Sheep and Goat Control Order Impact Assessment

Synthesis Report

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A. Introduction

Outbreaks of pneumonia in bighorn sheep in North America have been linked to contact with domestic sheep and goats. Transmission of pneumonia between domestic sheep and goats and wild sheep and goats has been known to occur through the bacteria *Mycoplasma ovipneumoniae*.
On 1 January 2020, the Yukon Government issued Control Order 2018-001 under the *Animal Health Act* to reduce the risk that wild thinhorn sheep and mountain goats will be exposed to *Mycoplasma ovipneumoniae*.

The intention of the order is to mitigate the risk of respiratory pathogen transmission from domestic small ruminants to wildlife in the Yukon through dual requirements for pathogen testing and double fencing. All sheep and goat owners are also obligated by the *Animal Health Act* to advise the Animal Health Unit at Yukon Environment of any changes in animal ownership, including imports of sheep and goats. The Agriculture Branch at Yukon Energy, Mines and Resources has assisted with specific aspects of control order implementation, including the administration of funding for fencing.

Control Order 2018-001 will expire on 31 December 2024. An assessment is required to document the level of compliance with the control order and to understand the impacts of the control order on owners of domestic sheep and goats in the Yukon. The findings of the impact assessment will also help inform the next steps to be taken in advance of the expiry of Control Order 2018-001.

Both quantitative and qualitative data were collected and analysed to undertake the sheep and goat control order impact assessment. The data sources included:

- administrative and program documents including Control Order 2018-001, *Sheep and Goat Control Order Findings Reports* (various years) and the Yukon Livestock Guide for Sheep and Goats.
- *Control Order Database* (inception to 31 March 2024);
- *Testing Database* (inception to 31 March 2024);
- semi-structured phone interviews with key informants:
    - program staff (n=5),
    - industry representatives (n=3); and,
    - sheep and goat producers (n=11).
- a web-based survey of sheep and goat producers (19 completed surveys); and,
- a written submission from Growers of Organic Food Yukon.

This report is comprised of three sections. The first section outlines the results of the compliance criteria analysis. The second section presents the findings of the impact assessment for the control order. The report concludes in the third section with suggestions to improve a future control order.

B. Compliance Criteria Analysis

The sheep and goat control order contains seven compliance criteria, four of which relate to farm operations and three of which relate to activities to be undertaken by sheep and goat owners. Under Control Order 2018-001, the compliance criteria are specified as follows:

Sheep and goats must:

- be kept in an approved enclosure;
- have permanent identification (e.g., ear tag, microchip, tattoo);
- be kept below 1,000 meters elevation; and,
- be negative when tested for the pathogens of concern including *Mycoplasma ovipneumoniae.*

All owners of sheep and goats must:

- keep records for every individual sheep and goat;
- report the escape of any sheep or goats from their enclosure, or while being transported; and,
- apply for and obtain a permit to import sheep or goats into the Yukon.

Approved Enclosure

On the basis of information provided by the Animal Health Unit, all known domestic sheep and goats in the Yukon are currently kept in approved (i.e., double-fenced) enclosures. The existence and state of enclosures is verified through inspections of enclosures undertaken by Animal Health Unit staff at the time of annual or bi-annual testing sheep and goats for pathogens of concern. As testing may be done only every one to two years, it is not possible to know if fences are fully functional at all times.

Permanent Identification

On the basis of information provided by the Animal Health Unit, all domestic sheep and goats that are known to exist in the Yukon have the required permanent identification (i.e., ear tag, microchip or tattoo). The placement of appropriate permanent identification is verified at the time of testing sheep and goats for pathogens of concern. If an animal does not have permanent identification, a tag or microchip is placed at that time.

Elevation Less Than 1,000 Metres

On the basis of information provided by the Animal Health Unit, no farms in the Yukon are known to exist at more than 1,000 metres in elevation. When a new sheep or goat owner is identified, location information for their farm is collected and checked for compliance with the elevation requirement. In addition, the Yukon Government is not known to have issued tenure (by sale or lease) for any agriculture land parcels at elevations over 1,000 metres. Note that sheep and goats may be kept on properties not zoned for agriculture.

Testing for Pathogens of Concern

On the basis of data from the *Testing Database*, the table below page summarizes testing activities for pathogens of concern, including *Mycoplasma ovipneumoniae*. The tests were carried out over the calendar years 2019 to 2024 (to 31 March) and are presented in the table according to the year of the sample collection date. The figures presented in the table include only tests conducted in the Yukon; pre-import tests conducted outside of the Yukon are excluded.

Sheep and Goat Testing Summary

Calendar Years 2019 to 2024 (to 31 March).
Note: pre-import tests are not included.
Source: Yukon Environment.

		Tests Performed	Negative Results	Suspected Results	Positive Results
Sheep	2019	664	525	14	125
	2020	304	304	0	0
	2021	145	108	2	35
	2022	77	77	0	0
	2023	63	63	0	0
	Total	**1,253**	**1,077**	**16**	**160**
Goats	2019	542	516	4	22
	2020	274	248	6	20
	2021	218	187	1	30
	2022	116	116	0	0
	2023	132	127	0	5
	Total	**1,282**	**1,194**	**11**	**77**
Total		**2,535**	**2,271**	**27**	**237**

As shown in the table, a total of 2,535 tests were performed, with 1,253 tests on sheep and 1,282 tests on goats. In total, 237 positive results were collected with 160 positive results for sheep and 77 positive results for goats. As a positive test result requires an animal be culled or removed from the Yukon, the number of positive test results is a reliable proxy for the number of sheep and goats slaughtered or removed from the Yukon as a result of the sheep and goat control order. The testing database lists a single instance of non-compliance with the testing requirement.

As the same animal is required to be tested for pathogens of concern at least three times, the *Testing Database*, which lists the number of tests per farm visit rather the number of animals tested per farm, cannot be used as a census of sheep and goats in the Yukon. As a result, it has not been possible to calculate the proportion of sheep and goats culled as a result of Control Order 2018-001, relative to the overall sheep and goat population in the Yukon. In the absence of a sheep and goat census, it has also not been possible to distinguish between hobby and commercial farm operations in the Yukon on the basis of farm size.

Record Keeping by Producers

Section 10 of Control Order 2018-001 states that *a person who possesses a domestic sheep or a domestic goat must maintain records of it, including documentation of its date of birth, sale, purchase, natural death, or slaughter.* As the control order fully delegates responsibility for record keeping to producers, neither the Animal Health Unit or the Agriculture Branch have a checklist or database for producer compliance with Control Order 2018-001 record keeping.

A semi-structured interview and web survey question directed to producers asked "in what ways have the compliance requirements for *animal owners* – such as record keeping [...] – affected the operation of your farm over the last four years?" Responses received in the interviews and the web survey suggest two categories of record keeping activity is ongoing. Some producers indicated either that record keeping was already being done prior to the control order (e.g., for breeding purposes) or was readily incorporated into record keeping practices for other aspects of farm operations. In contrast, other producers indicated that the record keeping requirements are adding to an already overwhelming paper burden and/or are unnecessarily intrusive.

Escape Reports

A single report of an animal escape was received by Yukon Environment since the sheep and goat control order was imposed in early 2020.

Import Permits and Testing

On the basis of the *Sheep and Goat Control Order Findings Reports* issued by Yukon Environment, a total of 18 sheep and goat import permits have been issued by the Animal Health Unit since the sheep and goat control order was imposed in early 2020. One instance of sheep being imported without a permit was noted by Yukon Environment, with the farmer involved described as being unaware of the requirement to obtain an import permit. The animals were brought onto the Yukon with the intent to immediately slaughter and so were quarantined for two weeks and then slaughtered.

Testing Database records include a flag which indicates whether tests for pathogens of concern were conducted on animals before being imported into the Yukon. The pre-import test provision allowed producers to avoid importing animals into the Yukon only to have to slaughter them upon receiving a positive test result. As shown in the table, a total of 96 pre-import tests were performed (4 sheep and 92 goats), with a total of 37 positive results (no sheep and 37 goats). Note: no tests were performed in years absent from the table.

Sheep and Goat Pre-Import Testing
Calendar Years 2019 to 2024 (to 31 March).
Source: Yukon Environment.

		Tests Performed	Positive Results
Sheep	2019	3	0
	2021	1	0
	Total	**4**	**0**
Goats	2020	5	3
	2021	35	2
	2022	20	1
	2024	32	31
	Total	**92**	**37**
Total		**96**	**37**

In conclusion, full compliance with each of the seven elements of Control Order 2018-001 has been demonstrated, with one exception. The one exception involves record keeping for sheep and goats (birth dates, sales, purchases, natural deaths and slaughter), for which responsibility has been delegated to producers. In the absence of data tracking mechanism for compliance, a definitive finding for record keeping compliance cannot be made.

C. Impact Assessment

This section of the report assesses the impacts of Control Order 2018-001 on the Yukon's sheep and goat producers from the introduction of Control Order 2018-001 to March 2024. The assessment is based on both quantitative data provided by the Animal Health Unit and qualitative data collected for the impact assessment, as listed on page one of this report.

Sheep and Goat Population Health

As noted earlier in this report, a periodic census of Yukon sheep and goat populations does not exist. In consequence, it has not been possible to establish how the overall populations of domestic sheep and goats have changed since the control order was introduced in early 2020. On the basis of the *Testing Database*, it is known, however, that an estimated 160 sheep and 114 goats were slaughtered or removed from the territory after positive results for pathogens of concern tests were received. Many interview and web survey respondents indicated a perception that populations of domestic sheep and goat have declined in the Yukon since the control order was introduced. The perceived declines in sheep and goat populations were taken by some interview and web survey respondents to mean a corresponding decline in overall population health.

Prior to the introduction of the control order, Yukon Government staff knew very little about domestic sheep and goat populations in the Yukon, as the control order was the first attempt to regulate Yukon's domestic sheep and goats. Implementation of the control order has established a baseline of knowledge about the overall state, size and distribution of the sheep and goat industry in the Yukon. Yukon sheep and goat owners had increased contact with veterinary care providers, providing new opportunities to ask about animal care (e.g., preventative care, livestock health, nutrition) and learn about the services available from the Animal Health Unit and the Agriculture Branch.

As noted earlier, Yukon sheep and goat farmers can arrange pre-import tests for *Mycoplasma ovipneumoniae* in southern Canada to avoid importing animals into the Yukon which need to be slaughtered upon testing positive. However, no Canadian jurisdictions outside of the Yukon have implemented a *Mycoplasma ovipneumoniae* requirement for sheep and goats. In consequence, several farmers reported encountering difficulty in aligning sources of new sheep and goats with awareness or ability to test for *Mycoplasma ovipneumoniae*. Challenges in importing *Mycoplasma ovipneumoniae*-free animals were in turn reported to have created a deterrent to importing new sheep and goat bloodlines. The recycling of bloodlines within the Yukon was noted to now be resulting in inbreeding among Yukon

sheep and goats, with concomitant health concerns and higher veterinary bills as some animals are being "kept on the farm too long".

The requirement for double fencing was cited as leading to pastures and paddocks being built as small as possible, especially in more recent years when smaller funding grants have been available for constructing double fences. Smaller pastures and paddocks are seen to be resulting in negative health impacts associated with overcrowding, parasite exchange, monodiets, fighting and general animal stress. A respondent described the effects of the control order on animal health this way:

> *"M. Ovi does not negatively affect the domestic goats health. However, not being able to free range does negatively affect the goats health. Also, it is harder to bring in a male goat for breeding, so genetics are getting in-bred."*

Farm Economics

To encourage compliance with the sheep and goat control order, Yukon Environment provided financial resources to Yukon Sheep and Goat producers in the form of:

- compensation (as prescribed in the Yukon's *Animal Health Act*) for sheep and goats slaughtered as a result of a positive *Mycoplasma ovipneumoniae* test;
- funding approved for the construction of double fences;
- funding paid for the voluntary depopulation of animals prior to *Mycoplasma ovipneumoniae* testing to become compliant with the control order; and,
- other funding paid to producers to cover, for example, time to muster animals for testing, time to slaughter animals if done by the producer and abattoir fees.

Financial Resources Available to Producers ($)

Source: Yukon Environment.

File Year	Number of Farms	Compensation paid for animals	Funding for fencing	Funding for depopulation	Funding - other	Total compensation and funding
2019	48	229,785	214,307	31,100	26,922	502,114
2020	9	12,000			375	12,375
2021	6					0
2022	8					0
2023	2					0
2024	1					0
Total	**74**	**241,785**	**214,307**	**31,100**	**27,297**	**514,489**

The table above presents the financial resources made available to Yukon sheep and goat farmers in advance of, and after imposition of, the control order. In the table, the first column (File Year) refers to the calendar year of first contact with a sheep or goat owner by Animal Health Unit staff for purposes of implementation of the control order. The second column (Number of Farms) indicates how many farms were newly entered in the *Control Order* database in a given calendar year. A total

of 74 sheep and goat farms are listed in the *Control Order* database. Table cells with blanks or zeroes indicate that no financial resources were received by a producer in a given time period or a given compensation category. As shown in the table, a total of $514,489 in financial resources were made available to Yukon sheep and goat producers over the file years 2019 to 2024.

A total of 16 Yukon farms received compensation for having to slaughter or remove from the Yukon animals that tested positive for *Mycoplasma ovipneumoniae*, with per farm payouts ranging from a low of $825 to a high of $133,000. Excluding the lowest and highest compensation payment values results in an average per farm animal compensation payout of $7,650. Note that producers could retain and sell products from slaughtered sheep and goats such as meat.

A total of 34 Yukon farms were approved for funding for double fence construction, with per farm approval amounts ranging from a low of $741 to a high of $26,792. A total of $214,307 in fencing funding was approved, with an average per farm approval amount of $6,303. Funding paid for voluntary depopulation and 'other' totaled $31,100 and $27,297, respectively.

The table to the right presents the value of compensation and funding made available by the Animal Health Unit and the Agriculture Branch by area, in the file years 2019 and 2020. As shown in the table, out of the $514,489 in total compensation and funding, 82% ($420,825) was directed to Whitehorse area sheep and goat producers. A total of $60,812 (12%) in compensation and funding was made available to Dawson City area producers. The remaining 6% was made available to producers in the areas of: Haines Junction, Carcross, Braeburn and Tagish area. No financial resources were received by Mayo area or Watson Lake area producers.

Compensation and Funding by Area
Source: Yukon Environment.

	Total compensation and funding	Share (%)
Whitehorse area	420,825	82%
Dawson City area	60,812	12%
Other Yukon areas	32,852	6%
Total	514,489	100%

Interview and web survey participants were asked how the control order has changed the economics of their sheep and goat farm operation in the Yukon. Many respondents indicated that the control order has had little effect on farm economics due to the small size of their farm operation, having all of their sheep or goats test negative for *Mycoplasma ovipneumoniae* or being able to screen for *Mycoplasma ovipneumoniae*-positive animals with pre-import testing. In contrast, some respondents indicated being significantly negatively affected by the control order.

Interview and web survey participants described the negative impacts of the control order on farm economics in a variety of ways. Respondents who indicated shutting down farm operations stated:

> *"I have moved my animals to [outside of the Yukon], …so no farm operation for me in the Yukon now."*

> *"We actually left the Yukon with our animals as we could no longer sustain a living there after our male goats were ordered culled."*

Other respondents spoke to facing higher costs in the form of:

- bought feed costs, as animals can no longer forage over a wide-ranging area;
- maintenance costs for double-fencing; and,
- time costs related to finding animals in the south on farms set up for pre-import testing.

In terms of bought feed costs, one respondent described the situation this way:

> *"The government needs to do a true economic analysis of food consumption and recognize what it costs to raise those sheep and lamb. There's no market in it. You can get New Zealand lamb way cheaper than you can get local lamb. It's not viable. There are people still advocating to have sheep and goats but if they knew what it costs, they might not want to."*

And some respondents wondered about the fate of the Yukon's sheep and goat industry under the current, or a future, control order:

> *"The regulation had no response to food security, sustainability and local food sources. Skipped that completely."*

> *"Due to this order, I will not be getting any more sheep or goats as was my long-term plan."*

> *"We're refraining from investing. So much restriction and uncertainty. If any number of our herd test positive this year, we're going to ask the government to take all of them. And call it quits. They make it too hard."*

Culling and Removal Impact Distribution

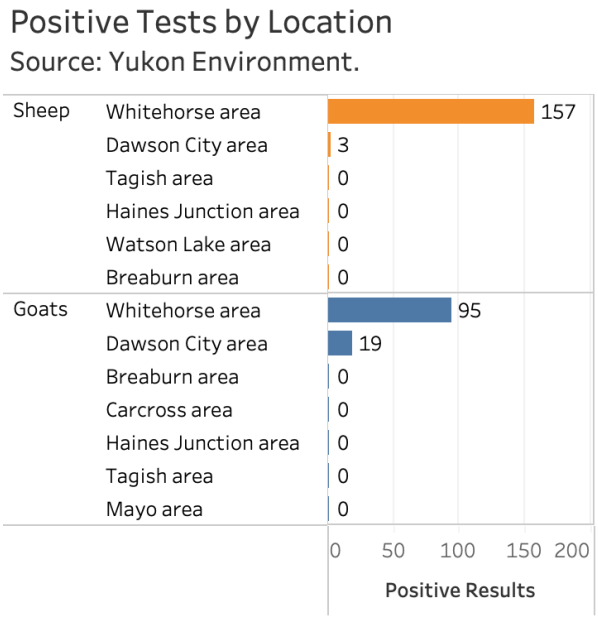
The distribution of culling and removal impacts is a key consideration in understanding how Yukon farmers have been affected by the sheep and goat control order. Culling and removal impact distribution is considered below through three lenses: animal type, concentration among producers and geography.

In terms of the distribution of culling and removal impacts between sheep and goat producers, Yukon sheep producers were relatively more affected that goat producers. Using the number of positive test results for animals tested in the Yukon as a proxy for the number of animals slaughtered or removed, a total of 237 sheep and goats were culled or removed in compliance with the control order. Out of the total of 237 animals culled or removed since the control order was introduced, 68% (160) were sheep and 32% (77) were goats.

Looking at the distribution of culling and removal impacts according to how many sheep and goat farmers were affected by the requirements for slaughter or removal relative to the total number of each type of farmer presents a different perspective. For sheep, analysis of data in the *Testing Database* (excluding pre-import tests) indicates that *Mycoplasma ovipneumoniae* tests were performed on sheep on a total of 23 Yukon farms. Positive test results for sheep were found on four of the 23 farms where testing took place, which means that the impact of sheep culling or removal

was experienced on less that one fifth (17%) of Yukon sheep farms. For goats, analysis of data in the *Testing Database* (excluding pre-import tests) indicates that *Mycoplasma ovipneumoniae* tests were performed on goats on a total of 48 Yukon farms. Positive test results for goats were found on 11 of the 48 farms where testing took place, which means that the impact of goat culling and removal was experienced on almost one quarter (23%) of Yukon goat farms.

The chart to the right illustrates the geographic distribution of positive *Mycoplasma ovipneumoniae* tests and associated culling and removal of sheep and goats. As can be seen from the chart, the control order culling and removal impacts for sheep were almost entirely experienced by farmers located in the Whitehorse area, where 98% (157) of positive test results were received. Dawson City area famers received the remaining 2% (3) of positive test results for sheep. No culling or removal of sheep was required in the areas of Tagish, Haines Junction, Watson Lake or Braeburn. The culling and removal impacts of the control order for goats were mostly experienced by farmers located in the Whitehorse area, where 83% (95) of positive test results were received. Dawson City area famers received the remaining 17% (19) of positive test results for goats. No culling or removal of goats was required in the areas of Braeburn, Carcross, Haines Junction, Tagish or Mayo.



Interview and web survey participants were asked whether they would say the control order has improved markets in the Yukon for sheep and goat products such as meat, wool and milk. As outlined earlier in this report, breeding of sheep and goats within the Yukon has become more challenging over the course of the control order as it has become more difficult to import new breeding stock. The resulting constraint on herd building capacity was noted by some respondents to be limiting options for enhancing existing markets for products such as meat, wool and milk.

As described earlier, it has not been possible to establish whether the overall population of domestic sheep and goats in the Yukon has changed since the introduction of the control order. A decrease in overall populations, however, as perceived by many interview respondents, would suggest that control order has not resulted in improved markets for sheep and goat products simply on the basis of there being fewer animals in the territory producing meat, wool and milk.

Some respondents indicated that an expanded market for halal goat meat is developing in the Yukon. The market expansion involves the importing of young goats and slaughtering them within

the three-month quarantine window that is open between the import date and the requirement to slaughter in response to a positive test under the control order.

Interview and web survey participants were also asked whether the control order has resulted in new economic opportunities on farms across the Yukon. In general, respondents suggested that the control order has not resulted in new economic opportunities. Some respondents noted that the control order has had the effect of scaring off new investment in the industry as the control order has introduced the possibility of a whole herd being wiped out on the basis of a single test on an asymptotic animal. Other respondents spoke to the broader and negative impacts on investment in the Yukon's overall agriculture industry, stating that some producers have been left wondering which animals (e.g., chickens, pigs) will be next, and negatively, affected by new regulations.

Farm Logistics and Operations

Interview and web survey participants were asked about the implications of the control order in terms of logistics and farm operations. Changes to farm logistics and operations in response to the control order noted by respondents included:

- feed transport: on farms where sheep and goats previously foraged for food, new efforts and costs were experienced to purchase, transport and distribute feed.
- pen management: on farms where sheep and goats were previously free-ranged, having animals confined in a double-fenced area has resulted in more effort to manage and compost animal waste;
- depopulation logistics: arranging for animal transport to an approved slaughter facility or on-farm visits by a veterinarian;
- breeding options: as a result of the shrinking gene pool for sheep and goats within the Yukon, more time and effort are now required to find breeding mates; and,
- double-gating: where farm properties have been entirely double-fenced, double-gate systems have made coming and going to and from the farm tedious.

The implications of the import requirements in the control order were summed up by a respondent this way:

> *"Import permits have made it extremely difficult to get new goats up to the Yukon as farms outside the Yukon are reluctant to pre-test animals, as it is not necessary anywhere else in Canada. Farms are more likely to sell their goats to other buyers than have to deal with the additional paperwork and testing needed."*

Another respondent described their situation as follows:

> *"A lot of extra costs to manage. Once we slaughter these sheep, we're completely out."*

Compliance Requirements for Animals

Interview and web survey participants were also asked about whether the control order compliance requirements for animals – such as fenced enclosures, animal identification and animal testing – have affected farm operations over the last four years. Many respondents indicated that the new compliance requirements made little difference for them, as they had already been operating their farm in alignment, or near-alignment, with the control order requirements prior to the introduction of the order. Others commented that the introduction of the control order has been a welcome advance in the professionalization of Yukon farm operations, with one respondent stating that:

> *"The control order, overall, was probably good for us. It forced us to have a better fencing system in place which protected our animals from predators. It was also nice to have access to a vet that would visit the property from time to time."*

Two implications of the control order's fencing requirements were again mentioned by interview respondents. First, the requirement that food must now be brought to the animals – instead of sending animals out to forage for feed – was noted to have increased farm operating expenses. Second, the forcing of sheep and goats into smaller containment areas was noted to be bad for herd health in terms of overcrowding and parasite transmission.

Other respondents spoke to negative consequences of combining two conceptually different control measures into a single control order – *Mycoplasma ovipneumoniae* testing and double fencing. As described by some respondents, testing for *Mycoplasma ovipneumoniae* was not seen to be completely reliable at the time of control order drafting due to the possibility of false negative results. A second control measure, double fencing, was also included to limit the possibility of nose-to-nose contact between domestic sheep and goats and wild sheep without knowing whether double fencing is completely effective as a control measure.

The implementation of both *Mycoplasma ovipneumoniae* testing and double fencing was seen by some respondents to be a significant waste of taxpayer resources and farmers time, noting that "there is no reason to double fence animals that have tested negative for *Mycoplasma ovipneumoniae*." Other respondents stated that traditional methods of ensuring the wellbeing of domestic sheep and goat populations, namely human shepherds and livestock guardian dogs, were excluded from consideration of how avoid contact between domestic and wild animals.

Control Order 2018-001 applies to all of the Yukon's 482,443 square kilometres. The risk of contact between domestic and wild sheep and goats is assumed to be equal within every square kilometre of the Yukon. Thus, the control order does not consider the likelihood of both domestic and wild sheep and goats may never reasonably occupy the same land area. As such, the control order was seen by some interview and web survey respondents as needlessly excessive approach to the regulation of domestic sheep and goats as it does not consider transmission risk at the farm level.

Effects on Yukon Sheep and Goat Producers

As described earlier in this report, relatively few sheep and goat producers were directly affected by the culling requirements of the sheep and goat control order. It is clear from the semi-structured and web survey responses, however, that for the farmers directly affected, they experienced a profound sense of loss, as illustrated by this response:

> *"Still not over having to remove our animals. All of our animals were well taken care of and cared for as though they wouldn't be destroyed."*

The sense of loss was also expressed in in terms of livelihood loss and implications for future livelihoods. Some respondents viewed the actions of the Yukon Government to be heavy-handed and unnecessary, which in turn has led to a loss of trust in Yukon Environment, specifically, and the Yukon Government, in general. For individuals who considered their sheep or goats to be more like pets than 'a means of production', the sense of loss was expressed in terms of confusion and frustration. The potential loss of opportunity to raise children on farms with sheep and goats was also shared:

> *"I got out completely. Which means my kids missed out on opportunities to raise these animals and friends and neighbors didn't get any exposure. Just go to the store and buy from the meat rack, who needs any connection to their food?"*

Several interview and web survey respondents questioned the quality of the science backing the need for a control order, pointing out that while a clear link has been drawn between *Mycoplasma ovipneumoniae* and *bighorn* sheep, the link has not been conclusively extended to *Mycoplasma ovipneumoniae* and *thinhorn* sheep. Some respondents wondered whether *Mycoplasma ovipneumoniae* is already present in wild populations of caribou and bison and why it's necessary to regulate only sheep and goats. Some respondents also questioned the efficacy of the *Mycoplasma ovipneumoniae* test, suggesting that the current test may not always be able to distinguish between different strains of *Mycoplasma* bacteria, including conjunctivitis.

Several interview and web survey respondents wondered aloud about the political motivations behind Control Order 2018-001. The efforts of the Wild Sheep Foundation to lobby the Yukon Government to impose legislated "no contact" measures between domestic and wild sheep are readily available on the public record, as is the acceptance of a leadership award from the Wild Sheep Foundation by Yukon Government staff. Some respondents expressed discomfort at being caught in the middle of friction between the Yukon agriculture industry and the Yukon's outfitting industry, when all involved have the continued good health of both domestic and wild sheep and goat populations top of mind. A respondent phrased the discomfort this way:

> *"One thing I didn't appreciate was the animosity between farmers and outfitters that developed because of the way this rolled out."*

D. Improvements for a Future Control Order

Interview and web survey participants were also asked to consider how implementation of the control order could be improved if re-issued after expiry at the end of 2024. Responses to this question were quite mixed, ranging from a sentiment that the control order should not be re-implemented so that the industry can rebuild, to a sentiment that the order should simply be re-implemented as currently formulated. Within that range, many responses outlining constructive changes to the control order were received, with the responses falling into five general categories, with each described below.

A\ *Focus control order measures according to actual risk of pathogen transmission*: instead of using a blanket approach that covers all of the Yukon's land area, implement a risk-based adaptive management approach that considers the geographic location of domestic sheep and goats relative to wild sheep and goat populations. Testing requirements for sheep and goats not in proximity to wild populations can be modified according to the mapped geographic risk. Other contact measures such as human shepherds and livestock guardian dogs could be recognized as suitable control measures. Manage risk at the farm level by, for example, allowing the use of single fencing in low-risk areas.

B\ *Import measures:* to support industry growth and the development of new markets for sheep and goat products, the Animal Health Unit and the Agriculture Branch can assist Yukon sheep and goat farmers with the importation of sheep and goats by:

- creating and maintaining a roster of farms in southern Canada that can pre-test for pathogens of concern;
- building and operating a quarantine facility for farmers who are unable to arrange pre-testing for specific breeds (e.g., purebred meat or milk-bearing animals); and,
- introduce additional monetary incentives to encourage the importation of sheep and goats.

C\ Assistance to re-establish diverse breeding bloodlines: to address the impacts of the control order on the now-narrowed breeding bloodlines of domestic sheep and goats in the Yukon, introduce funding assistance for a) the importation of new sheep and goat genetic lines and b) artificial insemination. Design a measure, which could include a means of transport, to increase mobility of domestic sheep and goats between Yukon farms deemed clear of pathogens of concern.

D\ Food security and industry development: investigate and communicate how expanded sheep and goat production can contribute to food security in the Yukon. Create and staff an agricultural extension worker position that can liaise between with Yukon sheep and goat farmers in an informative and supportive manner that ensures both domestic and wild sheep and goats continue to be protected, with less emphasis on the enforcement aspects of a control order. In addition, publicly acknowledge how a single positive *Mycoplasma ovipneumoniae* test can have lottery-like implications for Yukon farmers and serves to dampen overall industry investment interest.

E\ Refresh and communicate the scientific basis for a subsequent control order: to regain trust within the industry, document what has been learned about *Mycoplasma ovipneumoniae* transmission by Yukon Government staff over the last five years. Integrate that local Yukon knowledge with what scientists and veterinarians across North America have come to understand over the last 10 years (including scientists with dissenting views) and including whether or not *Mycoplasma ovipneumoniae* bacteria already exist in caribou and bison. Publish the integrated learnings and communicate to all constituents of the Yukon sheep and goat community.