤10% of all bighorn sheep tags and not more than 1 nonresident tag can be issued for controlled hunts with ≤10 tags (≤10% to nonresidents in hunts with >10 tags). Chances of obtaining a bighorn sheep tag generally declined over time as interest and demand have increased (Figure 4).

*Figure 4. Resident, nonresident, and total number of applicants for bighorn sheep tags 1982–2024, Idaho.*




*Disease and Herd Health*

Population health is an essential component of bighorn sheep restoration and management. Historically disease was an important factor contributing to declines and extirpation of bighorn sheep in much of their

range and disease continues to limit bighorn sheep numbers today. Not only does disease affect populations directly, risk of disease transmission also affects where and how IDFG manages for bighorn sheep in Idaho.

The primary limiting factor for Idaho bighorn sheep populations is disease, although other factors including habitat, genetics, climate change, predation, and hunting can also be important. The disease that has the most widespread and severe impacts on bighorn sheep population abundance is a microbiologically complex pneumonia triggered by the bacterium *Mycoplasma ovipneumoniae*, commonly referred to as "Movi".

In December 2023, *Mycoplasma ovipneumoniae* (Movi) and pneumonia were detected in Hells Canyon bighorn sheep for the first time in over 5 years. Pneumonia appeared to peak in January 2024 and the number of mortalities observed has declined since then, although Movi is still present. Detections of Movi and pneumonia have been limited to populations along the Snake River in Idaho, Oregon, and Washington. As of April 2024, we have received strain-typing results from WADDL on 12 Movi detections and all were identified as strain BHS-056. This strain has never been detected in Hells Canyon before. It was first identified in a 2020 pneumonia outbreak in the Lookout Mountain and Burnt River bighorn sheep populations in Baker County, Oregon, and was detected in Salmon River bighorn sheep above Riggins from 2021-2024. In December 2024 and February 2025, 70 total bighorn sheep were captured in Hells Canyon. We are continuing to monitor and plan to use information from this capture to guide management.

IDFG is currently conducting test and remove research/adaptive management to clear Movi from multiple infected bighorn sheep populations. This includes testing and removing infected sheep in the Lower Salmon, Lower Panther-Main Salmon, and the South Beaverhead PMUs. We are also gathering baseline data in other populations.

*Hollie Miyasaki, Idaho Department of Fish and Game*

## Montana

### Rocky Mountain Bighorn Sheep

*Populations*

Rocky Mountain bighorn sheep (RMBHS) in Montana suffered widespread population reductions during the late 19th and early 20th centuries. Subsequently, various conservation measures were initiated and RMBHS populations stabilized with estimates by 1950 at approximately 1,200 sheep throughout the state. Beginning in the middle part of the 20th century and continuing over the next several decades, significant translocation and management efforts were completed to help re-establish and/or improve population levels and increase distribution (Figure 1). To date, approximately 3,000 RMBHS have been translocated in MT (including out of state transplants) to augment and/or re-establish populations. Montana currently completes statewide population estimates every two years and as of 2024, RMBHS population estimates comprises just over 4,700 sheep (Figure 2). The recent average (2010 to present) estimated state population is just under 5,500 sheep.

*Licenses and Harvest*

Montana has 36 RMBHS hunting districts (HDs) providing opportunity for limited either-sex/legal ram/any ram, unlimited legal ram (quota areas), and adult ewe license permit types. Montana's primary bighorn sheep hunting seasons include a limited archery-only season in early September (excludes three unlimited areas) and a general season (archery or rifle) that is open September 15 through the last

weekend in November. For 2024, 79 limited either-sex or legal ram licenses were allocated. Recent average (2010-2024) statewide limited either-sex/legal ram license drawing success rates is 0.56% and 0.13% for residents and nonresidents, respectively (Figure 3).

*Figure 1. Distribution of RMBHS within MT state jurisdiction and associated hunting districts.*


On a statewide level, there continues to be increased interest for this hunting opportunity yet cumulatively maintained or decreased license allocation (variety of reasons), ultimately leading to decreased odds of drawing over time (Figure 3). This is especially true for the 2024 hunting season in which cumulative limited either-sex/any ram licenses allocated were the lowest in many years (Figure 4). Decreased drawing odds is especially true for resident applicants (nonresidents are capped at a constant allocation rate of not more than 15% of licenses available). For example, in the 2014-2016 period, just over 19,000 residents vied for an average of 114 available limited licenses compared with over 30,000 applications for 73 licenses in 2024 (Figure 3). A reduction from 0.59% to 0.24% drawing success rate. Similarly, applications for adult ewe hunting opportunities continue to increase while statewide license allocation has become more limited. In 2016 (the peak of recent statewide adult ewe license allocation levels), 599 residents vied for 183 available limited adult ewe licenses compared with 802 applications for 47 licenses in 2024. A reduction from 33% to 6.5% drawing success rate.

Average annual statewide either-sex limited license harvest success rates are over 95%. Five HDs in Montana provide unlimited legal ram hunting opportunities managed through individual quotas. 2024 harvest data portray a 3.6% harvest success (all five HDs combined) for these license holders (n=387 via drawing). The annual statewide average age of harvested rams is consistently a little over 7 years

old. Limited adult ewe hunting opportunity is currently available in five HDs with a total of 50 licenses that were available for the 2024 season. Recent annual average statewide harvest success rates for adult ewe licenses are just under 56% (Figure 4). Adult ewe hunting opportunity is an ongoing balance correlated with other population/distribution control measures where necessary (i.e., translocation work).

*Figure 2. Population estimates are derived via professional biologist data and judgment and not a rigorous, statistical enumeration process. Prior to 2010, statewide population estimates include all known wild sheep within the boundaries of the state (including Glacier National Park). Beginning in 2010/2011, estimates include sheep within only MT state jurisdiction. Beginning in 2018, population estimates are completed every other year. Long-term average is calculated using data from 2010-2024 for ram harvest percentages and 2012-2024 for ewe harvest percentages.*

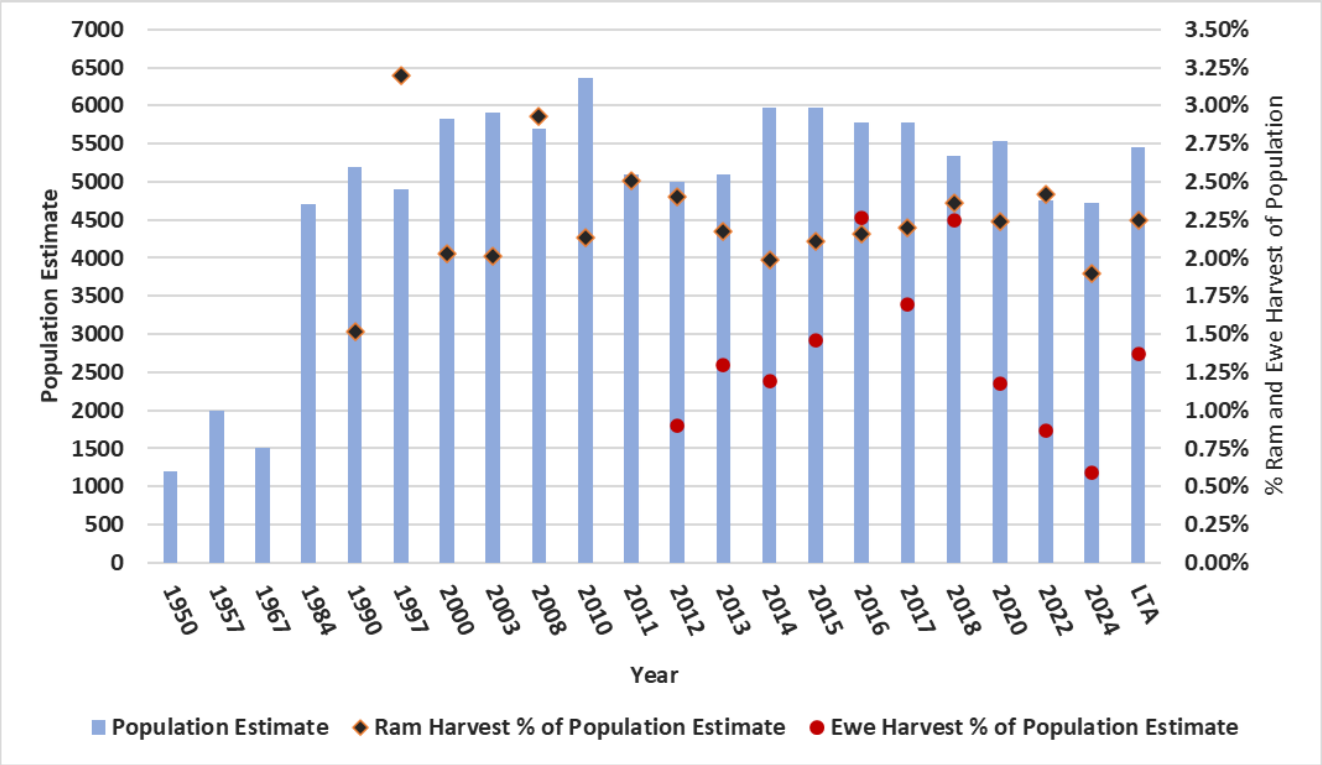


*Figure 3. Cumulative number of applicants for limited either-sex/legal ram/any ram license types and associated annual percent successfully drawn.*

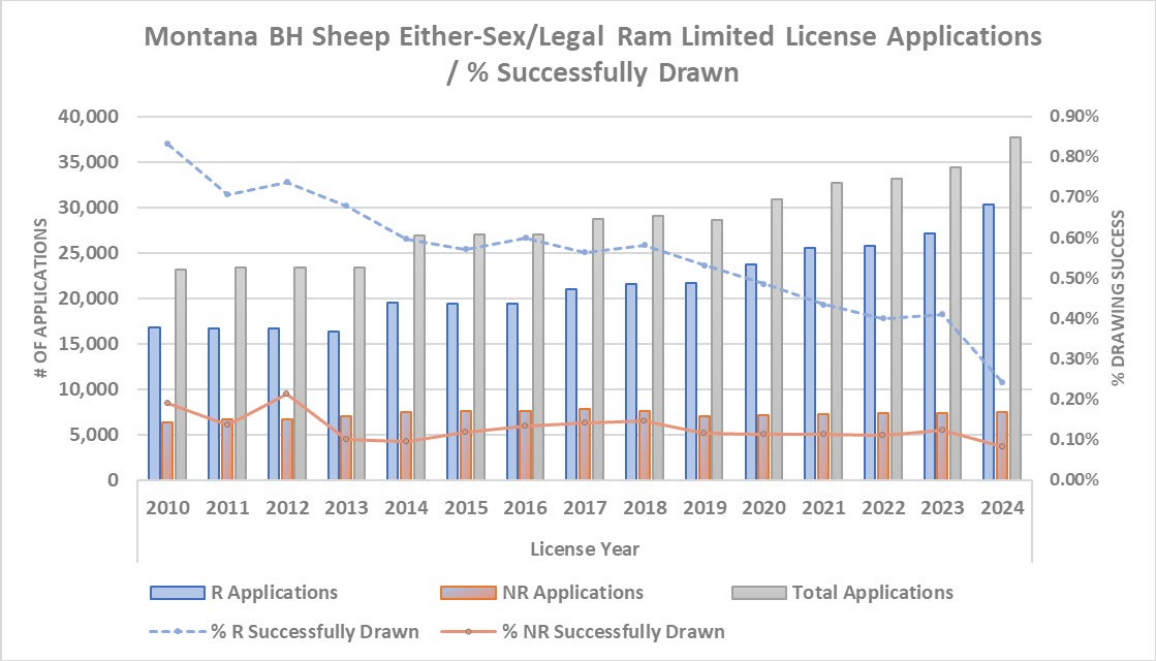
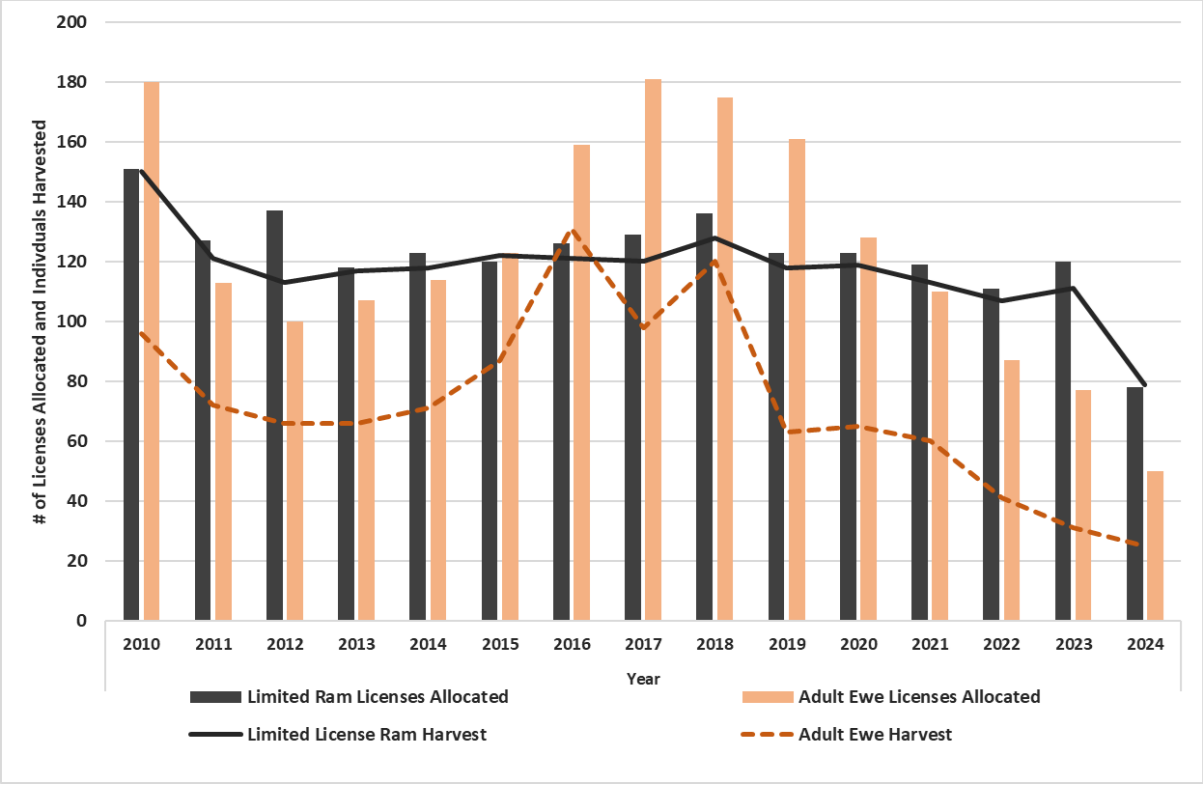



*Figure 4. Montana bighorn sheep ram and ewe license allocation and subsequent harvest, 2010 – 2024.*




*Disease and Herd Health*

Respiratory disease outbreaks involving RMBHS within state of Montana jurisdiction is an ongoing concern among several populations. There are several herds that continue to recover from more recent disease and die-off episodes over the last decade or more, with some herds (not all) showing improved progress towards population stability and/or recovery. As such, several RMBHS herds in Montana are

below population objective. For many of these areas, monitoring and/or recently completed or ongoing research is occurring to better understand and inform future management direction. The following are more specific and most recent health related concerns for a few of Montana's RMBHS populations:

- During the winters of 2020 and 2021 a total of 84 bighorn sheep were translocated within Montana from near the Missouri River to the Little Belt Mountains. Sheep began presenting respiratory disease (pneumonia) symptoms in April 2021 and a total of 14 were confirmed to have died. Other translocated sheep exhibited symptoms but later recovered. The exact degree to which subsequent lamb survival was impacted is unknown, but biologists have observed successful lamb recruitment during 2022, 2023, and 2024. All translocated sheep were fitted with GPS collars, and no commingling of BHS and domestic sheep was detected prior to the disease outbreak. Predation, primarily by mountain lions, remains the predominant cause of mortality in this reintroduced herd.

- A disease event occurred in bighorn sheep subherds within the Upper Yellowstone drainage during winter 2023-2024. Thirteen carcasses were detected and sampled. Although necropsies appeared to show some classic pneumonia symptoms, detection of M. ovi was inconsistent and only found in a single animal. Approximately 3-4 additional carcasses were found during the spring by members of the public; these animals likely died in December/January and may have also been involved in the disease event. Lamb and ewe numbers remained relatively robust in spring 2024 and no additional disease has been observed since.

- A pneumonia event occurred in January-February 2025 in the Mill Creek herd, an unhunted population that winters on the east side of Paradise Valley. At least 13 mortalities occurred, primarily within a ram subherd. M. ovi was detected in some, but not in all the mortalities that were examined. Additional test results and population monitoring are pending. Currently it appears that most of the ewes and lambs were unaffected.

- The easternmost population of bighorn sheep in the Missouri River Breaks Complex of Montana has had a major die off. During the Winter 2024 survey, 121 total sheep were observed during aerial winter surveys producing 43 lambs/100 ewes, 25% below the long-term average but not indicative of collapse. However, sheep hunters reported seeing 88% fewer sheep during the Fall of 2024, and harvested rams were in noticeably poor condition. Lung samples from harvested sheep indicated respiratory disease and a nasal swab from a harvested ram tested positive for M. Ovi. In March 2025, only 5 rams were observed during an aerial survey. One of which died during observation. Lab results for that ram are still pending, but it had obvious signs of severe respiratory disease. On March 31, 2025, the Fish and Wildlife Commission closed all hunting in this bighorn sheep hunting district for the upcoming fall season.

In winter of 2023/2024, Montana Fish, Wildlife & Parks formally began new statewide research projects aimed at 1) better understanding how various management regimes influences RMBHS population dynamics within select herds across the state and 2), improve our understanding of the factors that influence the probability of wild and domestic sheep/goat contact, and to use that information to further explore tools to maintain effective separation and prevent disease-related issues for both wild and domestic animals. These projects are large collaborative efforts with the University of Montana, Montana State University, Montana Woolgrowers Association, Montana Wild Sheep Foundation, private domestic sheep producers, private landowners and others. Through fall 2024, a suite of data has been collected from 25 domestic sheep/goat producers and six RMBHS study herds. Both projects are

scheduled to take place over a five-year period (through 2028).

*Test and Remove*

Currently, the Highland Mountains RMBHS population is undergoing a multi-year research effort to better understand ongoing impacts of disease and general herd health since their initial die-off 30 years ago. A before-after analysis of ewe and lamb survival and/or *Mycoplasma ovipnuemonia (*M. ovi) prevalence is being employed where the pre-removal monitoring (years 1-3) consist of pre-treatment testing of individuals to identify chronic shedders (two or more consecutive positive test results for M. ovi), estimate vital rates and cause-specific mortality. The first round of chronic shedder removals occurred in during winter 2024/25 (two died from natural causes and five were removed in fall, 2024) and correlations to lamb survival and overall population performance will be evaluated. The project is currently in year four and further monitoring and any necessary removals is proposed to occur over the next two to three years. A total of 62 more sheep were heli-captured and tested in winter 2024/25. Lab results from this winter's sampling are pending. Removal of additional chronic shedders will occur as needed in late summer 2025.

*Submitted by Brent Lonner, Montana Department of Fish, Wildlife and Parks*

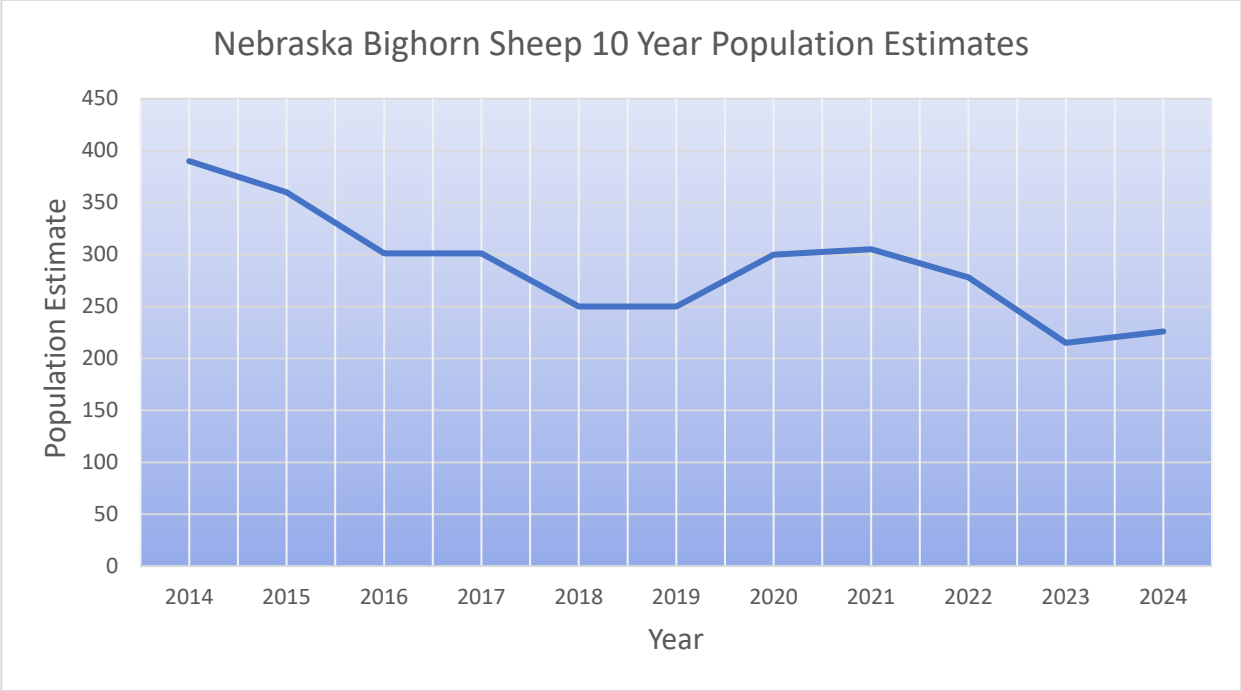
## Nebraska

### Rocky Mountain Bighorn Sheep

*Populations*

The Rocky Mountain Bighorn Sheep (RMBS) population consists of 5 herds totaling approximately 226 (2024) sheep in two separate regions (Pine Ridge and Wildcat Hills) of western NE. After a nearly 100-year absence to the state, 1981 marked the first of 5 reintroductions to establish bighorn sheep into their historic habitats. Over the past 10 years, RMBS numbers have declined by about 40% (Figure 1).

*Figure 1. Bighorn sheep population estimates.*




From 1981 to present, Nebraska has conducted 5 translocations of approximately 175 RMBS. One internal translocation was conducted in 2014. Other translocations are being considered in unoccupied habitats as RMBS become available for transplant.

*Licenses and Harvest*

Since 1998, 38 rams have been harvested in Nebraska with a success rate of 100%. Permits typically consist of 1 auction permit and 1 Nebraska resident lottery permit. Any sheep (ram or ewe) is allowed for harvest but only rams have been taken thus far. In, 2025, a management hunt was implemented with two rams that were ½ curl or less harvested.

*Test & Remove*

Over the past few years, the Test and Remove method has been implemented in 3 of the 5 herds showing some initial positive results with greater lamb recruitment in some regions. More recently, bighorn sheep captures took place in Sep 2022 and Feb 2023-2025 experimenting and evaluating 3 different *Mycoplasma ovipneumoniae* (M. ovi) detection methods. These included the standard lab tests through the Washington Animal Disease Diagnostic Laboratory (WADDL) as well as the Biomeme field testing unit and Working Dogs for Conservation. While there was not a 100% percent match between methods, having in-field results with possible M. ovi detections did allow for more immediate management decisions to be made. Initial plans to transplant some of these captured sheep from this previously clean herd were put on hold until further evaluations can be made. Below are comparisons amongst WADDL and the Biomeme unit from the Hubbard's Gap and Cedar Canyon herds in Nebraska's southern panhandle. Dr. Kate Huyvaert, Washington State University, conducted Biomeme testing and results analysis. Evaluation from the Working Dogs for Conservation is ongoing. In 2024, comparisons continued to be made but additional Biomeme restrictions limited its use.

Disease testing will continue with each herd through future helicopter captures, darting, and mortalities, along with plans to fill unoccupied habitats with RMBS sheep from clean herds.

*Table 1. Percentage of bighorn sheep that tested positive for M. ovi (WADDL PCR on nasal swab) and percentage seropositive for M. ovi (WADDL cELISA); Pine Ridge and Wildcat Hills regions of Nebraska, USA, 2022-2025. 2025 data include captures and two harvested rams at Cedar Canyon.*

| | | 2022 | | 2023 | | 2024 | | 2025 | |
|---|---|---|---|---|---|---|---|---|---|
| Population | Parameter | PCR | cELISA | PCR | cELISA | PCR | cELISA | PCR | cELISA |
| Cedar Canyon | # tested | 7 | 5 | 11 | 11 | N/A | N/A | 10 | 10 |
| | % positive | 0% | 0% | 18.2% | 36.4% | N/A | N/A | 0% | 20% |
| Hubbard's Gap | # tested | 20 | 16 | 25 | 25 | 27 | 26 | 22 | 22 |
| | % positive | 0% | 6.3% | 4.0% | 36.0% | 11.1% | 65.4% | 4.5% | 59% |
| Pine Ridge | # tested | 7 | N/A | N/A | N/A | 5 | 5 | 5 | 5 |
| | % positive | 28.5% | N/A | N/A | N/A | 0% | 20.0% | 0% | 0% |

*-Todd Nordeen, Nebraska Game & Parks Commission*

**Nevada**

It is estimated based on historic explorer and naturalist records, well-documented anecdotes in early newspapers, broad paleontological data, and a geospatial analyses of bighorn sheep terrain, that Nevada's bighorn sheep numbers prior to European settlement were 30,000 – 50,000. Historically, the entire state including both the Mojave/Great Basin Deserts and Mountains were occupied by a single species of desert bighorn sheep (Ramey 1993, 2000; Wehausen 2000), but with different races adapted to a tremendous amount of climatic and elevation gradient.

Nevada's bighorn sheep population was at its lowest in the late 1950s at approximately 2,500 animals that primarily occupied the lower one-third of the state (see remnant polygons on map). Bighorn sheep in the entire northern half of the state were completely extirpated because of pneumonia die-offs contracted by comingling with domestic sheep that numbered as high as 3 million in Nevada in the early 1900s. The first experimental bighorn transplants occurred in 1968, but it wasn't until the late 1970s that bighorn translocations were successful. Through early 2025, 2,111 desert bighorn sheep were reintroduced, and 1,045 California and 326 Rocky Mountain bighorn were introduced into Nevada. Most of the transplants were highly successful with the peak statewide bighorn population estimate in 2019 at 12,500. As was planned, a great deal of herd connectivity was created with narrow valleys separating many of the mountain ranges that allow for bighorn sheep forays. Much of this connectivity was created in desert environments with no domestic sheep operations. In other areas of higher elevations and more productive habitats, a few reintroduced bighorn sheep herds were established 10-50 miles from public land domestic sheep allotments and trailing routes. Regardless of distance, pathogen transmission was accelerated over the last 15-20 years for both domestic-bighorn and bighorn-bighorn interaction. This resulted in several metapopulation disease events with some die-offs having no known domestic sheep source, especially in the Mojave Desert. Six years after peak levels, the 2025 statewide estimate saw a minor drop from 2024 to 8,300 bighorn adults (6,300 Desert bighorn sheep and 2,000 California/Rocky Mountain bighorn sheep) (Figure 2).

*Population Performance*

### Desert Bighorn Sheep

Statewide annual desert bighorn sheep lamb recruitment values that support herd recovery and growth continued to show uptrends over the last 4 years (2021 – 2024 ratios were 21, 23, 27, and 30, respectively). But these are all below the long-term lamb ratio since 1990 of 38 lambs:100 ewes. Hopefully, the statewide desert bighorn sheep estimate has ended its 6-year skid with 6,400 in 2024 to 6,300 in 2025. This estimate is a 39% decline since its peak in 2019 at 10,300. This decline was attributable to many factors including (in order of magnitude): 1) continued high lamb mortality from pneumonia in most desert bighorn sheep herds, 2) multi-year drought that ended in 2022 but still poor moisture in many areas in 2024 and early 2025, 3) lion predation on small, depressed herds has contributed to a "predator pit" state where lamb recruitment is unable to overcome losses from predation, and 4) competition at and destruction of critical riparian/water sources from excessive feral horses and burros.

### California Bighorn Sheep

The 2023 and 2024 aerial surveys resulted in detecting the same 46 lambs:100 ewe ratio the last 2 years which should allow for limited population growth. Overgrazing and degraded riparian areas from free-roaming horses/burros and cattle, and mountain lion predation continue to suppress population growth. The 2025 statewide California bighorn sheep population estimate is stable at 1,700 adults.

### Rocky Mountain Bighorn Sheep

Aerial and ground surveys conducted in 2024 in all 6 of the Rocky Mountain bighorn sheep herds classified over 200 animals with a slightly higher lamb ratio of 65 lambs:100 ewes compared to 60 in 2023. The statewide Rocky Mountain bighorn sheep population estimate is static at 330 adults.

*Figure 1. Occupied bighorn sheep habitat distribution of bighorn sheep in Nevada categorized by remnant, introduced, and pioneered in Nevada.*

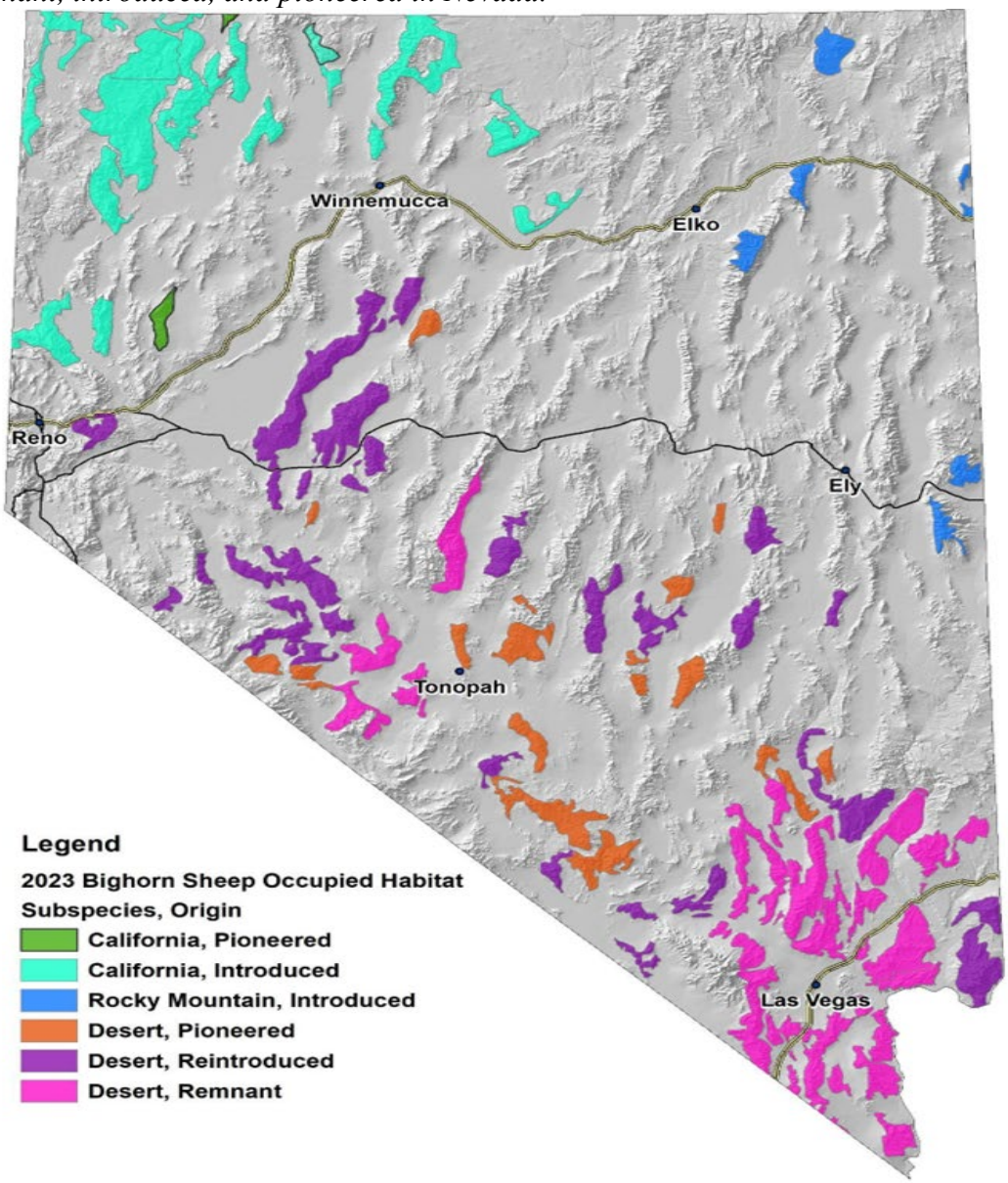
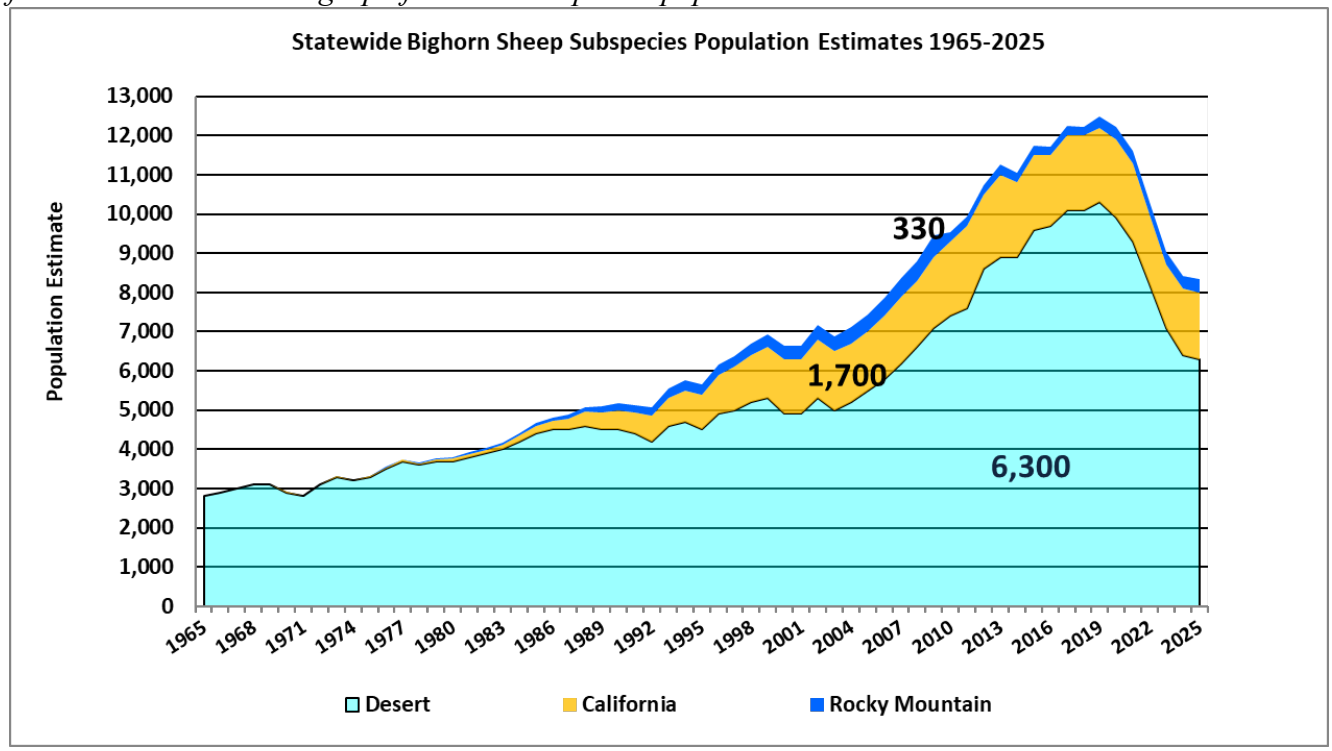


*Figure 2. Statewide bighorn sheep population estimates by subspecies 1965 – 2025. Population estimates for 2025 are labeled on graph for each subspecies population.*




*Hunt/Harvest Metrics for All Subspecies*

## Desert Bighorn Sheep

In the 2024 ram hunt season, there were 200 desert bighorn sheep ram tags compared to 240 in 2023. This included 175 for standard seasons, 5 archery-only, 5 specialty, 5 management (access-limited), and 10 one-horn ram tags. Excluding the 1-horn ram hunt, there were 169 rams harvested in 2024 for 91% success of tags used. Figure 3 depicts annual ram harvest for all subspecies since 1965. Peak ram harvest was 356 in 2017 with 300 of those being desert bighorn rams. Average ram age was one of the highest on record at 7.0, but horn length and base metrics were lower than long-term averages. Only 6 rams were harvested that scored above 170 B&C pts (long-term average is 12). The previous drought years continue to impact both horn base and horn length. The last 2 years average days hunted were 6.8 and 6.6, the highest recorded, which is a combination of both difficulty of finding mature rams and enjoying the month-long hunt. The one-horn ram hunt had reduced success in 2024 with only 3 out of 8 that hunted being successful with average age of rams at 9.0. The 2024 demand for desert bighorn ram hunting continued to rise with 13,915 resident and 14,717 nonresident applicants. There was only 1 desert bighorn sheep ewe hunt with 56 hunters going afield with 73% success in the Muddy Mountains near Las Vegas.

## California Bighorn Sheep

The 2024 California bighorn sheep ram season was the lowest tag quota in 20 years at 40 tags that included 1 specialty raffle tag. Hunter success was improved from 2023 at 87%, compared to long-term average of 91%. Average hunt days continued to be high at almost 9 days. Average age of harvested rams rose to 6.8, near the long-term average years over the last 20 years. The average B&C score was 152 7/8 above the long-term average. The largest ram taken scored almost 172 B&C. The previous multi-year drought

continued to impact both horn base and length metrics in 2024. Demand for California bighorn sheep ram hunts continued strong with 10,113 residents and 12,851 nonresidents applying for 35 and 4 tags, respectively.

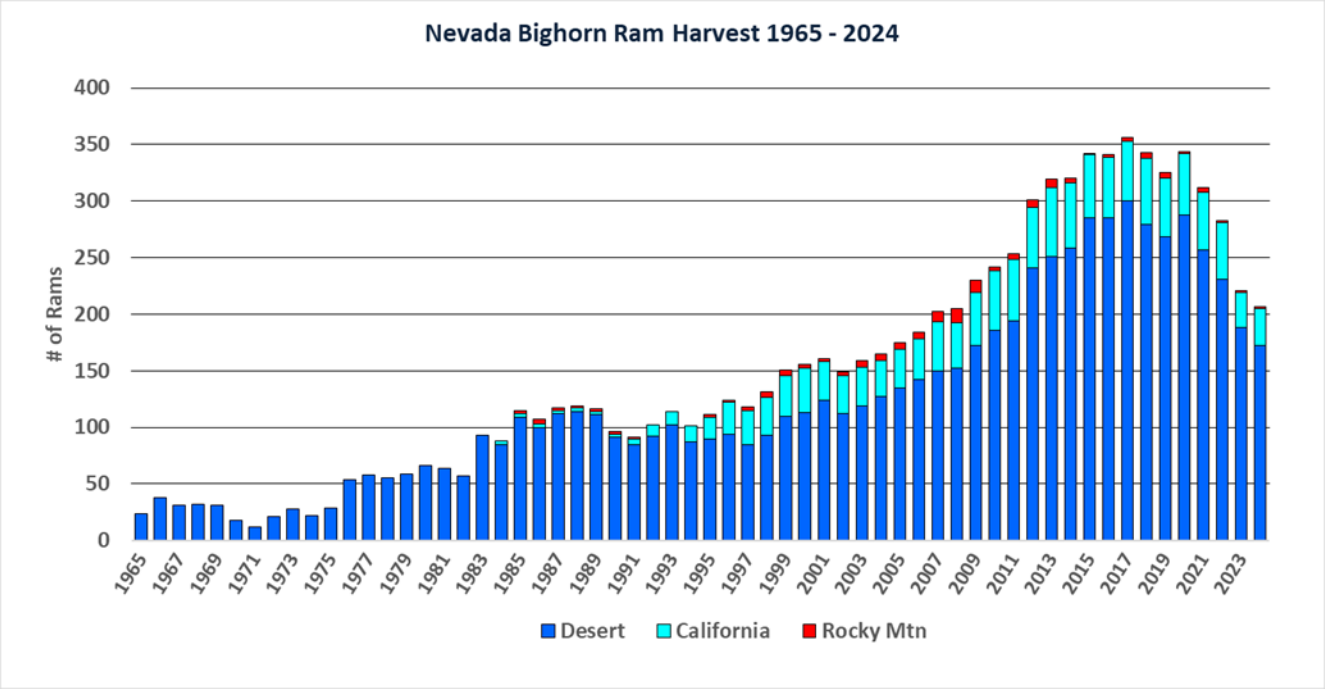
## Rocky Mountain Bighorn Sheep

Only 3 Rocky Mountain bighorn sheep ram tags were available in 2024. Two rams were taken in the Ruby Mountains during its third hunting season since the all-age dieoff in 2010. The average score of these 2 rams was only 162 compared to the previous 2 rams harvested that both scored 177. The other tagholder was unsuccessful in the South Snake Range below the Great Basin National Park.

*Disease and Herd Health*

Pneumonia dieoffs have significantly impacted Nevada bighorn sheep herds in the last 20 years. Approximately 60 of the state's 81 bighorn sheep herds have experienced upper respiratory disease events. The impacts to the herds involved >15% adult loss the first year after the pathogen spillover and variable/cyclical lamb mortality lasting 1 to 18 years. It is estimated that since 2019 over 3,000 adults died of pneumonia and innumerable lambs perished that would have normally been recruited into the population. Extensive disease surveillance and post event testing has confirmed *Mycoplasma ovipneumoniae* (*Movi*) as the "trigger" pathogen involving approximately 17 different strains (Figure 4). Most of the pathogen spillovers over the last decade have been bighorn sheep to bighorn sheep transmission.

*Figure 3. Ram Harvest in Nevada by subspecies 1965 - 2024*



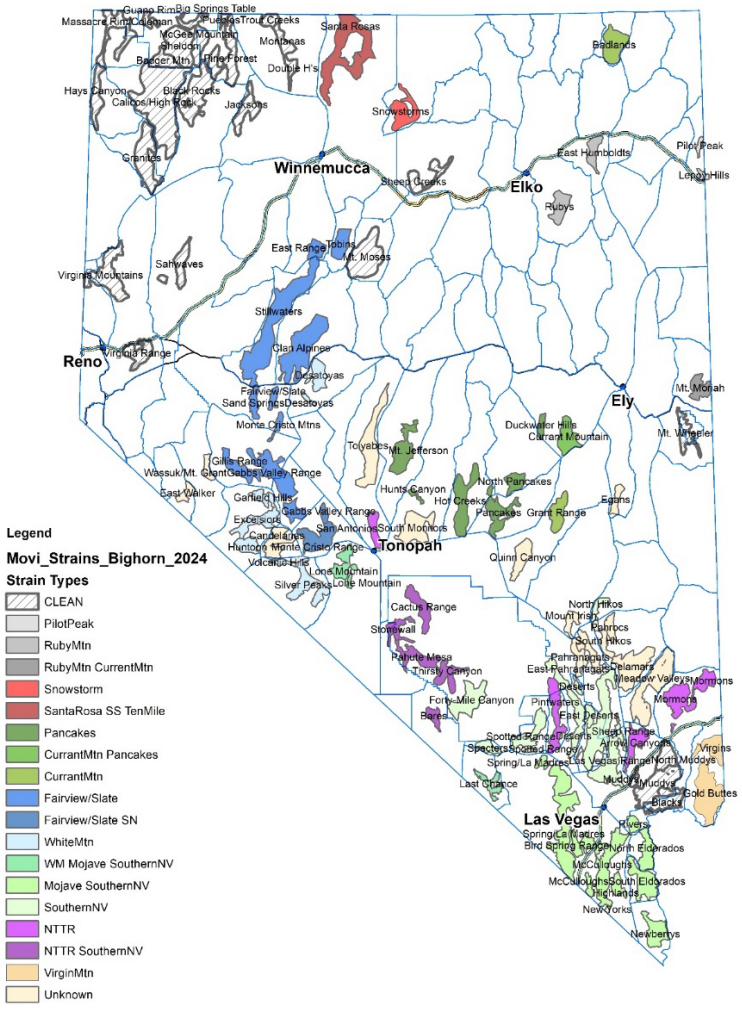

*Test and Remove*

Ongoing efforts continue with Test and Remove in the metapopulation of 2 California bighorn sheep herds - Santa Rosa Range and Snowstorm Mountains in northern Nevada. For the Santa Rosas, 127 bighorn sheep have been sampled since 2021 (90% ewes) and 15 were positive for Mycoplasma ovipneumoniae (Movi) by PCR through January 2025. For the Snowstorms, 118 animals have been sampled and tested since 2014 (68% ewes). A total of 33 were positive for Movi by PCR. The most recent 2025 test results are surprising in that both herds had shown strong lamb recruitment in summer

2024, but new Movi strains were detected in both herds. These new strains are "recombinations" of previous Movi strains in the respective herds. Further consultation with geneticists and colleagues will be made as we "pump the brakes" on this important T&R project. Plans are to closely monitor lamb recruitment in 2025 to see if the new recombination strains will affect lamb survival. This project is in collaboration with the Oregon Department of Fish and Wildlife involving an interstate herd (Santa Rosas/Rattlesnake/Ten Mile) and part of the overall ION (Idaho/Oregon/Nevada) Partnership supported by the Wild Sheep Foundation and affiliate bighorn sheep conservation groups in each state.

A Test and Remove project was initiated in February 2024 on a desert bighorn sheep herd on Lone Mountain near the California border. This herd is a remnant "Great Basin" race that was never extirpated. It was showing exponential growth from 2000 to 2015, at which time, a ewe hunt was conducted for 4 years which lowered the population from 500 to 400 adults. Unfortunately, the herd experienced a severe pneomonia dieoff starting in 2021 causing an 80% decline in the herd over the last 4 years. In 2024, 18 ewes and rams were tested with all 18 negative by PCR and 10 positive on ELISA. In January 2025, the second round of testing was conducted with 1 indeterminate and 16 negative by PCR with 14 of 17 ELISA positive. The indeterminate PCR-tested ewe was euthanized. The positive note is a 2024 lamb recruitment survey detected 26 lambs:100 ewe ratio.

*Figure 4. Mycoplasma ovipneumoniae (Movi) strain map from statewide disease surveillance from 2010-2024 involving both live capture and hunter harvest sampling.*



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*Mike Cox, Nevada Department of Wildlife*

**New Mexico**

Historically, both Rocky Mountain bighorn sheep (Ovis canadensis canadensis) and Mexican desert bighorn sheep (O.c. mexicana) occurred in New Mexico. Rocky Mountain bighorn sheep occupied the mountainous northern regions of the state, while desert bighorn sheep ranged in the arid mountains of central and southern New Mexico. Both subspecies rapidly declined in the 20th century primarily due to unregulated harvest, disease exposure from and competition with domestic livestock, and loss of habitat. Recovery of Rocky Mountain bighorn sheep began in the 1940s, while intensive restoration of the desert variety began in earnest in the 1970s. Rocky Mountain bighorn sheep now exist in 11 discrete populations in the northern and southwestern portions of the state, while desert bighorn sheep persist in 9 discrete populations plus one captive herd at the Red Rock Wildlife Area in the south central and southwestern portions of the state. As of 2024, Rocky Mountain bighorn sheep abundance is now estimated at 1,675 (1,505-1,845) while desert bighorn sheep abundance is estimated to be 1,088 (950-1,225). Population performance of both subspecies is considered stable. Both subspecies continue to be surveyed and monitored annually, with collaring efforts, translocations, disease surveillance, mountain lion management, regulated harvest, and habitat protection and enhancement being key elements to their conservation and management in New Mexico.

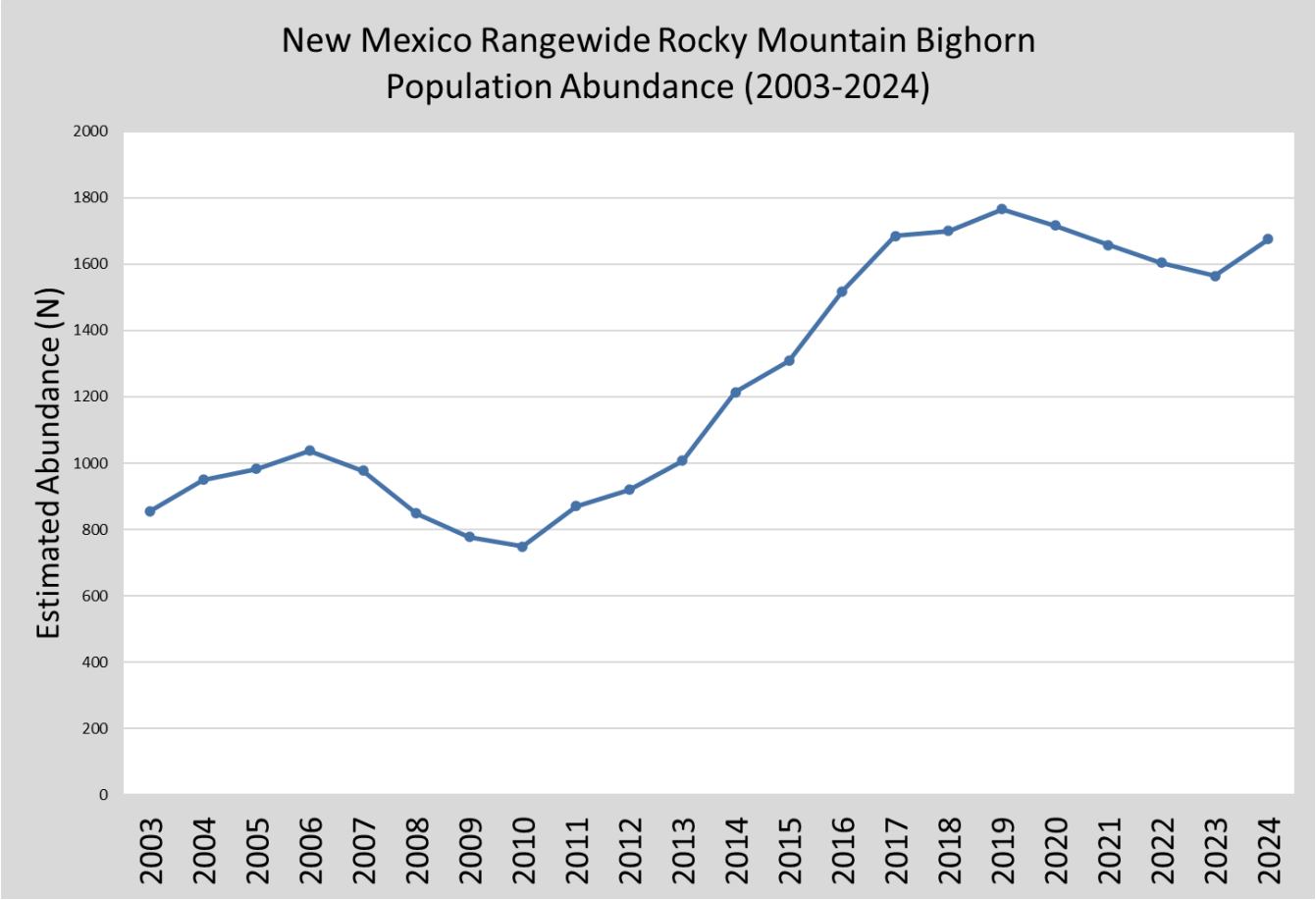
## Rocky Mountain Bighorn Sheep

*Population*

Prior to the last two years, New Mexico's Rocky Mountain bighorn sheep population experienced a decline, primarily following management intervention to reduce abundance in the Rio Grande Gorge population (Game Management Units [GMUs] 49, 50, and 53) following *Mycoplasma ovipneumoniae* (M. ovi) exposure. The population is now considered stable, with an estimated abundance of 1,675 (1,505-1,845) (Fig. 1) in 2024 ranging across 11 discrete populations. The Jemez Rocky Mountain bighorn sheep population (GMUs 6A and 6C) has increased in abundance since its reestablishment in 2014 when 45 bighorn sheep were released; the 2024 aerial survey yielded 134 animals, the highest total minimum count to date, resulting in an estimate of 225-300 bighorn sheep. The Rio Grande Gorge Rocky Mountain bighorn sheep population appears to have stabilized between 225-275 animals following the reduction efforts and subsequent recovery from M. ovi. exposure in 2020. Similarly, the Wheeler Rocky Mountain Bighorn sheep population (GMU 53) has also stabilized after M. ovi exposure in 2022, numbering between 55-75 animals. All other Rocky Mountain bighorn sheep populations appear stable.

Rocky mountain bighorn sheep have been restored to almost all known historic habitat since their extirpation in the early 20th century. With the last translocation occurring in 2017, recent management has focused on optimizing hunter opportunity and tracking the spillover of M. ovi into several naïve populations. However, additional habitat is being considered as potential future release site(s) to establish a new free-ranging, M.ovi-free population; for this to become reality, habitat assessment and enhancement will need to take place prior to any capture and relocation event.

*Figure 1. Rangewide estimated abundance of Rocky Mountain bighorn sheep in New Mexico (N) 2003-2024.*



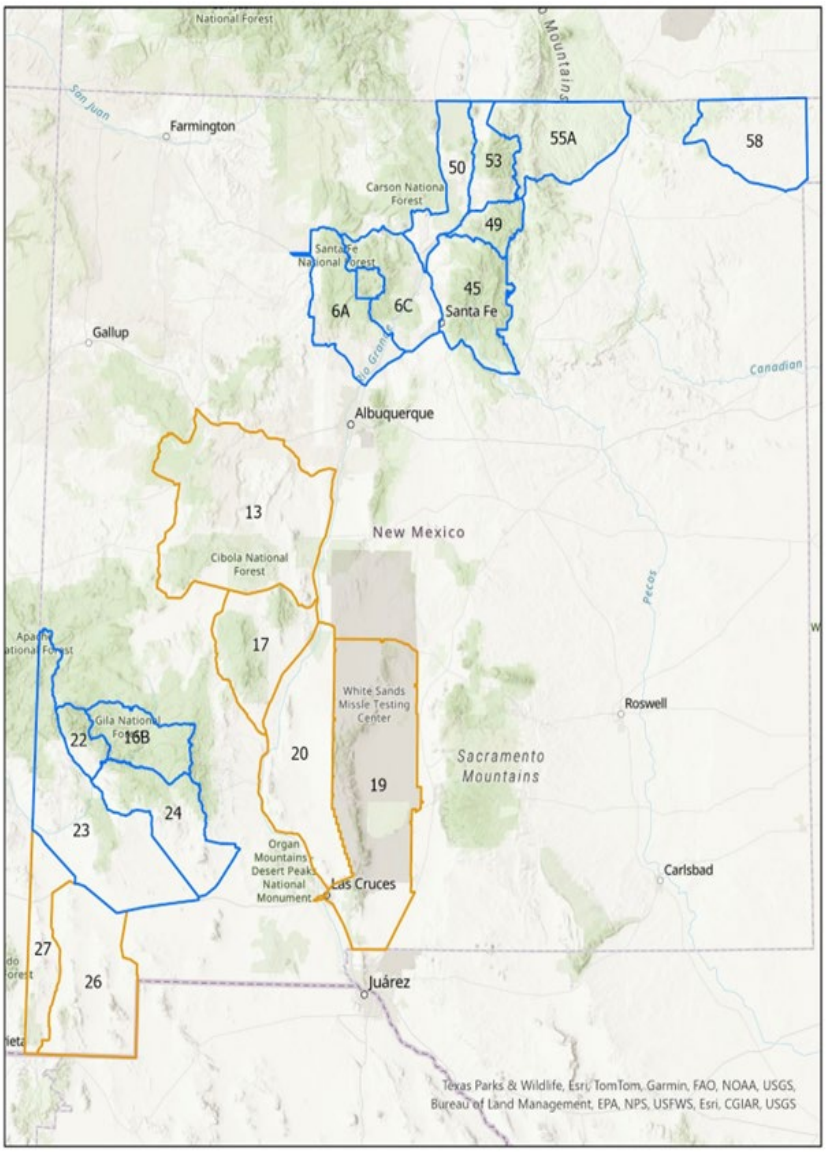

*Licenses and Harvest*

Rocky Mountain bighorn sheep hunts occur across 12 GMUs (Figure 2). Twenty-eight ram licenses were issued in 2024 (Figure 3). The 2024 hunt season included the inaugural hunt of GMUs 6A and 6C (Jemez). Two public licenses were issued for this GMU and another license holder, authorized under the state's Rocky Mountain auction tag, also chose to hunt this GMU. All three hunters were successful, with two harvested rams exceeding 200". The first ram recorded an official Boone and Crockett (B&C) score of 208 1/8", while the second ram produced an official B&C score of 202". These rams are now the 1st and 2nd largest Rocky Mountain bighorn sheep harvested in New Mexico, respectively. Notably, the official B&C score of 208 1/8" places New Mexico's top ram in the Top 5 for Rocky Mountain bighorn sheep (including "deadhead" pickups) and top 3 for harvested Rocky Mountain bighorn sheep in North America.

One public tag was added into the Jemez unit for the 2025-2026 hunt season. One additional ram tag was also added into the Pecos (GMU 45) unit for the 2025-2026 hunt season. With the addition of the Jemez hunt, 10 of the 11 discrete populations now offer hunt opportunities annually (the Manzanos population being the only population not currently hunted). Harvest success was 100% in 2024-2025 (excluding three tagholders who did not hunt).

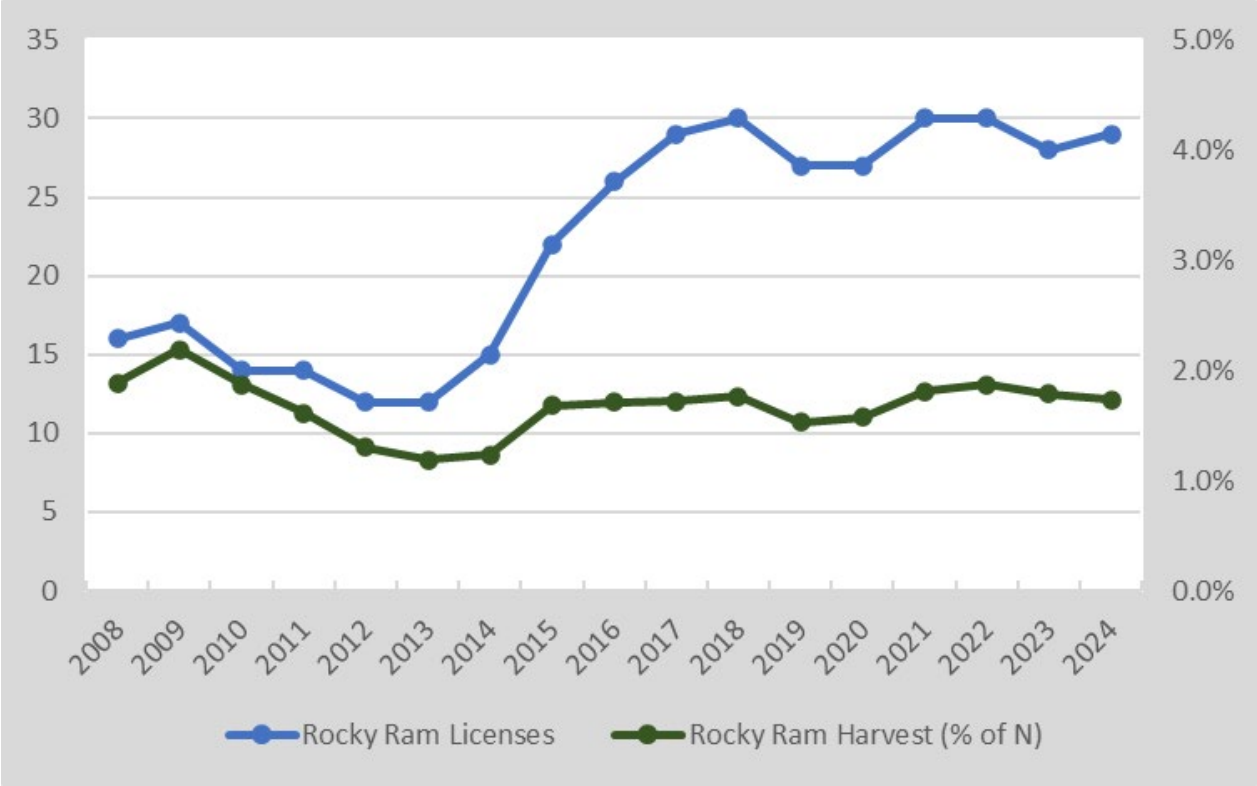
A suite of metrics is used to inform ram harvest decision making throughout the state. To prescribe appropriate harvest levels in areas where bighorn sheep populations occupy both Tribal and public land, NMDGF collaborates with Tribal partners in setting tag allocations. The metrics that guide license determination for rams are 2.5% of local population size, 10% of total rams, and 25% of CIII and CIV rams. Success on ram hunts has been nearly perfect and averaged >96% from 2020-2024. Horn restrictions do not apply, and the bag limit is defined as any ram. The average age at harvest of Rocky Mountain bighorn sheep rams in 2024-2025 was 9.

*Figure 2. New Mexico bighorn sheep hunts occur in the outlined GMUs, with blue boundaries indicating Rocky Mountain bighorn hunt units and orange boundaries indicating desert bighorn hunt units.*



Management ewe hunts have been prescribed in several populations primarily to maintain a stable population where capture and translocation is not feasible and to prevent the spread of M. ovi to adjacent herds. These ewe hunts were initiated in 2011 in the Latir Mountain herd. The number of ewe hunting licenses issued varies with population size and herd objective but has averaged around 21% of the estimated ewe segment (Figure 4) resulting in a harvest rate averaging ~11% annually. Ewe hunting has been limited to the Pecos and Rio Grande Gorge populations in recent years with 58 licenses issued in 2022. The management ewe hunt in the Rio Grande Gorge was suspended for the 2023-2024 season in response to decreased lamb:ewe ratios following an M. ovi spillover in 2020; the suspension of ewe hunts in this population continues. Thirty ewe licenses were issued for the Pecos population in 2024.

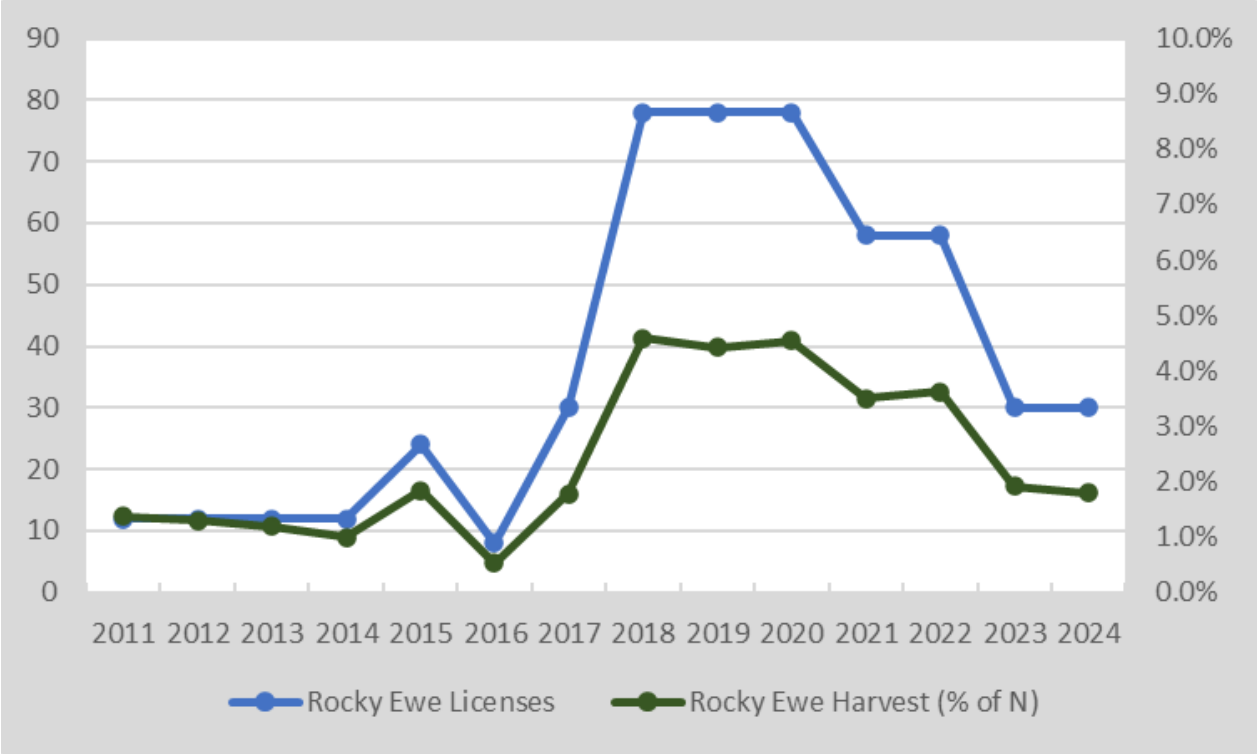
*Figure 3. The total number of ram licenses issued annually for Rocky Mountain bighorn sheep and harvest rate as a percentage of the statewide estimate (N) 2008-2024.*




*Disease and herd health*

In 2022 M. ovi was discovered for the first time in the Wheeler Peak herd, coinciding with the observation of 10-15 overwinter carcasses and symptomatic bighorn sheep observed in July 2022, yet that July aerial survey resulted in one of the highest counts in recent years with a minimum of 200 bighorn sheep observed. The population slightly declined following that aerial survey. Minimum counts of the Wheeler population have been similar the last two years (153 in 2023 and 152 in 2024) while the lamb:ewe ratio has improved from 14 ll:100 ee in 2023 to 28 ll:100 ee in 2024. Darting and collaring efforts began in 2023 to increase monitoring in Wheeler, however darting in the area is slow-going and limited by season. Deploying collars in the region remains a high priority for management.

*Figure 4. The total number ewe licenses issued annually for Rocky Mountain bighorn sheep and harvest rate as a percentage of the statewide estimate (N) 2011-2024.*




## Desert Bighorn Sheep

*Population*

The status of desert bighorn sheep has improved since their state endangered delisting in 2011 and the statewide population relatively stable following a slight decline in 2019. As of 2024, the estimated abundance of desert bighorn sheep in New Mexico is 1,088 (950-1,225) animals (Figure 5) distributed across 9 discrete free-ranging populations. Most populations are stable, with the Little Hatchets (GMU 26 West of NM 81) slightly increasing. However, two populations are experiencing difficulties related to population abundance: the Peloncillo (GMU 27) near the southwestern border with Arizona and the Sacramentos near Alamogordo. The Peloncillos, once one of the largest populations ranging from 210-240 bighorn sheep, has experienced a rapid decline in the last 5+ years and are now estimated to range between only 40-60 bighorn sheep. Several potential factors likely have contributed to this decline, including potential unidirectional movement of bighorn sheep into Arizona, elevated mountain lion predation (lion management is complicated in this range as it occurs in critical jaguar habitat as described by the Federal government), prolonged drought, and decay in habitat quality likely resulting in consequences for diet and nutrition. NMDGF staff are initiating a project to assess these factors more thoroughly to guide future management intervention. The Sacramentos population was established in 2018 but has experienced little to no growth since that release, with a stable estimate of 40-45 bighorn sheep annually. It was initially hypothesized that traditional helicopter surveys were not fully representing the population's distribution, complicated by complex, visually obstructive terrain and restricted airspace related to military activity. Exotic aoudad (*Ammotragus lervia*) also occur in this range

and may be a limiting competitor. These notions prompted NMDGF staff to partner with Owyhee Air Research to conduct fixed-wing flights along predetermined transects using forward-looking infrared (FLIR) equipment in the entirety of the range, which included authorization to access restricted airspace. The FLIR results were similar to the traditional helicopter surveys, which yielded a total of 34 and 29 detected bighorn sheep, respectively. Only 14 aoudad were observed during the FLIR effort. These results suggest other factors are preventing the Sacramento bighorn sheep population from increasing in abundance; efforts are underway to better understand lamb survival, diet and nutrition, and predation as limiting factors to inform future management actions.

As of 2024, lion predation continues to be a leading cause of mortality in desert bighorn sheep despite ongoing removal efforts within 7 of the 9 discrete desert bighorn sheep ranges. The contract authorizing third-party houndsmen and trappers to remove lions in bighorn sheep range was renewed this year. Increased lion removal efforts are planned to promote desert bighorn sheep population growth, particularly in the Peloncillos range.

New Mexico has maintained a captive desert bighorn sheep breeding facility at the Red Rock Wildlife Area, north of Lordsburg, since 1972. The population housed within this 1,500-acre high fence area serves as a source population to periodically augment demographics and genetics of existing free-ranging populations and to establish new herds. These captures and relocation events continue today. Annual ground surveys are conducted every May to determine whether and how many surplus desert bighorn sheep are available for capture and release (note that this number is not included in the rangewide estimated abundance of free-ranging populations). Most recently, desert bighorn sheep were restored to the Alamo Hueco mountains in the “Bootheel” region of southwestern New Mexico in 2021. After 94 bighorn sheep were counted in 2023, a second release of 28 individuals took place in the Alamo Huecos in October of that year. The 2024 count yielded 75 bighorn sheep, while the most recent count in May 2025 resulted in a count of 102 animals. Thus, surplus animals are available for capture and release, tentatively planned for fall/winter 2025. These bighorn sheep will likely be released into the Peloncillos to help bolster the struggling population. Suitable unoccupied desert bighorn sheep habitat remains on the landscape and continues to be considered for release sites/population restoration. Because suitable unoccupied habitat remains, harvest of desert bighorn sheep ewes has not and is not being considered.

*Licenses and Harvest*

Desert bighorn sheep hunts occur in the GMUs shown in orange in Figure 2. These areas include 8 of the 9 desert bighorn sheep populations, with one (Sacramentos) not hunted. Twenty-seven ram licenses were issued in 2024 (Figure 6). Harvest success was 96% in 2024-2025 (excluding one tagholder who did not hunt). Due to population performance, an additional tag was added into the Little Hatchets and one tag removed from the Peloncillos for the 2025-2026 hunt season. As with the Rocky Mountain subspecies, the metrics that guide license determination for desert rams are 2.5% of population size, 10% of total rams, and 25% of CIII and CIV rams. Success on ram hunts has averaged 100% from 2020-2024. The largest desert bighorn sheep harvested during the 2024-2025 hunt season hailed from the Ladrones (GMUs 13 and 17) and produced a green score of 178 3/4". Horn restrictions do not apply, and the bag limit is defined as any ram. The average age at harvest of desert bighorn sheep rams in 2024-2025 was 8.

*Figure 5. Rangewide estimated abundance of desert bighorn sheep in New Mexico (N) 2003-2024.*

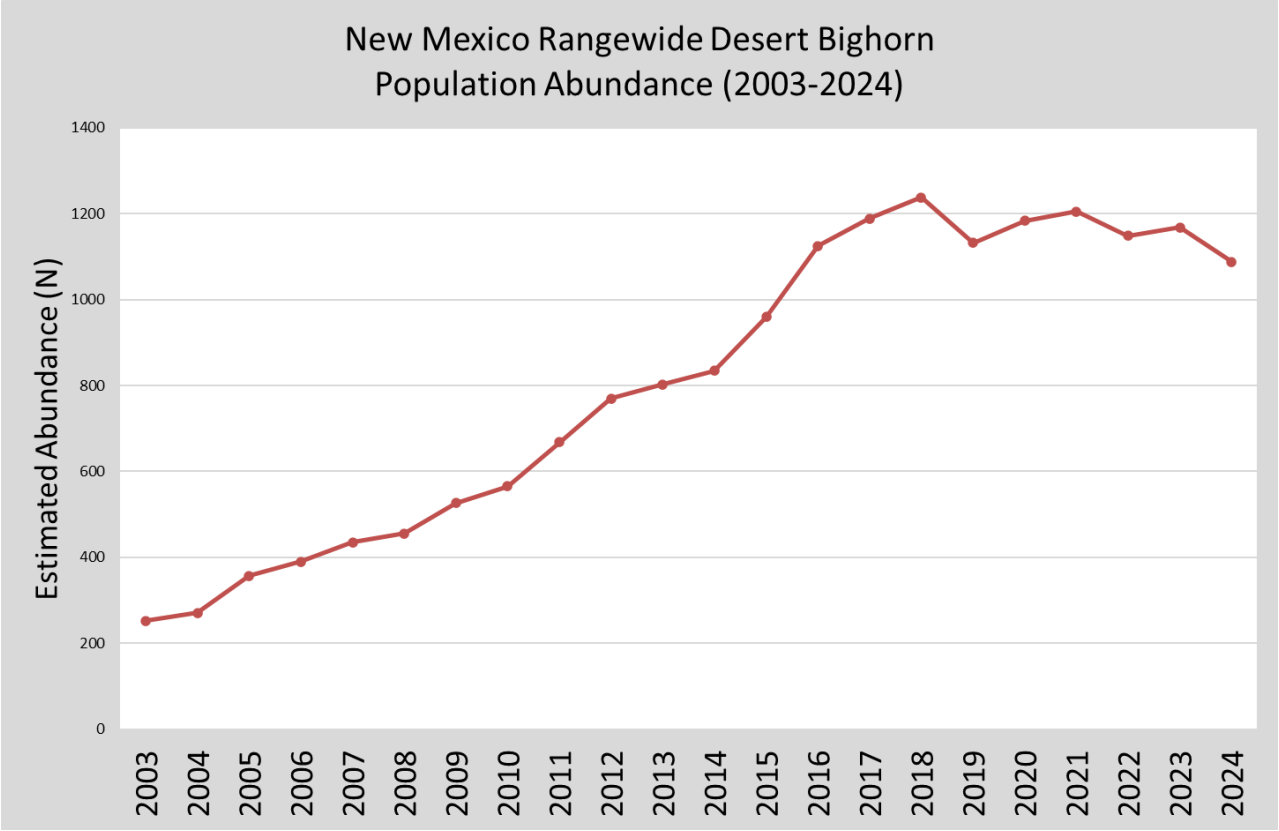
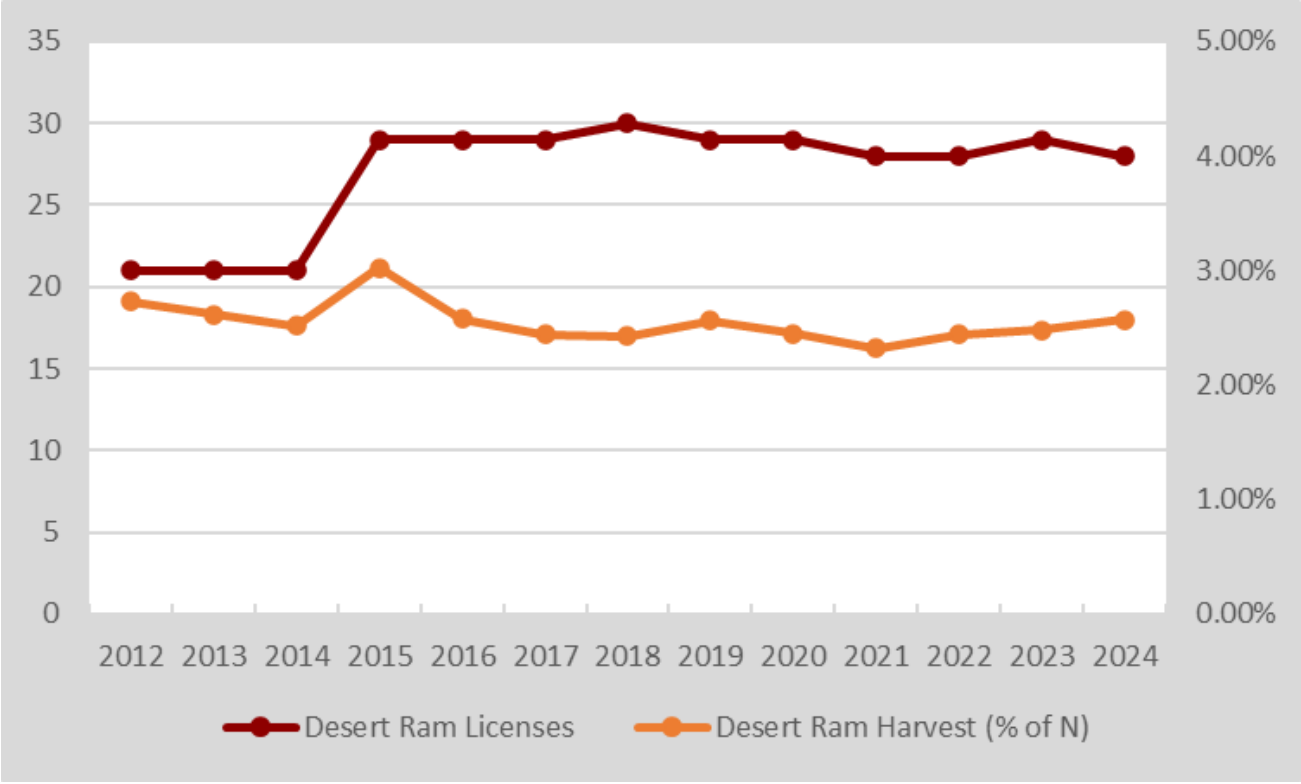



*Figure 6. The total number of ram licenses issued annually for desert bighorn sheep and harvest rate as a percentage of the statewide estimate (N) 2012-2024.*



*Disease and herd health*

Disease surveillance continues to be an integral part of New Mexico's desert bighorn sheep management. Prior to 2017, M. ovi had only been documented in the San Andres desert bighorn sheep population. In 2022, M. ovi was documented in four additional herds, including those adjacent to the San Andres and those in the central geographic region of New Mexico, including the Fra Cristobals. In 2024 M. ovi was again detected in a harvested ram from the Fra Cristobals. Of the populations surveyed, average Spring lamb:ewe ratios were greater in the Bootheel herds (58 ll:100 ee) compared survey results gathered in the fall for the interior populations (25 ll:100 ee). This may be a result of M. ovi exposure status in the interior herds, an artifact of the survey timing being more representative of production (Bootheel) or of recruitment (Interior), or both.

*Tom Batter, New Mexico Department of Game & Fish*

## North Dakota

### Rocky Mountain Bighorn Sheep

*Populations*

The North Dakota Game and Fish Department's 2024 bighorn sheep survey, completed by recounting lambs in March 2025, revealed a minimum of 350 bighorn sheep in the Little Missouri National Grassland of western North Dakota, down 4% from 2023 and 6% above the five-year average. Despite a slight decline from a record count in 2023, the 2024 survey was still the second highest on record.

Altogether, biologists counted 105 rams, 199 ewes and 46 lambs (Figures 1 and 2). Not included are the number of bighorn sheep in the North Unit of Theodore Roosevelt National Park and the Fort Berthold Indian Reservation.

*Figure 1. Population demographics in North Dakota, not including populations at Theodore Roosevelt National Park and Fort Berthold Reservation.*

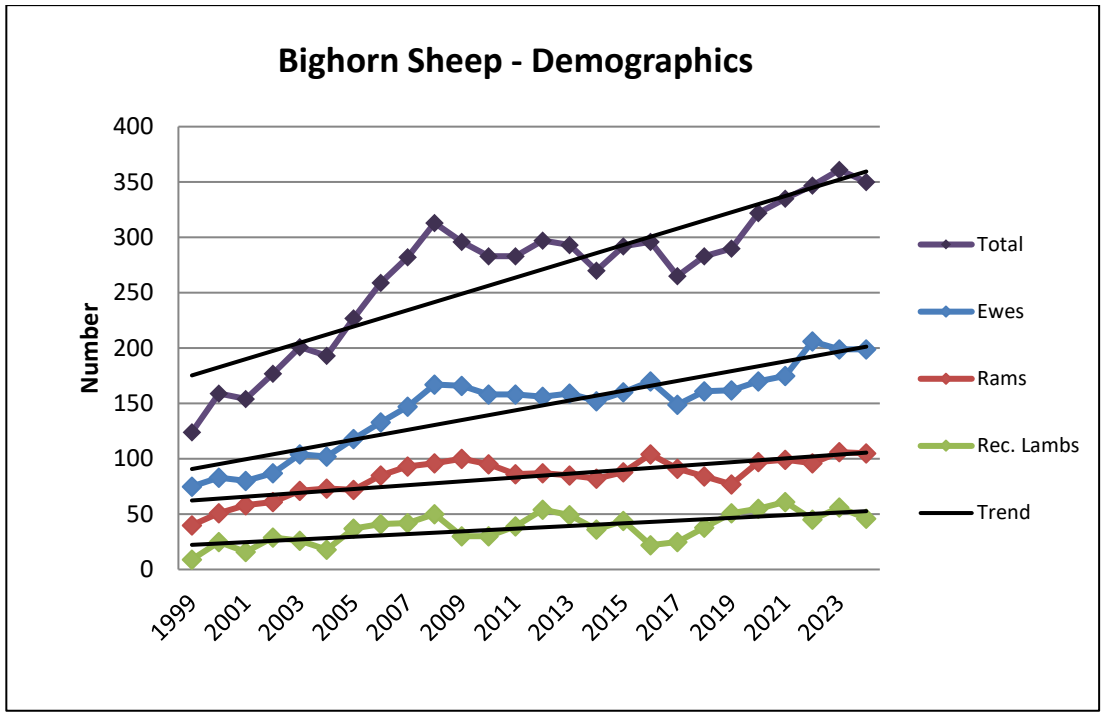
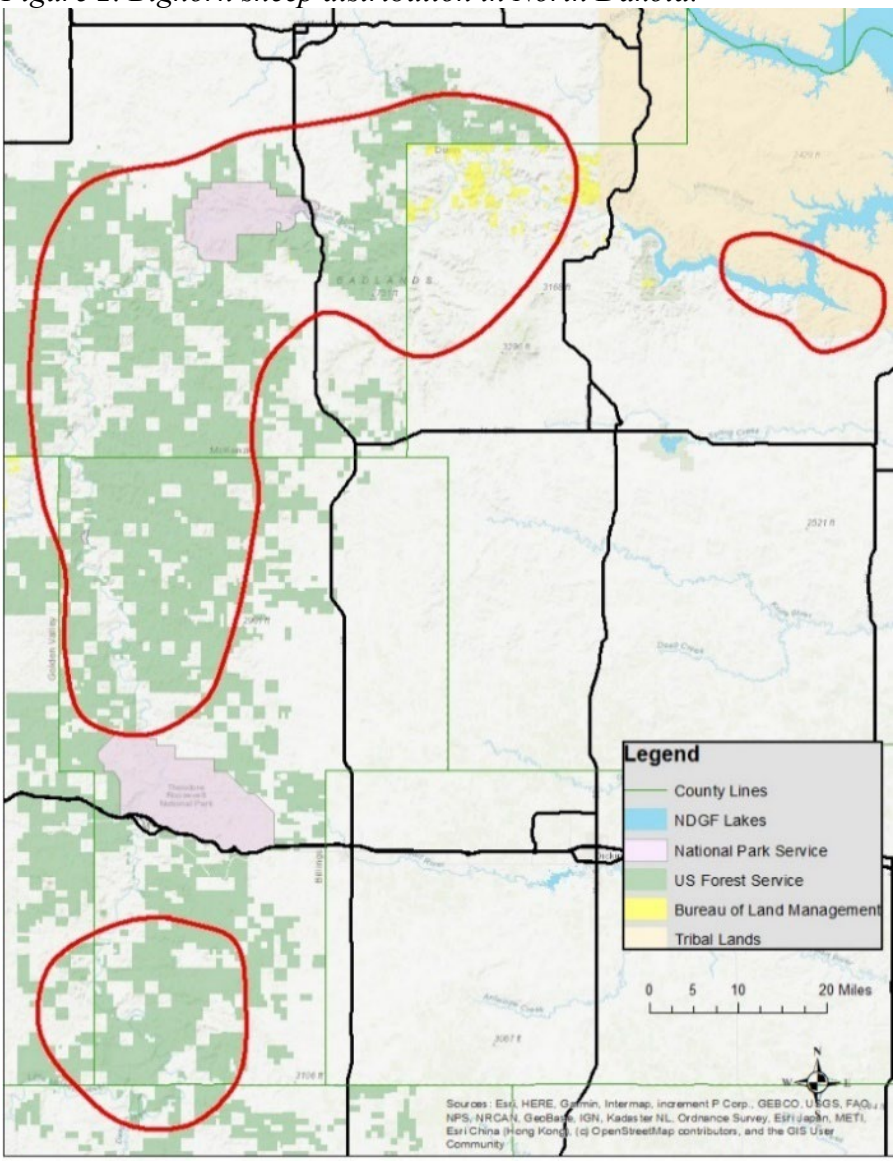


*Figure 2. Bighorn sheep distribution in North Dakota.*




The northern badlands population declined 4% from 2023 but was the second highest count on record. The southern badlands population increased slightly but remained near the lowest level since bighorn sheep were reintroduced there in 1966.

Adult rams and adult ewes were near record numbers, but lamb recruitment was below the long-term average. The lamb recruitment rate (lambs/adult ewe) was 27% and there were 53 rams per hundred ewes (Figures 3 and 4).

Department biologists count and classify all bighorn sheep in late summer, and then recount lambs the following March, as they approach 1 year of age, to determine recruitment.

There are currently about 480 bighorn sheep in the populations managed by the North Dakota Game and Fish Department, National Park Service and the Three Affiliated Tribes Fish and Wildlife Division.

Department staff were encouraged that the state's population remained near record levels in 2024.

*Figure 3. Rams per hundred ewes in North Dakota.*

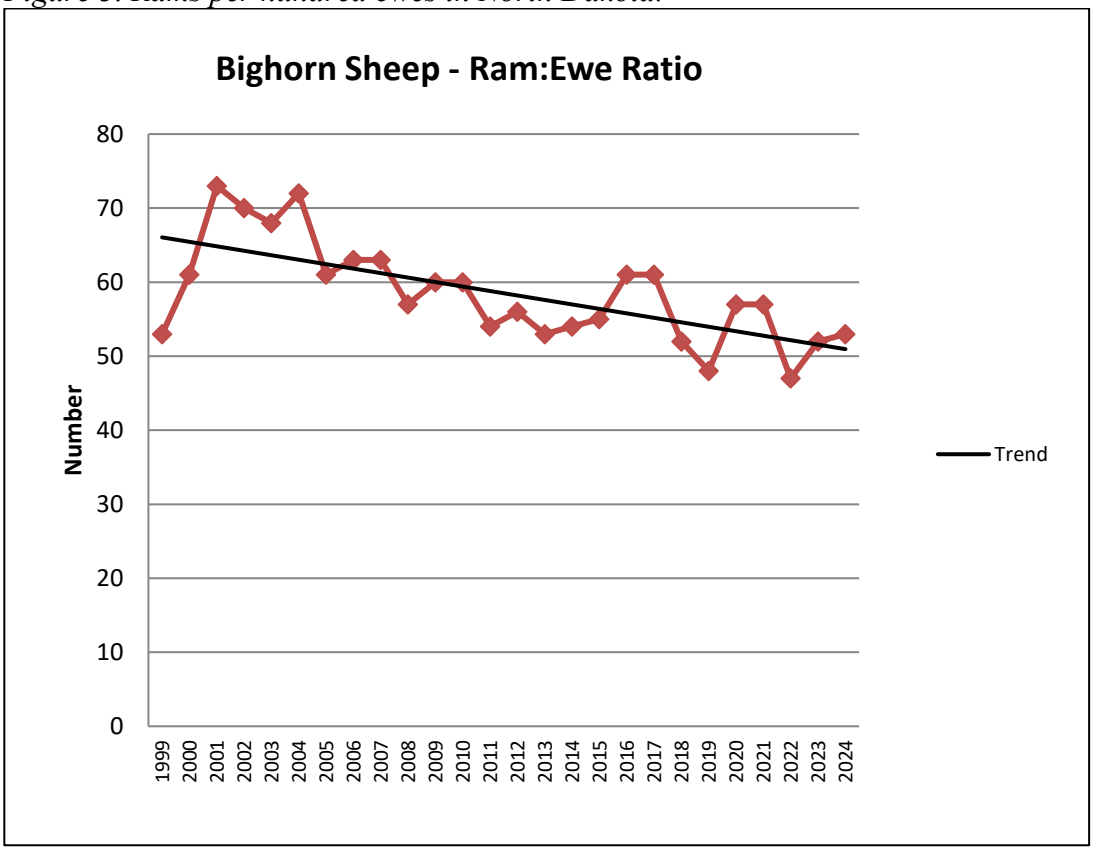
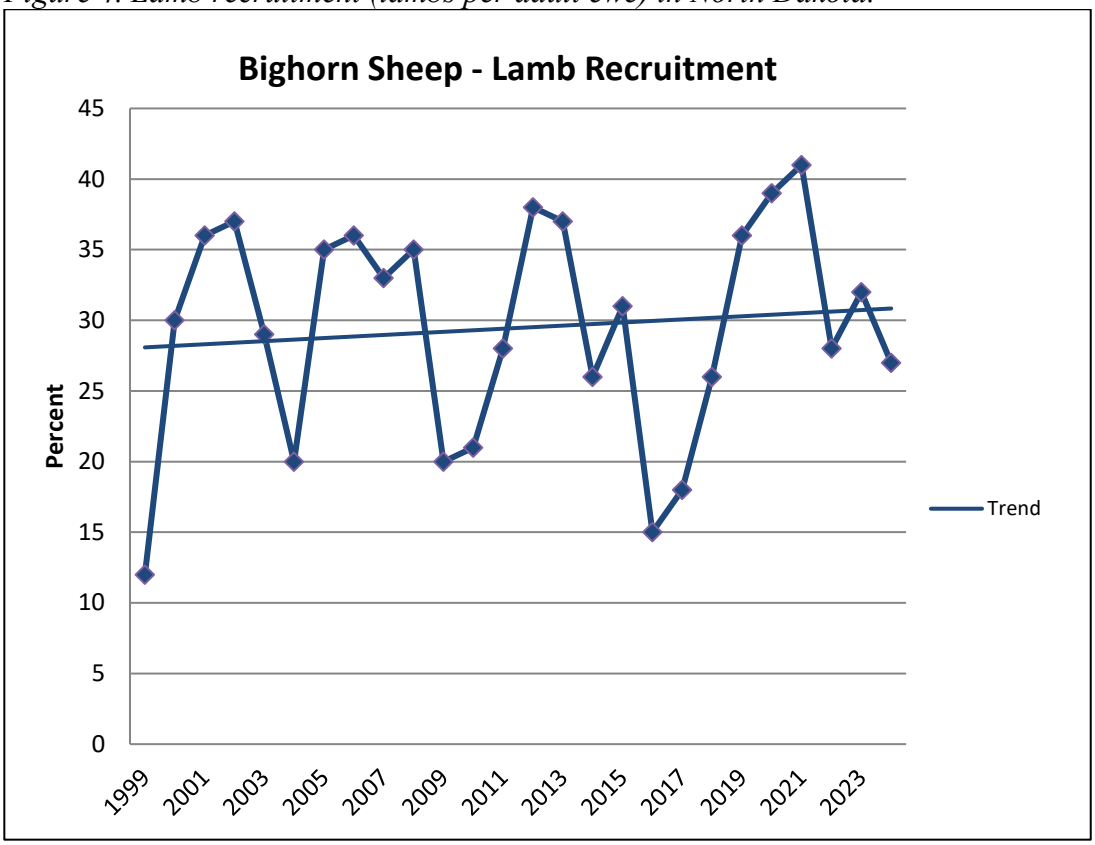


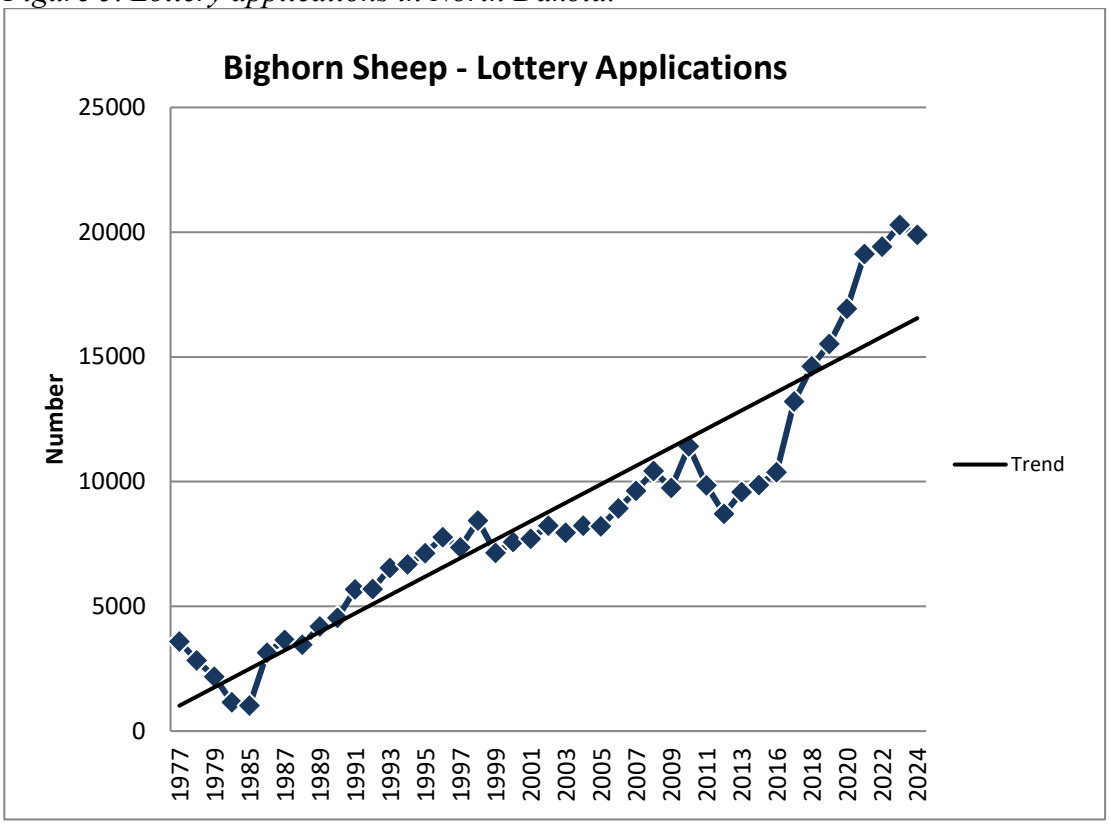

*Figure 4. Lamb recruitment (lambs per adult ewe) in North Dakota.*



*Licenses and Harvest*

A bighorn sheep hunting season is tentatively scheduled to open in 2025. The status of the season will be determined September 1, following the summer population survey. Game and Fish issued seven licenses in 2024, and all hunters were successful in harvesting a ram. A total of 277 bighorn rams have been harvested in North Dakota since 1975, with a success rate of 98%. There were 19,892 applications (19,558R, 334NR) submitted for the 2024 lottery (Figure 5).

*Figure 5. Lottery applications in North Dakota.*




*Test & Remove*

North Dakota experienced an epizootic in 2014. *Movi* was detected in 100% of mortalities. Despite the population currently near record numbers, animals that test positive via PCR testing during annual winter capture and collaring operations are euthanized. There was one PCR detection of a ram harvested by a hunter in 2024.

*Brett Wiedmann, North Dakota Game and Fish Department*

## Northwest Territories

Not Available

## Oregon

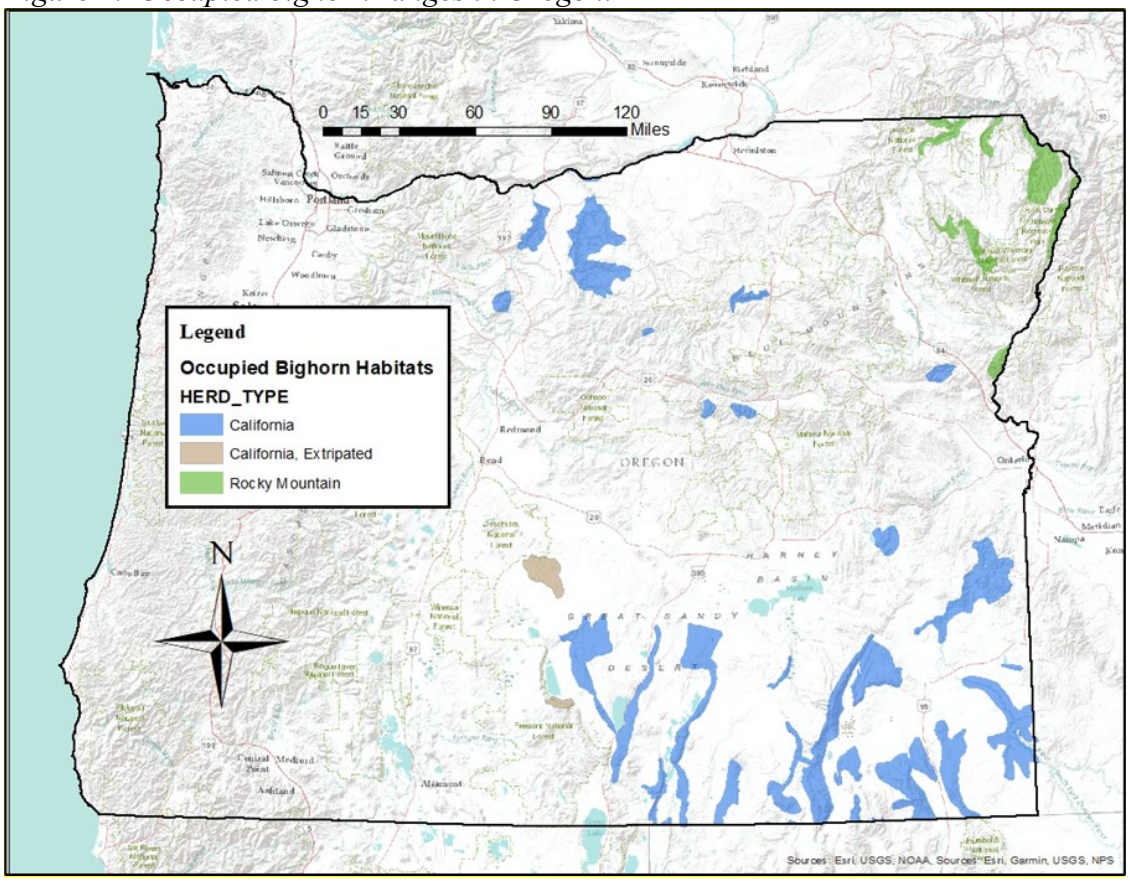
### Rocky Mountain Bighorn Sheep

*Population*

Oregon currently has 11 Rocky Mountain bighorn sheep herds, three of which are viable( Figure1). All extant Oregon herds are the result of re-introductions. Since the first successful release of 20 animals from Alberta, Canada in the Lostine River in 1971, 31 additional releases of 410 animals from 7 state or provinces including Alberta, British Columbia, Colorado, Idaho, Montana, and Oregon have occurred.

Release size has averaged 13 but has ranged from a low of 2 or 3 animals to as high as 29 animals.

*Figure 1. Occupied bighorn ranges in Oregon.*




The combined annual population estimate for Rocky Mountain bighorn sheep in Oregon has averaged 600–900 animals over the last 22 years (Figure 2) with a 2024 estimate of around 1,100 animals. Fluctuations are primarily the result of pneumonia induced, die-offs followed by variable degrees of population recovery. There are currently three Rocky Mountain bighorn sheep populations with active *Mycoplasma ovipneumonia* (*Movi*.) induced mortality.

*Harvest*

Since Oregon began hunting Rocky Mountain bighorn sheep in 1978, over 450 animals have been taken. Harvest has been primarily rams. Since 2001, an average of 8 controlled tags, 1 special auction tag, and 1 special raffle tag are allocated annually (Figure 3). Average harvest is 11 rams annually but has declined in response to disease induced population declines.

*Figure 2. Recent population trend of Rocky Mountain and California bighorn sheep in Oregon, 2001 – 2024.*

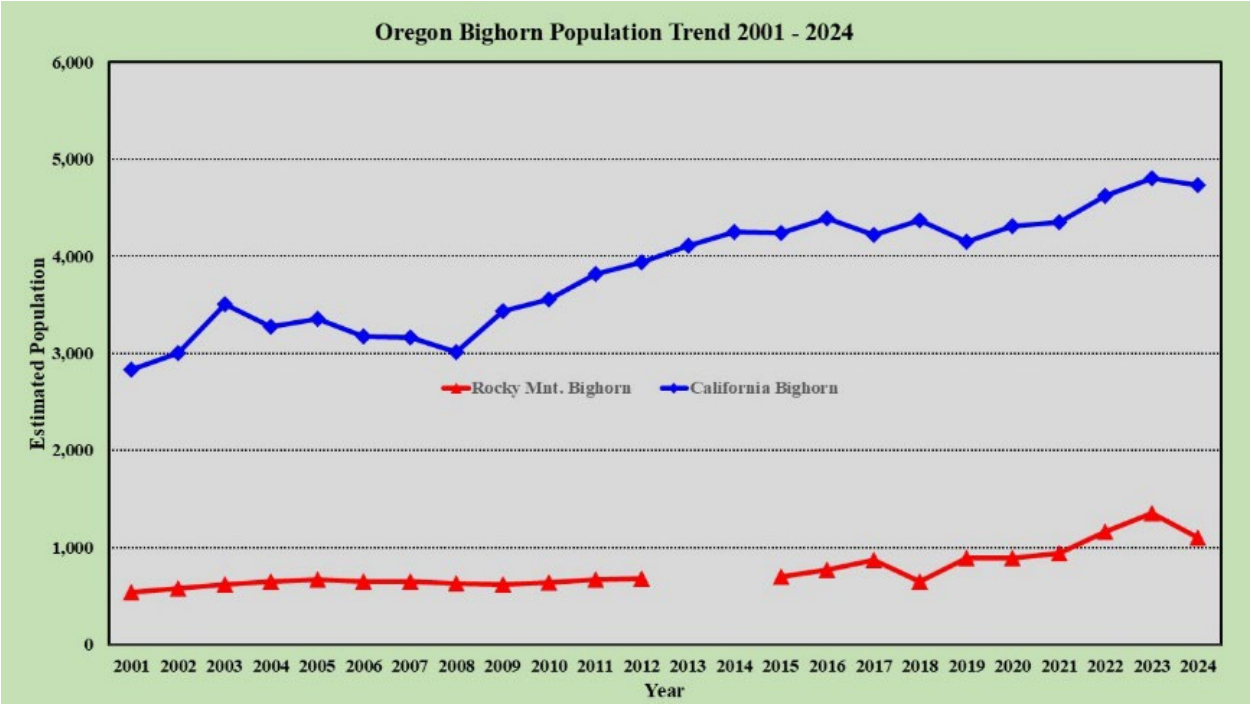
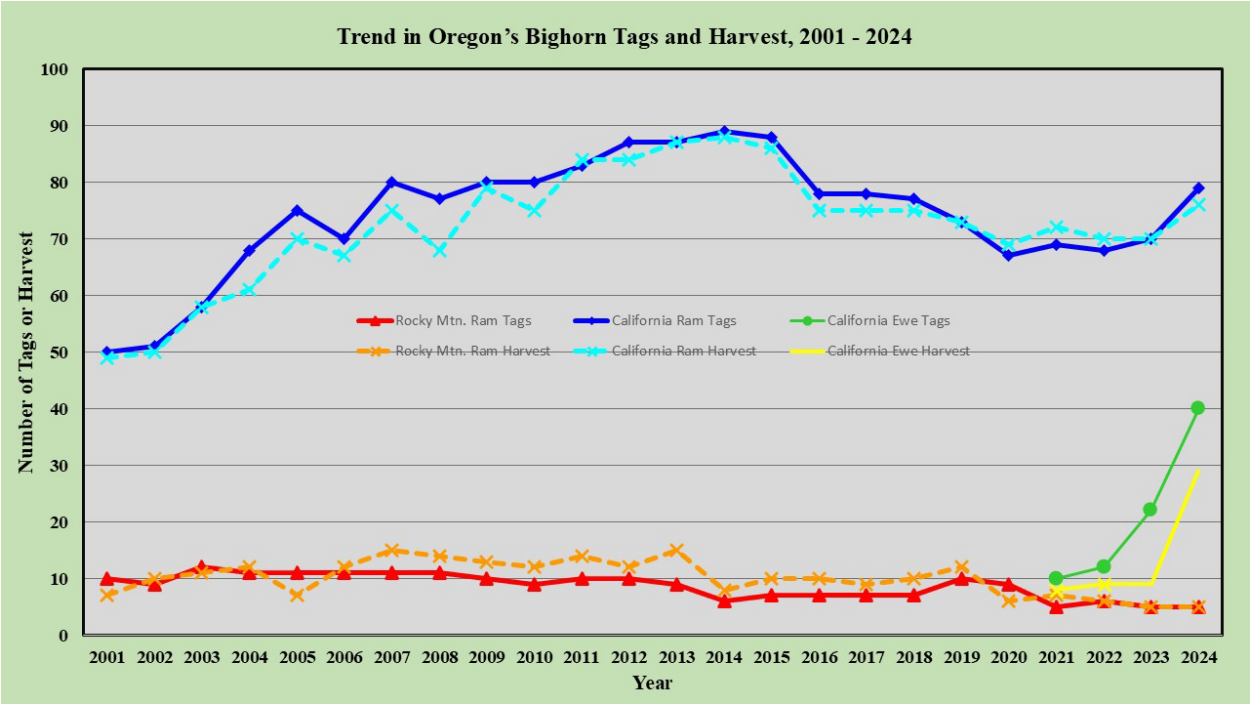



*Figure 3. Recent trend of Rocky Mountain and California bighorn sheep tags and harvest in Oregon, 2001 – 2024.*




## California Bighorn Sheep

Oregon currently has 32 extant herds of California bighorn sheep (Figure 1), all of which are the result of reintroductions. Since the first successful release of 20 animals from British Columbia, Canada onto Hart

Mountain National Antelope Refuge, 101 additional relocations of 1,343 California bighorn sheep from Oregon have occurred. Seventy-one of these releases (1,020 animals) were conducted within Oregon. Twenty-seven relocations (374 animals) were Oregon animals released in 4 other jurisdictions (Idaho, Nevada, Washington, Wyoming).

The combined annual population estimate for California bighorn sheep in Oregon has averaged about 4,500 animals in recent years (Figure 2) with a 2023 estimate of 4,730 animals. Fluctuations are primarily the result of pneumonia-induced die-offs followed by variable degrees of population recovery. At time of writing 4 distinct herds are experiencing *Movi*. induced mortality.

*Harvest*
Since Oregon began hunting California bighorn sheep in 1965, over 2,700 animals have been taken. Harvest has been primarily rams, but ewe harvest began in two herds beginning in 2021. Since 2001, an average of 85 controlled ram tags are allocated annually (Figure 3). Ten and 12 ewe tags were allocated in 2021 and 2022, respectively. Annual average harvest is 85 rams annually.

*Disease Management*
Oregon is currently conducting test and remove operations in 4 California bighorn sheep populations and 2 Rocky Mountain bighorn sheep populations. Pneumonia induced by *Movi*. was first detected in the Rattlesnake-Tenmile California bighorn sheep herd in southeastern Oregon in 2012, with detection of mortalities beginning in 2015. During late winter 2019-2020, Movi. induced pneumonia was detected in the Lookout Mountain herd of Rocky Mountain bighorn sheep along the Snake River in northeastern Oregon. By fall of 2020 the disease had crossed Interstate 84 to the west and *Movi.* was detected in the Burnt River California bighorn herd. In January 2024 *Movi.* also was detected in the lower Snake River herds. Because of the connections among these herds in three states (Oregon, Idaho, and Washington), all three states are paying extra attention to wild sheep in this area. The disease has moved north along the river into Washington and northeastern Oregon. Most mortalities, however, have occurred in Idaho and Washington.

*Don Whittaker, Oregon Department of Fish & Wildlife*

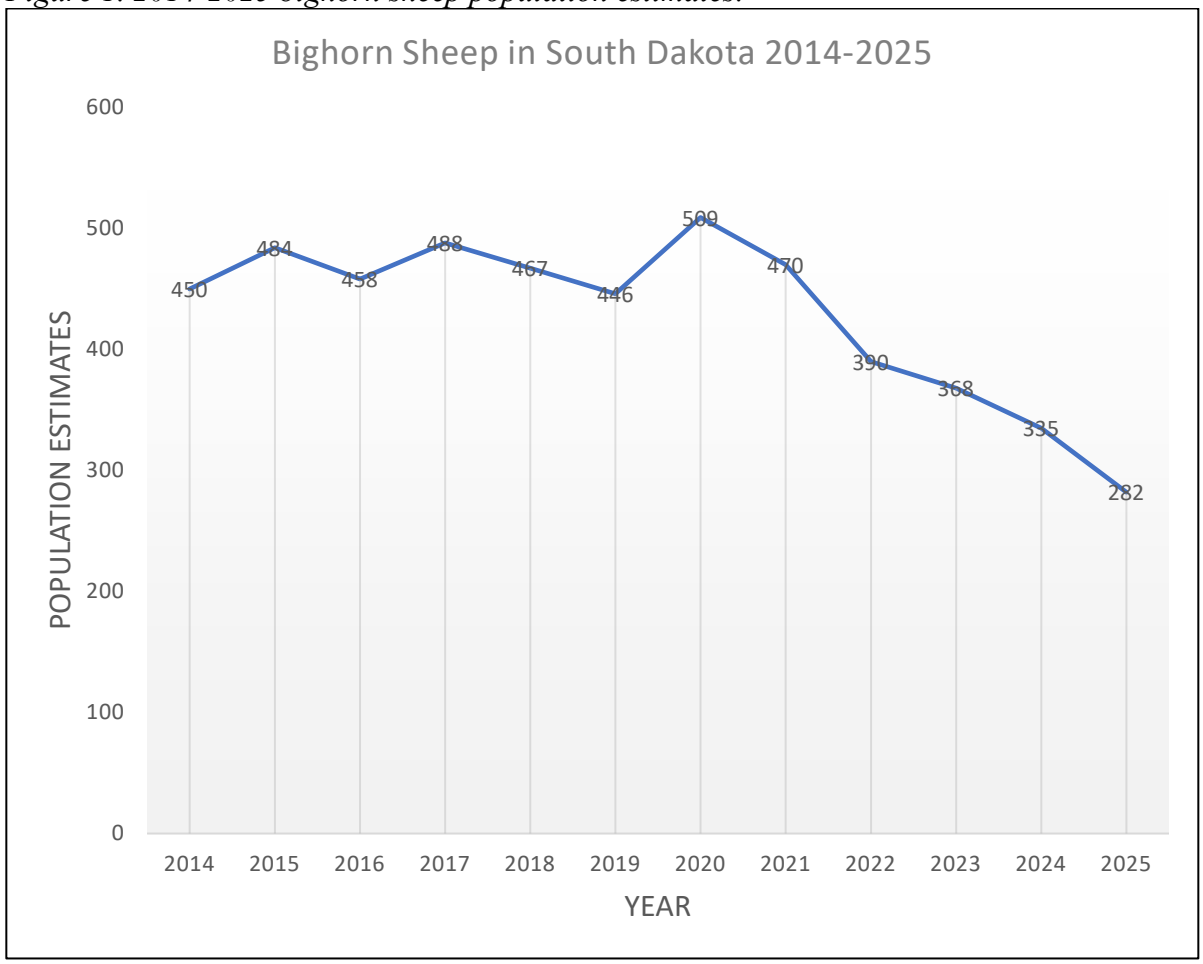
## South Dakota

### Rocky Mountain Bighorn Sheep

*Populations*
The Rocky Mountain Bighorn Sheep (RMBS) population consists of 6 herds totaling approximately 282 sheep scattered throughout western SD. Bighorn sheep were numerous on the prairies of western SD and the Black Hills before their extirpation in the late 1890s. United States Senator Peter Norbeck orchestrated their reintroduction in the early 1920s, and this began a conservation success story where bighorn sheep once again occupied their native habitats in SD. Unfortunately, bighorn sheep populations have fluctuated greatly since their reintroduction in the 1920s, most likely due to pneumonia-related mortality (Figure 1).

*Licenses and Harvest*
Going back to 1978 licenses offered have varied from 2 to 11. Harvest since 1978 has been at a success rate of 100%. Permits typically consist of 1 auction permit and several South Dakota resident random draw permits. Rams are only allowed for harvest. Ewe hunts can be implemented when deemed necessary.

*Figure 1. 2014-2025 bighorn sheep population estimates.*




*Test & Remove*

Unfortunately, researchers in SD have documented bighorn sheep disease die-offs in 5 populations related to pneumonia from *Mycoplasma Ovipneumoniae* (*Movi*) since 2004. To recover these populations SD has implemented the Test and Remove method in all 5 populations. In 2 of the populations (Custer State Park and Rapid City herds) this method has successfully removed the *Movi* pathogen and allowed lamb survival to recover to normal levels. In the most recent population (Hell Canyon) Test and Remove was just initiated in 2024. The Test and Remove method was important in reducing pneumonia related mortality in both adults and lambs and allowed recovery in 2 populations (Garwood et al. 2020, Ensrud 2022, SDGFP unpublished data).

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*-Chad Lehman, South Dakota Department of Game, Fish, and Parks*

## Texas

### Desert Bighorn Sheep

*Population*

Historically, desert bighorn sheep occupied 15-16 mountain ranges in the Trans-Pecos Region of Texas and numbered around 1,500-2,000 animals. However, by the early 1960s the native Texas desert bighorn sheep had been extirpated. Desert bighorn sheep from various states, including Nevada, Arizona, Utah and Baja California (Mexico), were brought into Texas to help with captive propagation and restoration efforts.

These efforts resulted in population growth to approximately 1,500 animals in 11 of their historic mountain ranges, where the population estimate remained for several years. In the last 5 years, the Texas population has been in decline and the statewide estimate is approximately 700 animals (Figure 1). This decline is largely attributed to disease impacts.

*Disease and Herd Health*

There have been at least three known disease events in Texas. The first event was detected in the Fall 2019 in the Van Horn Mountains, followed by another in the Spring 2020 in theBlack Gap Wildlife Management Area). More recently, in the summer of 2023, a disease event was detected in the Sierra Diablo Mountains population. *Mycoplasma ovipneumoniae* was found in all three disease events.

The Black Gap population appears to have stabilized since the 2020 disease event with counts of 126, 117, 127 and 148 in 2021, 2022, 2023, and 2024 respectively. The Van Horn Mountains' population is still struggling and even though no animals were observed during the 2024 surveys, there have been a few animals (approximately 15) observed since the survey. The 2022 count in the Sierra Diablo Mountains, and prior to the 2023 disease event, was 339 animals. Though the 2023 and 2024 counts are down from 2022, it appears the population is holding steady with counts of 172 and 175 in 2023 and 2024, respectively. Close monitoring continues in all three populations.

There have been population declines in at least five other populations including the Beach Mountains, Baylor Mountains, Sierra Vieja Mountains, 9 Point Mesa, and Big Bend Ranch State Park. Though the cause is unknown, disease is suspected. Investigations into possible causes are planned for the near future.

An immerging disease threat on the West TX landscape has been identified. Barbary sheep, also known as aoudad, are an exotic ungulate from the Barbary Coast of Africa. Aoudad are found in most of the West TX mountains, including the mountains considered prime bighorn habitat. Not only do they occur in extremely high densities (approximately 20,000 in the Trans-Pecos Ecoregion of TX) posing a competition threat, but they also present a disease transmission risk. Current disease monitoring and surveillance activities identified the aoudad as carriers of the *Mycoplasma ovipneumoniae* bacteria, or M. ovi,

In 2022 and 2023 aoudad tissue samples (i.e. serum and nasal swabs) were collected in 13 distinct West Texas mountain ranges. M. ovi was detected in all 13 mountain ranges. Out of 278 aoudad tested throughout the 13 mountain ranges, ELISA and PCR tests resulted in an overall average of 47% and 6%, respectively (Figures 2 and 3).

Aoudad tissue sampling for disease monitoring and surveillance purposes will continue throughout other West Texas mountain ranges. Efforts will be expanded to the Texas Panhandle soon.

*Figure 1. 2002-2024 Statewide desert bighorn sheep survey summary.*

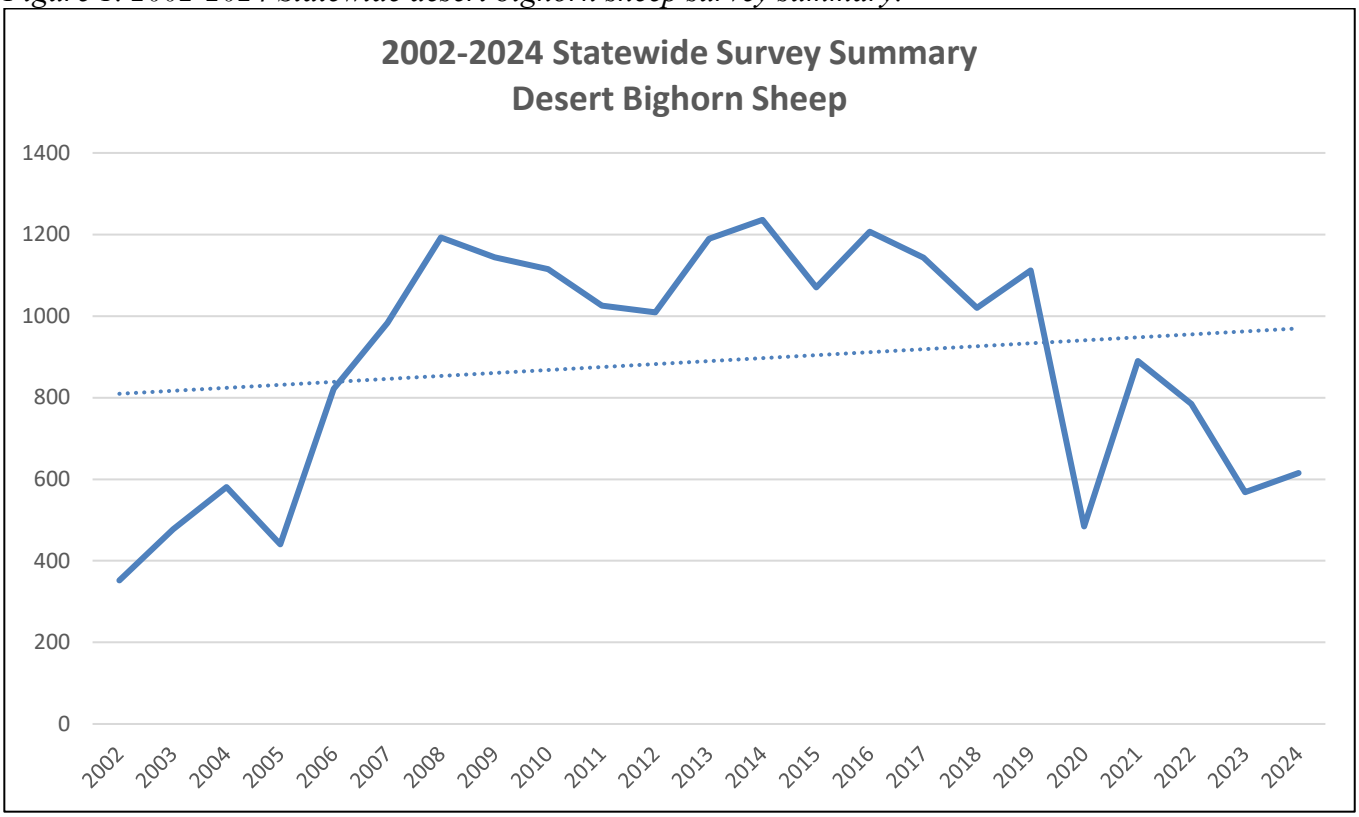



*Figure 2. 2022-2023 ELISA aoudad tissue results.*

| | ELISA Results | | | | | |
|---|---|---|---|---|---|---|
| **Range** | **Detected** | **Indeterminate** | **Not Detected** | **No Sample** | **Total Tested** | **Percent Detected** |
| Davis | 20 | 2 | 8 | 0 | 30 | 67% |
| Glass | 14 | 6 | 10 | 0 | 30 | 47% |
| Huecos | 4 | 1 | 25 | 0 | 30 | 13% |
| Near EMWMA | 37 | 4 | 19 | 0 | 60 | 62% |
| Wylie | 20 | 3 | 7 | 0 | 30 | 67% |
| Quitman | 16 | 2 | 7 | 0 | 25 | 64% |
| Eagles/Carrizos | 6 | 2 | 12 | 0 | 20 | 30% |
| Chinati | 11 | 4 | 14 | 1 | 30 | 37% |
| Big Bend Ranch | 3 | 1 | 19 | 0 | 23 | 13% |
| Grand Total | 131 | 25 | 121 | 1 | 278 | 47% |

*Figure 3. 2022-2023 PCR aoudad tissue results.*

| | PCR Results | | | | |
|---|---|---|---|---|---|
| **Range** | **Detected** | **Indeterminate** | **Not Detected** | **Total Tested** | **Percent Detected** |
| Davis | 2 | 3 | 25 | 30 | 7% |
| Glass | 0 | 1 | 29 | 30 | 0% |
| Hueco | 0 | 1 | 29 | 30 | 0% |
| Near EMWMA | 6 | 4 | 50 | 60 | 10% |
| Wylie | 3 | 1 | 26 | 30 | 10% |
| Quitman | 0 | 3 | 22 | 25 | 0% |
| Eagles/Carrizos | 2 | 2 | 16 | 20 | 10% |
| Chinati | 4 | 2 | 24 | 30 | 13% |
| Big Bend Ranch | 0 | 0 | 23 | 23 | 0% |
| Grand Total | 17 | 17 | 244 | 278 | 6% |

*Licenses and Harvest*

In 2018, the permit issuance and allocation system was changed from the system that had been in place since the late 1980s after desert bighorn hunting was reinstated in Texas. This change, which issues no more than 20% of the standing Class IV rams observed at time of survey, promoted the increase in permits and maximized hunting opportunities.

The permit issuance and allocation change increased permit numbers from 15 per permit year up to 25. Due to the disease events that began in the Fall 2019 and subsequent population decline, however, permit issuance has steadily decreased. Only 4 permits were issued in the 2023-2024 hunt season and 5 permits in 2024-2025.

*Test & Remove*

Though Texas has not conducted Test and Remove operations, the department is considering implementing this along with other disease management strategies.

-*Froylán Hernández, Texas Parks and Wildlife Department*

## Utah

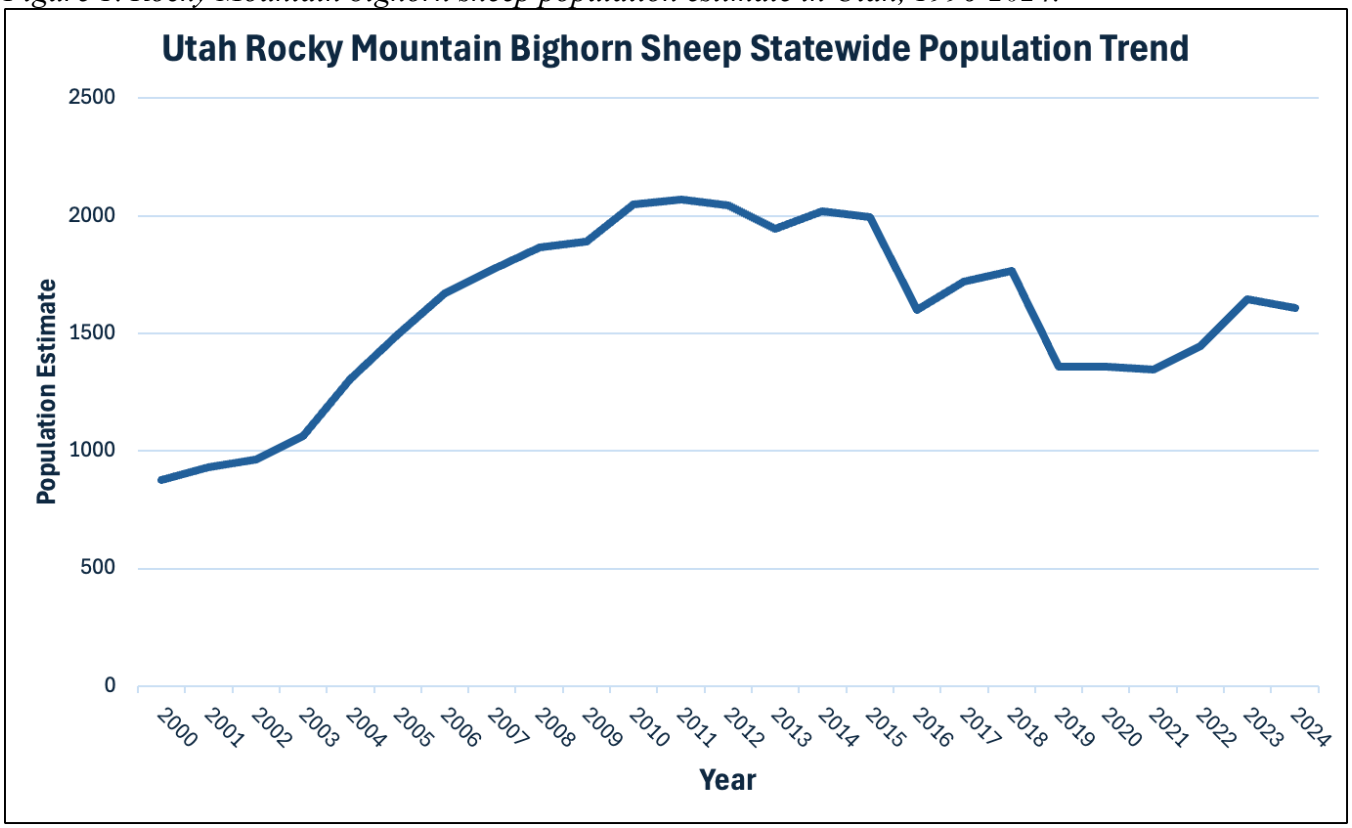
### Rocky Mountain Bighorn Sheep

*Populations*

Utah's 2024 post-hunt population of Rocky Mountain bighorn sheep (RMBHS) including California bighorn sheep is estimated at approximately 1609 individuals (Figure 1) and has grown from approximately 700 individuals 25 years ago. Since 1966, over 1200 RMBHS have been transplanted during 60 translocations. All RMBHS populations in the state are a result of translocations from British Columbia, Nevada, Colorado, Wyoming, Alberta, and Montana. The most recent RMBHS transplant

occurred in October 2022 in which Utah Division of Wildlife Resources partnered with Arizona Game and Fish Department to translocate 27 RMBHS from Morenci, AZ to Antelope Island, UT.

*Figure 1. Rocky Mountain bighorn sheep population estimate in Utah, 1996-2024.*




*Licenses and Harvest*

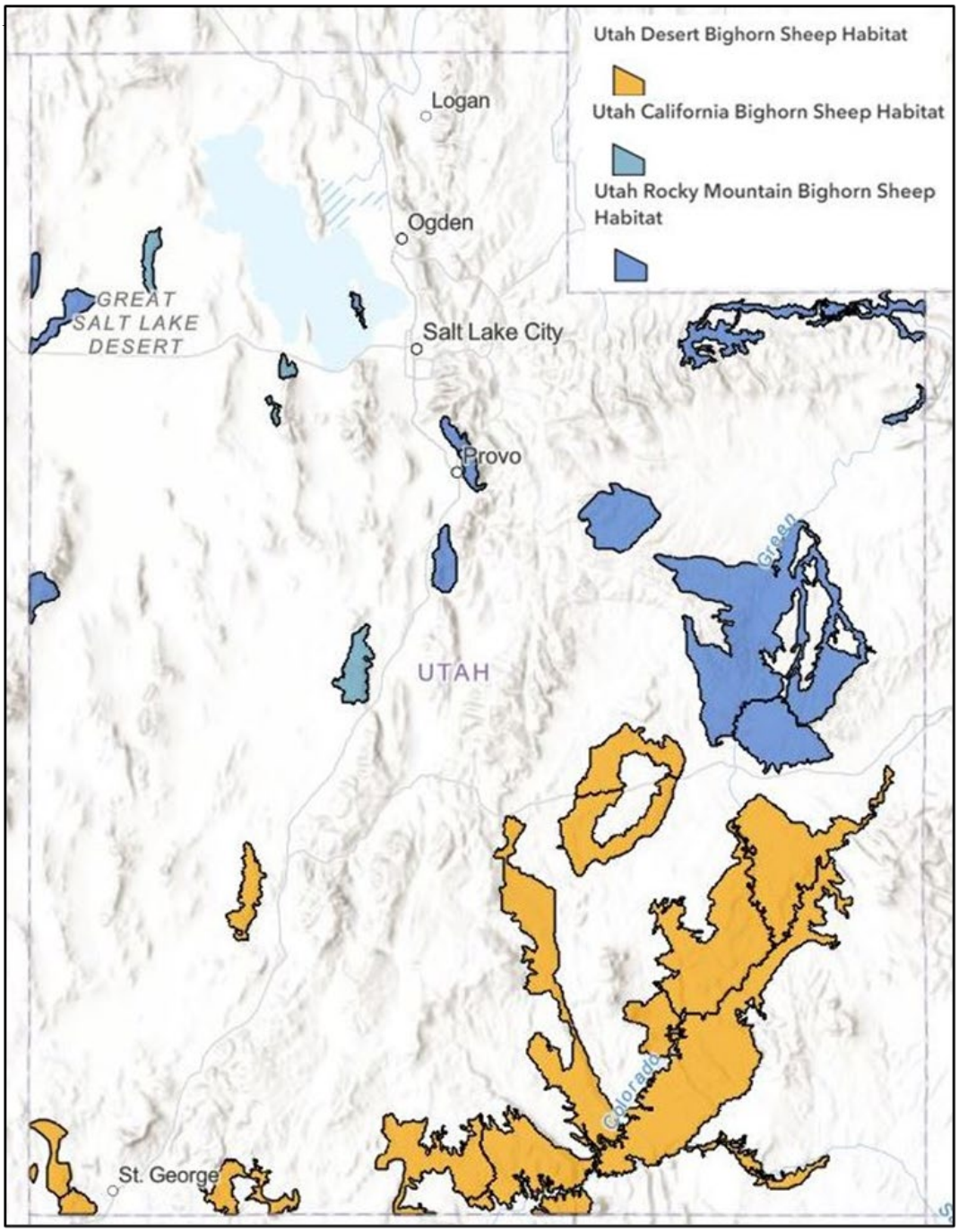
Utah has 14 public draw hunts on 10 different management units with occupied habitat shown in blue in Figure 2. For 2024, public draw RMBHS ram permits were increased from 52 to 57. Five RMBHS ewe permits were also issued, which is the same as 2023.

*Disease and Herd Health*

During the 2024-2025 capture season, 37 RMBHS were captured and sampled for disease surveillance. In addition, sampling kits were mailed to all permit holders to collect samples from harvested bighorns. No new all-age die-off events were detected, although disease has been identified as a limiting factor on many units throughout the state. In 2023, UDWR collaborated with Utah Department of Agriculture and Food (UDAF) to hire an interagency sheep outreach coordinator tasked with working with landowners and permittees at a statewide level to reduce disease risk in prioritized areas. Multiple potential spillover events have been prevented as a direct result of this position.

*Test and Remove*

No test and remove efforts have been implemented to date. However, this management tool will be considered in response to any documented disease outbreaks in populations that may be conducive and receptive to a test and remove effort.



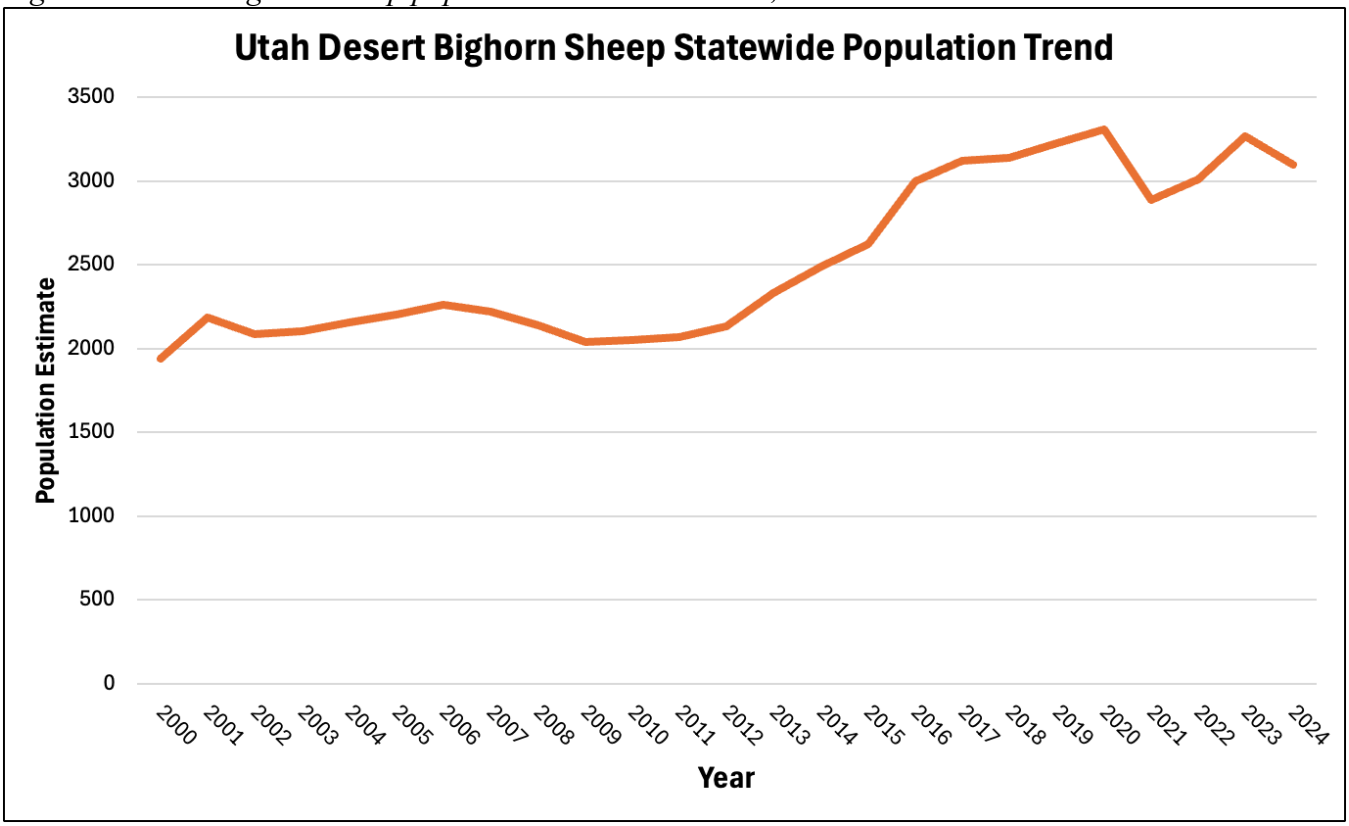

## Desert Bighorn Sheep

*Populations*

Utah's 2024 desert bighorn sheep (DBS) population is estimated at approximately 3094 individuals statewide (Figure 3) and is a result of over 70 transplants since 1973. Over 1100 DBS from Arizona, Nevada, and from within Utah have been translocated. One of the most recent translocation efforts occurred in 2019 when the UDWR partnered with Nevada Department of Wildlife (NDOW) to reintroduce 51 bighorns from the Muddy Mountains, NV to the Mineral Mountains near Milford, UT. In 2024, a bighorn hunt on the Mineral Mountains was initiated. In June of 2024, UDWR again partnered with NDOW to translocate 20 bighorns from Valley of Fire, NV to augment the existing conservation

breeding population established on Promontory Point, UT which was originally transplanted from the same source herd in 2022. This nursery facility is ~1100 acres, is equipped with a secure double fence and designed to keep a population of desert bighorns free from disease to be used for future translocations throughout Utah and elsewhere.

*Figure 3. Desert bighorn sheep population estimate in Utah, 1996-2024.*




*Licenses and Harvest*

Utah has 18 public draw hunts on 17 different management units with occupied habitat shown in orange in Figure 2. For 2024, public draw DBS ram permits were increased from 76 to 88. There are no ewe hunts established for DBS in Utah.

*Disease and Herd Health*

During the 2024-2025 capture season, 76 DBS were captured and sampled for disease surveillance. In addition, sampling kits were mailed to all permit holders to collect samples from harvested bighorn sheep. No new all-age die-off events were detected, although disease has been identified as a limiting factor on many units throughout the state. In 2023, UDWR collaborated with Utah Department of Agriculture and Food (UDAF) to hire an interagency sheep outreach coordinator tasked with working with landowners and permittees at a statewide level to reduce disease risk in prioritized areas. Multiple potential spillover events have been prevented as a direct result of this position.

*Test and Remove*

No test and remove efforts have been implemented to date. However, this management tool will be considered in response to any documented disease outbreaks in populations that may be conducive and receptive to a test and remove effort.

*- Rusty Robinson, Once-in-a-lifetime Species Coordinator*

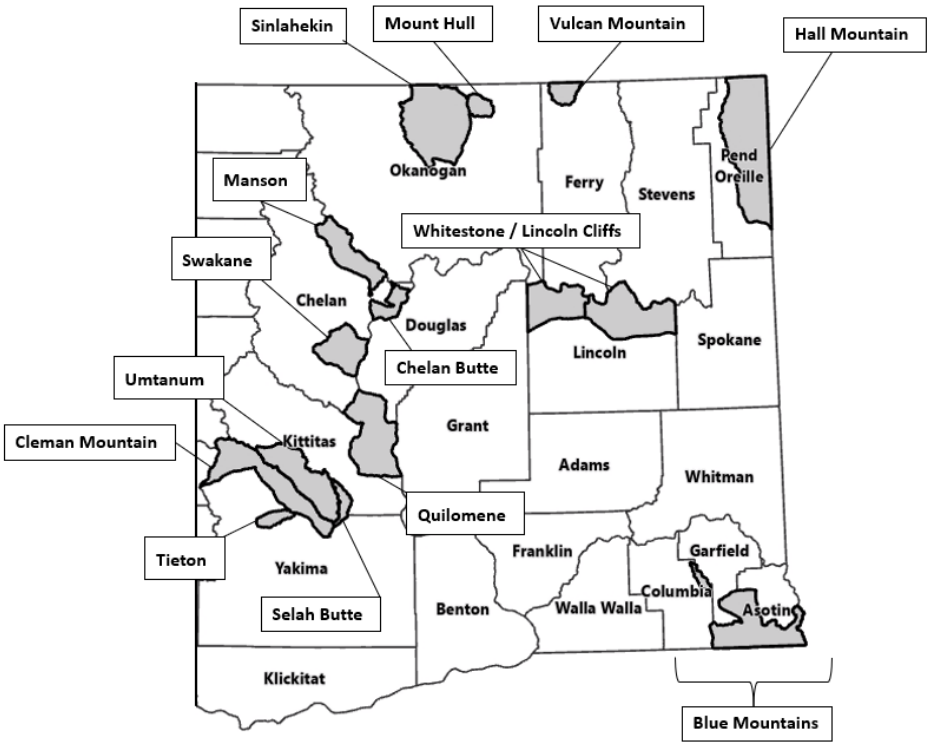
## Washington

### Rocky Mountain Bighorn Sheep

*Population*

Washington Department of Fish and Wildlife WDFW) manages 17 bighorn sheep herds that occupy a portion of their historic range within the eastern two-thirds of the state. Bighorn sheep were extirpated from Washington by 1935, and these herds are the result of reintroductions, which began in 1957 (Johnson, 1983) and continued until 2004. Herds associated with the eastern foothills of the Cascades and Okanogan Highland are designated as California bighorn (twelve herds), while those in the Blue and Selkirk mountains are considered Rocky Mountain bighorn sheep (five herds). One herd, Tieton, remains under the Department's purview but contracted pneumonia and was depopulated in 2013 to reduce the risk of disease transmission to the adjacent Cleman Mountain herd.

*Figure 1. Bighorn sheep distribution across the eastern portion of Washington state. Dark gray labeled polygons represent the Department's 2024 hunt units for each herd. Blue Mountains contains four herds, including Asotin Creek, Black Butte, Mountain View/Wenaha, and Tuccannon. Counties are labeled for reference.*

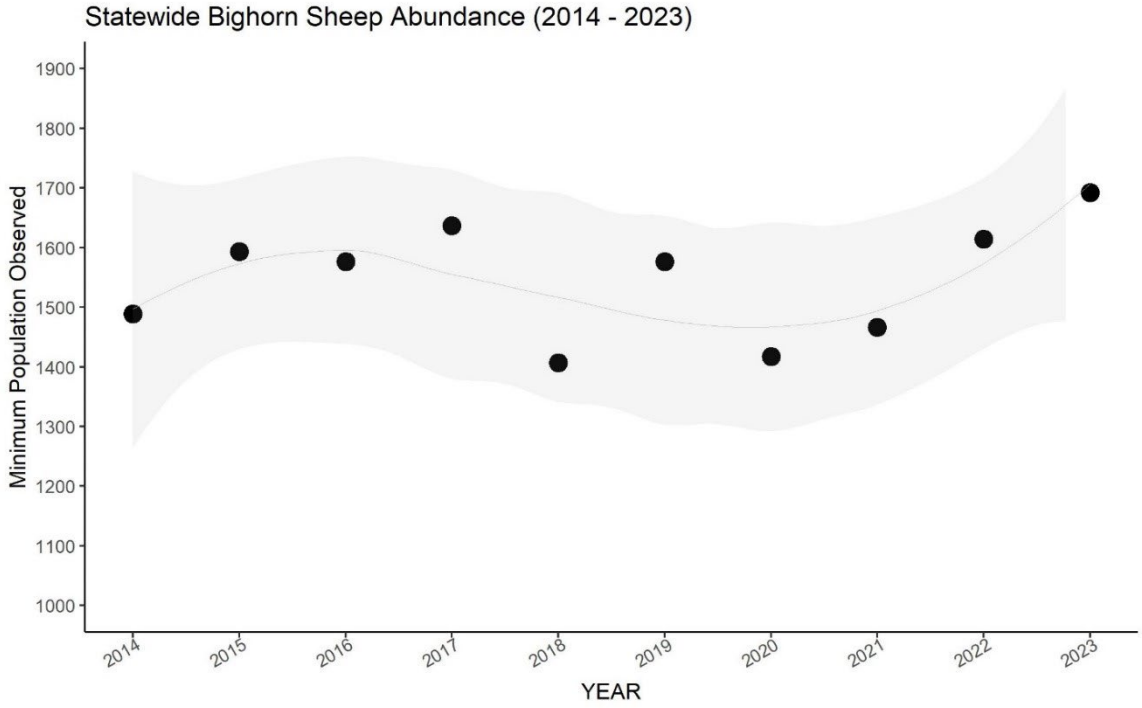



*Populations*

WDFW attempts to survey each herd biennially using aerial or ground approaches, which are not corrected for detection bias; therefore, in most circumstances, results should be considered minimum counts. However, in certain situations, when collars (i.e., marks) are distributed within a given herd, mark-resight methods may be utilized to generate abundance estimates. All aerial and ground surveys are typically conducted between late fall and early spring to estimate population size, lamb recruitment, sex ratio, and proportion of mature rams in the population. The Department estimates that nearly 1,700 bighorn sheep

are distributed throughout these herds, slightly less than the lower short-term population bound of 1,995 defined in Washington's 2015-2021 Game Management Plan (WDFW, 2014; Figure 2).

*Figure 2. Minimum statewide bighorn sheep population counts with LOESS* smoothing derived from aerial and ground surveys.*




*Harvest Management*

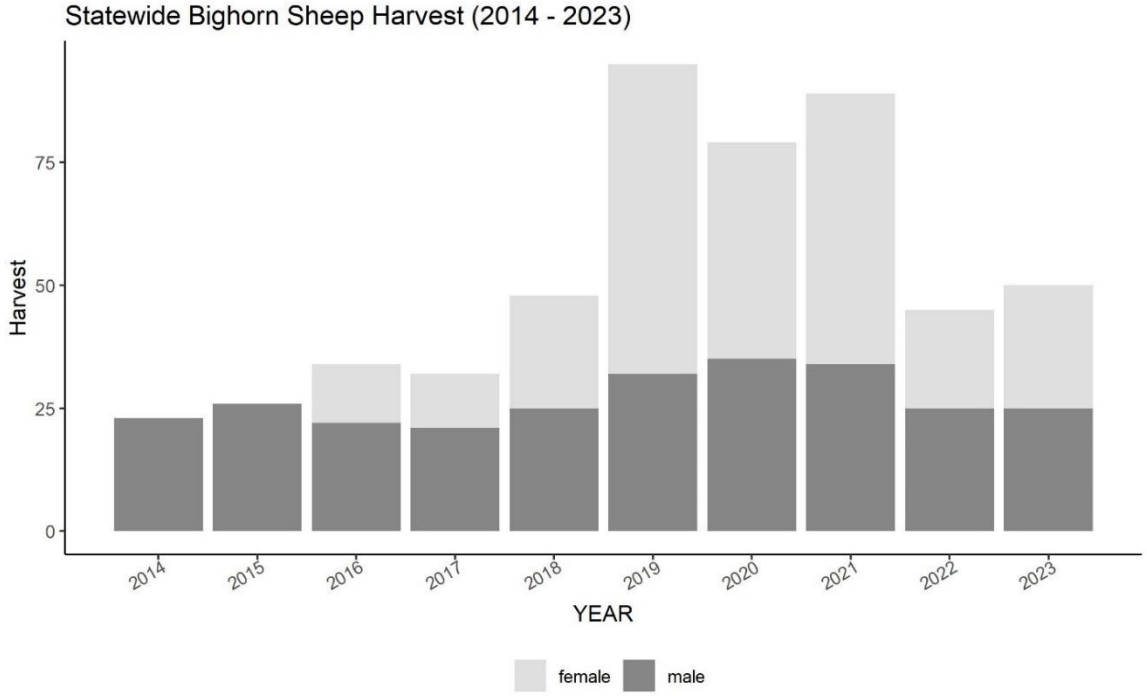
The Department manages harvest through a special permit system which promotes a high-quality hunting opportunity; therefore, the number of permits is set at a level to maintain long-term herd sustainability, low hunter densities, and long seasons to promote high success rates whether permits are "Any Ram," "Adult Ewe," or "Juvenile Ram." In addition, allocation levels of permits classified as "Any Ram" consider the population size, ram-to-ewe ratio, and the number of older age-class males to ensure a high-quality hunting experience is available when an individual is selected. Permits classified as either "Adult Ewe" or "Juvenile Ram" still maintain a high-quality hunting experience but are intended to reduce herd abundance (e.g., to maintain herd objectives or reduce the risk of contact between wild and domestic sheep), foray probability (decrease overall ram abundance by harvesting juvenile males given their higher probability of foray), or agricultural damage potential. Ram harvest has remained consistent over the last ten years, although overall harvest has fluctuated with the initiation of ewe and juvenile ram permits beginning in 2016, with dramatic increases between 2019-2021 associated with Test and Remove management in the Umtanum and Selah Butte herds (Figure 3).

*Disease and Herd Health*

The most significant threat to Washington's bighorn sheep populations is exposure to the bacterium *Mycoplasma ovipneumoniae* (*M. ovi*), a primary agent associated with pneumonia-related die-offs that have contributed to both contemporary population declines and historic extirpations. *M. ovi* has been documented in eight of the 17 bighorn sheep herds managed by WDFW. The most recent transmission occurred in December 2023 which has spread throughout the Black Butte, Mountain View/Wenaha, and Asotin segments of the Blue Mountains Complex within Hells Canyon. These outbreaks are ongoing, with acute illness still being observed; the extent of overall mortality is yet to be determined. Previous

transmission events and persistent pathogen presence have been recorded in the Umtanum/Selah Butte herd (2009), Tieton (2013), Mount Hull (2019), Cleman Mountain (2020), and Quilomene (2021). The Department conducts routine *M. ovi* surveillance during all captures, harvests, and opportunistic encounters (e.g., road-killed animals).

*Figure 3. Statewide bighorn sheep harvest from 2014 – 2023.*




Additional population-level concerns have emerged with the detection of psoroptic mange in the Sinlahekin, Mount Hull, and more recently, the Vulcan Mountain herd. This condition is caused by a non-burrowing ectoparasitic mite of the genus *Psoroptes*, which produces scabby lesions and alopecia, and is suspected to contribute to population decline (Hering et al., 2021). Research suggests the parasite spilled over from rabbits, originating in Canada and spreading to the Sinlahekin herd in 2011. It was detected in the Mount Hull herd during captures in January 2023 and in the Vulcan Mountain herd in February 2025. Further research is necessary to quantify the full impact of this parasite on herd health and population dynamics.

Finally, Bluetongue virus has been documented in several bighorn sheep populations, with severe short-term declines observed in the Sinlahekin, Mount Hull, and Vulcan herds. While the disease has also been detected in other herds, those populations have not experienced significant declines to date.

*Research and Management*

The Department actively participates in the Bighorn Sheep Restoration Committee, a collaborative group that includes multiple state fish and wildlife agencies, universities, and the Wild Sheep Foundation. This partnership coordinates research and funding efforts to support bighorn sheep conservation. Current research priorities focus on expanding the knowledge base needed to inform effective management strategies for populations exposed to *M. ovi*. The Department is currently engaged in projects involving herds in the Blue Mountains, Umtanum, Selah Butte, and Cleman Mountain, and has increased monitoring efforts in the Mount Hull and Vulcan herds.

*Management Conclusion*

Statewide, bighorn sheep populations are expected to decline due to disease impacts across several herds, including those in the Blue Mountains, Cleman Mountain, Quilomene, Sinlahekin, and Mount Hull. However, there is optimism that ongoing Test and Remove management efforts in the Umtanum and Selah Butte herds will lead to population increases in the future. The Department's primary objective is to enhance understanding of disease dynamics, implement measures to prevent transmission, and support the persistence of disease-free herds to promote long-term population stability and growth.

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*Will Moore, Washington Department of Fish and Wildlife*

## Wyoming

### Rocky Mountain Bighorn Sheep

*Population*

Rocky Mountain Bighorn sheep populations throughout Wyoming have declined since the early 1990s from an estimated 7,000 sheep in 1990 to a low of 5,800 sheep in 2019. Since 2010 bighorn sheep numbers have generally declined but are showing recovery in 2019 (Figure 1). At least some of this estimated increase is due to prospering reintroduced herds such as the Ferris/Seminoe population. Bighorn sheep hunting is managed in 19 hunt areas (Figure 1) encompassing 11 herd units or populations throughout the state. There are other populations in Wyoming including approximately 200 bighorn sheep in the northern portion of Yellowstone National Park, two populations within the Wind River Indian Reservation, and two "remnant" herds in Shell Canyon in the Bighorn Mountains and Temple Peak in the southern Wind River mountains where hunting seasons are not conducted and numbers are periodically monitored. After the 2024 hunting season it was estimated there were about 6,700 bighorn sheep, down slightly from the 2023 estimate.

License issuance and ram harvest (Figure 2) has similarly declined over the past twenty years. In part, the decline in licenses issued and harvest is linked to several factors other than population trend including harvest success, average age of harvested rams, and hunter effort. Because bighorn sheep hunting is so coveted (and now a once-in-a-lifetime opportunity), managers are very conservative with hunting opportunity, but harvest over the past decade has been consistent with change in population size (Figure 3).

*Figure 1. Bighorn sheep hunt areas.*

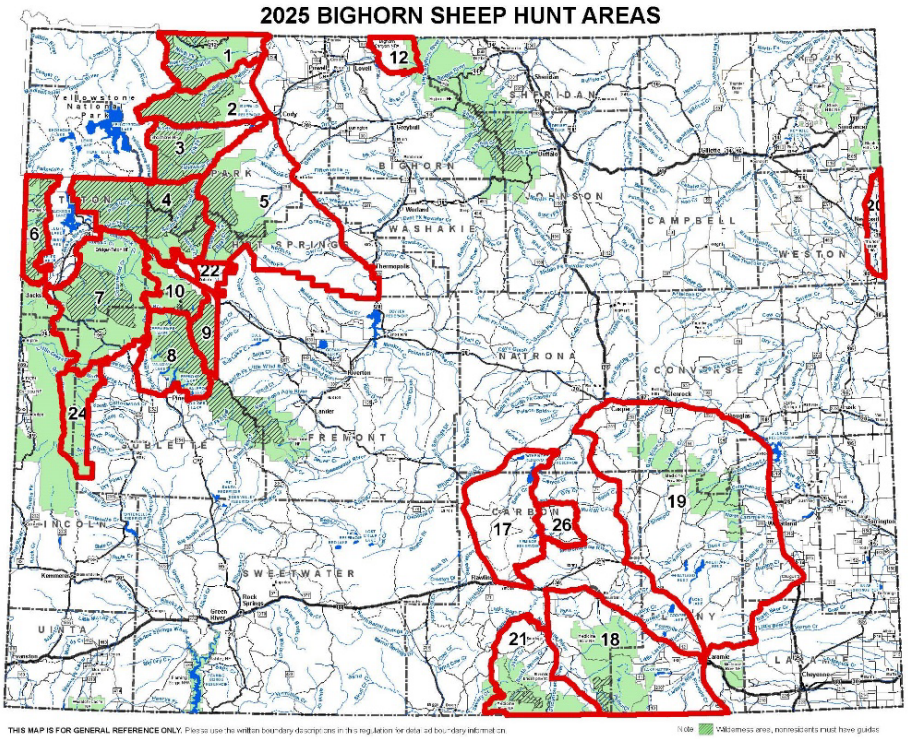


*Figure 2. Estimated population size and number of rams harvested.*

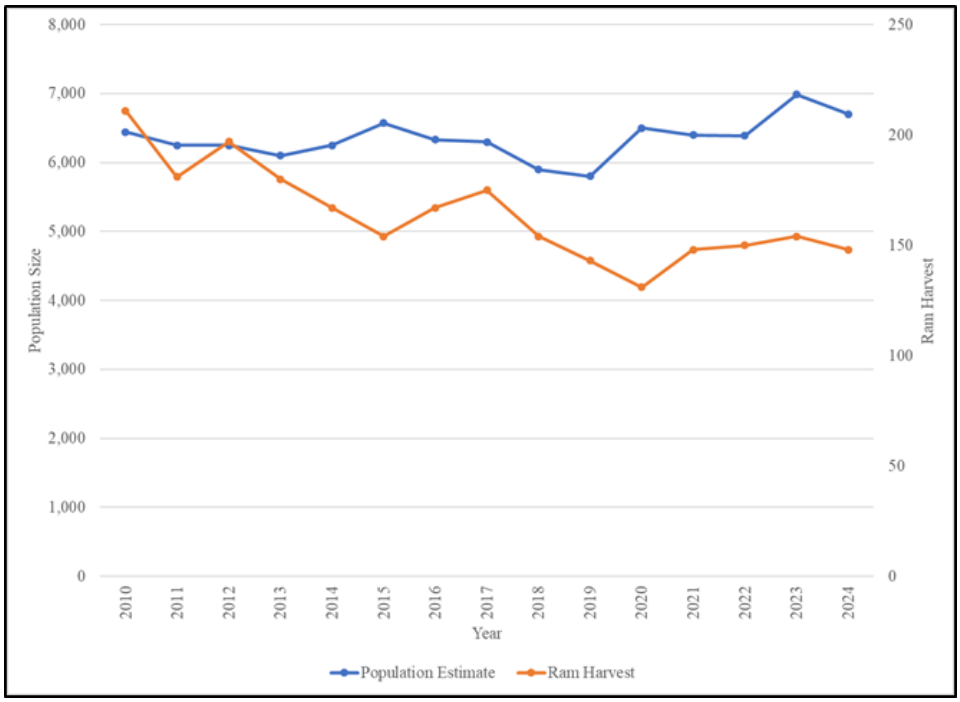
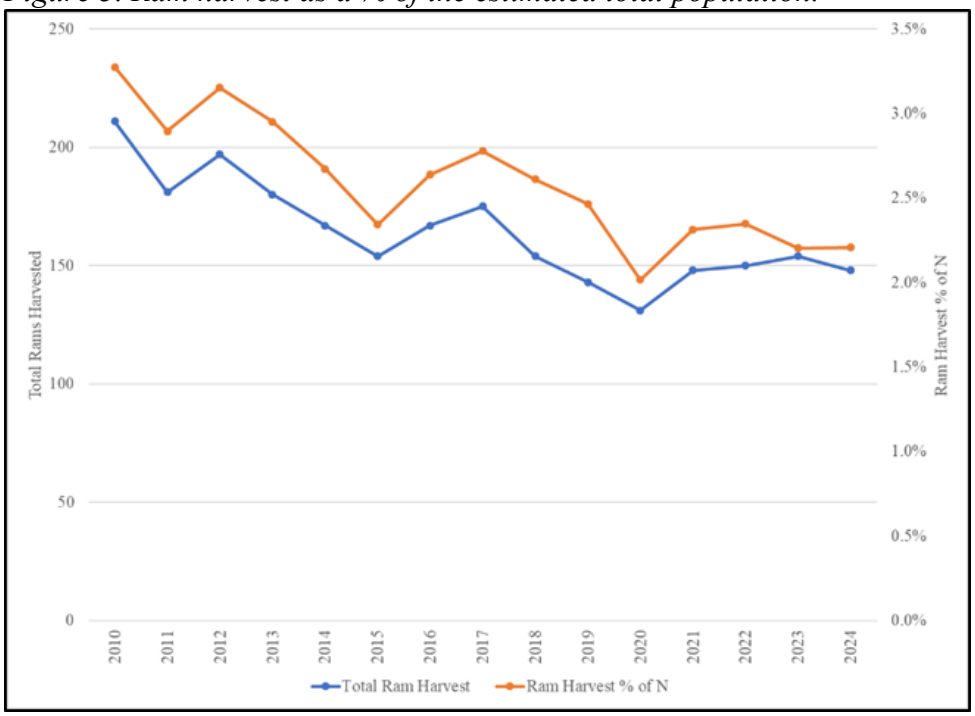



*Figure 3. Ram harvest as a % of the estimated total population.*




*Disease and Herd Health*

The Devil's Canyon herd in north central Wyoming experienced two pneumonia-related die-offs between October 2022 and September 2023. Wildlife Health Laboratory staff concluded this outbreak was triggered by a novel strain of the pathogen *Mannheimia haemolytica*. Based on 2023 observations, rams appeared to be unaffected from the second outbreak and rendered an increased ram ratio. In 2024 managers increased ram harvest with the introduction of Type 2 licenses, valid for any ram less than ¾

curl. This license type targeted younger aged rams (<4 y.o) which is an age cohort more prone to wander outside of the herd unit. A trend count was conducted from the air in November 2024 where 94 bighorn sheep were classified. This is slightly higher than managers anticipated, following the 2023 die-off. Ram ratios appeared lower (58:100) than in 2023, which could be due to increased harvest. The management strategy for 2025 is to maintain increased ram harvest to reduce ram ratios and discourage future dispersal while the population recovers.

*Test and Remove*

Given the significant and continual decline in bighorn sheep in the Whiskey Mountain Herd and following over a year's worth of in-depth discussion with other bighorn sheep experts, local managers and researchers took a novel approach for Wyoming and implemented "Test and Remove" in the Red Creek sub-herd. The goal was to lower the prevalence of the pneumonia-causing pathogen, *Mycoplasma ovipneumoniae* (M. ovi), by removing "chronic carriers" and ultimately increase overall herd health and lamb survival. It was decided to first test this approach with the smaller Red Rocks portion of the Whiskey herd. Testing for M.ovi has been conducted during captures each December and March since 2015. Based on these testing results to date, 14 ewes within the Red Rocks sub-herd have been removed (7 in 2022, 4 in 2023, 2 in 2024, and 1 in 2025). Of the 14 ewes removed, detailed lab necropsies found 7 (54%) had chronic pneumonia and 7 (54%) had sinus masses. Of the 4 removed in 2023, 1 (25%) had chronic pneumonia and 2 (50%) had sinus masses. One of the 2 ewes removed in 2024 had both chronic pneumonia and sinus masses. The 1 ewe removed in 2025 showed signs of chronic pneumonia and are waiting for the results determining the presence of a sinus mass. Though we have likely lessened the opportunity for mother-to-lamb and then lamb-to-lamb pneumonia transmission to occur, there are other untested ewes within this sub-herd from which transmissions could continue to occur. Lambing season in 2022 was the first glimpse at reproduction/survival after removing 7 of the chronic carriers. During 2022-2023 winter classifications, personnel observed a lamb ratio of 47 lambs per 100 ewes. In 2024, personnel classified 36 lambs:100 ewes. Again in 2025 we saw another year of improved lamb survival with 42 lambs per 100 ewes. This number of lambs had not been observed in this sub-herd in the past 7 years. In fact, this is more observed lambs than has been seen in the last 6 years combined. We are in the beginning stages of the project and are not making inferences about this increased number of lambs, but this is an encouraging step forward.

In 2024, test and remove was expanded to the rest of the Whiskey Mountain herd. To date, we have captured and tested 63 ewes with 21 (33%) testing positive using a lab PCR. Of the 21 positive ewes, 17 have been removed. We are using a "one-strike" protocol, with some exceptions, to identify chronic carriers. Ewes that test positive and are either 3 years old or younger, or have a lamb at side, will not be removed. This is a departure from the "two strike" protocol in the Red Creek sub-herd because these bighorn sheep are so weary of a helicopter and once they are caught they immediately leave the country and are in the Wilderness. So, getting our hands on the captured bighorn sheep to conduct a second test is nearly impossible and would greatly delay or hamper our ability to remove carriers. It is recognized this protocol may increase the likelihood of removing a positive animal that could clear the pathogen. We are not removing any rams or yearling ewes.

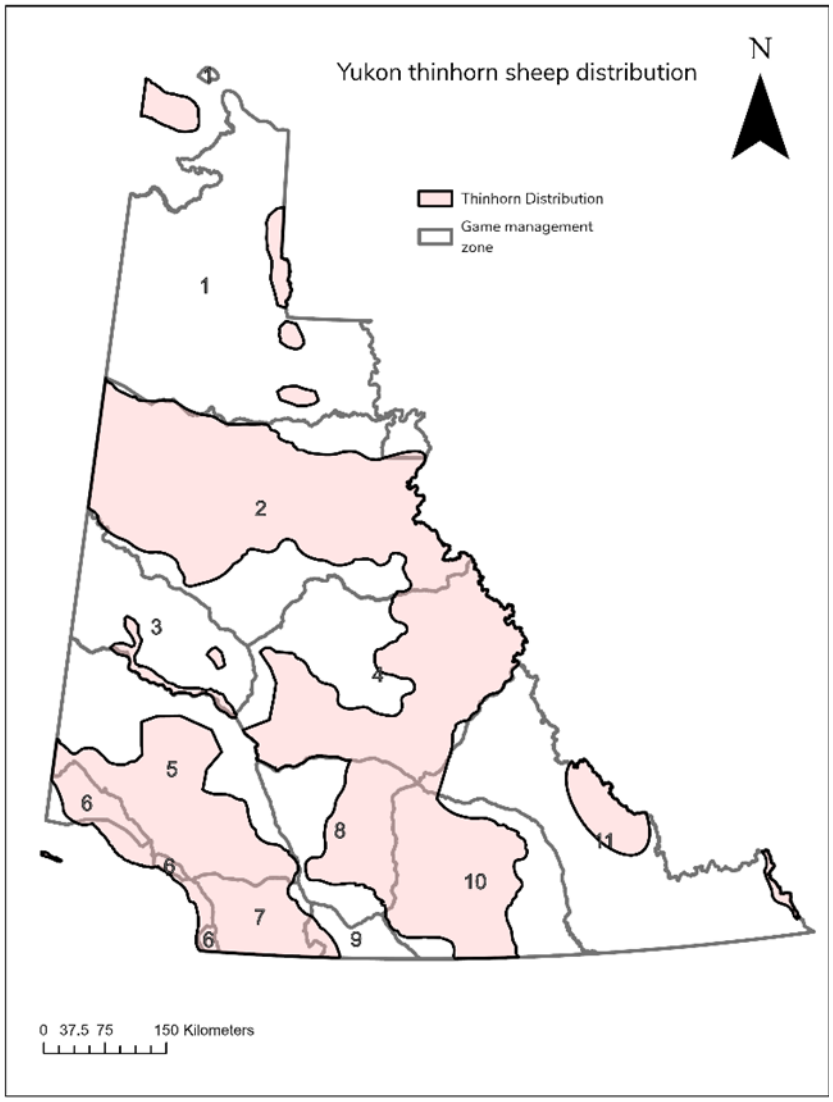
*Tony Mong, Wyoming Game and Fish Department*
*Zach Gregory, Wyoming Game and Fish Department*
*Daryl Lutz, Wyoming Game and Fish Department*

## Yukon

Yukon thinhorn sheep

The Yukon has two native subspecies of thinhorn sheep: Dall's and Stone's sheep. A hybrid of Dall's and Stone's sheep, called Fannin's sheep is present from the mid-southern border north towards Faro. There are approximately 22,500 thinhorn sheep within the territory. The distribution of Stone's sheep is limited in number, potentially occurring just north of the mid-southern border of the Yukon. Most Dall's sheep are located in the southern and southwest region of the Yukon, particularly in the Kluane and Ruby mountain ranges. However, sheep can be found in all mountain ranges, including in the northernmost, Richardson mountain range (Figure 1).

*Figure 1: Generalized Yukon thinhorn sheep distribution*




*Harvest trends*:

Licensed hunting is closed for all rams that are less than full curl and under 8 years of age. Annually, licensed hunters can harvest one legal ram from an open Game Management Subzone (GMS). In some Game management Zones (GMZ), sheep are managed at the level of the Sheep Management Unit (SMU), which reflects the mountain ranges most frequently occupied by a sub-population of sheep, with little

emigration or immigration from other adjacent sub-populations. In regions where human access and hunting pressure is likely to be higher, hunters can apply for a permit to hunt thinhorn sheep in a permit hunt authorized area. The accessibility of an area and harvest rates are considered when determining the number of permits allocated to an area. For example, several GMSs and SMUs closer to Whitehorse require a hunting permit to legally harvest a ram, as these areas often have good accessibility and higher numbers of active hunters. Compliance with hunting regulations is monitored by requiring hunters to submit ram skulls for standardized measurements. A unique, numbered plug is placed in one horn and horn material is collected for preservation of genetic information. Ewes and lambs are protected from hunting.

The number of thinhorn sheep seals obtained by licensed hunters, including resident and non-resident hunters, increased from around 855 seals in 1995 to a peak of 1839 seals in 2019 (Figure 2, Department of Environment Yukon, 2024). Since 2016, the purchase of seals has stabilized (resident hunters) or decreased (non-resident hunters). On average, 252 thinhorn sheep are harvested annually with 32% harvested by resident hunters and 68% harvested by non-resident hunters (Milligan, 2018). On average, 11% of resident hunters and 55% of non-resident hunters are successful in harvesting a thinhorn sheep (Milligan, 2018). The average age of rams harvested fluctuates due to differences in horn growth rates of ram cohorts. Some cohorts reach full curl earlier than others depending on the environmental conditions encountered in their early years of life (Hik and Carey, 2000) (Figure 3, Department of Environment Yukon, 2024).

Harvest rate limitations are recommended when sub-populations are inventoried relatively frequently (~5-10 years) by the minimum count method. In frequently surveyed herds, a harvest rate of no more than 4% of the non-lamb population is recommended (Environment Yukon, 2019).

*Figure 2: The number of annual thinghorn sheep seals sold to licensed hunters by hunter type.*

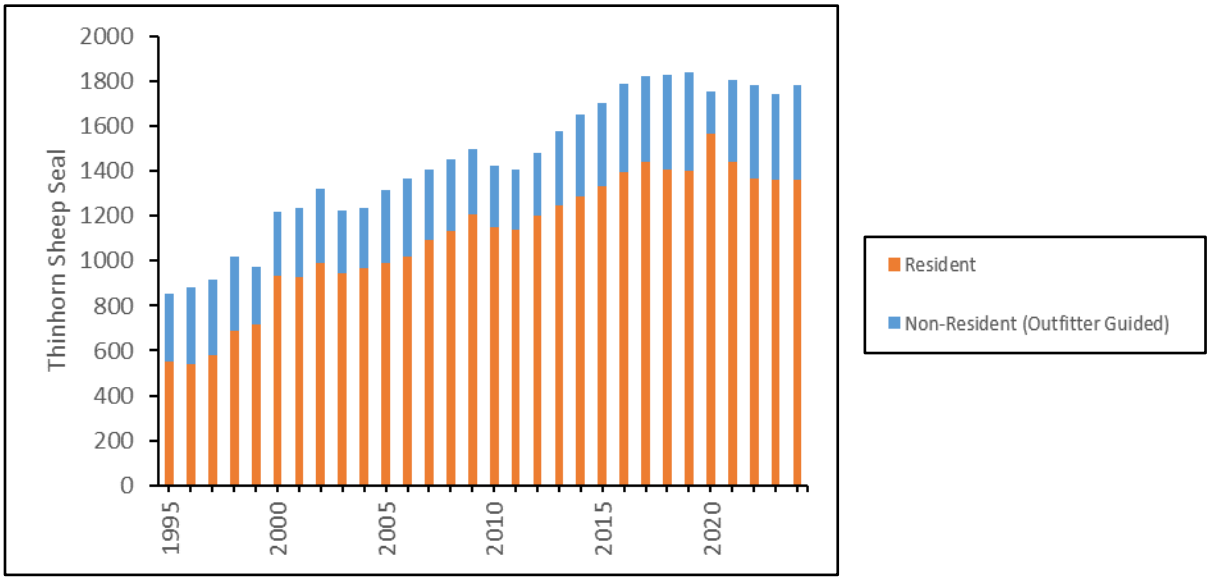
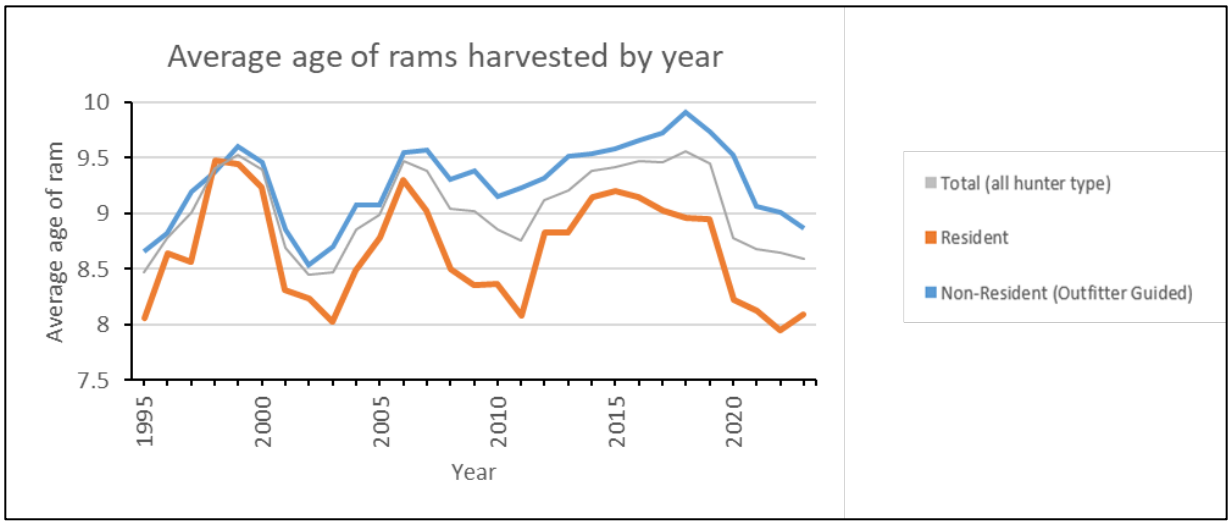


*Figure 3: The average age of rams harvested by year and by hunter type.*




*Management*

Management of thinhorn sheep within the territory is guided by the published document – *Science-based guidelines for management of thinhorn sheep in Yukon* (Environment Yukon, 2019). When established, sheep sub-populations are managed at the level of the SMU and otherwise, at the level of the GMS, which represents a discrete mountain block. Management primarily consists of a combination of monitoring sub-populations by minimum count surveys and harvest management.

Thinhorn sheep populations in the southern and south-west regions of the Yukon have historically been surveyed more frequently than in other regions. However, obtaining population trend information is challenging, even in frequently surveyed regions. Prior to the recent development of Sheep Management Units (2015), survey extent was not consistent and thus it is not possible to directly compare survey counts. It is not possible to obtain population trend information in infrequently surveyed areas such as in the central and northern regions of the Yukon. However, harvest pressure is lower in these areas and most harvest is from non-resident hunters. Population surveys are prioritized based on management concerns and the need to update population information. Thinhorn sheep herds that are easily accessed by roads or trails are likely to experience higher disturbance from human activities and greater harvest pressure. Surveys are used to estimate total minimum counts, and not sub-population estimates or density. Productivity is estimated by obtaining a sex and age class ratios.

From 2014 and 2016 large-scale surveys of GMZ 7 (Southern Lakes region in proximity to Whitehorse and Carcross) and GMZ 5 (Kluane and Ruby Range region in proximity to Haines Junction) were completed. These two management zones experience relatively high harvest pressure and contain some of the highest densities of sheep in the Yukon. Across all of GMZ 7, 3,112 thinhorn sheep were observed, 2,490 of which were non-lambs. Compared to surveys conducted in the 1970s, a 22% increase in the non-lamb population was noted and the population was deemed to be stable (Hegel and Russell, 2018). Across all of GMZ 5, 3,766 thinhorn sheep were observed, 3,011 of which were non-lambs. The only previous comprehensive survey of GMZ 5 occurred in 1974. In 2015 sheep numbers in GMZ 5 were found to be similar to those observed in 1974 and the population was considered stable.

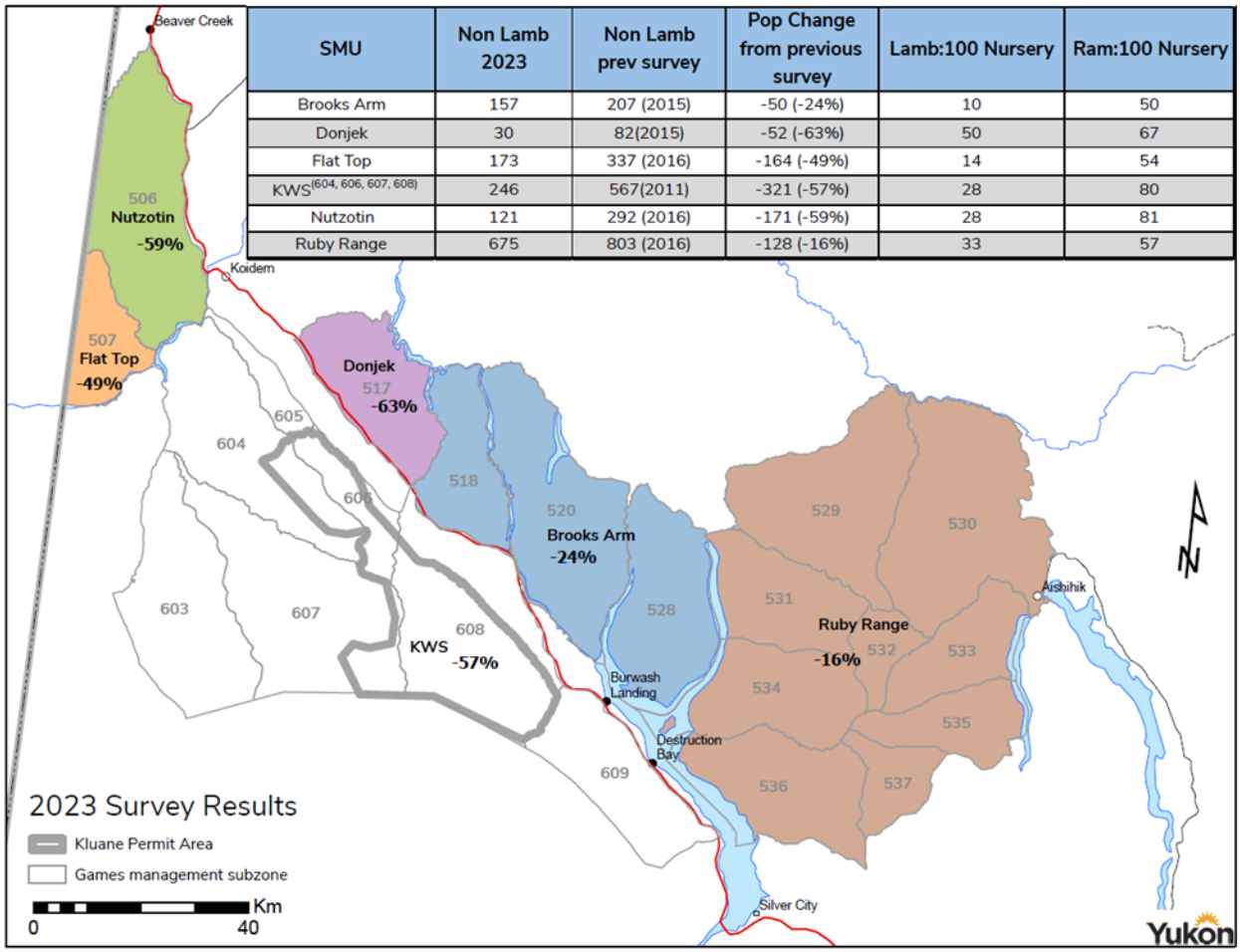
In 2022 and 2023, several SMUs in GMZ 5 were surveyed due to concerns that sheep populations may have been adversely affected by consecutive years of late spring melt and higher than average snow

accumulation. Results indicated that thinhorn sheep herds in these SMUs had experienced declines ranging from 16% to 63% (Figure 3). Ruby Range SMU holds the largest population of thinhorn sheep in GMZ 5 (n = 675 (non-lamb), yr = 2023) and experienced the smallest decline at 24% in 2022 and 16% in 2023. The smaller SMUs, ranging from 30 to 192 thinhorn sheep, saw larger declines at above 30%.

Historically, thinhorn sheep populations within the Yukon have experienced comparable levels of decline (for example, in the early 1990s). Due to the timing of surveys, detection of past declines relies on a combination of observational reporting from First Nations community members, resident hunters and outfitters, and biologists in addition to surveys. Reasons underlying the current decline are likely similar to those of previous declines; challenging environmental conditions, such as deep snowpack, ice, and late springs that impact food sources and adult and lamb survival rates over consecutive years.

*Figure 4: Results of the 2023 survey in south-west Yukon, Kluane region.*

| SMU | Non Lamb 2023 | Non Lamb prev survey | Pop Change from previous survey | Lamb:100 Nursery | Ram:100 Nursery |
|---|---|---|---|---|---|
| Brooks Arm | 157 | 207 (2015) | -50 (-24%) | 10 | 50 |
| Donjek | 30 | 82(2015) | -52 (-63%) | 50 | 67 |
| Flat Top | 173 | 337 (2016) | -164 (-49%) | 14 | 54 |
| KWS[604, 606, 607, 608] | 246 | 567(2011) | -321 (-57%) | 28 | 80 |
| Nutzotin | 121 | 292 (2016) | -171 (-59%) | 28 | 81 |
| Ruby Range | 675 | 803 (2016) | -128 (-16%) | 33 | 57 |




The significant population declines in the southwest Yukon are concerning given the effects of climate change may increase the frequency and severity of challenges that sheep populations may face. Inclement weather events may occur more frequently or less frequently or at unseasonable times. Understanding how thinhorn sheep populations may be vulnerable to changing conditions will help wildlife managers to continue to support self-sustaining populations.

An aerial thinhorn sheep survey of four SMU in the Southern Lakes area was completed in July 2024. This survey was flown to estimate abundance, distribution, lamb recruitment and adult sex ratios in the

Arkell, Pilot Mountain, Alligator Lake, and Sifton SMUs. The non-lamb counts for Arkell (-22%), Alligator Lake (-36%), and Sifton (-12%) decreased from the previous counts completed in 2015/2016. The Pilot Mountain count (+15%) has increased. Declines were anticipated, given that similar and more pronounced declines were detected in surveys conducted in the southwest and Kluane regions in 2022 and 2023.

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