Alberta Environment and Parks

Respiratory Disease Monitoring in Alberta – Annual Progress Report (July 2021)

Wildlife Management, Alberta Environment and Parks

Introduction

Respiratory disease can significantly limit the sustainability of bighorn sheep populations in North America. Southwestern Alberta has experienced significant die-offs from pneumonia outbreaks since the 1940s, with the most recently documented event occurring in Sheep River in 2000. On average, populations have declined by more than 50% (range 10-70%) and lamb recruitment has remained poor for at least 4 years post-event (range 1-6+ years).

Early detection of the disease is important to ensure timely management actions that minimize spread. Two pathogens are associated with respiratory disease in bighorn sheep: *Mycoplasma ovipneumoniae* (*M. ovi*) and *Pasteurellaceae spp.* Domestic sheep and goats are known carriers of *M. ovi*, and most (but not all) die-offs of wild sheep herds have followed known or suspected contact with these domestic species. *M. ovi* predisposes bighorn sheep to pneumonia, and the *Mannheimia haemolytica* leukotoxin gene in Pasteurellaceae spp. bacteria increases the disease severity. These pathogens can be sampled using nasal and tonsil swabbing, respectively.

Wildlife health professionals from across North America have developed standardized protocols for disease sampling in wild sheep (WAWFA 2015). Government agencies with wild sheep have committed to collecting this information in herds with low to high risk of contact with domestic sheep and goats. These data are critical to developing effective management strategies to combat risk and improve herd performance following infection. Alberta is one of the few jurisdictions with low risk (as well as moderate to high risk) wild sheep herds.

Alberta first began active disease testing for *M. ovi* and *Pasteurella* in 2017. Prior to that date, sampling occurred only opportunistically when sick or found dead animals were reported.

This report summarizes the results of the active disease testing from 2017-2020 in Alberta. It also provides an overview of proposed next steps.

Methods and Results

AEP biologists have collected swabs from harvested bighorn rams from 2017-2020 as part of the compulsory registration process. In addition, researchers in the Ram Mountain, Sheep River and Highway 3 areas have swabbed live sheep during all or part of this time period. Due to the difficulty of collecting “clean” tonsil swabs from shot and live animals, the majority of sampling has been nasal swabbing.

Table 1 shows the total number of bighorn sheep sampled in the past 4 years for each Sheep Management Area. The majority of samples have been collected in the southern part of the province (SMAs 1-3) where risk of contact with domestic sheep and goats is highest. Overall, about 294 sheep have been tested.

Table 1: Total number of bighorn sheep swabbed from 2017-2020 in each Sheep Management Area. Note- the number of samples may vary slightly by Sheep Management Area in cases where a WMU was split into A and B components and encompassed more than 1 Sheep Management Area (e.g. 410 A and B). The exact location was unknown in some cases.

		Total Number of Sheep Sampled			
Sheep Management Area	WMUs	2017	2018	2019	2020
1 - West Castle-Yarrow	302, 303, 400	5	9	3	2
2 - Livingstone	306, 308, 402	6	4	1	1
3 - Kananskis	404, 406, 408, 410B	34	43	46	10
4A - Bow Valley - Ghost	410A, 412, 414	5	5	7	1
4B - Clearwater - Ram	326, 416, 417, 418, 420, 422, 426A, 428, 430A	4	13	10	17
4C - Nordegg - Chungo	426B, 430B, 432, 434	6	8	4	1
5 - Ram - Shunda	328, 429	27	0	0	0
6 - Cadomin	436, 437, 438	0	2	1	4
7 - Wilmore	439, 440, 441, 442B, 444B	0	1	2	11
8 - Torrens	442A, 444A, 445, 446	0	0	0	1
		87	**85**	**74**	**48**

Table 2 shows the number of sheep tested that were killed by hunters or other means, versus live research animals. A large number of samples (20+) were collected from live animals at Sheep River from 2017-19.

Table 2: Source of sheep sampled

	2017	2018	2019	2020
Hunter Harvested	31	61	38	46
Research (live sheep)	50	24	30	0
Other (e.g. road kill)	6	0	6	2

All the 2017-2020 samples tested to date have been negative. We are still awaiting test results from 16 of the samples collected in 2019 and most of the 2020 samples.

Next Steps

This project is part of a large collaborative initiative with other North American jurisdictions with wild sheep to improve our understanding of disease transmission and management options to mitigate risk.

The initial focus of this project was in southern Alberta where the risk of contact with domestic sheep and goats is especially high. The project has expanded in scope to central and northern Alberta where risk has been increasing over time due to interest in using domestics for vegetation management and weed control, and pack goats in the backcountry. The data collected through this project provides important baseline data of *M. ovi* prevalence in bighorn sheep in the province.

Data collection will continue in 2021. We need more samples from bighorn sheep in northern areas to reach the required number of samples for detection at 1% prevalence (agency standard for disease free certification). In addition, other than at Sheep River (and Ram Mountain in 2017), the majority of samples to date are from hunter-killed rams. It is important to collect more samples from ewes and lambs in the different sheep management areas, given that these individuals generally have a higher likelihood of being carriers or infected by *M. ovi* than rams. Samples from non-trophy sheep would help partially address this issue.

This year, we are also interested in collecting nasal swabs from domestic sheep and goats in high-risk areas (e.g. within 50km of bighorn sheep range). Interested domestic sheep and goat owners and operators should contact the AEP provincial disease specialist or local wildlife biologist for more information (toll free 310-0000).

Nasal swabbing a hunter-killed ram. Photo credit G. Chapman.

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