

Secure Goat, Milk & Mohair Supply Plan (SGMMS) for Continuity of Business



SGMMS
SECURE GOAT, MILK
& MOHAIR SUPPLY
<https://securegoat.org>

MOHAIR & CASHMERE Section

Introduction

Foot and Mouth disease (FMD) is a highly contagious foreign animal disease that affects goats as well as other cloven-hooved animals, including cattle, sheep, deer and swine. FMD is not considered to be a zoonotic disease (a disease that can cause infection in humans) and is not a public health or food safety concern. FMD was eradicated in the United States in 1929, but this animal disease is still present in many other countries and continues to pose a serious threat to U.S. producers. Because it causes major animal production losses, State and Federal officials have worked collaboratively with goat and other animal disease experts to develop response plans should FMD virus infect susceptible animals in the U.S. The Secure Goat, Milk & Mohair Supply Plan (SGMMS) provides **guidance** for goat owners and producers (hereinafter referred to as producers) on continuity of business (COB) in the event of a foreign animal disease incursion into the U.S.

The SGMMS Plan Mohair & Cashmere Goat Section (MCGS) provides **specific guidance** for the Fiber Goat Industry on COB in the event of an outbreak of FMD in the U.S. It includes all the applicable information found in the main SGMMS Plan Overview outlining effective response strategies for controlling and stopping the spread of FMD. Responsible Regulatory Officials (RROs), including local, State, tribal and Federal officials, as appropriate, as well as private veterinarians have the authority and responsibility to establish Regulatory Control Areas (Control Areas) around FMD infected premises. Response strategies to control and stop an outbreak include stopping movement of susceptible animals, germplasm¹, carcasses, certain products, rapid identification of infected animals, strategic depopulation with proper disposal, and vaccination. The RROs can also regulate animals, animal products, and other movements that pose a risk of virus spread into, within, and out of these Control Areas.

Purpose

The MCGS provides guidance for a workable COB plan that is credible to RROs for mohair and cashmere goat producers whose premises have **no evidence of FMD infection** in a Control Area to move goats and goat products to slaughter and/or processing facilities, to and from production phases and premises, and/or other off-site locations. RROs must balance the risks of allowing movement of goats or goat products against the negative repercussions of prohibiting movement. While producers are not required to have their own plan, if authorities identify an FMD or other highly contagious disease infection threat, having a plan in place will help them lessen the detrimental effects and continue their business as soon as practical. FMD is not a public health or food safety concern.

¹Germplasm is defined here as animal material (such as semen, ova, or embryos) that is collected and stored chiefly for future use in breeding, conservation, or research.

Participation in the SGMMS Plan and this Section is voluntary. However, in the event of an outbreak of FMD, having a plan in place prior to a disease outbreak will provide the best option to protect the producer's premises, goats and ability to conduct business. The intent of the SGMMS Plan is to enhance coordination and communication between all stakeholders, expedite a successful response and eventually enable the issuance of movement permits after the extent of the outbreak is determined. This will support COB for goat producers, transporters, packers, processors, and allied industries who choose to participate.

The SGMMS plan includes guidance for producers and officials when requesting or evaluating requests for animal and/or animal product movement permits. There may be additional requirements depending on the type or scope of the outbreak. If permits are required, following the guidance in this plan could enable movement of goats and goat products sooner.

Very little research has been done on mohair and cashmere fiber, particularly related to FMD carriage and transmission. As a result, this document relies heavily on data derived from wool research, which given the similarities among the products, provides the best estimate of what to expect in mohair.

The SGMMS Plan and all Sections are the result of a collaborative effort by goat industry stakeholders, State, Federal and academic representatives. The project is funded by a cooperative agreement between the American Goat Federation (AGF) and the United States Department of Agriculture, Animal and Plant Health Inspection Services, Veterinary Services (USDA/APHIS/VIS). While it helps the industry prepare for an outbreak, the plan is designed to provide guidance only. During an actual outbreak, decisions will be made by the RROs based on the unique characteristics of the outbreak.

Response Guidance Documents

There are several guidance documents for RROs to use in the event of an FMD Outbreak. The goals of the SGMMS Plan align with these guidance documents.

Strategic guidance for responding to FMD and other highly contagious animal disease outbreaks in the USA can be found in the following resources:

- *Animal Health Emergency Management:* <https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/emergency-management>
- *Foot-and-Mouth Disease Response Plan: The Red Book:* https://www.aphis.usda.gov/animal_health/emergency_management/downloads/fmd_responseplan.pdf
- *Ready Reference Guides, that offer quick summaries of the information for training and educational purposes:* https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/emergency-management/ct_fadprep_readyreferenceguides

Strategies for a managed response to an FMD outbreak will change as the disease outbreak progresses (phases) and will depend on the magnitude of the disease outbreak (type), location of the outbreak, availability of vaccine, and other characteristics. **Pre-defined phases and types of an FMD outbreak** that can be applied to any highly contagious animal disease are described in:

- *Classification of Phases and Types of a Foot-and-Mouth Disease Outbreak and Response:* https://www.aphis.usda.gov/animal_health/downloads/sacah/2016/fmd_phases&types.pdf

This document helps facilitate development of adaptable emergency response and COB for the U.S. livestock industry in the event of an FMD outbreak in North America.

Surveillance, epidemiology, and tracing techniques will be utilized by RROs during the outbreak to detect new cases, understand and adapt to the outbreak situation, and provide information for decision making and disease control procedures such as quarantine and movement controls. USDA has developed the following document to provide details on these efforts:

- *FAD PReP/National Animal Health Emergency Management System (NAHEMS) Guidelines: Surveillance, Epidemiology, and Tracing*: to provide details on these efforts: https://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/nahems_sur_epi_trac.pdf
- **Animal surveillance** methods to demonstrate a lack of evidence of FMD infection to allow animal and/or product movement to support COB without spreading infection are described at: <https://SecureGoat.org/producers/>. They include current limitations of testing individual goats to provide a high degree of confidence that herds are not infected. These limitations are likely to slow the ability to move goats in a Control Area at the beginning of an outbreak. It is not possible to prove that an animal is not infected with FMD. It is only possible to establish the lack of evidence of infection.

Quarantine and movement controls are critical activities to control FMD. These approaches include establishing a Control Area around each infected premises and issuing movement restrictions² for goats and other susceptible animals and their products in the Control Area. Due to the highly contagious nature of the FMD virus, these Control Areas will be at minimum 10 km (6.2 miles) beyond the perimeter of the infected premises. USDA has developed *FAD PReP/NAHEMS Guidelines: Quarantine and Movement Control* to describe details and application of these measures during an outbreak:

https://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/nahems_qmc.pdf

COB activities for premises with no evidence of infection in a Control Area aim to minimize disruptions to commerce caused by quarantine and movement restrictions and decrease the economic consequences of a highly contagious animal disease outbreak. The USDA *FAD PReP/NAHEMS Continuity of Business (COB) Guidelines* provide the basis for managed movement of animals with no evidence of infection and their products from within a Control Area in a highly contagious animal disease incident. This is an important component of business continuity.

https://www.aphis.usda.gov/animal_health/emergency_management/downloads/nahems_guidelines/fadprepnahemstacticaltopicscob.pdf

Emergency response management during an FMD outbreak involves considerable amounts of data, including investigation records, premises identification numbers, individual animal and herd-level laboratory test results, movement permits, and resource allocation information. Producers in a Control Area will be required to have a National Premises Identification Number (PIN) in order to request movement permits during an outbreak. **This number is different from the Scrapie Flock ID that goat producers are familiar with.** PINs are available from the producer's State Animal Health Official (SAHO):

<https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/traceability/state-pin>

² In this document the term "movement restrictions" will be used as a general term to encompass the language and implementation differences among federal movement recommendations and individual State.

States are encouraged to transfer their premises data into the USDA Emergency Management Response System (EMRS) prior to any outbreak. EMRS is the USDA/APHIS official system of record for all animal health incidents, and all data needed to request movement permits will need to be entered into EMRS. This greatly facilitates response efforts.

For more information, refer to:

- *USDA Premises Data Transfer to EMRS from External/State-Based Systems:*
https://www.aphis.usda.gov/animal_health/emergency_management/downloads/emrs_premises_data_transfer.pdf
- *Ready Reference Guide – Introduction to EMRS2:*
https://www.aphis.usda.gov/animal_health/emergency_management/downloads/emrs_rrg_introduction.pdf

Managed Movement of Goats and Fiber in an FMD Response

An effective strategy for managing outbreaks involves restricting movement of susceptible livestock, germplasm, and certain livestock products with a risk of spreading FMD such as mohair, cashmere, or wool into, within and out of a Control Area for a defined time period. Prolonged movement restrictions will negatively impact the livestock industry and animal welfare.

Goat operations **affected** by movement restrictions but **not infected with FMD** will need to restart movement as soon as possible to support business continuity in a way that is consistent with mitigating the risk of spreading FMD. Movement permits, if required, will be issued based on the risk posed by movement of the item and the goat operation's ability to meet permit requirements.

USDA recommends a 24 to 72-hour national movement standstill of susceptible species and germplasm when FMD is first confirmed in the U.S. A national movement standstill does not affect movement of milk or other products; premises may continue moving milk to processing. After this time period, the standstill may be lifted, extended, or modified (e.g., applied to a smaller geographical area or only certain animal production types). After the national movement standstill is lifted, national guidance for the resumption of movement of livestock and germplasm will be provided. All premises with susceptible animals should continue to implement enhanced biosecurity.

For more information, please see *Managed Movement of Susceptible Livestock Species in the U.S. during a Foot and Mouth Disease Outbreak, August 2019*:

- *Overview (two page):* <https://www.cfsph.iastate.edu/pdf-library/FMD-Resources/disease-fmd-sfs-managed-movement-overview.pdf>
- *Considerations for Regulatory Officials (six-pages):* <https://www.cfsph.iastate.edu/pdf-library/FMD-Resources/disease-fmd-sfs-managed-movement-regulatory-officials.pdf>

Goat premises in any FMD Control Area that are designated as **Infected, Suspect, or Contact Premises** will not be allowed to move goats or certain goat products until they no longer have this status.

1. **Infected Premises (IP):** Premises where a presumptive positive case or confirmed positive case exists based on laboratory results, compatible clinical signs, case definition, and international standards.
2. **Suspect Premises (SP):** Premises under investigation due to the presence of susceptible animals reported to have clinical signs compatible with the FAD. This is intended to be a short-term premises designation.

- 3. Contact Premises (CP):** Premises with susceptible animals that may have been exposed to the FAD, either directly or indirectly, including but not limited to exposure to animals, animal products, fomites, or people from Infected Premises.

Goat premises in any FMD Control Area that are NOT designated as **Infected, Suspect, or Contact Premises** will be able to request permits from RROs to move goats or goat products out of the Control Area if they meet specified criteria. Goat premises in an FMD Control Area must immediately increase biosecurity as recommended in this SGMMS Plan to best protect their goats from infection and their ability to conduct their business.

Mohair and Cashmere goat operations that follow the guidance in this SGMMS Plan will be better prepared to request a movement permit in the event permits are required by RROs. At the beginning of an FMD outbreak, several days or weeks may be needed before the livestock industry, Federal and State officials have sufficient knowledge of the extent of the outbreak. Still, maintaining livestock commerce will be critical to support COB of the agriculture sector. As such, premises not in Control Areas will be allowed to move susceptible animals and product after the national movement standstill is lifted, whereas premises in Control Areas will be required to obtain a permit for movement.

Fiber Movement at the Beginning of an FMD Outbreak

In the event of a Foot and Mouth Disease (FMD) outbreak, it is possible that infected goats could be shorn, and their mohair and cashmere stored before the goats are diagnosed with FMD, as has been demonstrated in wool.³ RROs have the authority and responsibility to establish Control Areas around FMD Infected Premises and to manage animal and animal products (such as mohair and cashmere) movement within, into, and out of the Control Area.

Mohair and cashmere from an infected herd, and perhaps all fiber from a Control Area will be considered contaminated with FMD virus. It must be assumed that, in some cases, fiber from infected yet undetected herds will enter the supply chain. Depending on environmental conditions, fiber harvested from FMD infected animals can likely harbor the virus for weeks.⁴ It is critical that any fiber harvested during, or just before, a US FMD outbreak be handled in a biosecure manner, so it does not contribute to disease spread.

This document provides guidance only. In an actual outbreak, decisions will be made by the Responsible Regulatory Officials (RRO's) based on the unique characteristics of the outbreak. The World Organization for Animal Health (OIE) describes procedures to inactivate FMD virus in wool and hair in *OIE Terrestrial Animal Health Code, Foot and Mouth Disease, Article 8.8.32*, available at:

https://www.oie.int/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/?id=169&L=1&htmfile=chapitre_fmd.htm

Mohair and cashmere handlers and processors rely on goat producers for their product, making them integral to business continuity. Goats may be infected with FMD virus but undetected due to a lack of clinical signs. It must be assumed that mohair and cashmere from infected and undetected herds could be moved to processing. Mohair and cashmere handlers, processors, and others who have contact with the raw

³ McColl K, Westbury H, Kitching, RP, Lewis VM. 1995. The persistence of foot-and-mouth disease virus on wool. Australian veterinary journal. 72:286-92. 10.1111/j.1751-0813.1995.tb03556.x.

⁴ USDA Foreign Animal Disease Preparedness and Response Plan. November 2018. Standard Operating Procedures: 15. Cleaning and Disinfection. www.aphis.usda.gov/animal_health/emergency_management/downloads/sop/sop_cd.pdf.

fiber must observe proper biosecurity protocols to avoid transmitting the FMD virus to susceptible animals. FMD is not a public health concern, but can be carried on clothing, footwear, and personal items. Mohair and cashmere handlers and processors must also be instructed on biosecurity steps to follow prior to leaving the processing facility.

FMD Virus Survivability in Mohair and Cashmere

Due to their similarity to wool, mohair and cashmere are considered highly biodegradable, in part, due to the structural protein/keratin which readily breaks down – especially in warm, humid, and aerobic conditions. However, clean, dry animal source fiber kept in anaerobic conditions is extremely durable and has been unearthed thousands of years later.⁵

FMD virus has greater stability at lower temperatures, in the presence of organic matter, and when protected from sunlight.⁶ Reported survival time on wool (the best proxy for mohair and cashmere) was approximately two months at 4°C [39.2°F] (with significantly decreased survival at 18°C [64°F]). FMD can be inactivated in acid conditions (below 6.0 pH) or alkaline conditions (above 9.0 pH).⁶

It is important to note there are no USDA approved tests for detection of FMD in mohair or cashmere.⁷

Inactivating FMD Virus in Mohair and Cashmere, and on Handling Equipment

Mohair and cashmere, and their handling equipment can spread FMD unless proper procedures are followed. The World Organization for Animal Health (OIE) sets the international sanitary standards for trade in animal products to avoid transmitting pathogens between countries.

Guidance is provided in the 2019 OIE Terrestrial Animal Health Code, Article 8.8.32: *Procedures for the inactivation of FMDv in wool and hair*.⁸ [Excerpt] “For the inactivation of FMD present in wool and hair for industrial use, one of the following procedures should be used:

1. industrial washing, which consists of the immersion of the wool in a series of baths of water, soap and sodium hydroxide (soda) or potassium hydroxide (potash);
2. chemical depilation by means of slaked lime or sodium sulphide;
3. fumigation with formaldehyde in a hermetically sealed chamber for at least 24 hours
4. industrial scouring which consists of the immersion of wool in a water-soluble detergent held at 60-70°C [140-158°F];
5. storage of wool at 4°C [39.2°F] for four months, 18°C [64.4°F] for four weeks, or 37°C [98.6°F] for eight days.”

Preparing Mohair and Cashmere for Storage to Inactivate FMD

Step 5. in the list above may be most applicable to goat operations in a Control Area who wish to request a movement permit to transport mohair or cashmere off-site for further processing. As previously stated, it is

⁵ Swan P. 2019. Wool is Biodegradable. International Wool Textile Organization (IWTO) Factsheets. https://iwto.org/wp-content/uploads/2020/04/IWTO_Wool-is-Biodegradable.pdf Accessed August 26, 2021.

⁶ Spickler, Anna Rovid. 2015. Foot and Mouth Disease. at: www.cfsph.iastate.edu/Factsheets/pdfs/foot_and_mouth_disease.pdf Accessed August 26, 2021.

⁷ Christine Loiacono, personal communication, August, 2021.

⁸ OIE Terrestrial Animal Health Code, 2021, Article 8.8.32, Foot and Mouth Disease, Procedures for the inactivation of FMDV in wool. at: https://www.oie.int/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/?id=169&L=1&htmfile=chapitre_fmd.htm/ Accessed August 26, 2021

possible that FMD infected goats could be shorn and their mohair or cashmere stored before the goats are diagnosed.

Proper handling of mohair and cashmere is necessary to ensure that FMD is eliminated and the mohair or cashmere does not become re-contaminated during handling. The equipment used to harvest mohair or cashmere and bale it must also be treated as potentially contaminated. Cleaning and disinfecting equipment is important to minimize minimize contamination, especially if the equipment is to be used on other premises.

The following steps are recommended to prepare mohair or cashmere for storage.

- Clean the mohair and equipment to remove gross contamination.
- Bale large amounts of mohair using impermeable (waterproof) plastic to package it.
 - Nylon packs or burlap bags are permeable and should be sealed on farm with a secondary plastic bale cover before storage or transfer.
 - If small amounts of mohair are being handled, impermeable plastic trash bags may be used.
- Remove any gross contamination from the outside of the bale/bag.
- Clean the outside of the bale/bag.
- Disinfect the outside of bale/bag and equipment using a product registered by the U.S. Environmental Protection Agency and labeled for FMD.
 - a) USDA guidance on FMD Disinfectants is available at:
https://www.aphis.usda.gov/animal_health/emergency_management/downloads/fmd-virus-disinfectants.pdf
- Bales/bags should be stored in a bio-secure area that has not been potentially exposed to FMD or has been properly cleaned and disinfected prior to use as storage.
- Bales/bags should be stored at a minimum of 4°C [39.2°F] for four months, 18°C [64.4°F] for four weeks, or 37°C [98.6°F] for eight days. FMD is temperature sensitive so it is important that these temperatures are met for that length of time. Bale/bag temperatures should be systematically monitored and recorded (e.g., dated logbook) to ensure that bales/bags have reached the required temperature for the recommended time, paying special attention to the bale/bag core.
 - Temperature should be measured and documented during the coldest parts of the day to ensure that the required target temperature is being maintained. It can always be “hotter”, but not colder (recall FMD survives better in cold, damp conditions). Each bale/bag should be stored so that air can circulate around it.
 - Regulatory officials may require documentation of time and temperature monitoring as confirmation of the process prior to issuance of a movement permit.
- Once the appropriate temperature has been reached throughout each bale/bag for the required time, bales/bags may be eligible for movement under a permit.

Traceability of Mohair Bales/Bags

Traceability of mohair bales/bags from infected farms or commingled mohair from multiple herds, one or more that may be infected, will be needed in an FMD outbreak. Every bale/bag within a shipment should be uniquely identified so that it can be traced back to the individual herd of origin.

Establishing a bale/bag identification system prior to an outbreak is recommended because it is possible that FMD-infected goats could be shorn and their mohair stored before the goats are diagnosed. Once the bale/bag is uniquely identified, the mohair should remain in the original bale/bag, as delivered, and without additional sorting and re-baling.

Accurate and complete record keeping is a critical part of traceability to manage an FMD outbreak. Corresponding records/ledgers should contain the bales/bag unique identifier, the premises identification number (PIN) from the herd of origin, the date of shearing, the dates of any movements of animals or mohair prior to harvest, storage or resale, and the names and contact information of the grower.

Movement of Mohair and Cashmere Recommendations

Mohair and Cashmere transport into, within or out of a Control Area will require a movement permit. Mohair that cannot be treated to standards established by the World Organization for Animal Health (OIE) should be destroyed on the premises.

All interstate movements must meet normal movement/state entry requirements in addition to these outbreak-specific conditions. Implementing the guidance outlined in the SGMMS Plan before an outbreak decreases the risk of disease spread and facilitates issuing movement permits for premises with no evidence of infection and allied industries.

Plan Movement Permit Guidance

- Mohair and cashmere originating from herds within a Control Area should be treated to OIE standards for inactivation of FMD before leaving the Control Area for further processing.
- Baled/bagged mohair should be transported in a clean vehicle/trailer that has not been potentially exposed to FMD and/or has been properly cleaned and disinfected prior to use for transport.

Refer to the SGMMS Plan for Continuity of Business for movement permit guidance:

<https://SecureGoat.org>.

Mohair Disposal Options

Burial

Burial is an inexpensive, bio-secure, and commonly accepted means of carcass and certain byproduct disposal (both on- and off-site); however, there are a number of variables such as soil type, water tables, and environmental regulations⁹ that must be addressed prior to use. In an FMD response, the Food and Agriculture Organization of the United Nations (FAO) and Australian Veterinary Emergency Plan recommend burial; citing the challenges and limitations associated with burning wool and unshorn carcasses^{10 11}, which would also apply to mohair and cashmere

⁹ USDA Foreign Animal Disease Preparedness and Response Plan. October 2020. Foot- and Mouth Disease Response Plan: The Red Book: www.aphis.usda.gov/animal_health/emergency_management/downloads/fmd_responseplan.pdf/ August 26, 2021.

¹⁰ Food and Agriculture Organization of the United Nations (FAO). 2001. Manual on Procedures for Disease Eradication by Stamping Out. Part 2: Disposal Procedures: <http://www.fao.org/3/y0660e/Y0660E.htm>/ August 26, 2021.

Composting

Depending on situational factors, composting is one of the disposal methods suggested by USDA/ APHIS in the event of an FMD outbreak.⁹ The FAO suggests composting “...*be done in secure area not accessible to susceptible animals.*”¹⁰ This may limit the feasibility of implementing on-site composting for some operations. It has been demonstrated that a composted combination of grass clippings, manure, and wool can create an acceptable grade fertilizer.¹² Because of their similarity to wool, it is likely that similar success can be achieved with mohair and cashmere. This may be feasible in farm herds with small volumes of mohair and cashmere but may be unrealistic for operations with stacks of mohair and cashmere bales. Furthermore, studies using swine and cattle carcasses have demonstrated that FMD can be inactivated in compost, provided adequate internal temperatures are reached.^{13, 14} It seems plausible that mohair infected with FMD would behave similarly due to the FMD virus’ susceptibility to high temperatures.

Burning/Incineration

Wool is naturally flame retardant and has a high Limiting Oxygen Index (LOI) which is a measure of the oxygen level needed to sustain combustion. Wool also has a very high ignition temperature (570-600°C [1058-1112°F]) and is self-extinguishing.¹⁵ Although similar fiber specific data has not been published for mohair, because of their similarity to wool these factors represent significant challenges to burning mohair or unshorn carcasses, as they tend to smolder for short periods of time only. Therefore, high-temperature incineration would likely be required. In some regions, there may be environmental restrictions limiting or prohibiting the use of burning/incineration of carcasses. Additionally, these methods may be deemed unacceptable by the public.

Emerging Technologies

New and emerging technologies such as “dissolving” wool into keratin nanomaterials using a “choline-chloride-urea solvent” which is then refined and freeze dried to form a protein powder that can be used in a variety of processes.^{16,17} The use of these procedures has not been described for mohair and FMD survivability during this process needs to be determined.

The hydrolysis of wool in superheated water can be carried out in different process conditions with different chemical agents. Boiling in alkali media represents the most common way to carry out a strong hydrolysis of keratin. There is an initiative in the European Union with the goal of converting wool wastes into fertilizer using this process.¹⁸ The high temperatures utilized in this process may present an alternative way to inactivate FMD in the future, pending validation for mohair and cashmere.

¹¹ Animal Health Australia. 2015. Operational manual: Disposal (Version 3.1). Australian Veterinary Emergency Plan (AUSVETPLAN), Edition 3, National Biosecurity Committee, Canberra, ACT.
<https://www.animalhealthaustralia.com.au/wp-content/uploads/2015/09/DISP-08-FINAL24Aug15.pdf/> August 26, 2021.

¹² Hustvedt G, Meier E, Waliczek T. 2016. The Feasibility of Large-Scale Composting of Wool. 10.1007/978-981-10-0111-6_4.

¹³ Guan J, Chan M, Grenier C, et al. Degradation of foot-and-mouth disease virus during composting of infected pig carcasses. *Can J Vet Res.* 2010;74(1):40–44.

¹⁴ Xu W, Reuter T, Inglis D, et al. Development of a composting system for emergency disposal of cattle carcasses and manure during an infectious disease outbreak. *J Environ Qual* 2009;38:437–450.

¹⁵ International Wool Textile Organization Wool and Fire. International Wool Textile Organization (IWTO) Factsheets: https://iwto.org/wp-content/uploads/2020/04/IWTO_Wool-Fire.pdf/ Accessed August 26, 2021

¹⁶ Flinders University. March 29, 2016. Recycling Waste Wool a Step Closer.
<https://phys.org/news/2016-03-recycling-wool-closer.html/> Accessed August 26, 2021.

Once the national movement standstill lifts, movement restrictions may remain for Control Area(s) to limit risk of disease spread by animals, animal products, and vehicles and other equipment, including mohair and cashmere. Movement into, within, or out of Control Area(s) will be by permit only and based on the risk posed by that movement and the premises' ability to meet permit requirements. There are two types of permits in an FMD outbreak, Specific and COB. Both are based on risk and meeting certain criteria. Goat operations that follow the guidance in this SGMMS Plan will be better prepared to request a movement permit once movement restarts. The Summary of Movement Permit Guidance is shown in the following table.

Summary of Secure Food Supply COB Movement Permit Guidance for Goats, Semen, Embryos and Goat Products located within a Control Area during a Highly Contagious Animal Disease Response	
Permitting Guidance for Movement of Goats/Semen/Embryos or Goat Products	Conditions have been Met
1. Traceability information is available (PIN, GPS Coordinates and information on type and number of goats/semen/embryos/products to be moved).	Yes
2. Biosecurity measures in the Biosecurity Checklist are in place and acceptable to RROs.	Yes
3. Epidemiology information is acceptable.	Yes
4. Destination premises and State are willing to accept goats/semen/embryos.	Yes
5. No evidence of infection based on surveillance.	Yes
6. Permit guidance to move goats, semen or embryos, or goat products if all above responses are "Yes."	Consider Issuing MOVEMENT PERMIT

The following USDA documents contain information about permits.

- *Ready Reference Guide – Defining Permitted Movement, February 2017:*
https://www.aphis.usda.gov/animal_health/emergency_management/downloads/documents/manuals/rrg_definingpermittedmovement.pdf
- *Ready Reference Guide – Permitting Process, February 2017:*
https://www.aphis.usda.gov/animal_health/emergency_management/downloads/documents/manuals/rrg-permittingprocess.pdf
- *Foreign Animal Disease Preparedness and Response Plan (FAD PReP) Permitted Movement (Manual 6-0):*
https://www.aphis.usda.gov/animal_health/emergency_management/downloads/documents/manuals/fadprep_man6-0_permit-mvmt.pdf

RROs are responsible for detecting, controlling, and containing FMD as quickly as possible during an outbreak, with eradication being the ultimate goal. RROs managing the incident will make permitting decisions regarding the movements of goats and goat products within, into, out of Control Areas based on the risk of virus spread, the status of the premises, and the risks and mitigations involved with the types of movement.

¹⁷ Moore K, et al. 2016. ^{Wool} deconstruction using a benign eutectic melt, RSC Adv. (2016). DOI: 10.1039/C5RA26516A

¹⁸ How the GreenWoolF Project Achieved to Convert Wool Wastes into High Value Fertilizer:
<https://www.euromontana.org/en/greenwoolf-project-achieved-convert-wool-wastes-high-value-fertilizer/>

Producers are responsible for protecting their goats from becoming infected during an outbreak by focusing on what they can control on their operation. To facilitate business continuity (movement), producers will need to provide assurances to the destination premises as well as the RROs that they are not contributing to the spread of disease nor putting their own goats at risk of exposure. Some movements (live animals) carry more risk than others (packaged products).

Enhanced biosecurity will be paramount to limiting disease spread. A written enhanced biosecurity plan that is ready to implement during an outbreak increases the producer's preparedness to prevent disease exposure and maintain the COB. Sharing the plan with SAHOs prior to an outbreak of FMD builds trust and confidence when requesting a movement permit during an outbreak. Producers should be ready to provide evidence that they have implemented all of the enhanced biosecurity measures recommended in the *SGMMS Self-Assessment Checklist for Enhanced Biosecurity for FMD Prevention*: <https://SecureGoat.org/producers/biosecurity>

Additionally, producers should be prepared to manage their goat premises if they are not allowed to move goats or goat products for several days or weeks. Contingency plans that the producer has already developed will be important to implement during the timeframe RROs are conducting surveillance needed to demonstrate a lack of evidence of disease and have confidence that an animal movement does not present a significant risk for disease spread. Review the *Contingency Planning Considerations for Producers Prior to an FMD Outbreak*: <https://securegoat.org/producers/steps-to-move/> for guidance.

Meat and Milk Products from goats that pass ante-mortem and post-mortem inspection by USDA Food Safety Inspection Service (FSIS) are safe and wholesome for human consumption, even if they are in the pre-clinical or recovery stage of FMD infection because FMD is not a public health or food safety concern. Processing healthy animals preserves high quality protein for human consumption and reduces the need for carcass disposal. Product that has passed FSIS inspection is safe for human consumption and potentially may be released into commerce for human consumption.

Meat Packers and Meat and Milk Processors are essential to the success of business continuity for the goat industry during an FMD outbreak. Participation in the SGMMS Plan includes guidance for packers and processors (when they make requests) and RROs (when evaluating requests) for animal and/or animal product movement permits. Processing healthy animals from a regulatory control area could continue, even if FMD infected animals are suspected or proven to already be in the packing plant.

Many packing plants do not have on-site rendering capacity for non-edible products, so any virus in those products would need to be destroyed or transported in a bio-secure manner. Following the announcement of an FMD outbreak, processing all healthy animals already at a slaughter facility as well as those in transit to the facility is the fastest way to eliminate virus amplification and further spread of FMD.

Processing healthy animals preserves high quality protein for human consumption and reduces the need for carcass disposal. Processing healthy animals from a regulatory control area could continue, even if FMD infected animals are suspected or proven to already be in the packing plant. Product that has passed FSIS inspection is safe for human consumption and potentially may be released into commerce for human consumption.

Mohair and Cashmere Fiber can harbor FMD virus for a period of time. Fiber harvested during, or just before a US FMD outbreak should be handled in a biosecure manner at the herd of origin so it does not contribute to disease spread. FMD is not a public health concern, but can be carried on clothing, footwear, and personal items. Fiber handlers and processors must be instructed on biosecurity steps to follow prior to leaving the processing facility.

Packing plant employees, truck drivers, and others who contact animals or their bodily fluids must observe proper biosecurity protocols to avoid transmitting the FMD virus to susceptible animals when these individuals leave the plant. All personnel must be instructed on enhanced biosecurity steps to follow prior to and after leaving the plant.

More information about managed movement of livestock during an FMD response is available in: *Managed Movement of Susceptible Livestock Species in the U.S. in a Foot and Mouth Disease Outbreak*: <https://www.cfsph.iastate.edu/pdf-library/FMD-Resources/disease-fmd-sfs-managed-movement-overview.pdf>

Producer Preparations Prior to an Outbreak

Request a National Premises Identification Number (PremID or PIN) from the office of the SAHO: Contact information for each State is available at:

<https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/traceability/state-pin>.

PINs are required for movement permits, and having one facilitates requesting a movement permit during an outbreak. A PIN includes a valid 911 address and a set of matching coordinates (longitude and latitude) reflecting the actual location of the goats on the premises and is required for both the premises of origin and the premises of destination. **This number is different from the Scrapie Flock ID that goat producers are familiar with.**

Producers may already have a national PIN assigned if they have received official RFID goat ID tags or implants (a 15 digit “840” tag or implant, sometimes referred to as EID Scrapie Tags), as part of the National Scrapie Eradication Program. Producers may also have a location ID (LID) or herd identification number, often referred to as the Scrapie flock/herd ID. LIDs and scrapie flock/herd IDs start with the State postal abbreviation where the premises is located. **Neither LIDs nor scrapie flock/herd IDs are allowed to be used in place of a PIN for movement permits.**

The PIN is site-specific and producers who already have one are encouraged to validate their PIN with their SAHO to ensure their data on file accurately represents the location of the animals and not a mailbox at a residence or business affiliated with the animal premises. Validated PINs speed up communication and response during an outbreak and help prevent unnecessary restrictions in the event of an outbreak. Producers who don't have one will need to get a PIN from their SAHO: <https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/traceability/state-pin>

The National Pork Board provides an online premises verification resource for all species at: <https://lms.pork.org/Premises>.

A producer or packer who finds errors should submit corrections to their SAHO office.

When animals on a premises become infected, all premises (locations) with the same PIN number will be considered to be infected. Generally, it is best to have separate PINs for premises with goats that are housed/located off-site and accessed via a public road, even if managed or owned by same producer or operation.

Producers who use public (US Forest Service, Bureau of Land Management, etc.) or private rangeland for browse are encouraged to record their location throughout the year using the coordinates (latitude and longitude) for the entrance to the location. If regulatory action is needed during an outbreak (testing or movement permit), USDA and the SAHO will work closely with agencies that oversee the land if public land is involved, or the property owner if privately owned land is involved, and the producer to determine the PIN and whether one has already been assigned.

Develop an Enhanced Biosecurity Plan: Mitigation is needed to prevent the spread of FMD virus through movement of animals. Stringent biosecurity measures are essential for a producer to protect their herd from virus exposure. Additional mitigations are needed for animal movement or if the public will be visiting areas of the premises for commercial purchase of goat meat or products, or for agritourism.

Goat operation owners/managers should work with their herd veterinarian to develop a written, operation-specific biosecurity plan that meets or exceeds the items in the Self-Assessment Checklist for their segment of the goat industry. When the biosecurity plan is written, owners/managers of the goat operation are encouraged to implement as much of the plan as practical in the absence of FMD in the U.S. with plans for implementing the remainder of the plan when an outbreak occurs.

Implementing the items in the checklist before an FMD outbreak occurs can help prevent animals on the operation from being exposed. Producers are encouraged to share their plan with SAHOs as soon as it is written. In addition, producers should include in their plan contact information for State veterinary authorities in States where their goats will be.

Effective biosecurity to protect animals from FMD that are raised outdoors on range, and used in situations where they are regularly in multiple locations off premises can be expensive and difficult. Producers are encouraged to review the following documents:

- *Considerations for Enhanced Biosecurity for Livestock Grazing on Public Land Allotment document:* <https://SecureGoat.org/Biosecurity-Public-Land/>.
- *The Self-Assessment Checklist for Enhanced Biosecurity for FMD Prevention: (Biosecurity Checklist and the Information Manual for Enhanced Biosecurity for FMD Prevention,* available at: <https://SecureGoat.org/biosecurity/>
- *Information Manual for Enhanced Biosecurity for FMD Prevention* available at: <https://SecureGoat.org/biosecurity/>

They describe the steps needed to prevent disease exposure from multiple routes (personnel, vehicles, semen, manure, carcasses, etc.) based on known exposure routes for FMD. They provide assistance in writing a biosecurity plan, biosecurity plan templates, and materials for educating individuals who work on goat operations and will be available in English and Spanish.

Designate personnel on the goat operation who will conduct FMD surveillance: FMD lesions are typically mild or not apparent in adult goats while death rates in kids can be high. Animal caretakers should know what to look for in order to identify infected animals in the herd. This will enable them to recognize abnormal findings (clinical signs and/or changes in production parameters) that may be an early indicator of FMD virus infection, and document when there is no evidence of an FMD virus infection in their herd through Active Observational Surveillance (AOS). Materials that include presentations, handouts, and posters that visually depict clinical signs of FMD in goats are available

in English and Spanish on the SGMMS Plan website: <https://securegoat.org>. Record keeping templates are also available for operations that do not already use a system to document health observations and feed consumption data.

Producers should ask their herd veterinarian if they are accredited by USDA. If not, they should establish a relationship with a USDA Category II Accredited Veterinarian as they may be a necessary component of disease monitoring and sample collection (surveillance) during an outbreak. USDA provides an Accredited Veterinarian locator at:

https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/nvap/ct_locate_av/

Producers should report suspicious clinical signs to their veterinarian, or State or Federal animal health official, if they have been unable to find a veterinarian in their area to work with. Contact information for SAHOs can be found at: <https://SecureGoat.org>.

The document, *Factors to Consider Regarding Surveillance, Biosecurity and Movement Permitting of Goats in a Foot and Mouth Disease Outbreak*, available at: <https://SecureGoat.org> summarizes challenges in surveillance options for goat premises within a Control Area to demonstrate a lack of evidence of FMD infection to support continuity of business movements.

Maintain movement records: Premises in a Control Area will be required to provide epidemiological information at the beginning of an outbreak to identify the possibility of previous exposure to the disease. Maintaining accurate records of movement of animals, product, feed, supplies, equipment, personnel, and visitors enables producers to provide accurate trace-back epidemiological information.

Movement records should include names, addresses, and telephone numbers of animal or product transporters (truckers), employed personnel, feed suppliers, etc. When possible, electronic records are preferred, but paper records may also be acceptable. Although complex, this information will be critical for determining the scope of an outbreak and it is important for goat producers to be able to provide accurate information in a timely manner.

- Sample movement logs can be found at: <https://SecureGoat.org/producers>. This information can help determine the scope of an outbreak. It can be difficult to provide needed detail on short notice, so it is important to create these records before an outbreak.
- To see the information that will be needed in an outbreak, producers can use the *Secure Goat Supply Practice Questionnaire*: <https://SecureGoat.org/producers/>.

Plan to be able to care for your animals in the event of a 72-hour national movement standstill:

Because USDA recommends a 24 to 72-hour national movement standstill of susceptible animals when FMD is diagnosed, producers should have a plan to allow for feeding, watering, and providing other necessary care of their animals in the event that movement of susceptible animals is not possible. Producers should also be prepared to extend the plan in the event that the movement standstill is extended. Animals that are in transit will likely be allowed to continue to their destination but may be stranded there until the movement standstill is lifted.

If FMD is Diagnosed in the U.S.

Implement the Operation-Specific Enhanced Biosecurity Plan: If FMD is diagnosed anywhere in the US, owners/managers of goat operations should review, update as necessary, and implement their operation-specific biosecurity plan to minimize the risk of exposing their animals. If the goat operation

is located in an FMD Control Area, RROs may require that all of the items on the Biosecurity Checklist, and possibly others, be implemented before animal movement is allowed.

Conduct Surveillance: The document, *Surveillance Guidance to Support the SGMMS Continuity of Business (COB) Plan during an FMD Outbreak* summarizes surveillance options for goat premises within a Control Area to demonstrate a lack of evidence of FMD virus infection to support COB movements. It will be available in late 2022. The ability to provide a very high degree of confidence that animals are negative for FMD virus using currently available, validated laboratory testing methods, and sample collection protocols for large groups or certain types of animals is limited. Diagnostic tests to be performed and sampling protocols may evolve throughout the outbreak based on new knowledge and technology.

Protocols have not yet been established, but will be determined by RROs and are expected to include:

- Virological surveillance (such as oral swabs)
- Conducting Active Observational Surveillance (AOS) daily by trained Goat Health Monitors employed by the premises
- Periodic inspection of goats and AOS records by Accredited Veterinarians under the authority of RROs
- Follow-up laboratory testing when available for goats with suspicious clinical signs.

Provide epidemiological information and movement records: Premises within an FMD Control Area will be part of the disease investigation and may be required to provide information about past and present disease events to identify potential exposure to the virus by contact with Infected, Suspect, or Contact Premises within the control Area. Accurate records will help RROs determine the status of the premises and help guide additional surveillance and permitting decisions. Additional guidance regarding disease monitoring and sample collection have not yet been determined; however, animal movement permits will not be issued to Infected, Suspect, or Contact Premises due to the risk of disease spread.

USDA definitions for traceability and premises designations

- Animal disease traceability: knowing where diseased and at-risk animals are, where they've been, and when.
- Infected Premises (IP): Premises where a presumptive positive case or confirmed positive case exists based on laboratory results, compatible clinical signs, case definition, and international standards.
- Contact Premises (CP): Premises with susceptible animals that may have been exposed to FMD, either directly or indirectly, including but not limited to exposure to animals, animal products, fomites, or people from IP.
- Suspect Premises (SP): Premises under investigation due to the presence of susceptible animals reported to have clinical signs compatible with FMD. This is intended to be a short-term premises designation.
- At-Risk Premises (ARP): Premises that have susceptible animals, but none of those susceptible animals have clinical signs compatible with FMD. Premises objectively demonstrates that it is not an IP, CP, or SP. ARP seek to move susceptible animals or products within the Control Area by permit. Only ARP are eligible to become MP.

- **Monitored Premises (MP):** Premises objectively demonstrates that it is not an Infected, Contact, or Suspect Premises. Only ARP are eligible to become MP. Monitored Premises meet a set of defined criteria in seeking to move susceptible animals or products out of the Control Area by permit.

Preparation for movement restrictions while at Off-Site Locations

- Record and have with you the Premises ID for your goat's location, as well as the PIN for your home operation if you have goats at an off-site location such as attending a show or sale, fulfilling a brush control contract or packing.
- Many brush control locations and areas where pack goats are used will not have PINs. For these locations it is recommended that you have the coordinates (latitude and longitude) for the location.
- Most show and sale facilities will already have a PIN and you can contact the show secretary or sale manager to get that information prior to leaving for the event.
- Record and have with you contact information for State officials for your goat's location as well as your home premises.
- Have a contingency plan to care for your goats if placed under movement restrictions for an extended period while at an off-site location. This could be for 72 hours or several days or weeks.
- Check with the show secretary or the sale clerk to make sure they have a contingency plan in case of a sudden quarantine of that location.

Requesting a Secure Food Supply Movement Permit during an Outbreak

Before requesting a Secure Food Supply movement permit for goats or goat products to move out of, within, or into a Control Area, both the premises of origin and the premises of destination, including packing plants, need to have a National PIN. In addition, both the SAHO of the State of destination as well as the destination premises must be willing to accept the risk of receiving the animals or animal products.

Each premises requesting a movement permit must be registered through the office of their SAHO and/or established as a premises in the USDA's Emergency Management Response System (EMRS) before requesting a permit. EMRS is the USDA/APHIS official system of record for all animal health incidents. For premises following the guidance in the SGMMS Plan, permits should be requested through the EMRS Customer Permit Gateway or similar State-approved permitting system that is capable of exporting data required for EMRS during an outbreak.

If a State elects to use their own information management system to handle permitting, the information must, in near real-time, be linked into EMRS, especially for interstate movements where approval of both origin and destination State must be granted and Unified Incident Command be informed.

Further information on Secure Food Supply permits and permitted movements is available in the document: *FAD PReP Manual 6-0: Permitted Movement*:

https://www.aphis.usda.gov/animal_health/emergency_management/downloads/documents_manuals/fadprep_man6-0_permit-mvmt.pdf.

It contains detailed information on the different types of permits and movements as well as thorough explanations of the permitting process.

Provide the following information (it will be required in EMRS):

- Permit class—where you want to move animals or animal products in relation to the Control Area (such as out of Control Area, into a Control Area or within a Control Area).
- Permit reason—why you want to move animals or animal products (such as direct to slaughter or raw milk transport to processor).
- Origin premises—premises location (physical latitude/longitude) including validated National PIN must be entered in a State information system. For permits issued by EMRS or the EMRS Gateway, the National PIN must be entered into EMRS. (State information systems and EMRS will share data before or during incidents).
- Destination premises—premises location (physical latitude/longitude) including validated National PIN must be entered in a State information system. The destination premises must sign a statement that they understand the risk of accepting animals or animal products from the Control Area. For permits issued by EMRS or the EMRS Gateway, the National PIN must be entered into EMRS. (State information systems and EMRS will share data before or during incidents).
- Item(s) permitted—category of what you want to move (animals, products, manure, etc.).
- Item class—specifically what you want to move (such as goats to slaughter, breeding does, feed).
- Duration/span of permit—first movement date, how long the permit is valid, and over what time period movements are expected to occur.

For any permitted movement, the Origin State can request documentation from the premises making the request, and attach that documentation to the permit request in EMRS or make the information available through a workable data management system. This documentation may include:

- Epidemiological information showing that the premises is **not** Infect, **not** Suspect, and **not** a Contact Premises.
- Enhanced Biosecurity Plan and a completed copy of the Biosecurity Checklist.
 - For milk movement, a written plan that describes the operation-specific biosecurity performance standards (BPS) for raw milk collection and transport. This could be included in the operation specific enhanced biosecurity plan or kept separate.
 - For animal movement, a completed copy of the Biosecurity Checklist and the operation-specific enhanced biosecurity plan.
- Written assurance by the producer of compliance with the Biosecurity Checklist.
- Information demonstrating normal health status for the animals on the production premises involved (such as goat health monitoring documents and/or Certificate of Veterinary Inspection signed by an Accredited Veterinarian at the time the animals are loaded).
- Diagnostic testing results from samples tested. When submitting samples for testing, it is imperative that the National PIN for the location sampled is always included with the diagnostic submission (the recommended type and number of samples to collect and frequency of collection are being developed).
- For animal movements to another production premises, the destination premises must indicate that they understand and accept the risks associated with receiving the animals.

Completed movement permit requests will be reviewed first by the Origin State. The Origin State can recommend that the permit be recommended for approval to Destination State, not recommended for approval to Destination State, or rejected. If approved, then the Destination State reviews and approves

or rejects the permit. The destination premises may also have the ability to reject a permit. If the permit request is not approved, an explanation for denial will be provided in the EMRS Gateway. If approved, the producer will receive the approved permit (likely as an electronic PDF) from the appropriate official working to inform Unified Incident Command; it will also be available for download directly from the EMRS Gateway. The permitted movement must comply with all requirements on the permit; all subsequent permitted movements associated with that permit must be submitted to and recorded in EMRS through the permit Gateway or other State-approved data information system for permits.

Terms

A Glossary of Terms used in this document as well as in all others that are part of the Secure Goat, Milk & Mohair Supply Plan is available at: <https://SecureGoat.org/Glossary/>

Additional Resources

The Secure Goat, Milk & Mohair Supply Plan website has additional resources available at: <https://SecureGoat.org>.

Comments

Please send comments or suggested edits for improvement to: office@AmericanGoatFederation.org

Acknowledgments

This Secure Goat, Milk & Mohair Supply Plan for Continuity of Business (SGMMS) was developed by the American Goat Federation Federation using information from USDA and other Secure Product Supply Plans developed by Iowa State University and the American Sheep Industry Association. Goat industry specific details and review were provided by the Mohair Council and Cashmere Goat Association, goat industry stakeholders, State veterinarians, USDA representatives, university personnel, allied livestock industries, and knowledgeable individuals from AGF Member Organizations. This SGMMS Plan was funded by the United States Department of Agriculture Animal and Plant Health Inspection Service (USDA/APHIS).