

Livestock Market Interruption Strategy

Final Report of the Livestock Market Interruption Strategy Steering Committee

April 2016

The Livestock Market Interruption Strategy has been developed through collaboration and efforts of many governments and organizations, participating as active members of the Steering Committee or sub-working groups.

Steering Committee Members

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Animal Nutrition Association of Canada	Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec
Canadian Cattlemen's Association	Manitoba Agriculture, Food and Rural Development
Canadian Food Inspection Agency	National Cattle Feeders' Association
Canadian Renderer's Association	Ontario Ministry of Agriculture, Food and Rural Affairs
Cargill Inc.	Saskatchewan Ministry of Agriculture
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Canadian Cattlemen's Association	New Brunswick Ministry of Agriculture, Aquaculture and Fisheries
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Canadian Pork Council	Ontario Ministry of Agriculture, Food and Rural Affairs
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Executive Summary

With an economically significant sector, preparedness for emergencies is critical

As one of the world's largest agricultural producers, Canada possesses a large and competitive livestock sector, particularly for cattle and hogs, which is highly integrated within a North American market. As a result, the Canadian livestock industry is highly dependent on continued access to international markets, with nearly 70% of hogs and pork products and approximately 50% of cattle and beef products being exported.

Given the importance of the sector and a number of inter-related economic, social and environmental considerations at play, large scale interruptions to the livestock market could have broad impacts for the livestock sector beyond the capacity of governments and industry to effectively manage with existing preparations (e.g., beyond what current policies and programs are designed to mitigate). The experience of the 2003 discovery of bovine spongiform encephalopathy (BSE), which resulted in the immediate closure of international markets for Canadian cattle and beef (the impacts of which rippled throughout the entire value chain), highlighted the need for greater preparedness across players. Moreover, the potential discovery of foot and mouth disease (FMD) and subsequent border closures would be estimated to have a net economic impact of around \$58 billion (in 2014 dollars), forcing the industry to quickly adjust its structure and production levels to meet only domestic demand. This would result in a sudden and dramatic decline in commodity prices and a significant surplus of healthy animals that would need to be depopulated and disposed of.

Recognizing these risks, in 2012, Federal, Provincial and Territorial (FPT) Assistant Deputy Ministers of Agriculture agreed on the need to engage industry in developing a Livestock Market Interruption Strategy (LMIS). The development of the strategy was to enhance industry and government preparedness to deal with the impacts of a market interruption, outside of the regulatory response already in place (e.g., working to deal with the market impacts of a border closure, recognizing the role of animal health authorities in dealing with the actual disease that caused the border closure). As such, the LMIS is intended to be a national strategy supported by two policy objectives:

- Managing industry transition, ensuring a functioning domestic market, including through herd management, carcass disposal and transition assistance measures.
- Facilitating the resumption of international trade and maintaining domestic consumption.

It is the impact to healthy animals that provides the focus of the Livestock Market Interruption Strategy (LMIS). Although FMD is used as an example, the strategy is designed to be scalable and to support the livestock industry during any significant market interruption no matter the cause.

The engagement of governments and industry has been critical to creating a joint strategy

The fact that no single entity has exclusive responsibility for response to, and decisions regarding, the management of healthy animals, surplus to market demand, is the primary challenge in managing and responding to a major livestock market interruption (LMI). Response will require effective coordination and cooperation of all parties in determining which animals enter the domestic market and which animals are surplus and consequently, candidates for

depopulation. Producers will be required to make immediate decisions on how much to produce, including decisions regarding continued breeding of animals and what to do with surplus animals for which there may be no market. Processors must decide how much product the Canadian market can absorb, where and how best to source the product, how to continue to compete with imported products, as well as how to deal with the surplus product returning to Canada. Governments must decide whether intervention is required and, if so, where, when and how to initiate intervention measures to facilitate industry transition to respond to the change in markets. At the same time, all parties must find ways to effectively coordinate consistent messaging within and between stakeholder groups as well as with the general public.

To this end, a joint government/industry LMIS Steering Committee (LMISSC) was established in 2013 to provide a forum that enabled active involvement in government and industry dialogue on the issues and challenges, and to develop approaches and solutions to the problems resulting from a LMI. Three years of effort across stakeholders has culminated in bringing together the findings, information, models and tools developed in this report.

It is important to note that the LMIS is not a plan; rather, it is a national strategy that can help prepare key stakeholders to act and provide them with key tools, information and approaches to guide decision-making and actions, as well as the development of individual stakeholder plans, during an actual response. While based on a worse-case scenario of a market interruption due to a border closure to FMD, the LMIS consists of a set of scalable tools that can be used for any market interruption in the livestock sector.

THE STRATEGY

Through the work completed as outlined in the report, the strategy has been developed, including a guide for how the strategy can be utilized in planning and in responding to a LMI. See Annex A for details.

This joint resolve has significantly advanced preparedness in a number of key areas

Governance, Roles and Responsibilities

As all parties have distinct roles and responsibilities in managing a major market disruption, the LMIS provided the groundwork for understanding the roles and responsibilities of each party. By making a distinction between operational and strategic decisions, and establishing clear roles and responsibilities, the LMIS governance structure allows for timely, coordinated and well-understood decision-making and coordination amongst all parties for response activities. Formalizing a government-industry advisory committee, the FPT-Industry Emergency Response Executive Council, also highlights the importance of the necessary government/industry relationships in responding to and managing a LMI.

Communications

As coordinated and consistent communications will be critical in managing an LMI, the LMIS has developed a communications protocol with a set of mini-strategies addressing a number of the areas and activities under the LMIS that will be available and useable by all parties in order to maintain public confidence and support, which will be particularly useful in the case of depopulation and disposal of surplus, healthy animals.

KEY ACHIEVEMENTS

The **FPT-industry network** created has established strong relationships before a crisis that will benefit all when responding to a crisis.

Agreement and joint approach for key livestock sector organizations to work together to maintain and increase domestic consumption.

A **governance structure** to be used to facilitate and coordinate response actions across FPT governments and industry.

An **Impact Modelling Tool** to enable real-time economic analysis and support decision-making.

A **communications framework and protocol** with draft pre-defined communications strategies to enable collaborative development of communications activities and messages.

List of **generally accepted humane depopulation and carcass disposal methods** as well as **tools to support decision-making** with respect to those methods (e.g. cost estimate calculators, method selection tool, post-disposal environmental assessment considerations).

Trade resumption strategy identifies current priority markets, key roles and responsibilities and potential market development tools to facilitate moving forward during a crisis.

Industry Transition and Decision Support

While a major LMI will require the affected industry sectors to quickly adapt and transition to a new market reality, there is rarely one simple solution. Varied responses across different players may be necessary to reflect evolving phases or stages of a significant market interruption, from financial hardship of producers, to bottlenecks in the supply chain, to the emotional toll on those in the field. For these reasons, the LMISSC drew upon past experiences, reviewing the objectives used to determine parameters for prior response programming (e.g., for BSE and hog market challenges in the mid-2000s). While the responses were reflective of the conditions of the event, the review identified the potential objectives for transition measures and different approaches for each phase of transition. Therefore, to assist government and industry in making decisions regarding livestock production, the LMIS has developed:

- A set of approaches and tools to select an appropriate method to use and to estimate costs and the equipment, human resource and facility resource requirements for humane depopulation and carcass disposal activities.
 - An Impact Modelling Tool to enable real-time economic analysis of the value-chain impacts resulting from a LMI or different LMI scenarios. It also provides the ability to test, analyze and identify the impacts and effects of possible solutions.
 - Producer decision models for cow-calf, backgrounder/feeder/fed cattle and hogs to illustrate daily decision-making that will need to be adjusted in the context of a LMI.

Markets

Reopening international markets is critical to the competitiveness and profitability of the sector. To this end, priority international markets for Canadian livestock products have been identified that will be the focus of efforts to re-establish Canada's trade. At the same time, while markets remain closed, maintaining and subsequently increasing domestic consumption will be a priority in order to minimize the negative impact to the sector. Industry groups will need to implement market strategies aimed at maintaining public confidence and growing consumer demand for Canadian products for the duration of a market closure.

In addition to developing the LMIS, the Steering Committee made additional recommendations for going forward

While the work completed has been significant in enhancing government and industry preparedness, the following recommendations represent a summary of the priority actions required to continue to advance the preparedness of all parties for an LMI. Some will focus on the logical next phase of work following what has been completed under the LMIS, including the validation of that work through testing and exercises, while others relate to new activities based on the gaps identified over the course of its development.

Communications and Governance

1. Endorse the proposed LMIS governance and decision-making structure to ensure coordinated and collaborative communications and decision-making during a livestock market interruption event. The structure will include an FPT/Industry Emergency Response Executive Council to provide timely, high-level, strategic and well-informed advice and recommendations for decision-makers.
2. Promote LMIS among all federal, provincial, and industry stakeholders to increase awareness of its importance and to increase preparedness of the sector in the event of a large-scale market interruption situation.

Validation and Evergreening

3. To ensure the LMIS remains relevant:
 - a. Evaluate LMIS tools and material through an exercise program;
 - b. Review and update material, on an as-needed basis, based on lessons learned from exercises and real events, and emerging challenges; and
 - c. Test multiple market interruption scenarios using the Impacting Modelling Tool created under LMIS.

Proposed Future Activities

4. Recognizing that work was identified beyond the scope of the LMIS, it is recommended to:
 - a. Establish a FPT/industry steering committee and secretariat to continue work identified by the LMIS Steering Committee, with the support of Value Chain Roundtables and other existing networks as required.
 - i. Through the steering committee, continue the analysis and the development of detailed plans, guides and capacity development in support of the broader strategy in areas including:
 - o Determining the options and tools to support the optimal use of slaughter facilities for depopulation, given their social acceptance and capacity;
 - o Building upon the existing depopulation and disposal reports by:
 - a. Refining existing depopulation and disposal methods, and for sectors where existing tools and methods are inadequate, supporting the development and resourcing of new methods;
 - b. Supporting the wellbeing of those directly involved in response;
 - c. Supporting on farm, area and provincial planning for disposal and depopulation, and creating tools for sector use;

- Developing options for the movement and marketing of livestock toward the development of a government-industry plan; and
 - Assessing the potential to align provincial-territorial legislation to facilitate disposal.
- b. Determine the feasibility and requirement to address the unanticipated issues identified through LMIS (e.g. the impact of zoning and/or the coordination required with CFIA's eradication activities if the market interruption is as a result of a disease outbreak).
5. Understand the scope of investment and resources required to enhance industry preparedness for emergency events and consider investment through means including existing and future agricultural policy frameworks.

Finally, through this process, a number of lessons were learned that can be considered for future projects

As the LMIS is the first comprehensive, national strategy to address the market impacts of a large-scale market interruption in Canada, participants have shared their thoughts and views to aid in the continued evolution and development of the strategy as well as for future initiatives.

- **The importance of the network:** Through the LMIS, an effective forum was developed utilizing a collaborative approach with a broad range of representatives from FPT governments and industry
- **Recognizing that all parties have roles and responsibilities during an LMI.**
 - Building a solid foundation for further discussion and a full appreciation of each other's perspectives.
 - Establishing relationships before a crisis.
- **Enhanced preparedness:** The LMISSC developed and shared significant and detailed documentation to improve the understanding of the impacts and effects, including a better understanding of collaborative communications needs and approaches. However, preparedness takes time.
- **A better understanding of the problem:** The work of the LMISSC and the development of the LMIS have increased awareness and understanding of the realities that must be addressed to improve overall preparedness to respond and manage a LMI. Gaps in knowledge for key elements of the LMIS support the need for further work.
- **An ambitious scope meant that additional issues arose that had not originally been considered:** Not only did unanticipated challenges prevent the completion of some activities, but issues arose that hadn't been conceptualized at the outset, and merit further investigation.
- **Retaining and building upon what we have learned:** While LMIS was a significant achievement, preparedness requires ongoing updates, practice and testing in order to not lose the value of the work to date.

As the first strategy of its kind, the progress made under the LMIS and the lessons learned are valuable in the development of approaches for the implementation of the Strategic Emergency Management Framework (SEMF), which is currently under development by FPT governments. LMIS is seen as a major contributor to the SEMF outcomes and the proposed future work will be well aligned with the direction being taken.

I. Introduction

Agriculture in Canada exists within a complex operating system of inter-related and inter-connected economic (markets, trade and commerce), social (food safety, food quality, animal welfare) and environmental (weather, disease and pests) drivers. These system drivers, while creating opportunities for Canadian agriculture, also serve as risks and hazards that can quickly become emergencies that would exceed or overwhelm the sector and governments capacity to respond and would require prompt action and coordination.

The Need for a Livestock Market Interruption Strategy (LMIS)

Within the agricultural context, governments and industry have recognized that a large-scale market interruption (which would likely take the form of a border closure to the United States) would have broad impacts for the livestock sector beyond their capacity to effectively manage. The Canadian livestock industry is highly dependent on continued access to international markets for products. Nearly 70% of hogs and pork products and approximately 50% of cattle and beef products are exported. An extended market interruption in these export-dependent sectors would have devastating and far reaching impacts, extending beyond what current policies and programs are designed to mitigate.

For example, the May 2003 Bovine Spongiform Encephalopathy (BSE) discovery resulted in the immediate closure of international markets for Canadian cattle and beef. The impacts and effects of the BSE event were felt not only by the premises where BSE was discovered, but by the entire beef value chain. Prices for cattle dropped dramatically; slaughter plant contracts for animals were cancelled; feedlots in turn delayed or refused delivery of additional feeders and adjusted feeding regimes; backgrounders had to retain and continue to feed animals that were destined for feedlots; cow-calf operators were uncertain as to whether or not there would be a market for their calves; and the market for cull and surplus cows evaporated.

Many international markets were closed for a significant amount of time. Overall the response and transition to deal with the market closures were managed through a series of ad hoc measures totaling \$2.1 billion in federal funding over a five-year period from 2003-04 to 2007-08¹.

An example of a more far-reaching livestock market interruption (LMI) would be the discovery of Foot and Mouth Disease (FMD). Where BSE impacted only the cattle sector and is a disease that is not as easily transmitted, the impact of FMD would be felt by all cloven hoof livestock (which include all major red meat species, such as hogs, cattle, sheep, and goats), and all infected and non-infected premises along the entire value chain. It could also have broader impacts outside the agricultural sector (e.g. tourism, transportation of non-agricultural products) as was found during the United Kingdom's FMD outbreak. The net economic impact of a large-scale FMD outbreak in Canada was once estimated to be around \$58 billion (in 2014 dollars).²

¹ Evaluation of AAFC's program response to the BSE crisis
<http://publications.gc.ca/site/eng/9.694567/publication.html>

² Serecon Management Consulting, prepared for the Canadian Animal Health Coalition (2002). Economic Impacts of a Potential Outbreak of Foot and Mouth Disease in Canada

Such a market interruption would result in a sudden and dramatic decline in commodity prices and force the industry to quickly adjust its structure and production levels to meet only domestic demand.

In the case of a federally reportable disease such as BSE and FMD, there is a clear established leadership role for the Canadian Food Inspection Agency (CFIA) and its Provincial/Territorial (PT) counterparts. The CFIA is responsible for responding to and addressing the reportable disease outbreak. This includes the depopulation and disposal of the diseased animals and other animals potentially exposed to the disease to prevent possible disease spread, as well as the compensation for those animals depopulated. The processes for this work are well established.

The responsibilities of the CFIA do not include activities to address the healthy, surplus animals that are affected by the market impacts of border closure. It is this work, and the inherent decisions that need to be made in relation to those healthy animals, that provide the focus of the LMIS.

However, there are challenges in creating a LMIS. Firstly, no single entity has exclusive responsibility for response to, and decisions regarding, the management of healthy animals, surplus to market demand. Producers will be required to make immediate decisions on how much to produce, including decisions regarding adjusting breeding cycles of animals and what to do with surplus animals for which there may be no market. Industry associations will need to decide on strategies that best represent their needs and adapt to new market conditions. Processors must decide how much product the Canadian market can absorb, where and how best to source the product and how to continue to compete with imported products and other protein sources. Governments must decide whether intervention is required and if so, where, when and how to initiate intervention measures to facilitate industry transition to respond to the change in markets. At the same time, all parties must find ways to effectively coordinate consistent messaging within and between stakeholder groups as well as with the general public to instil confidence in the safety of product and maintain domestic consumption.

Notwithstanding these challenges, all stakeholders will need to quickly evaluate the situation with a focus on how best to manage supply and excess production capacity while maintaining and attempting to grow domestic market demand. This evaluation is critical to enabling decisions on how best to utilize existing capacity (production and processing). Governments and industry will be further challenged to maintain public confidence and support, especially as it relates to the depopulation and disposal of surplus healthy animals. The mechanisms to resume international trade and transition to a new production environment that can quickly ramp up once trade resumes also need to be in place.

Through consultations with provinces and national industry organizations, it was confirmed that governments and industry were not adequately prepared to deal with a potential large scale market interruption.

Objectives and Outcomes

In 2012, FPT Assistant Deputy Ministers of Agriculture (ADMs) agreed on the need to engage industry in developing a LMIS to enhance industry and government preparedness. The LMIS was intended to be a national framework supported by two policy objectives:

- Managing industry transition, ensuring a functioning domestic market, including through herd management, carcass disposal and transition assistance measures.
- Facilitating the resumption of international trade and maintaining domestic consumption.

The desired outcomes of the national strategy were to provide FPT governments and industry with key tools, information and approaches to guide decision-making and actions. More specifically, it was to be a comprehensive strategy to address the impacts of a large-scale market interruption that improves preparedness by all parties. It would enable provincial and territorial governments and industry stakeholders to develop more detailed plans that would increase the speed of decision-making and more clearly define relationships, roles and responsibilities.

Given that a market interruption could happen in conjunction with the management a reportable/notifiable disease discovery or through trade sanctions imposed by another country, the assumptions used to drive the objectives included:

- Using FMD as a worst case scenario to guide the identification and development of the key elements of the LMIS;
- Planning to manage a minimum of six- to 12-month border closure;
- Identifying and developing processes and tools to enable timely decision making; and
- Developing evergreen processes and data that would be updated on a regular basis.

Activating the LMIS

When a market interruption occurs, governments will need to determine whether or not to activate part, all or none of the LMIS. Triggers were developed to help governments make such determinations, which ask whether:

- The scope of the LMI is national or provincial/territorial,
- There are alternative methods to manage the interruption, and if so, whether they could be deployed immediately, and
- Industry needs to transition their production cycle to adapt.

Not all market interruptions will result in the use of LMIS, however, evaluation of the need to activate LMIS should be undertaken each time the situation changes³. This could mean initiation, escalation or deactivation of all or a portion of the LMIS activities. LMIS activities should not continue in perpetuity – the situation should be addressed regularly to determine whether LMIS continues to be necessary and whether a province or the industry can handle the situation on its own.

³ Agriculture and Agri-Food Canada (2016). [LMIS Activation Decision Tree](#).

Intended Audience

As a national strategy, the LMIS provides all levels of governments and industry stakeholders with an overarching approach to deal with a LMI. While the strategy is helpful as a foundation, more detailed plans are necessary to ensure adequate preparedness and limit confusion among those responsible for the response. Based on this approach and the tools created, individual stakeholders will be able to develop plans and procedures within their respective mandate and/or jurisdictions which would support the collaborative actions required for a LMI. The strategy and a guide detailing how the strategy can be used is provided in Annex A, along with the bibliography at the end of this report.

Report Structure

The report is meant to summarize the work of the Steering Committee over the three years since its inception, culminating in the strategy and related tools. As such, the report is broken into three principal sections:

- (i) the approach and activities section describes how the strategy was developed, the challenges to be addressed and the key elements that were examined;
- (ii) the findings and achievements section highlights the results from examining the key elements through four substantive themes; and
- (iii) the recommendations section provides the LMIS Steering Committee's views on the continued evolution and development of the strategy to enhance overall preparedness.

II. Approach and Activities

Initiating and facilitating the FPT and industry dialogue was the first step in developing a LMIS. This was done through the creation of a Livestock Market Interruption Strategy Steering Committee (LMISSC)⁴, established by FPT Policy ADMs to guide the development of the LMIS. Its mandate was to work within the policy objectives to provide recommendations that contain a scalable set of solutions that would be applicable in any LMI situation. The LMISSC consisted of representatives of the federal, provincial and territorial governments; producer, processor and stakeholder organizations; and key processing firms.

The LMISSC was guided by a set of principles for the development of response options under LMIS:

- Efficiency in meeting policy objectives and specific needs
- Cost effectiveness
- Alignment with accepted animal welfare practices
- Minimization of environmental impact
- Minimization of moral hazard
- Alignment with governments and industry priorities
- Feasibility
- Flexibility

In line with these principles, LMISSC members also agreed:

- That it was beyond the scope of the LMIS to reach agreement on specific program parameters;
- To learn from work already completed or underway and use existing working groups to address the key issues identified, where possible; and
- That all members should find ways to maintain focus on the broader interests of industry as opposed to promoting individual interests.

To manage such a large initiative involving multiple stakeholders, a detailed work plan was created, with each member leading one or more tasks (out of a total of 68 tasks). The work was divided into seven broad pillars:

1. Emergency Management Governance
2. Communications
3. Industry Transition
4. Humane Depopulation and Carcass Disposal
5. Marketing Options
6. Domestic Consumption
7. Resumption of International Trade

⁴ Agriculture and Agri-Food Canada (2013). LMIS Steering Committee Terms of Reference.

i. Emergency Management Governance

While the governance and decision-making for actions related to disease eradication is clearly outlined through mandates, legislation and detailed plans developed by the CFIA and provincial/territorial governments, an equivalent approach to manage the impacts of a market interruption to healthy animals had not been developed. As a result, under the LMIS, the objective was to create a governance structure that facilitates coordinated, strategic and operational decisions during a large-scale market interruption across levels of government and with industry.

However, there were a number of challenges in developing such a governance structure. The task of establishing a joint government/industry governance structure is complex given that no single organization has exclusive responsibility for response to, and decisions regarding the management of healthy animals, surplus to market demand. Within the complex web of decision-making, each stakeholder from the individual producer and processor to industry associations to governments, is individually and collectively challenged with the need to make decisions under a LMI. Economic considerations will be the primary drivers of individual decisions; however, there are a variety of other considerations as well (e.g., animal welfare, social, environmental). Moreover, a major LMI will require communal decisions that serve the best interests of the industry as a whole.

The LMISSC, using the existing FPT Emergency Management Working Group, set out to determine how best to structure a governance body to serve the overall interests of the industry as a whole.

ii. Communications

Communications to stakeholders and the public is essential in instilling trust in governments and industry during any emergency and ensuring coherence across decision-makers. There are many hard decisions that governments and industry have to make in a LMI, which could result in negative public reaction, such as large-scale herd depopulation and mass carcass disposal. The intent of this pillar was to develop a standard set of practical strategies and tools to ensure effective coordination of communications between governments and industry as well as consistent messaging to the public.

The challenges for communications activities under the LMIS were three-fold. First, as highlighted above, the breadth of elements to cover is substantial and required significant work to be completed in the other pillars before the supporting communications aspects could be developed. Second, specific communications materials are dependent on the scenario and difficult to develop in advance. Third, all stakeholders – all levels of government and industry – will be communicating with each other and with the public, resulting in a need to have consistency and a clear delineation of roles.

Understanding these challenges, a LMIS Communications Working Group was established with representatives from Agriculture and Agri-Food Canada (AAFC), the CFIA, provincial/territorial governments and national livestock organizations to develop a collaborative approach to preparing basic material in advance that could address likely communications challenges that would occur in the first days of a LMI.

iii. Domestic Consumption

Experience has been gained through past events such as BSE and Avian Influenza (AI) proving that consumer confidence and domestic consumption can increase or decrease depending on how the public perceives the issue is being handled. The intent of this pillar was to outline common approaches for the pork and beef sectors to maintain the confidence and support of Canadian consumers, using lessons learned from past experiences.

Industry associations each have marketing plans to promote their respective sectors in both domestic and international markets focussed on establishing brand recognition for premium quality, safe products valued by consumers. Defending and maintaining the brand reputation in light of a foreign animal disease outbreak is a critical challenge. It is a greater challenge when multiple sectors are impacted – this increases the need for collaboration and joint promotion so that one sector is not negatively impacted by the other. Understanding the need for collaboration, the Canadian Cattlemen’s Association and the Canadian Pork Council led the work to establish a common approach to promote domestic consumption.

iv. Resumption of International Trade

The beef and pork sectors are highly dependent on access to international markets, in particular, the United States. The intent of this pillar was to examine the international markets for Canadian livestock and livestock products as well as lessons learned from past experiences to guide the identification and development of strategies and actions to minimize the impacts to trade and, if necessary, facilitate the timely resumption of trade.

Each market interruption scenario is different and the markets closed to Canadian livestock and livestock products and the impact of the closure of those markets will change over time. Which livestock sectors are impacted will also be dependent on the nature of the LMI. As such, a prescriptive plan for trade resumption is difficult to determine in advance.

AAFC’s Market Access Secretariat led the work to identify priorities and define the roles and responsibilities of the various stakeholders in support of a trade resumption strategy for a LMI.

v. Industry Transition

LMIS stakeholders have experiences in responses to prior disease events, which were leveraged to examine how impacted groups can transition through a LMI. The intent of this pillar was to recognize the need for short-term decisions and actions without adversely affecting recovery and transition to new market conditions over the longer-term. There were two main objectives of the work under this pillar:

- To consider approaches to effectively transition the industry to a “new normal” resulting from a large-scale livestock market disruption.
- Develop an Impact Modelling Tool (IMT) that can model different scenarios and evaluate the consequences of the various options for managing surplus healthy animals during a LMI.

For the first objective, it was decided to maintain focus on high-level guiding principles for potential transition support rather than develop specific programming options. Given the highly unpredictable and variable nature of a LMI, it was neither prudent nor practical to attempt to propose programming options. Maintaining focus on principles and objectives rather than

developing specific program options was a continual challenge because it is the latter, including financial assistance funding, that are of most interest to some stakeholders, while at the same time being the most difficult to determine until an event occurs.

The challenge of the second objective was to fill the gap in econometric data to meet the needs for short-term decision-making during a LMI and enabling the evaluation of the consequences, while not duplicating analysis that can be done through existing econometric models and not requiring the creation of new data to feed the model.

The work on the first objective was led by the LMISSC through a workshop with all stakeholders and subsequent analysis of the input. The work on the second objective was conducted through contracted services directed by AAFC.

vi. Marketing Options

The intent of this pillar was to examine the possible options to manage the supply and movement of healthy animals, surplus to market demand, to ensure the movement of animals in a LMI situation is orderly and efficient.

As hogs and cattle are not supply-managed sectors, orderly marketing is a challenge because the level of control over movement is significantly less than in the supply-managed sector. There are varying levels of regulation across the country (most provinces support research and marketing activities), but no one has the authority or capacity to manage the supply and movement of animals during an event. The affected industries emphasized that there should not be such government management, even in a LMI situation.

Despite these challenges, the LMISSC undertook to document the differing approaches across the country and identify the acceptability of additional systems in periods of crisis, while recognizing that further work is necessary to be able to advance an approach for livestock movement and marketing.

vii. Humane Depopulation and Carcass Disposal

A major LMI such as FMD would quickly result in surplus healthy animals. Market, economic and animal welfare considerations, particularly in the intensive hog industry, will require governments and industry to explore large-scale animal depopulation and carcass disposal options. The decision to depopulate and dispose of excess healthy animals in a humane and environmentally acceptable manner is critical to maintaining public confidence and reducing potential animal welfare incidences. Public confidence will also be directly linked to Canada's ability to effectively demonstrate that slaughter for disposal would be targeted, as much as possible, at those animals at risk of welfare issues, such as those facing overcrowding issues. It is, by far, the most significant component of an LMI response, and will involve considerable effort by all governments and the primary and processing industries during a LMI.

The intent of this pillar was to examine the options for the humane depopulation of surplus livestock and carcass disposal; assess the resources required against a range of scenarios and options; determine the limitations (e.g. staff resources/equipment) in capacity to respond; and creating tools to support decision-making.

Although depopulation often occurs on a small-scale, mass depopulation and disposal is rare. Developing options with little data available on capacity to be able to manage a large, but

undetermined quantity of animals, is a challenge. It is also a challenge when the availability and acceptability of some options is inconsistent across the country and between sectors. Outside factors, such as licensing can also impact the options available. Creating tools to support decision-making in this area, keeping these challenges in mind, was an important part of the work under the LMIS.

Government-industry discussion groups and contracted services were integral in the development of reports and tools to support enhanced decision-making to depopulate in a humane manner and dispose of livestock carcasses.

viii. Overarching Challenges

A number of challenges were identified in the development of LMIS.

The first main challenge was that the LMIS was developed with few dedicated resources. The completion of LMIS work plan tasks often competed with existing day-to-day priorities of LMISSC members. While great strides have been made in preparedness, this challenge meant that tasks sometimes took longer to complete or could not be completed to the extent originally envisaged in the timeframe for the LMIS' development.

Second, the intent of the LMIS was to have a national strategy upon which regional and sector specific operational plans and procedures could be based. Keeping the focus at the strategic level, rather than on operational activities and plans remained an ongoing challenge, but was ultimately successful.

Finally, as can be seen through some of the limitations in the completeness of certain tasks, developing a strategy prior to a real event is a sound planning approach; however, it is not feasible to cover all possible requirements that would come while experiencing a real emergency. In some instances, the finalization of some tools, like communications strategies, must be done at the time of a real event. Further, it is important to regularly test what has been developed to be able to identify what works and what does not work in order to further refine the strategy and enhance overall preparedness. This is compounded by the fact that change is constant; industry does not remain static, and data and information quickly become outdated and of limited value. The data and information assembled under the LMIS will need to be refreshed periodically and mechanisms to ensure the strategy and its supporting tools remain evergreen, as required.

III. Findings and Achievements

The work conducted by and under the direction of the LMISSC over the past three years (2013 - 2016) has provided FPT governments and industry with key tools, information and approaches to guide decision-making and actions. This work can be broadly organized into four key themes:

- Governance, Roles and Responsibilities
- Communications
- Industry Transition and Decision Support
- Markets

i. Governance, Roles and Responsibilities

Each pillar under the LMIS has noted areas where decisions are required. They can range from operational decisions within a single organization to decisions made jointly by certain stakeholders; they may be relatively straightforward, such as how to communicate with the public; to hard decisions like whether to depopulate healthy animals. How these decisions are made and by whom will depend on the stakeholders involved and their distinct roles and responsibilities.

The LMISSC acknowledged early on that decisions taken by any party can and will impact others given the joint or shared responsibilities in managing a major market interruption.

Existing response governance structures in Canada have generally focused on the organization and decision-making related to a disease outbreak, specifically the decisions for disease eradication and control. The review of past experiences from the perspective of the market interruption side of a disease event identified no clear organizational structure that brought together government and industry. During BSE, industry associations and processors met with FPT ministers, deputy ministers and ADMs, individually and collectively. The beef value-chain roundtable was used as a mechanism to share information and gain collective input and advice. The approach was built on the concept of inclusion, hierarchy and pre-existing decision authorities. While it was effective, it was ad-hoc in nature.

The LMIS was to investigate the roles and responsibilities of each party in a market interruption and outline a formal governance structure that would effectively and efficiently facilitate a comprehensive and coordinated response. This meant the creation of an organizational structure showing the involvement of all stakeholders, as well as guiding principles for how all stakeholders would work together within that structure.

The FPT Emergency Management Working Group led the analysis and development of governance models and options for LMISSC consideration. As well, the Working Group developed a set of overarching decision-making approaches, and clearly identified broad roles and responsibilities for government and industry stakeholders⁵.

In determining the best approach for governance, AAFC examined models used by other countries. As in Canada, these models focused on governance for the management of the disease eradication and control activities rather than the aspects that would fall under the LMIS.

⁵ Agriculture and Agri-Food Canada (2016). [LMIS Market Interruption Emergency Response Governance Approach](#).

The research confirmed that other countries grapple with the same issues and that there is a need for collaboration across all stakeholders (governments and industry). The research provided a few key points regarding the challenges in such governance structures, including ensuring:

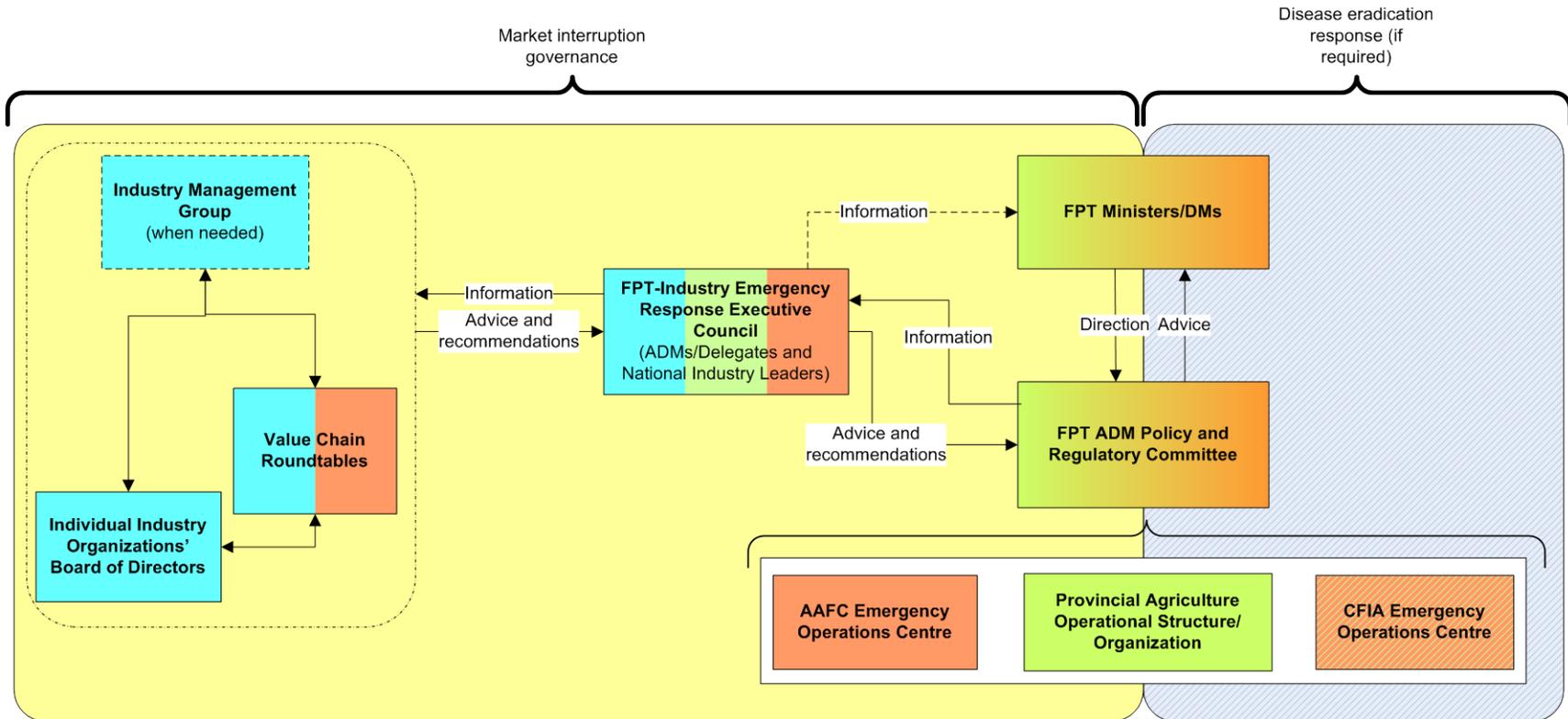
- The concept of national leadership does not take away from the shared responsibility of all stakeholders;
- That the collaborative discussions do not obscure true individual accountability; and
- Integrated information sharing amongst all stakeholders continues to help inform decisions.

Based on discussions, the research findings and understanding of the challenges in the collective management of an emergency event, key principles to guide strategic and operational decision-making and actions in a LMI scenario across levels of government, and with industry, were developed as part of the governance structure.

Key Principles to Guide Decision-Making

- All parties commit to respect each other's roles and responsibilities in order to achieve common goals for response and recovery.
 - FPT governments and industry agree to partner and collaborate in preparing for, responding to and addressing sector recovery to a market interruption, in recognition of the roles that each party has to play.
 - All parties agree to communicate in a timely and transparent manner, using consistent messaging with partners and with the public, both during and following a market interruption.
 - FPT governments, with the necessary cooperation of industry stakeholders, commit to continuous improvement of policy, programs and procedures so as to enhance government and industry's preparedness and capacity to respond to events.
 - FPT governments and industry agree to operate under a shared governance structure and to commit to sharing current and comprehensive information among all implicated parties. Where possible, decisions will be made at the lowest level possible within the governance structure.
 - All parties acknowledge that decisions will often be made by individual stakeholder groups, but some decisions will need to be made jointly between the federal and provincial/territorial governments.
 - Where possible, all parties agree to share information regarding a potential event that could result in a market closure to all parties as soon as possible so as to appropriately prepare for and/or to mitigate the impacts of the market interruption.
 - All parties will contribute to setting achievable joint goals/outcomes in addressing a market interruption.
 - Recognizing the psychological impacts of certain activities that may be performed during a market interruption and the potential negative public perception of some activities, all parties commit to maintaining and enhancing public trust through transparency of decision-making and clear actions to support the challenges felt by the sector and those involved in the response.
-

Figure 1. Recommended LMIS Governance Structure



The recommended governance structure in Figure 1 builds on the use of existing committees. Recognizing that a significant LMI such as a FMD outbreak will require timely response, the structure must be capable of coming together immediately following the border closure and assume information sharing and analysis functions, making the use of well-established committees ideal.

Although many entities in the structure already exist, there are two new entities. First is the Industry Management Group, which may or may not be established at the discretion of industry leaders. This group is a forum for industry to jointly discuss and recommend actions across multiple sectors, such as in the case of FMD where both cattle and pork (as well as other cloven hoof sector organizations) will be impacted. The results of these discussions and decisions may help form the information, advice and recommendations that feed into the FPT-Industry Emergency Response Executive Council.

The second new entity in the governance structure, the FPT-Industry Emergency Response Executive Council, is critical to the success of the governance structure. Formalizing this entity signals to industry that FPT governments will engage them early in an emergency response. It also demonstrates a more robust acknowledgement of the breadth of roles and responsibilities of the various stakeholders in a LMI. This council will be expected to provide the venue for frank and timely dialogue and deliberation and will support and inform decision-making by both FPT Policy ADMs and FPT Deputy Ministers/Ministers. It will focus on providing broad, overarching direction and recommendations for strategic-level decisions. As such, it will:

- Provide feedback and advice on policy approaches and options for response (e.g. financial assistance mechanisms, where to first deploy resources);
- Enable issues and concerns from all stakeholders to be brought together quickly for deliberation and recommendations for actions to be developed;
- Provide a forum for deliberation and consensus-building between industry and governments regarding emergency response;
- Consolidate industry-government views on the strategic direction necessary and provide recommendations to decision-making bodies for action; and
- Advise of any further action that should be undertaken after the emergency is over, such as further research and revision of contingency plans

The Council will not replace the other avenues of information sharing during an event. Its intent is to facilitate timely and well-informed discussions of critical government and industry leaders.

While the governance and decision-making structure uses existing bodies, they do not have an explicit mandate for emergency management although some having been used in the past to address major issues. The value chain roundtables (VCRTs) have a membership that encompasses the entire value/supply chain for a sector and are ideally placed to inform the FPT-Industry Emergency Response Executive Council of issues and provide recommendations for action. Similarly, the FPT Policy ADMs Committee does not have a specific mandate to manage an emergency event, but its membership and general approach for building consensus on issues across federal and provincial/territorial governments makes it an ideal forum for joint emergency management decision-making, where required.

The governance structure acknowledges that all levels of government and industry are making decisions at various stages of a LMI and is based on the concept that decisions are being taken at both an operational and strategic level.

Strategic decisions set the overall direction in addressing the event and focus on issues that are multi-jurisdictional or involve more than one body. The decisions taken at this level will, for the most part, be informed by the FPT-Industry Emergency Response Executive Council.

Operational decisions are focused on actions regarding how key direction should be implemented (e.g. what methods to use in depopulation, priorities for depopulation, coordinating with other partners where necessary) and on decisions that can be made through existing policy frameworks within a single jurisdiction.

Although decisions are generally made by a single jurisdiction, it is recognized that information will be shared between stakeholders. It is also at an operational level where staff will coordinate with the broader government emergency coordination bodies (Federal Government Operations Centre, Provincial Emergency Management Offices, etc.).

A key piece in developing an appropriate governance structure was to clearly define roles and responsibilities for all stakeholders and ensure those roles and responsibilities were enabled. A summary of the key roles and responsibilities of stakeholders involved in the governance structure is provided below.⁶

The **federal government** has a dual response role in any market interruption emergency. First, it leads on activities within the federal mandate, such as international trade. Second, it will provide assistance to provincial/territorial governments upon request and coordinate actions with provinces/territories where necessary.

AAFC's primary role during an emergency is to support the sector in relation to trade and economic impacts. In the context of a market interruption, this translates to:

- Leading trade resumption activities;
- Leading information sharing and situational awareness with other federal departments, provincial/territorial governments and industry stakeholders;
- Developing specific transition initiatives and programs, in conjunction with provincial/territorial governments and industry as appropriate, to assist industry in recovering from the event or in the interim of markets reopening;
- Ensuring AAFC-led actions are coordinated with other key federal departments involved (e.g. CFIA, Global Affairs Canada);
- Communicating regularly with national industry stakeholders regarding impacts and response actions being taken;
- Facilitating FPT and FPT/Industry discussions and decision-making through the agreed upon governance structure;
- Ensuring that Public Safety Canada and other federal government departments (as required) are provided timely and relevant updates; and
- Leading the public communications response to the market interruption in conjunction with provincial and industry partners

Other federal departments also have responsibilities in a market interruption. For example, the CFIA is the mandated lead for emergency response relating to food safety and animal health

⁶ Agriculture and Agri-Food Canada (2016). [LMIS Market Interruption Emergency Response Governance Approach](#)

and would lead the investigation and control of a foreign animal disease outbreak. It is AAFC's responsibility to ensure that other federal government departments are provided timely and relevant updates on LMIS-type activities.

In general, **provinces/territories (PTs)** will respond based on their provincial emergency legislative authorities and can request assistance from the federal government when required. In the context of a market interruption this means:

- Supporting response activities on the ground and facilitating discussions with key stakeholders (e.g., municipalities) for those activities, where necessary;
- Participating in trade resumption planning and related activities at the request of the federal government (AAFC);
- Ensuring response decisions are shared with other governments;
- Supporting industry transition and depopulation decisions through initiatives/programs and information; and
- Supporting disposal of animal carcasses, which is jointly managed by producers, industry organizations and provincial/municipal governments.

To be successful, work cannot only be undertaken by governments. **Industry** has an important role to play in emergency response, both in informing government decisions and in managing its transition during a period of turmoil and change. This would include managing their business and risks in the immediate term when a market interruption occurs. Industry also has an important role to play in managing its own risks during 'peace-time' such as through diversified exports, biosecurity measures and preparedness activities. As such, industry responsibilities include:

- Providing recommendations and industry perspectives to FPT governments to aid in decision-making and notifying FPT governments of issues and concerns as they arise;
- Communicating FPT government decisions to its members and encouraging individual producer/business action in relation to government decisions;
- Leading communication activities directed to its members to ensure those members can make informed decisions related to their individual business and to the public regarding food safety;
- Responding to animal care and environmental issues if and as they arise;
- Leading promotion of domestic consumption to help mitigate the impact of a border closure in collaboration with FPT governments;
- Managing flow of product to the domestic market; and
- Proactively managing risks within their capacity and capabilities to support long-term resiliency.

Individuals in the sector supply chain, **producers and processors**, will ultimately take the information and initiatives provided by FPT governments and industry organizations and make decisions directly related to their business, such as maintaining on-farm practices consistent with animal care and environmental codes of practice. They also have a responsibility to identify issues and report them to their respective PT or national organization. Lastly, all sector individuals and businesses have a responsibility to ensure the health and welfare of livestock in their care.

Outcomes and Next Steps

Completing the work on governance has generated one key outcome. Discussions have challenged all stakeholders to think about the best governance model for managing a long-term crisis, one that goes beyond the initial disease control and eradication focus led by the CFIA. The structure ultimately developed will enable timely, fact-based coordinated and well-understood decision-making and collaboration amongst all parties, which will contribute to consistent public messaging. This is a significant step forward in achieving the fundamental policy objectives for LMIS, although how governments and industry can work together more broadly for all types of incidents, including in prevention/mitigation (beyond the LMIS response governance structure) is also important to consider. While outside the scope of a LMIS, it should be considered as part of other emergency management initiatives, such as the Strategic Emergency Management Framework (SEMF)⁷.

While a significant outcome was achieved, further governance work is required to validate that work and support ongoing work. While the LMISSC did not have the opportunity to put LMIS, or the governance piece specifically, through a tabletop exercise to assess performance and identify strengths and weaknesses prior to publishing this report, all members agree on the value of practicing the activation and use of LMIS. The relatively infrequent activation of emergency response for AAFC does not provide opportunities for individuals and organizations to prepare for a real occurrence. Multiple occurrences of notifiable avian influenza in British Columbia have required emergency response with the repeat occurrence enabling the BC poultry industry and governments to improve overall performance in managing the response. The application of joint lessons learned sessions have aided in identifying deficiencies and improvements in policies, protocols and practice.

The use and application of a table top exercise to activate LMIS with a subsequent critical assessment of the response performance will serve to:

- Enhance preparedness
- Improve the effectiveness of managing the response
- Identify critical weaknesses
- Enable further planning and preparedness to address areas of critical weaknesses

Accepting that staff turnover will occur in all organizations, all parties must commit to regular, periodic exercises to ensure the full benefits of LMIS can be realized.

It was also noted that to both advance the work and recommendations of this report as well as to ensure an enhanced, ongoing state of preparedness among all implicated stakeholders, a sustained, steering committee would be critical to ensure these outcomes. This would ensure

KEY ACHIEVEMENT

A governance structure that formalizes the importance of the government-industry relationship, while acknowledging and using existing forums and committees where possible to make managing an emergency easier because the structure is regularly used for normal business.

⁷ For more information on the SEMF, see VI. End Note.

continued attention to this file, preparedness of individuals implicated in a response, and ongoing awareness of developments that could impact how governments would react (e.g., keeping abreast of new developments in disposal and depopulation methods).

ii. Communications

Communications with the public and between stakeholders are of critical importance during an emergency. Timely, accurate, open and coordinated information is a key element to instilling confidence in the public and facilitating collaboration among stakeholders. Implementing strategies and ensuring coordinated communications would help to manage the transition, reopen markets and promote domestic consumption. To that end a broad communications approach was prepared to ensure all stakeholders would be able to communicate with the public more quickly and clearly in an emergency.

Guiding Principles for Coordinated Communications

- Engage in timely and appropriate communications activities coordinated among government and industry partners.
- Confirm a communications coordination lead and a communications team involving government and industry partners.
- Facilitate information sharing with communications partners as quickly as possible and establish a process for ongoing cooperation.
- Confirm roles and responsibilities specific to the event.
- Coordinate communications within the partners' respective structures.
- Ensure the communications response embodies general risk communications and emergency and crisis communications principles.
- Ensure consistent messaging regarding animal health, public health and food safety
- Develop a protocol for the exchange of confidential information, if necessary.

A review and strategic analysis was undertaken of livestock interruption communications strategies, as well as case studies and lessons learned from BSE and foot and mouth disease outbreaks, and recent food safety incidents in Canada, along with other literature. Based on that review, a number of communications issues and considerations arose, such as the need to:

- Come together quickly to share information and coordinate communications messages (in a pre-established forum for such purposes);
- Ensure accurate, approved messaging is communicated as quickly as possible;
- Have consistent, non-contradictory messaging to build public confidence and trust; and
- Have a clearly defined lead and designated spokespersons that can speak clearly with the appropriate authority and establish trust that the situation is being handled.

Two key documents were produced to help coordinate the communications responses of governments and industry during a LMI: a framework and protocol.

The LMIS Communications Framework, summarizes the review and strategic analysis of

previous livestock interruption communications strategies; identifies communications issues and considerations; provides guiding principles for coordination; and recommends a series of communications strategies that should be created in advance of a LMI to allow governments and industry to be better prepared to respond quickly. In addition, the Communications Framework suggests tools to use in those strategies.

The Communications Protocol builds on the Framework. The objectives for the Communications Protocol include minimizing financial loss by providing coordinated and consistent information and direction for producers, processors and consumers; maintaining the trust and confidence of consumers, stakeholders and domestic and international markets through open and well-coordinated communication; and informing decision-making through information sharing and coordination.

The Protocol sets out FPT government and industry roles and responsibilities, as well as the roles and responsibilities of proposed communications committees that would be struck in a LMI. It describes the target audiences for communications products and includes a series of mini communications strategies with draft key messages for themes that would be expected to arise during a LMI, such as humane depopulation of healthy animals and the availability of Business Risk Management programs that might be able to help address financial impacts of the market interruption. It also includes a number of sample general messages to be used at the outset of a LMI. These messages focus on describing the event and impact, what governments and industry are doing to address the situation, as well as assuring the public of the safety of food and explaining human health risks, if any.

The recommended communications mini-strategies and tools contained in the LMIS Communications Protocol are based on best practices and are intended to be a starting point to assist planning for a coordinated communications response. Recognizing that government and industry stakeholders have their own respective roles and communications plans and approaches, they contain a breakdown of the theme; lead responsibility; spokesperson (political and technical); target audiences; strategic communications considerations; communications approach; communications roles and activities (for each party – federal, PT and industry); recommended activities; and sample key messages broken down by intended audiences. It is understood that the messaging will have to be modified based on the real scenario, but it provides an agreed-to starting point intended to save time at the outset of an emergency.⁸

Two broad audiences for communications efforts in a LMI

- Primary audiences include producers, packers and processors; trading partners; and organizations servicing the livestock and meat sector.
 - Secondary audiences include the general public, travellers, other FPT departments and media.
-

⁸ LMIS Communications Working Group, with Livestock Intelligence (2016). [LMIS Communications Protocol](#).

Having these will allow stakeholders to communicate efficiently and consistently immediately when an event occurs.

Roles and Responsibilities

All stakeholders have communications roles and responsibilities both within their own organizations and as part of the broader communications response as outlined below. Each organization is responsible for designating spokespersons; identifying technical experts;

AAFC Roles and Responsibilities

- Lead and coordinate the federal government's communications activities of a market interruption.
- Address the communications needs of the Canadian public and trading partners, with communications products, materials and services specific to the event.
- Coordinate the activity of participating stakeholders from FPT governments and industry organizations to ensure consistent and timely messaging.

Provincial and Territorial Roles and Responsibilities

- Lead the communications activities of their respective governments.
- Address the communications interests of the public within the respective province and coordinate the activity of participating stakeholders within their jurisdiction from local government and provincial industry interests.
- Lead on communications specific to their jurisdiction, such as disposal siting, and generally support the efforts of the federal government communications.

Industry Organizations Roles and Responsibilities

- Address the communications interests of its members and constituents.
- Coordinate the activity and resources of participating organizations, nationally and provincially within their sector.
- Focus communications on producers and the public and lead on communication directed towards helping the sector recover; and support the communications efforts of FPT governments in response to the more general aspects of the interruption.

maintaining contact lists of target audiences and key resources; developing communications

messaging and tools to prepare for a possible LMI; maintaining factsheets, messaging or other risk communications products specific to events anticipated within a market interruption; and responding during an event.

Outcomes and Next Steps

The Communications Working Group has advanced the preparedness of government and industry stakeholders for a LMI and has established a network of FPT and industry communications specialists. Specifically, it developed guiding principles and a protocol. The protocol outlines the communications committees that would be struck in an emergency and includes a series of mini communications strategies with draft key messages. While the messaging will have to be modified based on the real scenario, the protocol provides an agreed-to starting point intended to save time during an emergency.

To ensure that what has been developed can work in an emergency, it needs to be tested. Further, the communications committees are not existing entities. To ensure they are the most useful committees and would contain the right membership, bringing them together and using them to develop the refined communications material based on a scenario would be beneficial. A small-scale exercise focused on communications would confirm that the material developed and committees will work satisfactorily in an emergency and/or highlight areas of improvement.

KEY ACHIEVEMENTS

A communications framework and protocol to enable collaborative development of communications activities and messages.

Draft communications strategies and key messages that support national consistency and timely communication while allowing refinement as needed during a real event.

iii. Industry Transition and Decision Support

The objective of the LMIS was to gain a better understanding of how industry could transition through a market interruption and what supports might be needed, while not committing to or designing specific programs. The economic impacts and effects of a major LMI are estimated to be up to \$58 billion for FMD (2014 dollars)⁹; however, existing information and models are incomplete and limit the ability to undertake informed decision-making. Further, the range of potential options or solutions for dealing with the surplus of healthy animals has not been fully scoped out.

Much has been learned from past responses to foreign animal disease outbreaks, not just in Canada but from other countries' experiences. No two outbreaks are the same, nor are outbreaks all of the same disease. The common element, however, is the need for the affected industry sectors to have a range of strategies identified in advance to quickly adapt and transition to a new market reality.

In Canada, no single entity has the authority or responsibility for managing production, transportation, processing, marketing and distribution of live animals and product on a national basis, which provides a significant challenge to overcome at a time of crisis. The range of decision makers from individual producers and processors through to industry associations and all levels of government add layers of complexity. There is a lack of clearly defined authorities and responsibilities to undertake actions to mitigate the economic impacts of a LMI (e.g., undertaking depopulation and disposal), which often increases pressure by, and for, certain parties to act. This can lead to paralysis or delays in decision-making, while increasing pressure for short-term announcements made without the benefit of detailed information. The default is each stakeholder making independent decisions without due regard for the broader interests of the industry. Establishing a process that contributes to timely decision-making and supporting collective and collaborative efforts to transition industry to a "new normal" as efficiently as possible, is a priority.

Considerable work has been undertaken by governments and industry to further the information and knowledge base to support decision-making in a LMI event in all areas examined by the LMISSC. This report only provides a summary of that increased knowledge and decision-making approach, but specific tools and information have been developed, including:

- Considering approaches to effectively transition the industry to a "new normal" after a LMI, including the identification of principles to guide support for transition;
- Developing models and tools to provide information that will enable the evaluation of the consequences of various options for managing animals during a LMI; and
- Examining humane depopulation and carcass disposal methods and their resource requirements.

Industry Transition

Undertaking measures to assist industry transition through large-scale market interruptions is not new. However, it is understood that the needs of the stakeholders can change drastically during different types of events, and over different timeframes.

⁹ Serecon Management, prepared for the Canadian Animal Health Coalition (2002). [Economic Impacts of a Potential Outbreak of Foot and Mouth Disease in Canada.](#)

To gain a greater understanding of industry needs and to assist in decision-making (and the understanding of the potential impacts of those decisions), several pieces of work were completed under the LMIS. A first step was to develop Producer Decision Models. These models reflect that producers will need to make decisions on whether to continue breeding sows and cows and how many breeding animals to retain in the event of a LMI, as well as to take decisions about the ultimate disposition of market animals based on underlying factors. Decision models for cow-calf, backgrounder/feeder/fed cattle and hogs were developed, which illustrate the daily decision-making that will need to be adjusted in the context of a LMI.¹⁰

After engaging with the sector to confirm the decision models, the potential needs identified through those models provided a starting point to discuss transition approaches. This discussion was undertaken through a joint government-industry workshop¹¹. The intent of the workshop included:

- Discussing the objectives of transition approaches;
- Reviewing previous responses to large-scale market interruptions; and
- Discussing potential transition approaches and potential roles for government and industry through those approaches.

The workshop participants looked at a range of previous program responses and their objectives to determine best practices and potential areas where any future support measures should focus. Examples such as the range of programs offered to address BSE in 2003 and measures to assist the hog sector during a period of market decline demonstrated the difficulty in developing cost-effective and measurable program options during time-sensitive and dynamic crises. The participants also considered the existing suite of Business Risk Management (BRM) programs; however, they noted that the program suite is not specifically intended to address medium- to long-term impacts of large-scale LMIs. BRM programs can, however, provide short-term support until the potential need for other programming approaches is understood.

The review of previous program responses concluded that previous program objectives

Overarching Objectives for Transition Measures

- Support and maintain a functioning market;
- Recognize the full impacts along the supply chain, while targeting key parts of the supply chain (e.g., potentially supporting slaughterhouses with an aim to increase entire beef supply chain performance);
- Consider the “phase”-based view of transition, reflecting that different approaches may be necessary at different periods from response to recovery;
- During the event, focus on adaptation to production and marketing realities; and
- During the event, provide structure for any rationalization of the sector that is necessitated by market realities.

¹⁰ Agriculture and Agri-Food Canada (2015). Transition Producer Decision Models.

¹¹ Agriculture and Agri-Food Canada (2015). Transition Workshop “What We Heard” Report.

reflected a range of approaches any future assistance programs could have in a LMI. This led participants to consider the potential transition approaches that could be used in the future. Discussions emphasized the desire for a government-industry approach, including cost-sharing between all stakeholders. Industry representatives of the LMISSC were interested in pursuing options such as those found during a review of the Netherlands and Australian models, including initiatives established in advance of a real event (particularly, their focus on pre-defined cost-sharing arrangements, and models whereby funds are provided quickly during a crisis and paid back over a longer time period). Other approaches such as insurance-type models were identified as being worthy of consideration.

The workshop laid the important groundwork in establishing the range, breadth and depth of the challenges for managing and facilitating industry transition during an LMI. In addition to the key objectives, the workshop participants also noted:

- The acknowledgement that government and industry both have roles to play in policy and programming;
- The need for preparedness efforts, down to the producer level (e.g., being prepared to manage impacts in the short term); and
- There are proactive models/scenarios that could be considered in light of transition approaches.

Based on what has been learned through the development of this work under the LMIS, it can be concluded that, in the short-term, there will be greater emphasis on individual financial management and use of existing programming (i.e., Business Risk Management). As needs are understood, and other programs are potentially being developed, it will be important to ensure that they align with the various other actions being taken within an overall transition approach (e.g., if an orderly marketing/movement plan is put in place during a LMI event, this will impact potential programming).

Impact Modelling Tool

A major deficiency in preparedness has been the absence of an existing econometric model or tool that provides real-time analysis of the impacts and effects of a LMI. While a number of economic models currently exist within AAFC (Food and Agriculture Regional Model (FARM), OECD's AGLINK/Cosimo Model and Canadian Regional Agriculture Model (CRAM)) or outside of AAFC that can contribute to an economic assessment in the medium- and long-term, none of the models were capable of providing real-time economic assessments or analysis of the impacts and effects of a range of possible options. It was necessary to explore the development of a modeling tool that would complement these existing models and allow governments to see the short-term impacts, and also assist governments in assessing the impacts of response options/decisions.

An Impact Modelling Tool (IMT) has now been designed and developed to take into account the producer decision models, transition concepts and other tools developed through the LMIS (e.g. humane depopulation calculator) to inform actions. The tool can determine the possible short-term impacts to the sector from both the scenario itself as well as potential options for action (e.g., x% culling of cattle would yield a y% increase in the cattle price).

The IMT is made up of some basic design elements:

- Commodities/Livestock species - Focus on the key livestock value-chains, beef cattle and hogs/swine. This provides the ability to design commodity/species specific scenarios.

- Regions – Subject to data limitations, the model is designed to look at the situation from national and a provincial/territorial perspective.
- Modelling Time Intervals – The model will utilize the most recent data and be able to project on a weekly basis the actual impact of what is happening and the impact of specific scenarios.

Humane Depopulation (HD) and Carcass Disposal (CD)

A large focus of LMIS work was in the area of humane depopulation and carcass disposal. Canada has not faced a situation that necessitated the mass depopulation and disposal of livestock in recent history. A major LMI such as a FMD would quickly result in a surplus supply of healthy animals. Market, economic and animal welfare considerations, particularly in the intensive hog industry, will require industry and governments to explore large-scale livestock depopulation and carcass disposal options. The decision to depopulate and dispose of excess healthy animals must take into consideration public perception and confidence issues as well as animal welfare concerns. It is, by far, the most significant component of the LMIS, and will involve considerable effort by all governments as well as the primary and processing industries.

Although depopulation often occurs on a small-scale, mass depopulation and disposal of large mammals is rare. As a result, very little information was available to support LMIS activities in this area. Several provinces have initiated plans¹² for many of the areas of concern; however, the significance and interconnectedness of a response strategy to a market interruption requires a common focus among all of the participants. Consequently, efforts to increase the knowledge in the areas of humane depopulation and carcass disposal are a key element to enhance preparedness.

The first main piece of work was to determine options for methods that could be used for mass depopulation or carcass disposal. Discussions with a panel of experts from CFIA, provincial/territorial governments and industry were used to determine whether the methods were acceptable for use in mass depopulation and disposal activities and the conditions under which each would be applied. While the cattle industry remains concerned with respect to the practical application of the methods, particularly in high density locations such as feedlot alley in Alberta; ultimately, seven depopulation and nine disposal methods were determined to be acceptable for use for some or all subject species. It should be noted that not all are equally approved for use in all provinces.

In addition to examining the methods of disposal, the LMIS identified the need to assess site disposal risks for forward-planning, to manage and mitigate potential environmental impacts of a mass disposal of livestock carcasses¹³.

The risk to the environment will be dependent upon the disposal method; the number and type of animals to be disposed of; disease considerations (such as human health impacts, the need for full containment over time, persistence in soil, presence of spore forming organisms); and the location of the site and environmentally sensitive attributes (water, soil type, etc.). The level

¹² British Columbia and the Atlantic Canada Dairy Producers have developed emergency management guidance documents for producers. The guides provide templates for individual farm level emergency management plans. These plans contribute to increased emergency awareness and preparedness at the producer level.

¹³ Ontario Ministry of Agriculture, Food and Rural Affairs (2015). [Post-Disposal Environmental Assessment](#).

of risk increases from rendering and incineration methods at the lower end of the scale to centralized or on-farm burial at the high end of the scale.

To address this risk, analysis determined that data such as animal and site information; who will be responsible for holding the data and for how long; and implementing monitoring systems will need to be collected. The monitoring systems would identify what will be monitored; frequency and duration of monitoring; the thresholds for emissions triggering a response; and action plans where a response is triggered.

Two specific methods, slaughterhouses (for depopulation) and rendering facilities (for disposal), were considered key to meeting the needs to quickly and humanely address the surplus of livestock in a LMI and were looked at in more detail by representatives within those sectors. The LMISSC viewed government licensed slaughterhouses as the preferred means for humane depopulation since slaughter facilities are already a socially acceptable method for animal slaughter.

Representatives from the slaughterhouse sector worked with their counterparts to establish a set of Guiding Principles for Slaughterhouse Operators in Emergency Situations, recognizing operational standards already in place (including Hazard Analysis Critical Control Point plans, Standard Operating Procedures, training and emergency simulations). They were also intended to guide the development of industry-wide emergency plans and recommendations of meat industry associations.

While the merits of using slaughterhouses for humane depopulation from a public perception perspective are unquestionable, implementing the option is not without its own set of challenges. There are facility, financial, privacy and other challenges that will need to be considered or addressed to be able to optimize the use of slaughterhouses for depopulation. A summary of the challenges identified by industry are included in Annex B.

An important challenge identified in using slaughterhouses was the processing flow built into the facilities. Slaughterhouses are designed to move an animal/carcass through a set process to small cuts for sale. When using slaughterhouses for a mass cull, it would be inefficient to run the carcass through the entire process if there was no demand for the meat/product, but there is no current option for stopping the process flow once an animal has entered the process. To optimize the use of slaughterhouses there are likely to be significant costs to adapting the existing infrastructure to increase support of throughput in humane depopulation activities in a LMI event.

Guiding Principles for Slaughterhouse Operators in Emergency Situations

- Food safety – maintain existing measures and standards in emergency situations, even where the ultimate disposition and product values are not known at the time of slaughter.
 - Animal health and welfare – maintain existing measures and standards and plan for their continued application in emergency situations.
 - Employee health and safety – ensure priority for maintaining a safe work environment for employees and maintain existing health and safety measures in the workplace and develop emergency situation processes and policies for workers.
 - Environmental stewardship – continue to operate in accordance with the environmental requirements and plan for different waste disposal scenarios in collaboration with transporters, renderers, government inspectors, etc.
 - Collaboration – establish and maintain strong relationships with government and other LMIS stakeholders to encourage trust and facilitate communication.
 - Coordination – synchronize activities with all relevant stakeholders to achieve the desired outcome and mitigate the impact of a LMI.
 - Financial viability – slaughterhouse operators and government partners need to anticipate and plan for the financial implications of operating in a situation of greatly disrupted market conditions, both in terms of animal supply and product sales.
-

Just as slaughter facilities can provide a more socially acceptable approach to humane depopulation, so too can the use of rendering facilities for carcass disposal. The size and capacity of rendering facilities also permit efficient processing of mass quantities and allows the disposal of surplus, healthy carcasses as useable product. In the event of a FAD, segregation of infected and healthy carcasses would be required.

As with the use of slaughter facilities in the depopulation process, there were a number of issues that precluded the development of a generic plan for their use. Like slaughterhouses, facility, regulatory (licences and permits), and financial issues were raised. In addition, the industry noted some additional challenges that would need to be considered, including:

- The need for carcasses to be in good condition because decomposed material does not render properly, which would mean minimal delay between slaughter and rendering;
- Lack of storage capacity;
- The ability to move carcasses to the rendering locations, which are dispersed across Canada and have set pick up routes; and
- Trucking capacity and the availability of specialized carcass handling equipment to manage the possible quantity of carcasses.

Along with the challenges noted in using slaughterhouses and rendering facilities, there were a number of general challenges noted related to:

- Legislation;
- Capacity;
- Authorities; and
- Existing provincial/territorial and industry plans

Legislative challenges

Approximately 220 federal and provincial legislation and policy records pertaining to depopulation, disposal, animal movement and emergency management were obtained in files and public sources¹⁴. These legislation and policy records suggest there is significant coverage across jurisdictions to manage depopulation and disposal efforts. However, a more in depth analysis¹⁵ revealed:

- Variation in ministries responsible for disposal between provinces;
- Disposal methods legislated by different ministries within a province;
- Variation in types of legislation across provinces;
- Legislation is not enacted to cover all disposal methods;
- Not all disposal options are available in every province (e.g. rendering); and
- Not all disposal options are permitted in every province.

As a result, there could be a number of barriers to effective disposal in a large-scale market interruption. While bringing consistency and harmonization across all provinces would improve response in an emergency even further, it may not be practical or feasible.

Disposal Capacity

The legislative analysis related to disposal capacity identified that disposal options within any given jurisdiction are likely to be rapidly overwhelmed in a LMI. Current emergency management legislation is not flexible enough to address large scale disposal events. Public perception will also significantly influence the ability to utilize certain disposal options (e.g., “not in my backyard” for landfills).

Municipal Authority

Municipalities will play an important role in carcass disposal activities, including the use of municipal disposal facilities. While provincial legislation and regulation enable provinces to direct the use of such facilities for these purposes, provincial governments have demonstrated reluctance to exercise such powers, even in the midst of an emergency situation. Lessons learned through proactive approaches by some provincial governments in working with municipalities were identified as possible ways forward to mitigate this issue.

Provincial and Industry Plans

All provinces have general emergency management/response plans. Four currently include provisions that pertain to depopulation and related concerns: Quebec and British Columbia have specific depopulation and carcass disposal plans, Ontario has a Mass Carcass Disposal Plan in place, and Manitoba has a detailed regional carcass disposal plan for the Hanover area that is a model for the rest of the province.

¹⁴ Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec (2014). Identify differences between provincial regulations and an FPT mechanism to discuss regulatory differences.

¹⁵ Ontario Ministry of Agriculture, Food and Rural Affairs (2015). Identification of the disposal response options impacted by current FPT authorities and the assessment of potential changes.

In addition, some provincial commodity boards and associations have emergency management/response plans that include depopulation and related concerns, notably swine in Quebec. As well some provincial commodity associations have produced emergency management guides and developed templates for farm-level emergency plans.

Humane Depopulation and Carcass Disposal Models and Tools

- HD Selection Tool is a spreadsheet that assists in ranking numerous factors to determine suitability of approaches.
- HD Cost Estimate Calculator is a spreadsheet tool with pre-populated formulas to assist in estimating costs, based on the number of animals for depopulation.
- List of HD and CD equipment kits and supplies.
- Reference list of provincial resources.
- Planning process model – provincial/operational.

The development of plans is necessary and the existence of plans is beneficial for preparedness. However, the nature of a LMI event requires rapid, coordinated responses, potentially in a very wide geographical area encompassing several provincial jurisdictions. The potential for misalignment and conflict among jurisdictions can lead to risk for one or more of the decision-makers managing the response effort, or institutional paralysis while issues are sorted out situation by situation.

Although slaughterhouses and rendering facilities have been identified as having a key role in depopulation and disposal activities, given the challenges that currently exist for their use as well as the general challenges of mass depopulation and disposal identified above and the need for quick decisions for actions in those areas, an important piece of the LMIS work was to develop a series of tools to support stakeholder decision-making¹⁶.

Tools to facilitate the evaluation and selection of the depopulation method and to estimate

costs were developed. Once the methods were determined, further analysis of rates, crew sizes, equipment required and overall costs for the methods was undertaken. It is understood that herd depopulation is costly. However, cost-of-disease studies focus largely on the cost of livestock losses, opportunity costs to the industry and the costs of clean-up, and are undertaken after the fact. LMIS intended to proactively develop an understanding and estimates for the funding, human resources and equipment that may be required to effectively implement each method so that gaps could be identified and plans developed. The tools developed have made inroads to addressing some of the gaps.

Four 'worst-case' scenarios were developed and used to provide context for costs. Ultimately, determining rates, equipment and their related costs was a major challenge because the data currently available falls far short of what is needed to properly quantify the required depopulation and carcass disposal capacity nationally or by province. The absence of data for rates-of-use for HD methods and quantitative capacity for CD methods required the application

¹⁶ EBiz Professionals Inc. (2015). Investigation of Humane Depopulation and Carcass Disposal Methods, and Development of Plans and Procedures for a Livestock Market Interruption Strategy. (Executive Summary in Annex B).

of analytical tools and simulation methods drawn from other sectors and uses. These methods included process analysis, work breakdown structure, and activity-based costing to determine costs estimates. This methodology was presented at the September 2015 5th International Symposium on Managing Animal Mortalities, Products, By-Products, & Associated Health Risk: Connecting Research, Regulations, & Responses¹⁷ in Lancaster, Pennsylvania and was well received by participants and organizers. This could be considered a validation of the work completed under the LMIS on humane depopulation and carcass disposal throughput assessments.

Findings using the methodology and tools above suggest that the scale of the work that would be required and the potential costs would be substantial. Using the four worst-case scenarios chosen for the analysis, the estimated overall costs for humane depopulation and disposal based on a **60-day duration** of activity are provided in figure 2. The assumptions made in these costs are that all the acceptable methods would be equally used and that a cull would happen equally across the country (e.g. the same percentage of cull would occur in every province). It is also based on the current census data for quantities and distribution of livestock across the country. The estimated costs include:

- Trained personnel costs (based on estimated number of personnel needed to depopulate/dispose of the required number of livestock, hourly rates, per diems, estimated travel costs including hotels and transportation)
- Equipment costs (based on a detailed list of all equipment and supplies that would be needed for depopulation and disposal, from firearms, shelters and skid steers to needles, gloves and fuel and their current costs per unit).

Estimated costs do not include the value of the livestock depopulated or the value of the product and carcasses disposed of. It is limited to the estimated costs to *perform* the depopulation and disposal activities.

Figure 2.

Scenario	Estimated Costs
Border closure triggered by a non-disease event affecting exports of live hogs, pork and pork products (e.g. contamination of supply chain with an unauthorized product). Borders are assumed to remain closed for a period of at least 6 months.	\$194.1 million
Border closure triggered by a non-disease event affecting exports of live cattle, beef and beef products (e.g. contamination of supply chain with an unauthorized product). Borders are assumed to remain closed for a period of at least 6 months.	\$316.1 million
Border closure triggered by a reportable disease affecting both cattle and hogs (e.g. Foot and Mouth Disease); outbreak occurring in Alberta with the city of High River located in the disease control zone.	\$506.2 million
Border closure triggered by a reportable disease affecting both cattle and hogs (e.g. Foot and Mouth Disease); outbreak occurring in Quebec with the city of Charny located in the disease control zone.	\$523.8 million

As part of the work to determine estimated costs, the analysis also showed the resources that would be needed. For example, in the first scenario (hog, non-disease event), it was estimated

¹⁷ EBiz Professionals Inc. (2015). Approach to Planning for Canada-wide Mass Depopulation and Disposal.

that 451 trained staff working 60 days straight would be required to *depopulate* 70% of the livestock in Quebec alone. A total of 1,375 trained staff would be needed across Canada in that same scenario. This number is likely to be increased when taking into account the need to provide temporary relief for those needing respite from the stress, and also for those who are not able to remain active for the full period of the depopulation cycle.

The numbers are staggering. Knowing that it is likely that these same resources will be involved in depopulation and disposal related to diseased animals in a disease outbreak scenario, it supports the need for greater preparation of plans and training to be able to meet the challenge of depopulating and disposing of mass quantities of livestock in a humane manner.

Outcomes and Next Steps

The policy objective for a national framework to manage industry transition was a daunting challenge for the LMSSC. While it remains a work in progress, the work to date has served to improve the level of preparedness of all stakeholders.

First, the Impact Modelling Tool fills a gap in AAFC's economic modelling, which will support more informed decision-making in a LMI. However, it will be important to test, update and maintain the tool along with the other models and tools currently in place to ensure their contribution and value in the management of a LMI remains timely and effective.

Secondly, the information and tools supporting depopulation and disposal-specific activities have also allowed a more transparent understanding of the scope of the work that would need to be undertaken and the time and resources required to effect depopulation and disposal as well as identifying the large gaps that will need to be addressed. With this understanding, further work is needed to be prepared in an emergency. Continued dialogue and collaboration between government and industry, along with initiating the development of operational plans on a regional and sectoral basis can only serve to further enhance overall preparedness for a LMI. In particular, more detailed planning and additional research into acceptable depopulation and disposal methods for specific areas would significantly increase preparedness in critical areas.

In that regard, slaughter facilities need to develop a better understanding of the risks to their business in a market interruption and work to develop solutions to mitigate those risks. Facility owners may also need determine how their slaughter processes might best function to support humane depopulation. Facilities are currently designed to move an animal from slaughter to a final product, with no ability to change the production line, which may not be optimal for efficient humane depopulation. A common awareness of location and capacity across the country is also necessary to support provincial plans for their use in a LMI.

Third, experiences of FMD outbreaks in other countries, like the United Kingdom, have identified that the emotional stress for farmers and their families, farm workers, depopulation operatives, veterinarians and others involved in the depopulation and disposal activities will make the

KEY ACHIEVEMENTS

An Impact Modelling Tool to enable real-time economic analysis and support decision-making.

A list of generally acceptable humane depopulation and disposal methods.

Estimated costs and a series of tools and information to support decision-making regarding depopulation and disposal.

activities more difficult, may lead to additional fatigue and more mistakes and have long term psychological impacts. In the case of zoonotic disease risk, additional concern by these participants can be expected. This stress is driven by many concerns including for the distress of the livestock being depopulated and the economic consequences. Although not on the original work plan, the LMISSC acknowledged and investigated the psychological impacts and effects of humane depopulation and carcass disposal on producers and individuals that would be involved in depopulation and disposal. The LMISSC looked at the experiences from mass depopulations abroad and noted the significant toll that this would have on participants. Time did not permit an in-depth analysis while completing the original work plan, but the LMISSC noted that this issue should be an important facet of any complete strategy

Based on information received during the LMIS's development, the LMISSC agreed that systems should be in place to support those involved, but the current timeframe for completing LMIS did not allow work to begin immediately, although should be considered going forward. This was further complicated by the recognition that human health issues were a provincial responsibility beyond the scope of the governments involved in the development of the LMIS.

Fourth, market interruption impacts producers' supply chains. It also impacts the local communities within which the producers and their supply-chain partners operate. Over-use of municipal landfills, for example, may impact communities' future ability to sustain day-to-day landfill use in the longer term. These macro-economic factors should be used to support investments in infrastructure, human resources and equipment for depopulation and disposal. Pro-forma studies done in advance, using the findings from research conducted to support the strategy, could inform the decisions on investment in research and development, regional depopulation and disposal centres, equipment stockpiles, training and other support functions.

Fifth, as municipalities are generally at the forefront of any disposal options, and rules differ significantly, additional planning between provinces and their municipalities would help provide a clearer vision of how disposal would happen in individual jurisdictions. Moreover, ongoing discussions across provinces and with industry regarding acceptable depopulation options may yield a more consistent approach across the country.

iv. Markets

As the livestock sector is export dependent, the impacts of a market interruption would be felt immediately. The LMISSC directed specific activities to mitigate the impacts of a market interruption on the sector. Those activities included approaches to resume international trade as quickly as possible and maximize domestic consumption.

Significant effort will be made to reopen borders as quickly as possible since this can lessen the impact of the event on industry. Proactively developing a list of priority markets and defining roles and responsibilities for trade resumption activities were key elements under the LMIS.

Canada will not be able to increase its domestic consumption enough to offset the loss of international markets. Further, in the case of the hog industry, there is insufficient slaughter and freezer capacity to manage all market-ready hogs at the time of a border closure. However, it will be critical to maintain and grow domestic consumption in order to lower the percentage of animals in excess of domestic demand and minimize the negative impact to the sector. Industry organizations, and the sector writ large, have a leadership role to play in promoting domestic consumption. As a result, throughout the development of the LMIS, industry organizations have made significant progress in the development of an approach to work collaboratively to promote domestic consumption of their products for the duration of a market interruption.

In that regard, processors have an important role to play in maintaining plant operations to meet domestic demand and receive livestock in an orderly manner such as not to create welfare issues. The mechanics of directing and managing the orderly flow of healthy animals to slaughter is an important element in a LMI, whether for domestic consumption or humane depopulation. Progress has been made in finding a mechanism to coordinate and facilitate the flow of livestock to slaughter, while optimizing the use of existing infrastructure, although significant challenges were identified.

Trade Resumption

The resumption of trade will take time and significant effort. Specific actions will be dependent upon the reasons for the trade resumption. Recognizing the complexity of resuming trade, the broad elements of a trade resumption business plan, which provides direction on resuming trade following a significant event, should be in place to reduce the need for ad hoc reactions and to ensure robust decision-making. The challenge is in maintaining such a plan outside an emergency event. The level of trade to each market changes over time; new markets become priorities, while others may become less important. Industry market development organizations, such as Canada Pork International and Canada Beef Inc., would be of great assistance in defining priority markets.

To mitigate these challenges, a strategy was developed and focused on the approach to determining priority markets, defining roles and responsibilities in activities to resume trade and a summary of tools that could be used in a specific trade resumption plan that would be developed at the outset of a LMI.

The International Business Interruption Strategy¹⁸ outlines the manner through which stakeholders can identify and rank priority markets to focus collective trade resumption efforts.

¹⁸ Agriculture and Agri-Food Canada (2015). Development of an International Business Resumption Strategy.

This includes reviewing export statistics and consideration given to the current trade/political environment that exists between Canada and its trading partners (as well as the implementation of comprehensive trade agreements in the future). Based on the criteria, seven identified countries were ranked to establish a list of current priority markets, including the United States, China, and Japan.

The strategy also outlines general roles and responsibilities for trade activities. Market access and trade are federal responsibilities; however, all stakeholders have a role to play in supporting the resumption of trade. As such, the strategy developed acknowledges activities that should be coordinated, such as: briefings of Minister(s) at federal and provincial levels and the development of key messages to trading partners.

The individual roles and responsibilities outlined in this report do not represent an exhaustive list but rather an overview of key trade resumption activities that could be deployed should an LMI occur. Clearly defining these roles and responsibilities in advance is intended to mitigate delays in actions and the potential for inconsistency and duplication of effort. A brief summary of the roles and responsibilities is provided below.

AAFC and Global Affairs Canada (GAC) play a coordinating and leadership role in the re-establishment of a Canadian livestock sector that is competitive, innovative and sustainable.

The **CFIA** has a crucial role in trade when the market interruption is as a result of a disease outbreak. The success of the proposed trade resumption strategy, and Canada's overall advocacy efforts, will be dependent on CFIA's technical work, as well as CFIA's engagement with their counterparts in the priority countries.

CFIA also will play an important role in establishing, implementing and securing international recognition for a national zoning/compartmentalization strategy to facilitate international trade from "disease-free" zones in Canada.

Market development activities aimed at rebuilding international markets would be led by industry at the company and/or industry association-level. These activities would be supported by government which would leverage available tools (e.g., trade missions, trade shows, trade commissioner service) to assist industry efforts.

The details of every approach to reopen borders will vary depending on the event and the trade impacts. As such, the tools will vary as well. However, through the LMIS a list of probable tools to facilitate rebuilding of international markets was developed to enhance preparedness to create specific plans during an emergency event. These tools include: market research, trade missions, in-market outreach by trade commissioners, trade shows, advertising, and restaurant promotions.

AAFC and Global Affairs Canada Roles and Responsibilities

- Identifying key markets in consultation with provincial and industry stakeholders;
 - Leading the development of country specific strategies; consultation with CFIA and other stakeholders;
 - Gathering market intelligence/information; regular communications with stakeholders;
 - Responding to potential legal challenges; and
 - Outreach with foreign governments and international bodies.
-

CFIA Roles and Responsibilities

- Consultations with other countries on strategies they may have developed for a similar event;
 - Engaging in technical expert missions; preparing technical letters for reopening boarder; negotiating export certificates;
 - Proactively addressing requests for technical information from trading partners; and
 - Ensuring consistent communication to domestic and international regulatory bodies.
-

Provincial/Territorial Government Roles and Responsibilities

- Intelligence gathering and sharing;
 - Working with stakeholders in the development of key messages and advocacy materials;
 - Establishing and maintaining industry dialogue and cooperation;
 - Participating in outreach activities as appropriate; and
 - Providing technical/economic intelligence and advice
-

Industry Roles and Responsibilities

- Establishing and maintaining industry-to-industry dialogue and cooperation;
 - Intelligence gathering and sharing;
 - Working with other stakeholders to develop key messages and advocacy materials;
 - Engaging industry representatives in other markets, sharing key messages and advocacy materials to build broad-base support with other markets' industry;
 - Verifying other industry views; identifying influencers/decision makers that should be targeted; and
 - Participating in outreach activities.
-

Maintaining Domestic Markets

Although significant efforts will be placed in reopening the borders as quickly as possible, it will also be important to maintain domestic consumption. The challenges for domestic consumption in a LMI scenario, particularly when more than one sector is impacted, are two-fold. First, sector marketing plans give significant focus to external markets, as a result of the quantity of exports for livestock and livestock product. Sectors will have to quickly re-focus plans and resources to the domestic market. Second, marketing plans are developed by sector. This approach presents challenges when multiple sectors are involved, such as beef and pork. In a FMD outbreak scenario, sectors will be competing for the same Canadian protein market.

The LMIS was intended to address these challenges, by outlining common approaches for pork and beef to maintain the confidence and support of Canadian consumers in light of a surge in supply and the management requirements of an LMI in Canada. Building and maintaining consumer confidence in Canadian beef and pork products are at the core of the marketing, promotion and branding by the sectors and key area of leadership by industry. In a LMI, public relations and communication will be critical.

To reach this outcome, the cattle and pork industry organizations worked together to develop a Maintaining Domestic Market Consumption Report¹⁹. The report takes lessons from a review of past experience and outlines the individual, but complementary, plans for the beef and pork sectors. Both commodities have agreed that they must present a united front dealing with retail/foodservice procurement, because cutthroat discounting of one over the other is not acceptable.

Although they remain separate plans, both sectors have committed to using combined generic messaging related to protein and red meat so that one sector is not pitted against the other. The plans also include the use of similar tactics and tools to address similar issues. For example, both sectors see the utilization of the entire carcass as critical. This would include the domestic promotion of cuts/offals that are generally not marketed in Canada. Both sectors would also use donation programs (e.g. providing product to hospitals) and parking lot BBQ events to increase domestic consumption and decrease the disposal of good product.

FPT governments can and do support industry's work in domestic markets. Revenue for both marketing and promotion organizations in industry is also reliant on sales of live animals. As these sales initially cease and then slowly regain momentum, both pork and beef organizations will be strapped for cash and will need to leverage their resources in the domestic market and as foreign markets are opened. Further, in a FAD situation, governments have an important role in providing technical/scientific experts and messaging, particularly with regards to animal welfare, safe product and human health implications. This type of collaboration, through the LMIS governance structure, will be critical to the sectors' success in maintaining and potentially increasing domestic consumption as envisioned in their respective marketing plans.

¹⁹ Canadian Cattlemen's Association and Canadian Pork Council (2016). [Maintaining Domestic Market Consumption.](#)

Orderly Movement/Marketing

A key part of maintaining and increasing the domestic market is ensuring an orderly flow (movement) of market ready livestock to slaughter. Research²⁰ through the development of LMIS noted key challenges and gaps in that regard. The most significant challenges identified were:

- The free market system does not provide national/provincial commodity boards (or any other organization) with the capacity or mandate to manage the flow and movement of animals.
- No one organization has the authority to manage 'disaster' marketing and movement of animals.
- Continuing normal business transactions (e.g., fulfilling contracts, delivering goods on schedule) during a crisis would not be possible because they would most likely have broken down quickly following a price collapse.

Given this scenario, it was not possible to develop an orderly marketing plan for marketing boards to implement as was originally envisioned. The focus of work under LMIS had to turn to the development and assessment of three options:

1. a non-interventionist model with the market running itself;
2. enacting a time-limited supply management system; and
3. a joint FPT government and industry plan reflective of all stakeholder needs.

All stakeholders agreed that the first two options presented their own challenges and neither were feasible or acceptable. The LMISSC concluded that the third option should be pursued.²¹ This approach has a number of benefits, including:

- Shared responsibility reduces the strain on assets of any one stakeholder; and
- Positive relationship building for all stakeholders.

Slaughterhouses also play an important role in regulating the movement of animals to market. They are an integral part of any marketing plan. Facilitating the movement of market ready animals will be critical. The reduction or closure of slaughter/processing facilities will exacerbate problems in dealing with the surplus of healthy animals.

The ability of processors to generate positive returns will be challenging at best. While supplying domestic markets will be important to provide outlets for market-ready livestock, these markets may generate insufficient returns to processors. Reducing the impact of the loss of the international markets by focusing on growing supply to the domestic market may not be enough to maintain plant operations and interventions may be necessary to continue to utilize existing slaughter capacity.

Outcomes and Next Steps

The work on markets and marketing has increased the knowledge base related to the challenges presented by a LMI. The LMIS has enhanced preparedness to address international

²⁰ Manitoba Agriculture, Food and Rural Development (2015). Orderly Marketing: Development of an Integrated Marketing Board Response Plan.

²¹ Manitoba Agriculture, Food and Rural Development (2015). Orderly Marketing: Development of an Integrated Marketing Board Response Plan.

trade by having identified priority markets and roles and responsibilities for the various parties. As statistics and political priorities change, so should the list of priority markets. Tools may need to be refined or new ones developed. To ensure what has been developed under LMIS remains useful in a real emergency, the material should be regularly reviewed by AAFC's Market Access Secretariat, collaborating with its International Market Engagement Teams as required.

The pork and beef sector have increased their awareness and understanding of the need to cooperate and collaborate on growing domestic consumption during an LMI. The LMISSC has recognized the importance of the continued operation of slaughter/processing sector through a LMI, as well as the significant risks that will need to be addressed.

KEY ACHIEVEMENTS

A trade resumption strategy which identifies current priority markets, key trade-related roles and responsibilities of all stakeholders and potential market development tools to facilitate moving forward during a crisis.

An agreement and joint approach for key livestock sector organizations to work together to maintain and increase domestic consumption.

Mechanisms to invoke the orderly marketing of animals will be required to minimize chaos in marketing of live animals. The need for an integrated, government-industry disaster animal movement/marketing plan was identified as the solution as it shares the responsibility to act across all stakeholders; however, an approach to the scope and what needs to be considered in a plan requires further work.

Finally, while LMIS was undertaken to address any LMI, reducing the potential impact of a LMI is of high importance. Given the significant costs involved in a LMI, the LMISSC noted the positive benefits for promoting international approaches that reflect evolving scientific understanding of disease management and the potential for more nuanced response from trading partners. This is particularly true with issues such as zoning. The CFIA is working to get zoning for trade purpose recognized by the World Organization for Animal Health (OIE) during an FMD outbreak where the outbreak can be regionalized with the appropriate controls to prevent spread to the free area. If this concept is accepted, zoning would

potentially help to reopen borders to Canadian livestock and livestock products to countries with which we have zoning recognition agreements, significantly quicker than has been allowed in the past. The approaches outlined under the LMIS will need to be reviewed and possibly adjusted if agreements are established in the future.

IV. Lessons Learned

The LMIS was a major undertaking by government and industry. It was designed to look beyond the identification, containment and eradication of a FAD and identify the implications of a LMI event for healthy animals; examine the information and tools currently available to address the event; and develop options to address the gaps. The work of the LMISSC has made significant progress in identifying the issues and addressing gaps so that all stakeholders are better prepared should an event occur.

The LMIS is the first comprehensive strategy to address the impacts of a large-scale market interruption. Participants have shared their thoughts and views to aid in the continued evolution of the work that is recommended in order to advance beyond the development of the strategy to enhance all parties' preparedness to respond. Lessons learned can also be used when developing other strategies or approaches in the future. Irrespective of whether it was from an industry or provincial or federal government perspective, there were common messages including:

The importance of the network and recognition that all parties have roles and responsibilities during a LMI:

Through the LMIS, an effective forum was developed utilizing a collaborative approach with a broad range of representatives from FPT governments and industry. The inclusion of all stakeholders – FPT governments and industry – at the commencement of work and throughout its development recognized that all parties have roles and responsibilities during an LMI. It also enabled a full appreciation of each other's perspectives. After three years working together, not only has it established strong relationships before a crisis and linkages with key groups that would be involved, it has also built a solid foundation for further discussions.

Enhanced preparedness: The LMISSC developed and shared significant and detailed documentation to improve the understanding of the impacts and effects, including a better understanding of collaborative communications needs and approaches. However, preparedness takes time. Governments and industry are better prepared than they were, but preparedness can always be enhanced.

A better understanding of the problem: The work of the LMISSC and the development of the LMIS have increased awareness and understanding of the realities that must be addressed to improve overall preparedness to respond and manage a LMI. Gaps in knowledge for key elements of the LMIS support the need for further work.

An ambitious scope meant that additional issues arose that had not originally been considered: Not only did unanticipated challenges prevent the completion of some activities, but issues arose that had not been conceptualized at the outset, and merit further investigation. This acknowledgement has resulted in several recommendations to progress certain areas of

“The LMIS is the first of its kind concerning industry and government initiatives. This collaborative effort through LMIS has built a strong framework which will allow the livestock industry to much better cope with a possible market closure and to lessen the enormous negative impact this may cause for our Canadian industry.” *Canadian Pork Council*

work completed under the LMIS and to begin work in new areas that would support government and industry preparedness for a LMI.

Retaining and building upon what we have learned: Knowing that a large-scale LMI scenario would be a rare occurrence, it is possible that the material and tools developed for the LMIS may not be used for years. The LMIS represents a significant achievement, but regular maintenance will be required in order to not lose the value of the work to date. For example, new methods for mass depopulation will need to be assessed for use in Canada; lessons learned from exercises and real events may result in the need to revise LMIS material to incorporate best practices.

With the overarching collective vision created through the LMIS generally complete, regional and sector specific operational plans can also begin development.

V. Recommendations

The LMIS has demonstrated a sound market interruption to improve preparedness by all parties. The work to date has advanced the key elements of the national strategy, along with developing models and tools to facilitate decision making.

Outlined below are the key recommendations to governments and industry organizations made by the LMISSC to advance specific areas identified during the development of LMIS.

Overall, there is a tremendous opportunity to maintain and build on the momentum and progress made by the LMISSC to further evolve the strategy. As such, all stakeholders strongly endorse the continuation of the work to further develop and refine the LMIS. Furthermore, stakeholders should give due consideration to the recommendations to enhance the LMIS and commit the resources and funding to improve overall preparedness for a large-scale market interruption in order to move forward in a timely manner.

“Livestock market interruptions would deal a crippling blow to the beef cattle feedlot sector, and a coordinated strategy with industry as a full partner is essential. The LMIS presently being developed is an important first step in this direction.”
National Cattle Feeders’ Association

COMMUNICATIONS AND GOVERNANCE

Recommendation #1: Endorse the proposed LMIS governance and decision-making structure to ensure coordinated and collaborative communications and decision-making during a livestock market interruption event.

Recommendation #2: Promote LMIS among all federal, provincial, and industry stakeholders to increase awareness of its importance and to increase preparedness of the sector in the event of a large-scale market interruption situation.

VALIDATION AND EVERGREENING

Recommendation #3: To ensure the LMIS remains relevant:

- Evaluate LMIS tools and material through an exercise program; Review and update material, on an as-needed basis, based on lessons learned from exercises and real events, and emerging challenges; and Test multiple market interruption scenarios using the Impact Modelling Tool created under LMIS.

PROPOSED FUTURE ACTIVITIES

Recommendation #4: Recognizing that work was identified beyond the scope of the LMIS, it is recommended to:

- Continue the analysis and the development of detailed plans, guides and capacity development in support of the broader strategy; and
- Determine the feasibility and requirement to address the unanticipated issues identified through LMIS (e.g. the impact of zoning and/or the coordination required

with CFIA's eradication activities if the market interruption is as a result of a disease outbreak).

In that regard, it is recommended to:

4a) Support on farm, area and provincial planning for disposal and depopulation, and create tools for sector use, including:

- Doing further research to determine capacity levels for currently acceptable HD and CD methods and developing a plan to address likely shortage or apply existing resources effectively;
- Developing a national guide and template for the development of general producer plans; and
- Developing specific plans for priority/high density areas (e.g. feedlot alley in Alberta)

4b) Identify and review new/emerging methods for depopulation and disposal

4c) Consider leading proactive communications of mass carcass disposal plans and needs with municipalities

4d) Develop options for the movement and marketing of animals during a market interruption.

4e) Develop a national map of federally and provincially-registered slaughterhouse plants and related facilities (e.g. freezers) across the country to be shared with governments, in confidence

4f) In the longer-term, consider the possibility of aligning provincial/territorial legislation to allow the broadest disposal options and address a large-scale marketing interruption event

4g) Continue efforts to support zoning for trade.

4h) Determine how to best support the well-being of those involved in response activities.

Recommendation #5: Understand the scope of investment and resources required to enhance industry preparedness for emergency events and consider investment through means including existing and future agricultural policy frameworks

In that regard, possible investments could be made to activities including:

- 5a) encouraging industry plan development for HD and CD and other LMIS-related activities;
- 5b) supporting potential investment in research and implementation of facility modifications for welfare depopulation

To manage the work flowing from the recommendations above, it is also recommended that a new steering committee be established. A small committee, similar in make-up to the current LMISSC is proposed. Given that much of the work would fall under the authority of provinces or industry, it is proposed that the committee be chaired by a provincial representative, with federal government involvement.

VI. End Note: LMIS as part of the broader Agricultural Emergency Management Framework

In 2014, FPT Ministers of Agriculture directed the development of a comprehensive and collaborative approach to Emergency Management. As a result, a Strategic Emergency Management Framework (SEMF) for Agriculture in Canada is being developed by FPT governments, with engagement from stakeholders, to set the strategic direction for EM in the sector for all types of risks.

While the work to develop the LMIS began in advance of the SEMF and is specific to one risk, it directly supports the SEMF's intention to improve prevention, preparedness, response and recovery. As such, the LMIS will be one strategy under the overarching SEMF, along with other proposed strategies, tools and plans being developed to improve Canada's approach to EM in the agriculture sector.

While a key tool by itself to advance Canada's preparedness for an emergency, the development of the LMIS has also helped to advance key areas that the SEMF can leverage, such as a better understanding of roles and responsibilities across governments and industry. The development of LMIS has also exemplified the model for effective FPT-industry collaboration. As such, it is expected that approaches and lessons learned from LMIS will assist in developing approaches for the implementation of the SEMF in areas such as governance, communications, and collaborative action.

Annex A: The Livestock Market Interruption Strategy and Guide

Introduction

The following provides an overview of the Livestock Market Interruption Strategy (LMIS) and how the strategy can be utilized in planning and in responding to a LMI. Provincial/territorial governments and industry stakeholders may use the information and tools contained in the strategy as a starting point to develop more detailed plans in preparation for a LMI and during an initial response.

Objective

The LMIS is a national strategy that supports two primary policy objectives:

- Managing industry transition to ensure a functional domestic market, including measures for herd management, carcass disposal, and transition assistance; and
- Facilitating the resumption of international trade and maintenance of domestic consumption.

Scope

The development of the LMIS was to enhance industry and government preparedness to deal with the potential impacts of a market interruption on healthy animals and the livestock sector, aside from the regulatory response that would take place in any disease outbreak.

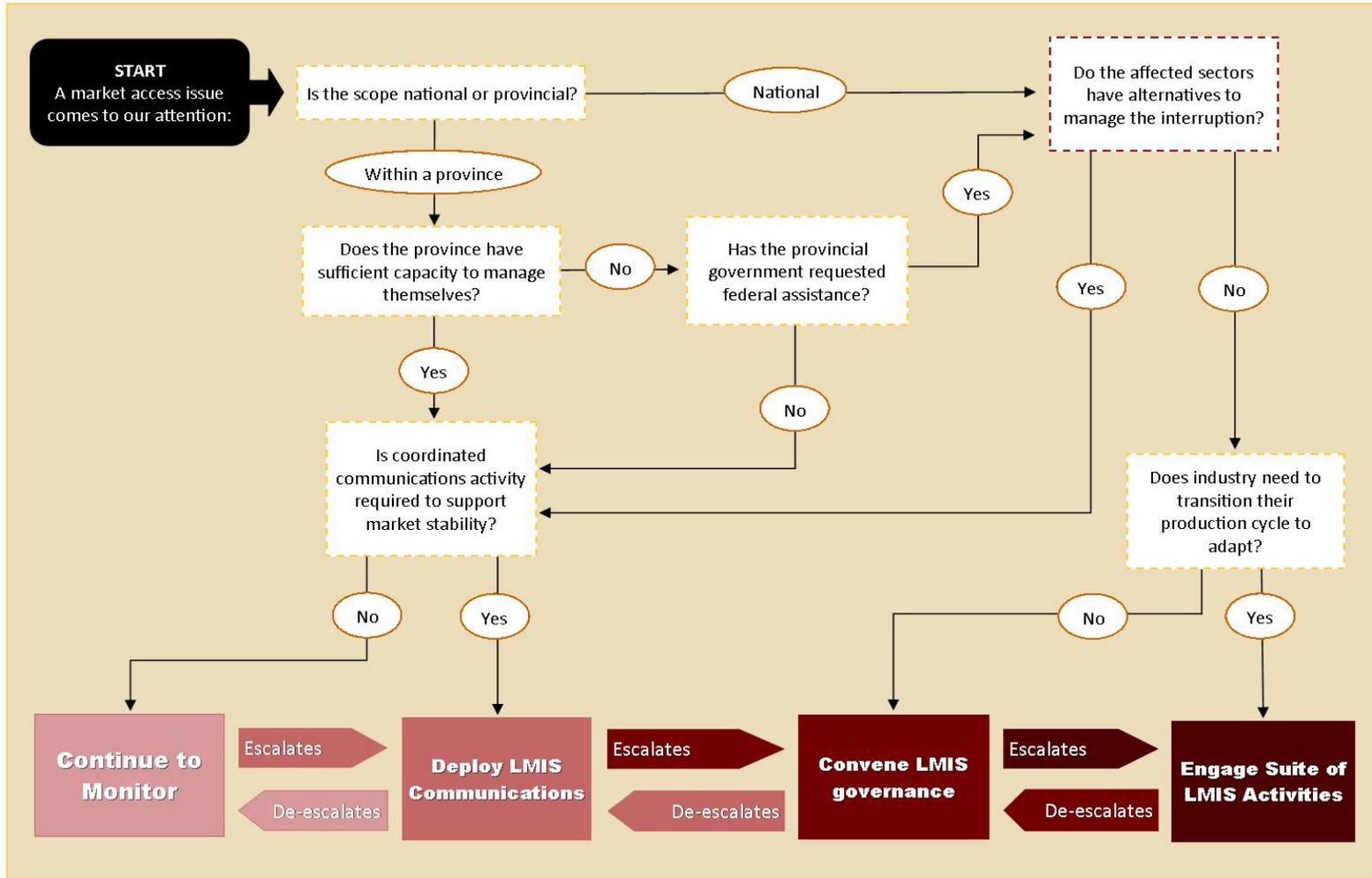
Although Foot and Mouth Disease is used as an example, the strategy is designed to be scalable and to support the livestock industry during any significant market interruption, no matter the cause.

The LMIS provides overarching direction for a national approach, which enables provincial/territorial governments and industry stakeholders to develop more detailed plans that would increase the speed of decision-making and more clearly define relationships, roles and responsibilities.

Activation

Given the varied reasons for a market interruption and the varied nature of how the market can be impacted, a first step for all stakeholders is a rapid situational assessment of the immediate impacts of the market closure, followed by a prioritization of actions, policies, and tools appropriate for the situation.

Not all market interruptions will result in the use of the LMIS, however, evaluation of the need to 'activate' should be undertaken each time the situation changes – determining whether the LMIS is necessary, or if it can be de-escalated as the situation evolves. The **Activation Decision-Tree** below will be used by decision-makers to determine whether the full suite of activities or a piece of the LMIS should be activated or de-escalated.



Roles and Responsibilities

Operationalizing the LMIS is a shared responsibility among federal/provincial/territorial (FPT) governments and industry.

Upon any market interruption, **Agriculture and Agri-Food Canada (AAFC)** has a dual response role, leading on activities within the federal mandate, such as international trade, and providing assistance to provincial/territorial governments upon request. Specifically, AAFC is responsible for:

- Maintaining trade and leading trade resumption activities;
- Leading information sharing and situational awareness with other federal departments, PT governments and industry stakeholders;
- Supporting and developing specific transition initiatives and programs, in conjunction with PT governments and industry as appropriate;
- Ensuring actions are coordinated with other key departments (e.g. Canadian Food Inspection Agency, Global Affairs Canada, Public Safety Canada);
- Communicating regularly with national industry stakeholders regarding impacts and response actions being taken;
- Facilitating FPT and FPT/industry discussions and decision-making through the agreed upon governance structure; and
- Leading the public communications response to the market interruption in conjunction with PT and industry partners.

In the context of a market interruption, **provinces/territories** respond to events based on the following responsibilities:

- Supporting response activities on the ground and facilitating discussions with key stakeholders (e.g. municipalities) for those activities, where necessary;
- Participating in trade resumption planning and related activities at the request of the federal government;
- Ensuring response decisions are shared with other governments;
- Supporting industry transition and depopulation decisions through initiatives/programs and information;
- Supporting disposal of animal carcasses, which is jointly managed by producers, industry organizations and municipal governments; and
- Communicating regularly with PT and industry stakeholders regarding impacts and response actions being taken.

Industry also holds distinct responsibilities in this context, both in informing government decisions and in managing transition during a period of turmoil and change:

- Providing recommendations and industry perspectives to governments to aid in decision-making and notifying governments of issues and concerns as they arise;
- Communicating government decisions to its members and encouraging individual producer/business action in relation to these;

- Leading communication activities to its members to ensure those members can make informed decisions related to their individual business, and communicating to the public regarding food safety;
- Responding to animal care and environmental issues if and as they arise;
- Leading promotion of domestic consumption to help mitigate the impact of a border closure in collaboration with FPT governments;
- Managing flow of product to the domestic market; and
- Proactively managing risks within their capacity and capabilities to support long-term resiliency.

Individuals in the **sector supply chain** (producers and processors) will ensure the health and welfare of livestock in their care, make decisions based on information provided by governments and industry, and report issues to their respective province/territory or national organization.

Approach

The strategy is a compilation of tools and information focused on:

- Governance, roles and responsibilities;
- Industry transition and decision support;
- Communications; and
- Markets.

Documents listed below are outlined in detail within the LMIS Bibliography

Governance, Roles and Responsibilities

The governance structure described in the “LMIS Emergency Response Governance Approach” will be used to support joint discussion and decision-making, but will not hinder each stakeholder’s respective governance requirements.

No single entity has exclusive responsibility for response to, and decisions regarding, the management of healthy animals surplus to market demand, presenting the primary challenge in managing and responding to a major LMI. The **LMIS Emergency Response Governance Approach** was developed to facilitate coordinated, strategic and operational decisions during a large-scale market interruption across levels of government and with industry – in the aim of timely and accurate decision-making.

As the LMIS focuses on the disruption of export markets, initial leadership of the market interruption response will be by AAFC. Leadership for disease response is the responsibility of the Canadian Food Inspection Agency (CFIA).

FPT and industry decision-makers should account for the shared roles and responsibilities described in the LMIS Emergency Response Governance Approach when developing operational plans, and should ensure individual stakeholder bodies are ready to work within and support this governance approach during a response.

Tasks for the governance may include:

- Review and understand the flow of information during a LMI in the PT or organization;
- Identify key positions that would be involved in the governance structure (e.g. regulatory ADM, others); and
- Identify areas that will require approval for the governance structure to be functional in the PT or organization.

Communications

Pre-drafted communications strategies provided in the “LMIS Communications Protocol” will be used as the starting point for approaches and messaging to the public and stakeholders during a LMI.

Communications to stakeholders and the public is essential in instilling trust in governments and industry during any emergency. There are many hard decisions that governments and industry have to make in a market interruption event, which could result in negative public reaction, such as large-scale herd depopulation and mass carcass disposal. The **LMIS Communications Protocol** was developed to assist stakeholders in communicating these types of decisions quickly and effectively. Its mini strategies and key messages can be quickly adapted to the real scenario at hand.

FPT governments and industry decision-makers should integrate measures for coordinated communications noted in the Protocol in their operational plans. This would include preparing for participation in the communications committees described and establishing spokespeople and draft messaging/communications material based on the agreed-upon approach.

Specific tasks for FPT and industry organizations may thereby include:

- Review the Communications Protocol;
- Identify who in the organization is responsible for communications activities and approval;
- Determine if the tools are appropriate for use in the specific setting and if other material should be considered; and
- Determine how material will be distributed.

Markets

Industry stakeholders have committed to collaborative promotion of domestic consumption.

Experience has proven that consumer confidence and domestic consumption can increase or decrease during an emergency event, depending how the public perceives the issue is being handled. Industry associations each have marketing plans to promote their respective sectors in both domestic and international markets focused on establishing brand recognition for premium quality, safe products valued by consumers.

Defending and maintaining the brand reputation in light of a foreign animal disease outbreak is a critical challenge. The **Report on Maintaining Domestic Market**

Consumption was developed to help mitigate this challenge, and provide a common approach for industry associations to maintain brand reputation and collaboratively promote livestock sectors. This approach can be integrated into operational plans developed by industry.

Tasks for industry organizations may include:

- Identify and understand stakeholder values and preferences (i.e. communication methods); and
- Consider how plans can integrate measures that are reflective of stakeholder needs.

Activities undertaken to maintain market access and resume trade will follow the “Plan for the Development of an International Business Resumption Strategy”, which includes an approach to determine priority markets, defines roles and responsibilities, and outlines tools that could be used for specific plans created at the outset of a LMI.

Each market interruption scenario is different, and the markets closed to Canadian livestock and livestock products (and the impact of the closure) will change over time. While a prescriptive plan for maintaining market access and trade resumption is difficult to determine in advance, the **Plan for the Development of an International Business Resumption Strategy** will assist FPT and industry decision-makers in the development of detailed plans.

Specific tasks for FPT and industry organizations may include:

- Identify and rank priority markets;
- Share necessary information with appropriate networks; and
- Establish which tools are best placed to reengage markets once an outbreak has been contained.

Industry Transition and Decision Support

Slaughterhouses are the preferred method to depopulate mass quantities of healthy livestock as the most socially accepted option. Where this method is not possible, other acceptable options have been outlined and tools are available to individual stakeholders to support decision-making.

Understanding that slaughterhouses will play a key role in depopulation, processors have worked with their colleagues to develop “Guiding Principles for Slaughterhouse Operators in Emergency Situations”. These principles reflect operational standards, align with in-house policies and procedures (including HACCP plans, SOPs, training and emergency simulations, etc.), and guide industry in the development of industry-wide emergency plans and recommendations as developed by meat and poultry industry associations.

Provincial/territorial governments should keep these principles in mind when developing government depopulation plans which intend to use slaughterhouses.

Tasks for PTs and industry organizations may include:

- Create a forum for open dialogue with plant operators, prior to a LMI; and

- Identify gaps, challenges, and reasonable actions in advance of a LMI.

When a LMI event occurs, existing assistance programs will be used, and new programs may be considered, using the range of possible approaches and program objectives developed by the LMIS Steering Committee as a starting point for program parameter design.

Given the highly unpredictable and variable nature of a LMI, it was neither prudent nor practical for the LMIS Steering Committee to attempt to propose programming options in advance.

LMIS work on transition approaches for government and industry, including **Transition Producer Decision Models**, offers FPT government and industry decision-makers a greater understanding of the daily decision-making a producer may need to adjust in the context of an event. The short-term and long-term considerations that are identified can be elaborated in strategies for all stakeholders in a market closure event.

The results outlined in the **Transition Workshop “What We Heard” Report** provide FPT governments and industry with an idea of transition objectives to guide program development when a LMI occurs.

Tasks for industry organizations may include:

- Discuss, with producers, the resources and tools that are currently available to industry to help guide decisions; and
- Communicate findings with necessary stakeholders.

Governments and industry will use the range of tools and information created under the LMIS (see Bibliography) to support the development of individual operational plans and in response to a LMI.

Tools ranging from depopulation cost estimate calculators, depopulation or disposal method selection tools and equipment and supply kits, to suggestions for tool/information maintenance timelines, and others created by the LMIS Steering Committee, as well as the wealth of information provided through reports, are important in supporting decision-making during a LMI and in preparing for a LMI.

As key decisions need to be made in the period of immediate response, AAFC’s **Impact Modelling Tool** will help inform decision makers on the possible short-term impacts to the sector as well as options for action. The economic modelling takes into account the producer decision models, transition concepts and other tools developed through the LMIS (e.g. humane depopulation calculator). Using the tool, AAFC can run different scenarios to assess value chain impacts, such as bottlenecks in animal flow/marketing, and can test a variety of possible solutions. The analysis that the Tool is capable of will provide for faster and targeted decision-making at the time of an event.

- Extensive analysis was conducted under LMIS on the current state of humane depopulation and disposal activities, through the work of eBiz Professionals (2015): **Investigation of Humane Depopulation and Carcass Disposal Methods, and Development of Plans and Procedures for a Livestock Market Interruption Strategy**. The report provides a clear sense of the scale of activities and costs for

depopulation and disposal. Decision-makers may wish to build on this analysis when establishing realistic strategies and detailed response plans for depopulation and disposal, accounting for the report's snapshot data and recommended focus of work.

- The **HD calculator** can help estimate potential costs by scenario for the number of animals or duration, and view what resources (personnel and equipment/supplies) and funds would be required to pay for those resources.
- The **Selection Tool** provides decision-makers with considerations to evaluate when choosing methods for depopulation or disposal.
- **Equipment and supply lists** for different facilities can support stockpiling, if so decided by PTs/industry, so that necessary equipment and supplies are quickly available for response.
- In developing plans, PTs can review the list of **reference documents** currently available on accepted depopulation and disposal methods and requirements, and use the recommended **plan development process** and the **proposed cyclical 'evergreening' process** to guide the creation and maintenance of documentation.

Tasks for PTs and industry organizations may include:

- Evaluate the current methods for HD and CD available for use in the PT;
- Review the livestock population in the area (i.e. demographics, densities);
- Begin to source resources as appropriate (consider how they will be acquired, training needs, and legislative restrictions); and
- Commit to actions on paper.

For more information or to access any of the products listed here or within the LMIS Bibliography, requests may be sent to AgEM-GUAg@agr.gc.ca.

Annex B: Summary of Slaughter Facility Challenges

Facility Challenges

- Operational constraints to intensifying plant production for an extended period, such as production scheduling and lot control/tracking.
- Design factors, such as live animal holding capacity, line speed variability, chiller/freezer capacity, enhanced biosecurity, transport availability.
- Plant licencing conditions and inspection procedure that would have to be adjusted to accommodate the operations under differing welfare slaughter scenarios.
- Implications, such as cleaning and disinfecting protocols and quarantine provisions for the resumption of production in the event of the inadvertent processing of infectious animals.
- Carcass removal/disposal options and implications such as immediate removal following slaughter for loading into trucks for rendering or other forms of acceptable disposal; logistics; and costs of plant modification.
- Labour issues, including occupational health and safety, availability (overtime, lay-off and recall provisions), labour agreement provisions (including temporary foreign workers).
- Existence and availability of on-site procurement, food safety, animal health, environmental compliance and transportation logistics managers to play decision making roles in collaboration with government officials and industry partners.

Financial Challenges

- Cost considerations, the incremental and/or additional (capital and operational) costs to operate under a welfare slaughter process.
- “Force majeure” provisions in contracts for animal procurement, labour, transport, etc.; Live animal supply contract terms of payment implications.
- Existence, availability and terms of business interruption insurance for a major livestock disease outbreak.

Industry Challenges

- The highly competitive nature of the meat industry and need to protect proprietary information.
- Challenges in providing collective representation to EOCs or other decision making bodies.
- Creating a map of all Canadian slaughterhouses, both federal and provincial, by species capability, showing capacity and other operational details that would enable emergency planning and response.

Other Challenges

- Implications for operating within the “Infected Zone” and outside the containment zone.
- Communication strategies and messages for the disposal of large volumes of safe meat products.

Annex C: Executive Summary of Final Report of an Investigation of Humane Depopulation and Carcass Disposal Methods, and Development of Plans and Procedures for a Livestock Market Interruption Strategy

Submitted by e-Biz Professionals Inc., April 2015

Purpose

The purpose of the “Methods, Plans and Procedures” study is to prepare Canada’s national and provincial governments and its livestock industries for the development of response plans to address the impact of a livestock market interruption. A “market interruption” is the sudden (and hopefully temporary) cessation of exports of livestock and meat products, caused by a contamination or other incident in the Canadian production and/or processing sector, or by an internationally-reportable disease occurrence. Such an event would require the rapid, humane depopulation (HD) of a large proportion of the affected national herds, and the safe disposal of their carcasses (CD).

The study focuses on hogs and beef cattle, which individually and together represent the largest and most financially-significant volume of export trade for Canada’s livestock sector. Using “worst-case” scenarios developed for the study, prescribing the numbers of hogs and cattle to be depopulated, estimates of personnel, equipment and supplies required to take on the depopulation and disposal work have been developed, and provincial and national totals for these field costs for each of four scenarios have been calculated²². This information and the methods and tools used in its development are intended to be used by planners in the development and completion of detailed, operational response plans.

Costs

Four scenarios were developed for the study:

Scenario 1: Border closure triggered by a non-disease event affecting exports of **live hogs, pork and pork products** (e.g. contamination of supply chain with an unauthorized product). Borders are assumed to remain closed for a period of at least 6 months.

Scenario 2: Border closure triggered by a non-disease event affecting exports of **live cattle, beef and beef products** (e.g. contamination of supply chain with an unauthorized product). Borders are assumed to remain closed for a period of at least 6 months.

Scenario 3A: Border closure triggered by a reportable disease affecting **both cattle and hogs** (e.g. Foot and Mouth Disease); outbreak occurring in Alberta with the city of High River²³ located in the disease control zone.

²² *Value of the livestock, costs for development of response plans, and some administration and logistical expenses are not included in the cost analysis in the study.*

²³ *Locations were selected randomly and without prejudice for the sake of defining possible scenarios.*

Scenario 3B: Border closure triggered by a reportable disease affecting **both cattle and hogs** (e.g. Foot and Mouth Disease); outbreak occurring in Quebec with the city of Charny²⁴ located in the disease control zone.

Total national costs for response to the scenarios are:

Scenario 1. Hogs: Non-disease event	\$ 194.1 million
Scenario 2. Cattle: Non-disease event	\$ 316.1 million
Scenario 3A. Hogs and Cattle: Disease event in Alberta	\$ 506.3 million
Scenario 3B. Hogs and Cattle: Disease event in Québec	\$ 523.8 million

Provincial totals and depopulation and disposal detail are shown in Table A below:

Table A. Summary Total Costs for All Scenarios (\$MM)

Scenarios	BC	AB	SK	MB	ON	QC	Atlantic	Canada
Scenario 1. Hogs: Non-Disease Event								
Humane Depopulation	\$ 0.4	\$ 8.5	\$ 6.2	\$ 17.0	\$ 18.4	\$ 24.9	\$ 0.5	\$ 75.8
Mass Carcass Disposal	\$ 0.8	\$ 12.9	\$ 6.9	\$ 24.7	\$ 28.3	\$ 44.0	\$ 0.8	\$ 118.3
Total Cost	\$ 1.2	\$ 21.4	\$ 13.1	\$ 41.7	\$ 46.6	\$ 68.8	\$ 1.2	\$ 194.1
Scenario 2. Cattle: Non-Disease Event								
Humane Depopulation	\$ 7.3	\$ 106.6	\$ 42.8	\$ 19.9	\$ 23.7	\$ 10.4	\$ 2.8	\$ 217.4
Mass Carcass Disposal	\$ 5.2	\$ 56.5	\$ 14.2	\$ 7.5	\$ 9.4	\$ 4.6	\$ 1.2	\$ 98.8
Total Cost	\$12.5	\$ 163.1	\$ 57.0	\$ 27.4	\$ 33.1	\$ 15.0	\$ 4.0	\$ 316.1
Scenario 3A. Hogs and Cattle: Outbreak in Alberta								
Humane Depopulation	\$ 3.1	\$ 162.8	\$ 22.3	\$ 21.1	\$ 22.5	\$ 23.1	\$ 1.4	\$ 256.3
Mass Carcass Disposal	\$ 2.1	\$ 132.2	\$ 11.3	\$ 26.6	\$ 31.3	\$ 45.5	\$ 1.1	\$ 250.0
Total Cost	\$ 5.2	\$ 295.0	\$ 33.6	\$ 47.7	\$ 53.8	\$ 68.5	\$ 2.6	\$ 506.3
Scenario 3B. Hogs and Cattle: Outbreak in Quebec								
Humane Depopulation	\$ 7.0	\$ 103.2	\$ 44.8	\$ 34.3	\$ 38.1	\$ 53.1	\$ 2.9	\$ 283.5
Mass Carcass Disposal	\$ 6.1	\$ 69.8	\$ 23.3	\$ 32.8	\$ 39.6	\$ 66.6	\$ 2.1	\$ 240.3
Total Cost	\$ 13.1	\$ 173.0	\$ 68.1	\$ 67.1	\$ 77.7	\$ 119.7	\$ 5.0	\$ 523.8

Resources

Numbers of people, equipment requirements and supplies needed to carry out each stage of the HD and CD activities in each scenario have been calculated so that numbers and amounts can be known, and costs can be estimated. These calculations and estimates have been based on a study and modelling of the activities required to complete each step in the HD and CD processes, using the depopulation numbers provided in the scenarios, and costs have been applied to each to determine the total costs summarized above.

Recruiting and training people for HD on the scale required for a mass depopulation was of significant interest in the study, both recognizing the specialized skills required, especially for HD activities and also given that these people would need to be on “stand-by” in anticipation of

²⁴ *ibid*

a market interruption. Table B below illustrates the number of trained personnel that would need to be available in each province, to respond to a market interruption, should it happen. It is important to note that the planned duration of the depopulation activity is key to the number of personnel required to be available. The numbers calculated for the table below, and all of the calculations in the study, are based on a 60-day duration. In reading the table below, therefore, needing eight trained people for HD in British Columbia means they are needed for 60 days of work.

Table B. Trained Personnel Requirements for Humane Depopulation

Scenario 1. Hogs: Non-Disease Event

Trained Personnel	BC	AB	SK	MB	ON	QC	Atlantic	Canada
Crew Members	6	109	79	217	236	319	6	971
Site Managers/Safety Officers	2	45	33	91	98	132	3	404
TOTAL	8	154	112	308	334	451	9	1,375

Scenario 2. Cattle: Non-Disease Event

Trained Personnel	BC	AB	SK	MB	ON	QC	Atlantic	Canada
Crew Members	110	1,699	651	308	395	166	47	3,524
Site Managers/Safety Officers	32	429	189	85	86	42	10	843
TOTAL	143	2,128	839	393	481	207	57	4,367

Scenario 3A. Hogs and Cattle: Outbreak in Alberta

Trained Personnel	BC	AB	SK	MB	ON	QC	Atlantic	Canada
Crew Members	48	2,493	343	329	351	362	22	3,948
Site Managers/Safety Officers	16	800	118	130	139	153	8	1,364
TOTAL	63	3,294	461	459	490	515	30	5,311

Scenario 3B. Hogs and Cattle: Outbreak in Quebec

Trained Personnel	BC	AB	SK	MB	ON	QC	Atlantic	Canada
Crew Members	106	1,550	666	478	532	531	43	3,905
Site Managers/Safety Officers	34	503	220	177	196	206	14	1,350
TOTAL	140	2,053	886	655	728	736	57	5,256

Also, HD activities are stressful and emotionally draining, and active mental health monitoring of all responders is intended to be carried out throughout these activities on all sites. Therefore, additional personnel over and above the numbers indicated above will be needed to provide temporary relief for those needing respite from the stress, and also for those who are not able to remain active for the full period of the depopulation cycle.

From the process analysis for all of the methods of HD and CD included in the study, equipment and supplies requirements have been estimated. Equipment includes vehicles and mobile farm equipment, specialized HD devices, such as captive-bolt units, modified atmosphere containers (MACs), and electric stunning apparatus, and more standard equipment generally found on-farm, such as rifles, gates, chutes and tools. Supplies include health and safety materials; small tools and convenience items; and consumables, such as ammunition, composting material, work gloves, and many others.

While some of this equipment and supplies, as noted, may be available on-farm, the analysis has assumed that it will all need to be secured, either by purchase or rental, for the duration of the depopulation and disposal activities. Costs for equipment and supplies have been included in the calculations for each scenario.

Methods

Humane Depopulation and Carcass Disposal methods to be used for hogs and cattle in all production stages have been updated from the previous LMIS Gap Analysis studies, and reasonable consensus has been reached.

Mass Humane Depopulation

The HD methods used in the study and selected for use in plan development across Canada are listed in Tables C and D below; and have been used to determine the rates and costs reported in the study.

Table C. Mass Humane Depopulation Methods for Hogs

HD Methods by Sub-Group - Swine	Piglets ¹	Nursery ²	Finishers ³	Adults / Replacements
Gunshot ⁴	Y	Y	Y	Y
Lethal Injection ⁵	Y	Y	Y	Y
Captive Bolt, Penetrating ⁶	N	Y	Y	Y
Captive Bolt, Non-penetrating	Y	N	N	N
Electric stun kill ⁷	N	Y	Y	Y
Gassing ⁸	Y	N	N	N
Slaughter plant ⁹	Y	Y	Y	Y
Notes: Y = Used N = Not used	1. Less than 6 kg/13lb - on sow 2. Less than 25 kg/55 lb. 3. Up to market weight 4. Use appropriate calibre 5. Caution re carcass disposal; primarily for small-lot farms	6. Caution re proximity; available confirmatory kill 7. Individual and mobile unit 8. Modified Atmospheric Container 9. Slaughter operations accommodate size/weight		

Table D. Mass Humane Depopulation Methods for Cattle

HD Methods by Sub-Group - Cattle	Dairy calves ¹	Beef calves on cow ²	Stockers / Feeders / repl. Dairy ³	Mature	Large bulls
Gunshot ⁴	Y	Y	Y	Y	Y
Lethal Injection ⁵	Y	Y	Y	Y	Y
Captive Bolt, Penetrating ⁶	Y	Y	Y	Y	Y
Slaughter plant ⁷	Y	Y	Y	Y	Y
Notes: Y = Used	1. Less than 150 kg/330 lb 2. Less than 275 kg/600 lb	5. Caution re carcass disposal 6. Caution re proximity; available confirmatory kill			

N = Not used

3. Less than 2 yr.

7. Slaughter operations accommodate size/weight

4. Use appropriate calibre

These HD methods are largely considered to be used on-farm. Descriptions of their use, and detailed analysis of the process followed by each is included in the full report, following. Use of both provincially-inspected and federally-licensed slaughter facilities for mass HD is feasible also. Analysis of modifications required to enable larger, federally-licensed plants to provide slaughter-only functions is underway in another LMISSC work unit. These facilities represent the vast majority of the potentially-available slaughter capacity across the country. Calculations of potentially-available capacity at federally-registered facilities, based on assessment of publicly-available data are shown in Tables E and F, following:

Table E. Potential Weekly Surge Capacity of Hogs at Federally-Registered Establishments

Region	Potential Weekly Surge Slaughter (# of head)
West	117,748 – 235,495
East	124,296 – 248,592

Table F. Potential Weekly Surge Capacity of Cattle at Federally-Registered Establishments

Region	Potential Weekly Surge Slaughter (# of head)
West	22,274 – 44,548
East	6,300 – 12,600

Mass Carcass Disposal

The CD methods used in the study and selected for use in plan development across Canada are listed in Tables G and H below; and have been used to determine the rates and costs reported in the study. Except for processing and processor-sited disposal, which are not options for smaller piglets and nursery stock, all methods are available for mass disposal of Hog carcasses.

Table G. CD Methods by Sub-Group - Hogs

CD Methods by Production Stage - Swine	Piglets ¹	Nursery ²	Growers ³	Finishers ⁴	Adults / Replacements
On-farm composting	Y	Y	Y	Y	Y
On-farm burial	Y	Y	Y	Y	Y
Landfill ⁵	Y	Y	Y	Y	Y
Rendering	Y	Y	Y	Y	Y
Processing to consumption			Y	Y	Y
Processing to disposal			Y	Y	Y
Rendering - processor-sited			Y	Y	Y
Incineration ⁶	Y	Y	Y	Y	Y
Notes:	1. On sow		4. Up to market weight		
	2. Less than 6 kg/13 lb.		5. Municipal and Other pre-approved sites		
	3. Less than 25 kg/29 lb		6. Contained, large-scale (Air curtain)		

Similarly, but without size exceptions, all mass carcass disposal options are available for use by all production stages in cattle.

Table H. CD Methods by Sub-Group - Cattle

CD Methods by Production Stage - Cattle	Dairy calves ¹	Beef calves on cow ²	Stockers / feeders / repl. Dairy ³	Mature	Large bulls
Composting ⁴	Y	Y	Y	Y	Y
On-farm burial	Y	Y	Y	Y	Y
Landfill ⁵	Y	Y	Y	Y	Y
Off-farm burial ⁶	Y	Y	Y	Y	Y
Rendering (SRM)	Y	Y	Y	Y	Y
Processing to consumption ⁷	Y	Y	Y	Y	Y
Processing to disposal ⁷	Y	Y	Y	Y	Y
Rendering (processor-sited ⁷)	Y	Y	Y	Y	Y
Incineration ⁸	Y	Y	Y	Y	Y
Notes:	1. Less than 150 kg/330 lb. 2. Less than 275 kg/600 lb. 3. Less than 2 yr. 4. On-farm only		5. Municipal and other pre-approved sites 6. Pre-approved sites 7. Slaughter operations accommodate size/weight 8. Contained - large scale (Air curtain)		

On-farm burial and composting are lowest cost per head, largely due to avoidance of transport and fees, but required large numbers of people and lots of equipment. Off-farm burial may offer availability of larger capacity, and an option for farms with limited acreage, but needs to be pre-approved and planned. Rendering is an important resource, with the potential for recovery of valuable by-products, but capacity is not known and logistics for mass carcass disposal are challenging, especially with respect to carcass quality. Concerns for SRM-containing deadstock impact landfill use and rendering options. Incineration is an efficient method that can be set up for regions or groups of farms, but is relatively costly.

Rates and capacity

Little direct information is largely available for rates and capacity for HD and CD methods, although determining throughput and resource requirements is essential to response planning. However, published information has been used to estimate potentially-available regional capacity for use of slaughter facilities and for rendering, shown above.

Process- and workflow-assessment methods and simulation techniques – essentially breaking the work in each method down to components that can be measured and costs that can be applied – have been used to establish resource requirements and costs for other HD and CD methods. Rates-of-use in these cases, and therefore the resource and cost values must therefore be considered estimates only.

Allocation of animals by production stage to CD methods have been based generally on availability in each province, therefore, since measures of capacity are not available. These are

useful for the level of accuracy needed in the overall analysis, but need to be revisited by provincial planners for local and regional plans.

Detailed calculations and estimates are available for review in numerous tables in the body of the report and in Appendices. In addition, an active version of the spreadsheets for Scenarios 1 and 2 is included in the tools that accompany this report.

Next Steps

It is anticipated that the information in the report will be used to inform federal and provincial governments on the methods, capacity and costs of response to the market interruption scenarios. Assuming its priority going forward, the information in the study and the accompanying guide material can be used to continue response planning by provinces and industry, using the process, tools and resources detailed in them.

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