A STRATEGIC PLAN FOR RISK MITIGATION OF AVIAN INFLUENZA IN BC POULTRY

Prepared For
The Industry Government Working Group

Prepared by the
Risk Mitigation Steering Committee

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SUMMARY

The Risk Mitigation Steering Committee (RMSC) is tasked with developing a plan for the implementation of recommended risk mitigation strategies directed at reducing the occurrence and transmission of contagious disease within the BC poultry industry. This proposal describes the recommendations of the Risk Mitigation Steering Committee for the BC poultry industry and outlines the processes required to fully develop these recommendations.

It is strongly recommended that activities move ahead in a coordinated manner. This requires the delegation of specific levels of authority to a specific group to oversee and coordinate activities. It also requires the recruitment of a person to serve as a manager and coordinator of the multiple projects and teams required to implement the recommendations in this report. The position will manage the day-to-day activities and linkages between the initiatives, develop funding proposals, monitor budgets and keep the RMSC apprised of developments as required.

Decisions required of the Industry Government Working Group

The further development and implementation of recommended strategies requires several key decisions before work can progress:

- Realignment of the role of the RMSC from developing a plan to being a body to oversee risk mitigation strategy development and implementation and serve in the coordination role. A new Terms of Reference is required and a review of committee membership.
- Endorsement of the recommendations proposed by the RMSC in this report.
- The commitment in principle of the required expertise and resources to the work teams.

Recommendations of the Risk Mitigation Steering Committee

1. Surveillance - Establish teams to:
    - Provide the technical knowledge and skills needed to: develop and describe the objectives of surveillance, identify risk factors, review industry contact structure, delineate surveillance methodologies, review the results of surveillance and make recommendations on potential gaps in bio-security.
    - Operate the day-to-day activities of surveillance.

2. North American Animal Disease Spread Model (NAADSM) - Establish teams to utilize the NAADSM model to:
    - provide a better understanding of disease risk in the BC poultry industry;
    - assist in determining a third party insurance premium level;
    - assist in determining a cost benchmark with which to compare self insurance options; and
    - develop local technical expertise in applying the NAADSM model for use in determining disease spread potential and intervention strategies.

3. Shared Risk Management
    - maintain all existing programs and develop an additional compensation fund to cover low path Avian Influenza (AI) and an insurance program to cover high path Avian Influenza;
    - use compensation to cover low path AI and insurance to cover high path AI;
    - develop compensation fund to be managed by industry and eligibility linked to bio-security and surveillance requirements;
    - move forward with insurance industry consultations;
    - apply for funding for carrying out on-farm risk assessment; loss quantification models and the actuarial assessment to facilitate an insurance product; and
    - develop premium rates and then decide if insurance is the most cost effective risk management technique to cover high pathogenic AI.

4. Universal Bio-security
    a) Establish teams to:
        - develop and implement initiatives to enhance allied trade adoption of bio-security;
        - support and develop initiatives to enhance adoption and use of bio-security measures in non-regulated commercial specialty bird sector;
        - enhance information on non-regulated small flocks in BC; and

    b) Endorse ongoing initiatives to:
        - integrate the auditing process for on-farm food safety, bio-security, environmental farm planning, and animal welfare; build awareness of bio-security in small non-regulated, non-commercial flocks; and
        - enhance private veterinary poultry bio-security training through seminars.

5. Industry Concentration/business intensity – Establish teams to:
    - systematically review and evaluate the risks of disease transmission associated with poultry farm concentration and business intensity so as to provide the ability to make more informed decisions on dealing with concentration and business intensity related risks. Specifically to carry out:
        - economic analysis of concentration and business intensity;
        - detailed cost benefit analyses on concentration and business intensity; and
        - analysis of potential policy alternatives on competitiveness considerations.
    - make recommendations on improved policies and practices for reducing concentration risks related to:
        - valuable breeding stock location;
        - future growth and expansion of the BC poultry industry;
        - impacts of policy changes on poultry industry competitiveness; and
        - operational procedures as alternatives to reducing concentration/business intensity.

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The following discussion outlines the recommendations of the RMSC for the implementation of the RASC report. The background of both the Risk Analysis Steering Committee (RASC) and the RMSC is located in the Appendix at the back of this report.

RECOMMENDATIONS

I) SURVEILLANCE

Surveillance involves ongoing systematic collection and analysis of samples from animal populations for disease detection and response. Sampling provides for early detection of disease thereby facilitating a rapid response.

The discovery of low path H5/H7 AI places a significant burden on individual producers to absorb financial losses. The development and implementation plan for surveillance needs to be accompanied by a linked producer compensation plan. The structure of compensation is dictated by the parameters of surveillance. The recommendations around compensation are described in the Shared Risk Management section of recommendations of this report. The recommendation, although separated in this report, need to be implemented as an integrated response. Surveillance and compensation need to be implemented simultaneously. Surveillance is a key component to a shared risk management strategy.

Objectives

a) reduce the probability of outbreaks of high pathogenic strains of Avian Influenza;
b) purge the sector of any latent accumulation of low pathogen H5/H7 Avian Influenza;
c) provide insight into the strengths and weaknesses of existing bio-security measures;
d) contribute to national trade obligations for surveillance;
e) reduce the probability that disease detection is delayed until identification at the processing plant;
f) reduce the projected risk and therefore premium costs of future insurance programs;
g) facilitate improved contingency planning and financing through systematic planning and scheduling of surveillance;
h) mitigate the disease risks due to the relatively high industry concentration;

i) acquire information on the process to serve as a template for developing surveillance plans for other diseases; and
j) improve public perception and international reputation of BC poultry products by demonstrating a proactive approach to early disease detection and eradication.

Desired Outcome

To affect a two stage surveillance program to:

- first, identify and remove existing low pathogenic H5/H7 AI from the BC poultry industry;
- secondly, to monitor for new occurrences of low pathogenic H5/H7 and eradicate them prior to it spreading and mutating into highly pathogenic AI. Facilitate the development of future surveillance strategies to address disease threats to the poultry industry.

Characteristics

The accomplishment of the objectives requires a surveillance strategy that encompasses the following characteristics:

a) Risk based
The frequency of surveillance and targeted approach should be based on risk factors. The frequency of testing may be affected by increased risk of disease introduction and transmission and/or the value/importance of the sector to the industry.

b) On-farm
Early disease detection at the farm level reduces opportunities for disease transmission and minimizes downstream impacts to the entire poultry sector.

Surveillance should occur at the producer level rather than at processing plants if application of surveillance is to minimize the potential for disease spread and economic impact through the total supply chain.

c) Active and passive
The majority of surveillance should be targeted proactive sampling. Routine testing of samples submitted to the provincial lab for any purpose other than Avian Influenza should also be carried out as this is a cost effective means to increase sampling frequency.

d) Clear linkage to compensation
A transparent and predictable compensation response is needed to achieve the support and endorsement of surveillance by industry. This allows producers to plan contingencies, if disease is discovered. Perception of fair and effective compensation also encourages early reporting of disease by individual producers, thereby reducing risk of disease spread.

e) Managed by industry
The frequency and extent of surveillance needs to be matched with the ability to compensate. The funds required to provide adequate compensation and the cost of surveillance needs to be managed together. Surveillance also needs to be coordinated with flock age and delivery or sale dates. Marketing boards are best positioned to coordinate surveillance and compensation. Compensation needs to be immediate. This is best accomplished by having industry manage the financial program, according to government accountability guidelines.

Next Steps

It is recommended that surveillance be carried out in two phases:

a) an initial sweep where all poultry farms (or a representative sample) are tested for Avian Influenza.
b) an on-going risk based monitoring program for AI in the poultry population. An implementation team of technical experts is required to develop and plan the initial surveillance sweep. The plan requires details on the rate of testing, resources required and contingencies in the event that notifiable Avian Influenza is detected. A detailed schedule of the initial sweep is recommended to ensure producers can plan well in advance.

Another team of technical experts is required to develop the desired testing frequency for the ongoing surveillance program. The work of this team will be to identify the risk factors for Avian Influenza and to rank each farm based on those risk factors. This ranking will affect testing frequency.

Testing frequency needs to take into consideration available resources, compensation funds and farm risk rating. Once a testing frequency is agreed to the implementation team can develop the testing schedule.

Risks

a) A significant amount of low pathogenic Avian Influenza is discovered

Multiple detections of notifiable Avian Influenza would be very disruptive and could result in prolonged trade restrictions on BC or Canadian poultry product. If there is a high prevalence of low path AI in BC flocks, the lack of proactive surveillance poses greater risks due to its potential to convert to high pathology AI and due to the impacts of periodic discoveries through passive surveillance, CFIA testing, or by other means. Over time repetitive detections of notifiable AI would be terminally damaging to the export market and result in reduced consumption of product locally.

An industry proactively working to rid itself of a problem will be viewed more favourably by the public as well as the legislators. Each detection of Avian Influenza brings public scrutiny to the safety of the poultry products. Each detection calls into question the effectiveness of the bio-security programs, legislation and regulation that governs the sector, leading to political risks and potential challenges to the compensation levels and industry cost sharing arrangements. The more frequent the occurrence, the greater the pressure for further government legislative intervention.

The mutation of certain low path AI subtypes is considered a significant potential source of high pathogenic strains. An effective surveillance program that reduces or eliminates current low pathogenic infection reduces the risks of mutation to high pathogenic strains. If surveillance does discover significant number of flocks infected with low pathogenic AI, this will provide information needed for the development and implementation of more effective bio-security measures to reduce the incidence of future disease outbreaks. Currently AI poses a constant threat with no clear picture of how severe or imminent that threat really is. Surveillance is a necessary step toward objectively quantifying the risk. An industry which supports proactive prevention through surveillance, removes a latent build-up of low path AI and is more stable and predictable than one that crisis manages repeated discoveries.

b) Lack of producer acceptance

Current remuneration programs for producers affected by disease response activities resulting from detection of notifiable AI are insufficient, particularly in some specific sectors. This could lead to producers not reporting or delaying in reporting low pathogenic AI, with the hopes the flock will recover. This can result in more virus particles capable of mutation and spread of low pathogenic AI to other flocks in the industry. Each time testing takes place the producer is at risk of significant financial loss. Surveillance is aimed at creating a healthy future for the sector and the individual producers. Effective compensation is required to facilitate this.

c) Lack of resources

Governments, marketing boards and producers all have an interest in managing this risk. Expertise and funding will need to be pooled to accomplish the goals of proactively mitigating risk.

d) Allied industry impacts

Each detection of notifiable influenza may result in processors being required to implement costly measures to access export markets and potential economic losses from closure of export markets. Failure to be able to export legs on back due to discovery of low path Avian Influenza can result in significant reduction in total chicken produced in BC, lower demand for inputs from hatcheries, feed companies and other allied industries and a requirement for processors to import more white meat to serve domestic markets and meet the demands of their further processing plant.

e) Unregulated industry impacts

The unregulated industries are often highly dependent upon export markets for their income and are often vertically integrated from breeding stock through processing and wholesale functions. Loss of breeder birds due to depopulation results in full closure of downstream facilities with little opportunity to replace breeding stock in the short-term, and permanent loss of their markets leading to prolonged business interruption losses. Ability to provide consistent supply of product is critical to maintaining customers in the specialty bird market. Retailers have ready access to import foreign product to fill their needs. Once a retailer changes a supplier due to a firm's inability to supply, the retailer often is reluctant and unwilling to return to the initial supplier.

II) NORTH AMERICAN ANIMAL DISEASE SPREAD MODEL

The North American Animal Disease Spread Model (NAADSM) is a tool that estimates the nature and extent of disease outbreaks. CFIA has been very involved in the development and utilization of this model. The RMSC recommends that this model be utilized to model Avian Influenza disease risk in the BC poultry sector.

There are other models that have been developed. However, the NAADSM model is recommended because it is the model that has been utilized by the Ontario Livestock and Poultry Council in their work with reinsurance companies in the development of an insurance product for Avian Influenza. Utilization of a different model would negate the ability to use work previously done in Ontario, resulting in the need to allocate significantly more time and money to the project.

The NAADSM is a critical element to the establishment of premium rates for a potential insurance product but its utility goes well beyond this single purpose. The RMSC recommends that work on NAADSM be carried out, regardless of whether RMSC recommendations for an insurance product are endorsed.

Objectives

a) Provide the basis for estimating the scope of a potential Avian Influenza outbreak for use in the development of insurance products.
b) Provide insight into the cost/benefit of risk mitigation techniques for further policy development. The model can be run using different variables for enhanced bio-security, lower industry concentration or other risk mitigation techniques.
c) Provide data collection. The model requires detailed information on the location of poultry farms and the frequency and context of all contact points with poultry. Current geospatial data helps identify key density areas. Detailed data on direct and indirect contact points provides information on where bio-security measures need careful scrutiny and where industry structure could be altered to reduce risks.
d) Develop expertise within BC. The disease spread model has potential applications for many animal diseases. The development of disease model expertise in BC and, in particular within the Ministry of Agriculture and Lands, could benefit other livestock sectors.

Desired Outcome

All sectors of the industry cooperate in providing the necessary information that will provide for a better understanding of the risk profile and contact relationships between industry sectors so as to lay the basis for a quantitative basis for premium level determination. Through NAADSM and whole farm risk analysis inputs to an actuarial analysis, a premium for third party insurance will be able to be established. The premium level will provide the basis for determining whether third party or self insurance is the most viable option for protecting producers against losses due to gaps in compensation during Avian Influenza depopulations.

Characteristics

a) Collaborative. The development of data requirements for the model requires the expertise and input of industry experts across all sectors of the poultry industry.

b) Multipurpose. There must be planning throughout the data collection and modeling processes to increase the utility of the model for estimating the impact of potential risk mitigation strategies.

Next Steps

Access to funding is a requirement. The Private Sector Risk Management Partnerships program is a potential source of funding. To access this funding an industry group, independent of government, must apply. It is recommended the marketing boards commit to take on this role.

The steps and processes for utilizing the NAADSM are more fully described in the paper entitled 'Setting the Foundation for Developing Poultry Insurance in BC' prepared by Serecon Management Consulting Inc. This paper calls for the formation of three work teams. Participation can and should be overlapping.

Two provincial veterinarians employed by BCMAL have already completed NAADSM training and will be required to lead or participate on work teams.

a) The first team is required to develop population at risk data. The team should include a provincial veterinarian trained in the NAADSM and a geospatial technician. The poultry marketing boards are the primary source of information and need to fully participate on this team.

   The NAADSM experts with CFIA should be involved through consultation to ensure data formats are consistent and energies are not wasted. Consultation with participants in the Ontario project is also recommended.

b) A second team of industry experts is required to develop the data for industry contact structure, start-up conditions and available controls needed to populate the model. It is recommended MAL vets lead this team and determine the required participation from industry. There is required participation and consultation with a broad group of industry trades and suppliers throughout the value chain. This includes such organizations as hatcheries, catching crews, feed companies grading plants and trucking companies, equipment dealers, as well as others.

   CFIA involvement is required particularly for defining the controls implemented following the discovery of disease.

c) The third team is required to run the model using multiple scenarios. The Ontario project ran thousands of variations of potential disease outbreaks. The team should consist of NAADSM experts from CFIA, technical people from the University of Guelph and veterinary and industry experts from BC.

   This team does not need to be assembled until key decisions are made on "if and how" BC will proceed with developing an insurance product. Discussions with CFIA and the University of Guelph should be conducted soon to ensure resources will be made available.

Risks

a) the primary risk of the model is that an insurance product is not pursued and the time and money spent does not lead directly to a measurable result. The experience in Ontario is that the data development for the model provided the opportunity to evaluate different scenarios even if the exercise did not result in a viable insurance product.

b) poor cooperation or involvement by stakeholders will compromise the quality of data input to the model.

III) SHARED RISK MANAGEMENT

This section describes the recommendation for compensation and insurance. The lack of a predictable financial response to Avian Influenza creates uncertainty and decreases the stability of the sector. Without a compensation plan individual producers face an unmanageable financial risk of the discovery of Avian Influenza on their farm. The losses producers suffer include the loss of the animals and cost of replacement, the cost of cleaning and disinfection (C and D) of the farm premises and the loss of income before production can be resumed.

There are some compensation mechanisms in place however they are often not considered adequate. The *Health of Animals Act* (HAA) does compensate for the current market value of the birds and covers the cost of testing, depopulation and disposal. AgriStability has the potential to provide significant compensation following a severe loss event however its effectiveness is influenced by numerous factors unrelated to the loss. The timing of the loss event, the composition and overall profitability of the entire farm enterprise, the schedule of C and D, repopulation, resumption of production costs and revenue and timing of HAA compensation payments make it virtually impossible to predict what the AgriStability response will be to a loss. The response is inconsistent between farms and payment generally occurs well after all additional expenses have been incurred.

Supply managed production is not eligible for AgriInvest. AgriRecovery does have the potential to offset losses however compensation amounts and approaches to determining compensation amounts are not prescribed. It could have a very meaningful response to the discovery of disease on multiple farms but single farm events of low pathogenic AI generally would not qualify.

A different approach to compensation/insurance is required.

Objectives

a) minimize the disincentive for producers to proactively identify Avian Influenza by closely linking compensation and surveillance;
b) ensure minimal production disruption following discovery of Avian Influenza by providing predictable, timely and adequate compensation to aid individual producers in re-establishing production;
c) encourage desirable behavior by ensuring producers share in the loss and by linking compensation, bio-security and surveillance;
d) avoid large unbudgeted costs to producers, marketing boards and governments by creating mechanisms to accumulate funds for compensation and through the transfer of risk to insurance;
e) provide a detailed profile of industry risk exposure through on-farm risk assessment and actuarial modeling; and
f) investigate actuarial modeling as a means to further develop impact analysis of risk mitigation techniques beyond the NAADSM.

Characteristics

The recommended approach is not to abandon the existing compensation mechanisms but rather to create additional ones that are predictable and adaptable to the needs and wants of industry.

a) *Health of Animals Act*

   This compensation should remain in place and all additional mechanisms should be geared to losses beyond its scope.

b) AgriStability

   Compensation and insurance payments are considered eligible income and will therefore replace AgriStability as a means of managing against disease risk. Events beyond the scope or intent of compensation and insurance are still protected against through AgriStability. Compensation and insurance will help to protect reference margins by providing eligible income if losses do occur.

c) AgriRecovery

This program is a viable compensation mechanism for losses that may be incurred if Avian Influenza is discovered through the initial surveillance sweep. Compensation and insurance should eliminate the need to utilize AgriRecovery in the future but the program will persist as a last resort if, due to unforeseen circumstances, other mechanisms fail.

d) AgriInvest

Although supply managed production is not eligible, farms that generate revenue from commodities not under supply management are able to participate to the extent of their non-regulated production.

The Ontario Livestock and Poultry Council have developed and is working on implementing a private insurance product for Avian Influenza. Ontario has not suffered losses from Avian Influenza in the recent past and industry concentration is also somewhat less a factor in Ontario. BC benefits immensely from this work however the recommended approach for BC is somewhat different.

Recommended for BC is the establishment of a compensation fund or funds that are closely linked to surveillance and the development of an insurance product that protects against disease discovery outside of surveillance. Essentially use compensation to cover low path AI and insurance to cover high path AI.

Low path AI discoveries are typically limited to one farm so from an industry wide perspective are relatively cheap to compensate for. The cost of transferring this risk to insurance is expected to be greater than the cost of absorbing the loss. An outbreak of high path AI can spread over multiple farms causing disruption to a large portion of the sector. The potential costs associated are beyond the scope of the sector to adequately prepare for and present a large unbudgeted risk to governments through existing programs. This severe loss event is best managed through insurance.

Compensation Fund(s)

a) Managed by industry

Marketing boards are probably best suited to take on this role along with surveillance. This provides the strongest opportunity to link compensation, surveillance and bio-security. It facilitates the accumulation of funds not permitted within government and allows for mechanisms that can pay compensation quickly. Marketing boards have the best access to the level of production and therefore the best opportunity to validate the extent of loss.

b) Shared funding

Producers, marketing boards and government all have a shared interest in mitigating risk. Close ties with surveillance and bio-security meet public policy rationale for government involvement. Marketing boards are accumulating funds to deal with Avian Influenza in an uncoordinated manner and have a vested interest in all parts of the sector actively participating in surveillance and bio-security. Producers currently bear most of the cost of the discovery of Avian Influenza with little certainty of what compensation will become available or when it might arrive. Producers bear the greatest responsibility for prevention and there must be financial incentive to do so.

c) Linked to surveillance and bio-security

To be eligible for compensation producers must be current with bio-security certification and must be in compliance at the time of the disease discovery. They must also cooperate fully with surveillance. The required size of the compensation fund is partially dictated by the rate of surveillance.

Insurance

The viability of an insurance option is dictated by the premium cost. It is recommended that BC continue to develop the necessary data and information to form an insurance product. The process requires on-farm risk assessment to develop a risk profile and variability of risk within the sector. It develops a market value of the risk which better informs economic decisions around risk mitigation.

The low frequency and high financial severity of losses make insurance the logical mechanism to manage the risk of a high path AI outbreak. Livestock insurance related to catastrophic disease loss is not well developed within the insurance sector. Informed decisions around risk mitigation, positive loss experience, accumulated knowledge and experience with livestock within the insurance sector and greater opportunity for risk pooling geographically will all serve to reduce premium costs over time. The BC poultry sector is best served by pursuing this option and maintaining the assumption that this is the right mechanism until it becomes evident that it is not. Simply put, develop a premium rate and then decide if insurance is the most cost effective risk management technique.

Next Steps

The steps involved in developing the insurance product are described in the paper "Setting the Foundation for Developing Poultry Insurance in BC" prepared by Serecon Management Consulting Inc. This report, found in Appendix II, serves as a template for the process of building an insurance program for Avian Influenza in BC and includes guidance to improve the efficiency and to reduce the costs in carrying out the process.

The Ontario process will need to be customized to take into consideration the special needs of the BC industry and government stakeholders.

The recommended approach follows closely the approach that was taken in Ontario. There are some additional considerations that need to be made to ensure this is the right approach for BC. Ontario has worked exclusively with the reinsurance company Endurance Re which was very charitable with their actuarial modeling resource.

a) Consultation with Endurance Re needs to occur to establish their willingness to produce and operate an actuarial model for the BC poultry sector. The costs and outputs of this work need to meet the needs of BC. This includes the ability to evaluate the impact of risk mitigation techniques. No other organizations have approached BC offering to do the actuarial modeling and a procurement process could be time consuming and we would have to acquire the necessary expertise to evaluate proposals. The use of a procurement process resulting in a contract that provided greater ownership of the modeling process may be beneficial but might not be practical.
b) It is recommended that consultation with the insurance brokers BMS occur right away for insight on the best way to move forward and as a conduit to Endurance Re or other potential re-insurers.
c) Funding for the actuarial assessment and development of an insurance product could be accessed from the Private Sector Risk Management Partnership program.
d) In addition to the work teams described in the recommendation on disease spread modeling two additional work teams/projects are required.
    - On-farm risk assessments. This work includes modifying the assessment process used in Ontario and conducting the assessments themselves. This work may be well suited for coordination with bio-security compliance audits conducted by marketing boards.
    - Development of the loss quantification models. This requires extensive input from producer groups to adapt the models already developed to BC conditions.
    - There is an additional step required for compensation. The surveillance plan and loss quantification work need to be evaluated together to determine the required size of a compensation fund. It is recommended that a private actuary review industry decisions on the initial size of the compensation fund. This amount can be fine tuned as actuarial work on insurance is completed and as surveillance progresses and generates experience.

Risks

The development of insurance is complex and expensive. The risk of not generating a meaningful product at the end of the project is outweighed by the knowledge and expertise that is developed through the process. The people involved in the Ontario project express this sentiment strongly.

IV UNIVERSAL BIO-SECURITY

The RASC report recommended that the BC poultry industry develop a universal bio-security program, which encompasses the full value chain of the sector, inclusive of allied trades and provides inducements and guidance for the inclusion of the non-regulated and small/specialty flocks in a bio-security system. The absence of a broad-based, universal bio-security system increases the risk of disease outbreaks, as weak links (farms, services, utilities, etc. with poor bio-security) allow the propagation and transmission of disease. Disease outbreaks impact individuals, the BC poultry industry and society. Costs include individual losses, public health concerns, and regional, national and international market losses, delayed or limited market recovery, ripple effects into industries such as tourism and higher cost of any potential insurance product.

Objectives

a) develop universal bio-security, which encompasses the full value chain of the poultry industry from regulated to non-regulated producers, to all allied trades/service industries.
b) prevent disease, particularly AI, carriage into a site, spread within a site, and transmission from the site to other farms.
c) minimize economic losses, minimize bird suffering and mortality, and minimize exposure of surrounding communities to Avian Influenza viruses.

Desired Outcome

The desired outcome is that bio-security measures are adopted and maintained by all producers and all who have contact with these operations so as to minimize the potential for disease spread both in and out of production facilities.

There are four aspects to developing a universal bio-security system that need to be addressed. These include developing an integrated auditing process in and by the regulated sector; improving the level and degree of penetration of bio-security in the allied trades sector; implementing bio-security in the non-regulated commercial specialty bird and non-regulated small farm flock (back yard flock) sectors.

1) Integrated Auditing Process:

BC Poultry Marketing Boards and Commissions are working to integrate the audit process for on-farm food safety programs, bio-security, environmental farm planning and animal welfare. The objective is to facilitate bio-security certification for the regulated sector. The goal is to minimize the resource costs of audit and reduce the inconvenience to the producer so as to minimize negative impacts of audits on industry competitiveness and enhance producer buy in.

Next Step

The recommended next step is to affirm the Boards' work towards integrating future audit processes.

2) Allied Trades

Protocols have been developed for any trade accessing the Controlled Access Zone and/or Restricted Access Zone of a poultry operation. These are voluntary. The goal is the adoption and implementation of these bio-security protocols by any trade accessing a controlled or restricted access zone.

Characteristics

To have the protocols adopted and implemented by the allied trades, would require an approach that addresses the following issues:

a) increase allied trade buy-in. While the allied trade organizations were approached to participate in the development of the protocols, actual participation by some allied industries was low; and
b) recognize that the producer is the "gate keeper".

Next Step

Establish a coordinating team to develop and oversee targeted projects addressing the actions below towards enhanced adoption of the Allied Trade protocols. The expectation would be that this team would be short-term to complete the tasks required and be inclusive of the poultry industry and the allied trades as much as possible.

a) develop a strategy to communicate to industry and the allied trades the protocols;
b) investigate into the feasibility or practicality of an incentive/certification process;
c) develop tools/services to help the producer ensure protocols are followed including communications; and
d) investigate into a monitoring/verification and enforcement process.

3) Non-Regulated Commercial Specialty Bird Sector

The goal is to have the non-regulated commercial specialty bird sector adopt and use measures for bio-security. An opportunity exists to relate bio-security to compensation.

Characteristics

Any approach to ensure bio-security measures are adopted and used must address the following characteristics:

a) lack of information about the non-regulated commercial sector and the potential impact.
b) business relationship between regulated and non-regulated commercial sectors. Conduits other than the regulated sector need to be explored.
c) competitive nature of non-regulated commercial businesses. The approach will need to build trust and potentially deal with individual operations.
d) limited capacity and reach of non-regulated commercial sectoral association. Capacity will need to be provided from elsewhere and may involve outreach to individual producers inside and outside of the association.
e) distinctness of stock and operations within the non-regulated commercial specialty bird sector. There is a need to confirm bio-security needs and application may need to be approached on an individual or customized basis.

Next Steps

Establish a coordinating team with technical expertise and representation of the range of bird species involved to develop and implement bio-security measures in the non-regulated commercial specialty bird sector. This could include hiring of a coordinator and private veterinarians to work with individual operations.

Various pieces of information with varying amounts of details are available from several separate sources which could be compiled, completed and enhanced as needed. The North American Animal Disease Spread Model (NAADSM) will assist in providing information about potential impact. The industry needs to endorse the NAADSM information development and the team may need to assist in coordinating information compilation.

4) Non-Regulated Small Flocks (Backyard Flocks or Small Farm Flocks Less Than 99 Birds)

Currently, CFIA and BCMAL are building awareness of bio-security in small farm flocks/backyard flocks through provision of information sessions across the province. In addition, BCMAL is enhancing training of non-poultry veterinarians in poultry bio-security and disease detection and prevention in small flocks. The goal is to ascertain the degree of bio-security risk posed by small farm flocks to the BC poultry industry and to develop or support targeted approaches/options to address the issues.

Characteristics

Any approach to achieve the objective must address the following issues:

a) lack of information about small farm flocks. Small farm flocks vary in numbers and locations over time which makes it difficult to maintain current and usable records of their location and numbers.
b) difficulty of reaching or finding the small farm flock sector and the need to build the trust of the sector to participate. Use an approach that is an incentive and/or is non-threatening to small farm flock participation.

Next Steps

a) coordinated by IAF/BCMAL, develop a project to gather information about the small farm flock sector.
b) evaluate and endorse CFIA and BCMAL work in building awareness in small farm flocks regarding bio-security and private veterinarian training.

Risks

It is recognized that a bio-security system that is not inclusive of the complete value chain is not fully effective. Any aspect of the value chain which is not practicing bio-security controls is a potential transmitter of disease. The benefit to the poultry sector of reduced disease outbreak is significant.

a) the intensity and consistency with which the bio-security procedures are applied may be dependent upon the market price conditions for unregulated commercial birds.

b) impacts of application of bio-security perceived as negatively impacting the competitive position of BC producers.
c) delays caused by perceptions that importers are not required to carry out equivalent bio-security.
d) the risk that bio-security protocols that are voluntary will not be implemented by a small percentage of the industry non-regulated producers or some service suppliers.

V INDUSTRY CONCENTRATION/BUSINESS INTENSITY

The Fraser Valley, and in particular, the Abbotsford area, has a high poultry sector concentration:

- 80% of the BC commercial broiler growers;
- 100% of the turkey, broiler and layer breeders;
- 90% of the hatcheries;
- 78% of the commercial egg layers;
- greater than 95% of the specialty and turkey industry;
- 90% of the province's poultry processor establishments;
- in excess of 80% of the egg grading;
- 100% of the egg processing; and
- 90% of the poultry feed industry capacity.

The proper analysis of the frequency and distribution of disease includes a complex set of factors. The type of infectious agent, presence of a susceptible host, environmental and management practices will all affect the ability of a pathogen to be transmitted. However, for many contagious diseases, industry concentration can lead to increased animal health risk exposure. A high animal stocking density at a barn can increase the risk of disease transmission within a barn. Similarly, increased farm concentration can facilitate disease transmission among farm premises. Disease spread can be mitigated and even prevented by implementing high levels of bio-security and augmented by other infrastructural preventives like tree buffers and siting considerations.

The concentration of poultry operations in the Fraser Valley is compound by:

- the variety of avian species reared in close proximity to each other;
- the geographic proximity of operations of differing scale and use; specialty, backyard, small and commercial flocks are interspersed;
- the close proximity and integration of non-poultry livestock production; and
- the close interface between agricultural and non-agricultural enterprises and the urban population pose a risk for zoonotic disease transmission.

Business intensity results in risk due to the concentration of services needed to supply and remove product from the poultry operations including hatcheries breeders, feed

mills, and processors. Many goods and service suppliers deliver goods and services to several operations in the same area in a matter of hours and days.

Concentration and business intensity strategy development is a longer term process than either surveillance implementation or enhanced and improved universal bio-security. The importance of moving forward on all fronts of surveillance, bio-security and financial programs, as a priority, is crucial. Only after these have been implemented, or been shown not to be practical, will we be able to properly evaluate to what extent concentration and business intensity needs addressing. Implementation of industry concentration and related business intensity policies, other than perhaps a methodical relocation of high risk/high value stock, should be a last resort.

Desired Outcome

The desired outcome is to develop the ability to make informed decisions in dealing with concentration and to better understand the impacts of policy changes related to poultry industry concentration and business intensity.

Objective

Evaluate the impact of policies on concentration and business intensity: Specifically by:

- economic analysis of concentration and business intensity;
- financial analysis of the costs and benefits of reducing these; and
- in-depth evaluation of prospective alternative policies on the poultry industry's competitive position.

Characteristics

a) many recommendations were presented in the Risk Analysis of the BC Poultry Industry report dealing with industry structure and proximity of operations. Some recommendations are controversial and their application would be challenging, while others require additional investigation. The recommendation is to focus on policy, operating and management changes to address the challenges that currently contribute to concentration. It is highly likely that many existing risks may be reduced by modifying some operational practices and by making some minor infrastructural changes. The focus needs to be forward looking versus looking at major structural changes of existing industry such as a wholesale moving of the poultry farms into regional areas to increase the distances between farms.

b) after further analysis firms may find that moving highly valuable and highly leveraged breeding stock which is the foundation of their downstream operations to more geographically isolated areas may be economically sound. It is recommended that this decision be the responsibility of the affected firm.

c) more information is needed on risk associated with industry concentration. The NAADSM results will be a key aspect in assessing the risk of industry concentration and the impact of potential changes on the risk profile. Pressures to make major changes in this regard will most likely arise if it becomes a cost-prohibitive risk either with respect to outbreaks or potential cost of insurance policies.

Next Steps

Establish a team to systematically evaluate; the effects of industry concentration and business intensity, possible changes to industry structure and the economic and operational impacts of possible changes. Specifically the factors to be evaluated could include:

a) the economic impact of relocation of high value breeder flocks;
b) the feasibility and impact of reducing overall density of production;
c) possible approaches on how density could be reduced; and
d) barn placement guidelines.

Risks

The lack of:

a) buy-in due to concerns over ability of existing producers in the Fraser Valley to expand on their home farms;
b) buy-in due to concerns of various sectors related to concerns about impacts on competitiveness;
c) ability to get information to evaluate competitive impacts; and
d) buy-in due to uncertainty related to the validity of analysis given the complexity of the analysis required.

APPENDIX I

SUMMARY OF WORK TEAMS

The following list of teams represents the functions that need to be accomplished. It is not necessary to form a distinct group for each described team. There are opportunities for one group to serve as many of the described teams or to form subgroups to work with specific stakeholders.

Industry Government Working Group

Roles - Oversee the entire initiative, broker solutions, strive for cooperation and collaboration between all stakeholders.

Linkages - Provide direction through the risk Mitigation Steering Committee.

Risk Mitigation Steering Committee

Roles - approve work team plans and oversee the day-to-day operations of work teams. Act as a coordinating body and prepare reports for the IGWG

Linkages - Direct contact with all work teams and to report to the IGWG.

Industry Funding Committee

Roles - Industry lead group needed to access Private Sector Risk Management Partnerships program money. Investigate and access other funding sources.

Linkages - Incorporate approved work team budget requirements into funding proposals and allocate funds to work teams.

Surveillance technical team

Roles - Develop and describe the objectives of surveillance. Identify risk factors, review industry contact structure and delineate surveillance methodologies. Review the results of surveillance and make recommendations on potential gaps in bio-security. Contains or collaborates closely with chief provincial veterinarian and CFIA for mandatory reporting of disease.

Linkages - Advise surveillance operational team on desired testing frequency. Trains sample takers on approved sampling protocol. Advise bio-security teams on potential gaps.

Surveillance operational team

Roles - Directs and schedules testing and manages the day-to-day surveillance activities.

Linkages - Follows approved recommendations of the surveillance technical team. Funding is coordinated with the compensation operational team.

Regulated bio-security team

Roles - Reviews and updates bio-security protocols. This is the team that developed existing protocols.

Linkages - Reviews recommendations of surveillance technical team. Review the findings of the industry contact team for gaps and weaknesses in bio-security. Coordinates and collaborates with other bio-security teams where appropriate.

Unregulated bio-security team

Roles - Develops and implements bio-security protocols and compliance audit process for non-regulated sector. Ensures custom bio-security programs meet a similar standard for disease exclusion and containment as those in the regulated sector.

Linkages - Reviews recommendations of surveillance technical team. Review the findings of the industry contact team for gaps and weaknesses in bio-security. Coordinates and collaborates with other bio-security teams where appropriate.

Allied trades bio-security team

Roles - Develops a process for minimizing the bio-security risk posed by allied trades.

Linkages - Review the findings of the industry contact team for gaps and weaknesses in bio-security. Coordinates and collaborates with other bio-security teams where appropriate.

Small flock bio-security extension team

Roles - Build awareness and provide expert advice on bio-security with small flock owners.

Linkages - Coordinate and collaborate with other bio-security teams where appropriate.

Population at risk team

Roles - Develops the information on population and location required for NAADSM.

Linkages - Provides information to disease spread modeling team.

Industry contact team

Roles - Develops the information required on industry contact points and frequency required for NAADSM.

Linkages - Provides information to disease spread modeling team.

Disease spread modeling team

Roles - Operates the disease spread model.

Linkages - Provides information to the actuarial modeling process and the business intensity/concentration evaluation team.

Business intensity/concentration evaluation team

Roles - Develops scenarios to be run through disease spread and actuarial modeling process to determine the economic value of changing industry structure and/or risk. Develops the costs associated with those scenarios.

Linkages - Works closely with disease spread modeling team.

On-farm risk assessment team

Roles - Develops implements and manages the on-farm risk assessment process required for actuarial modeling.

Linkages - Provides information to NAADSM and actuarial modeling process. Work to coordinate efforts for bio-security and other inspection processes to minimize interference to producers.

Loss quantification modeling team

Roles - Develops and keeps up-to-date the loss valuations to be used for compensation and insurance.

Linkages - Provides loss quantification information to the actuarial modeling process and works with compensation and insurance groups to define coverage.

Compensation operational team

Roles - Manages the compensation fund by collecting contributions and paying claims. Contracts a certified actuary to verify fund integrity and stability.

Linkages - Develops a structure to deliver compensation and works with loss quantification teams and policy development teams to put programs into operation.

Compensation/Insurance policy development team

Roles - Develops the terms and policy wording for compensation and insurance plans. Negotiates with private re-insurance providers policy terms.

Linkages - Works with insurance experts and lawyers to develop policy terms.

APPENDIX II

SETTING THE FOUNDATION FOR DEVELOPING POULTRY INSURANCE IN B.C.

Setting The Foundation For Developing Poultry Insurance In B.C.

Prepared For

The B.C. Risk Mitigation Steering Committee

Abbotsford, B.C.

Prepared By

Serecon Management Consulting Inc.

Edmonton, Alberta

Funding Provided By

Investment Agriculture Foundation of British Columbia

January 8, 2009

January 8, 2009

Mr. Stewart Paulson
Poultry Industry Development Specialist
Strategic Policy and Planning Branch
B.C. Ministry of Agriculture and Lands
1767 Angus Campbell Road
Abbotsford, British Columbia
V3G 2M3

Dear Mr. Paulson:

RE: SETTING THE FOUNDATION FOR DEVELOPING POULTRY INSURANCE IN B.C. – FINAL REPORT

We are pleased to present our Final Report for your use. We trust that the results will be useful for you as you progress through this important area.

A significant amount of information has been collected in this process. We have considered this information and summarized the key areas that should be considered for preliminary activities in B.C. All relevant considerations have been included in this report, and we acknowledge the hard work done by your Steering Committee in reviewing and providing comments on this process.

We look forward to discussing the results with you in person in January.

Yours truly,
SERECON MANAGEMENT CONSULTING INC.

Robert Burden, MBA, P.Ag.
Edmonton Office

Enclosure

/da

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Serecon Management Consulting Inc. also wishes to acknowledge the valuable contribution by the members of the B.C. Risk Mitigation Steering Committee in the preparation of and guidance given for the development of this document.

The members of the Steering Committee have been:

Garnet Etsell, Industry
Marvin Friesen, Industry
Al Sakalauskas, Industry
Ron Kilmury, Industry
Daniel Schwartz, CFIA
Lonny Steward, BCMAL
Janine Gyug, AAFC
Stewart Paulson (Chair) BCMAL

We would also like to acknowledge Lonny Steward and Ron Kilmury for their special contribution in the initiation, design and development of the consultation process.

Finally, we also acknowledge Coreen Moroziuk (Investment Agriculture Foundation) for her assistance in facilitating the funding approval process given the short time frame for the study process.

Disclaimer

The Investment Agriculture Foundation of B.C. (IAF) is pleased to participate in the production of this publication. We are committed to working with our industry partners to address issues of importance to the agriculture and agri-food industry in British Columbia. Opinions expressed in this report are those of Serecon Management Consulting Inc. and not necessarily those of IAF or its funding partners.

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List Of Acronyms/Contacts

Acronym	Definition	Role	Contact	Contact Information
OLPC	Ontario Livestock and Poultry Council	Coordinated the indemnification program in Ontario	Deborah Whale	(519) 638 2230 Whale@wightman.ca
BC RMSC	BC Risk Mitigation Steering Committee	It is anticipated that the BC RMSC would be responsible for the process of evaluating the opportunity to develop indemnification solutions in BC.	Stewart Paulson	(604) 556-3083 Stewart.Paulson@gov.bc.ca
RiscoGen	The risk assessment process that has been created by CMi	Substitutes for the lack of history that is available for the re-insurance industry	David Richardson Managing Director	44 (0) 1993 885657 david.richardson@nsf-cmicertification.com
CMi		CMi manages the risk assessment process. They would be responsible for providing the independent validation of the risk assessment process.	David Richardson Managing Director	44 (0) 1993 885657 david.richardson@nsf-cmicertification.com
BMS		BMS is a re-insurance broker. They are responsible for managing the collection and organization of information that goes to the re-insurance industry. BMS was hired to deliver the OLPC insurance project.	Gary Hutchings	44 (0) 20 7480 7288 gary.hutchings@bmsgroup.com
Crowe Livestock Underwriting Ltd		Crowe Livestock is an underwriter for the Caitlin Group which is a large Lloyds re-insurance syndicate. Crowe has significant experience in the poultry insurance sector.	Emma Stamper	44 (0) 1842 890 733 emma.stamper@crowelivestock.co.uk
NAADSM	North American Animal Disease Spread Model	This is the main analytical tool that can be used to define the nature and extent of the potential outbreak scenarios.	Dr. Caroline Dubé	(450) 424-0549 dubecm@inspection.gc.ca
Munich Reinsurance		Have expressed interest in working with other re-insurers to deliver products in Canada.	Rainer Stark Stephanie Buschman	49 (0) 89 38 91 0
PWS International		PWS is a re-insurance broker. They are responsible for managing the collection and organization of information that goes to the re-insurance industry.	Alan Woolnough	44 (0) 20 7480 0438 awoolnough@thbgroup.com

Acronym	Definition	Role	Contact	Contact Information
Thompson Health & Bond Line		They are a re-insurance broker. They are responsible for managing the collection and organization of information that goes to the re-insurance industry.	Charles Reeves	44 (0) 20 7480 6622
MPL	Maximum Potential Loss	The worst case scenario loss that could potentially occur – maximum liability for the insurer.		
LQM	Loss Quantification Model	A model that identifies the financial losses incurred by a specific sector of the industry in the event of a given peril .		
PSRMP	Private Sector Risk Management Partnerships	This is a program from AAFC that is targeted with working closely with the private sector in order to develop private sector solutions to problems that are currently not being addressed.	Mr. Bruce Stephen	(613) 759-7264 bstephe@agr.gc.ca
Endurance Reinsurance		They have worked closely with BMS, CMi and the OLPC in the development of the actuarial assessment for the poultry industry in Ontario.	Roger Heckman Senior Vice President, Agricultural Reinsurance	(949) 623 6480 rheckman@endurancereusa.com

Project Context

The main premise of this project is to design a proposed strategic approach that would guide the assessment of the potential for poultry disease insurance for B.C. The B.C. Risk Mitigation Steering Committee (RMSC) wants to ensure the most efficient and effective use of resources in pursuing this option given that:

1. The Risk Analysis Steering Committee, the precursor to the RMSC, completed an industry risk assessment in 2007, and one of the key findings was that there was a need to augment the compensation / indemnification available to poultry producers in the event of a disease outbreak.
2. The RMSC has been in contact with their colleagues Ontario and are aware of the indemnification process that is currently underway in this area (OLPC Project).
3. The RMSC is also aware that the National Poultry Group is working on the extension of this model nationally, and wants to leverage this opportunity while not necessarily waiting for it to conclude.
4. There is an understanding that this process, involves an assessment of specific disease risk spread parameters and the development of a disease spread model specific to the region. This information is of interest to the RMSC.
5. The RMSC is interested in evaluating the possibility of extending the OLPC Project to BC. While there is obvious interest by all parties to extend the process to BC, it is apparent that this would not occur for at least 6 months. In addition the next available training for disease spread modeling occurs in January of 09. The RMSC would like to ensure that work proceeds quickly by having as much of the data requirements developed in advance.

Given the operating reality that many of the elements will take a significant amount of time to complete, the RMSC wants to be proactive and do as much up front work as possible in order to be able to implement the process as quickly as possible. This is especially true in the area of developing a risk based approach to the implementation of active surveillance.

In addition, the RMSC also wants to assess the potential for having some level of control of the design and application of the risk modeling process – the only way that the public agencies would be able to be involved is if they have some understanding of the nature of the actuarial modeling process.

Specific Project Objectives

The stated purpose of this project is to:

1. Engage in discussions with organizations that could potentially design and implement a process similar to the RiscoGen process that was conducted in Ontario.
2. Identify a specific and detailed list of data elements and other information that would be required from producers, processors, hatcheries, service sectors, provincial boards, and public agencies in order to efficiently implement the risk identification and assessment process.
3. Identify the data requirements for the disease spread modeling process. Where possible identify ways that BC can be best prepared to run the model quickly once trained personnel are available.
4. Identify how best to have someone from BC involved in the development of the premium development model (currently held by Endurance Re. for the OLPC project). This would involve discussions with Endurance to determine how and under what circumstances they might consider partnering and if this option is available.
5. Use all of this information to provide a specific game plan for how the RMSC can best be prepared to implement the risk assessment and disease modeling process.
6. Work with the RMSC in order to present this process to the Reinsurance industry to ensure buy-in at that level.

Project Scope Limitations

It is understood that project activities are limited to the development of the strategic approach and the identification of specific data / information elements. This proposal does not involve running the disease spread model or the actuarial model for the calculation of insurance premiums, nor does it involve the actual collection of the information that is required to run the analysis.

More specifically, the process is limited to the identification and qualification of the specific parameters / data elements that would be involved, with the intent to provide the RMSC with the information necessary to proceed with the data collection process.

METHODOLOGY UTILIZED

There were two main phases in the process as outlined in the Letter of Engagement dated September 22, 2008.

We consulted and obtained significant information and insight from individuals and organizations who had been directly involved in the OLPC process.

This subjective information was then validated through discussions with other insurance industry experts, as well as through a search of the literature related to livestock insurance experience from around the world.

Specific steps included:

1. **Information From Current Participants on Data Elements** – the team of indemnification experts that are involved in both the OLPC and the NPG projects were contacted to solicit their input on specific data elements that would be required from BC in order to extend the OLPC process.

   This involved contact with BMS, CMi, CFIA, Crowe Livestock, and Endurance Reinsurance, and the various Commodity Boards in Ontario. It involved significant discussion regarding the issues that Ontario had in the data collection process and identifying what they learned throughout the process. The idea is to ensure that BC does not have to go through the same learning curve as Ontario.

   As part of this process, we identified where the Ontario project had difficulties obtaining data, spent unnecessary resources, collected unnecessary information and / or experienced avoidable delays. We specifically targeted:

   1) Data collected and gaps
   2) Determination of sample size
   3) Data collection specifics
   4) Survey transcription and data storage
   5) Data integrity issues
   6) General comments on the process

   Deliverables: ***A complete contact list and visual structural overview of all potential parties to consider. The structural overview clearly illustrates roles of the various groups highlighting how they fit together, and the basic information flow that would be required***.

2. **The Development of a Detailed List of Data / Information Requirements** – We identified specific data and risk assessment data that has to be collected to implement the process. We have also provided specific examples of the data required in order to ensure that the context of the information is understood.

   The intent here is to provide the RMSC with a complete set of data requirements for both the on farm risk assessment process as well as the specific disease spread model (North American Animal Disease Spread Model) used by the actuaries at Endurance in order to develop the premiums.

   The reality is that that process of building an indemnification process involves a significant amount of data and information collection. This phase would ensure these elements are identified proactively, along with suggestions on how best to proceed in collecting them.

   Deliverables: ***Lists that outline specific information / data requirements for each component of the analysis (producer risk assessments & disease spread model). This information would then be added to the structural model that was designed in the first step to clearly illustrate how all of this information fits together in the overall process.***

There would be a specific set of Steps, Actions & Deliverables provided for the process. I would also provide specific comments about potential challenges and approaches to dealing with them based on the experience from other jurisdictions (including but not exclusive to the OLPC project).

In-person interviews were conducted with the following industry / subject matter experts:

Mr. Mark Beveen (Egg Farmers of Ontario)[1]
Mr. Bob Guy (Ontario Broiler Hatching Egg Commission)
Mr. Dennis O'Connor (Chicken Farmers of Ontario)
Dr. Caroline Dubé (Canadian Food Inspection Agency)
Mr. Bruce Stephen (Agriculture and Agri-Food Canada)
Mr. Gary Hutchings (BMS)
Mr. John Drakeford (BMS)
Ms. Deborah Whale (OLPC)
Ms. Emma Stamper (Crowe Livestock Insurance)
Mr. Wally Wagner (A10K Insurance)
Mr. David Richardson (CMi)

Information from our meetings with Munich Re, PWS International, Thompson Health and Bond Ltd., and numerous other insurance industry experts, has also been considered in developing our recommendations and conclusions.

[1] Mark has recently accepted a position with the Canadian Animal Health Coalition (CAHC). Since the CAHC has always promoted this type of activity it is assumed that Mark would continue to be a strong supporter of the process that is being proposed in this document.

FINDINGS

Designing and implementing a process for exploring the potential of developing livestock/poultry insurance is complicated by the fact that many activities within a specific logical grouping are directly dependent on the completion of tasks within another group of activities. As a result, it became evident that our findings need to be presented in two ways in order for them to be of use:

- An overall structural assessment of how the various activities fit together - what the system ultimately looks like, and
- A priority ranking of specific elements within and across activity areas based on the time required to complete the element and the actual ability of the RMSC to effect the element itself -what comes first and how to implement it.

We have summarized the finding from this perspective starting with a discussion of general structural requirements typical to a livestock insurance policy development process. The experience from the OLPC project is then introduced in order to validate the specific process that is suggested for B.C.

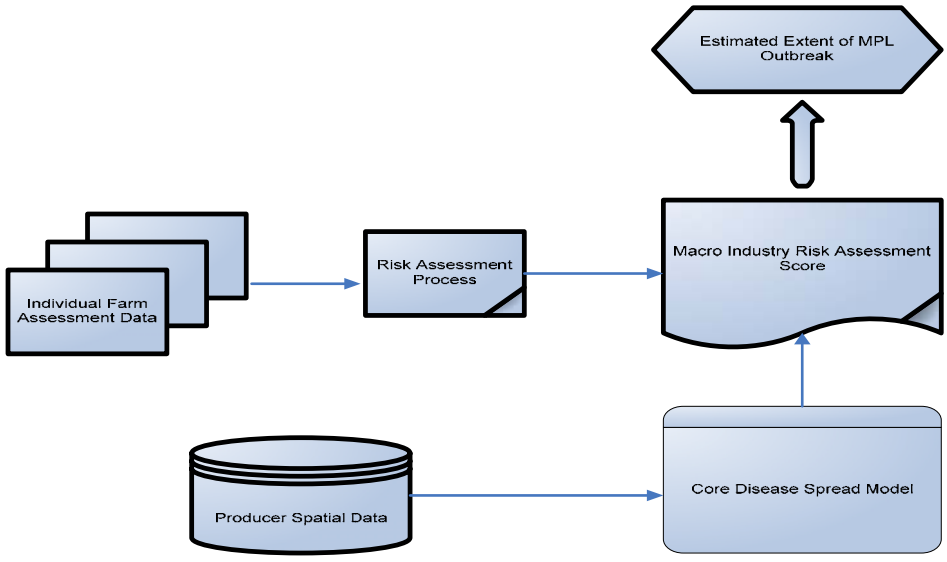
GENERAL OVERVIEW/STRUCTURE OF THE PROCESS

The general structure of designing and delivering livestock disease insurance typically involves three stages.

The first priority is to determine the potential rate of and nature of infection. This typically involves clearly understanding the demographics of the population at risk, as well as the nature of the disease itself. By understanding the specific production demographics of the industry and how the disease is likely to occur and spread, it is then possible to estimate potential infection rates, potential disease progression parameters, and the ultimate disease simulations to be considered. This is effectively what the NAADSM attempts to identify/quantify.

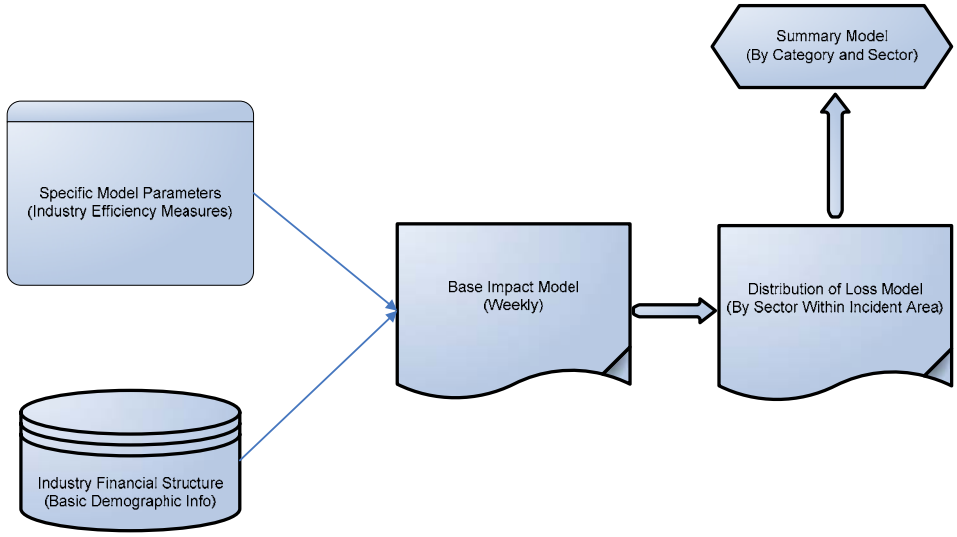
A visual representation can be observed in the following figure.

Figure 1: The Process – Determine Potential Rate of Infection



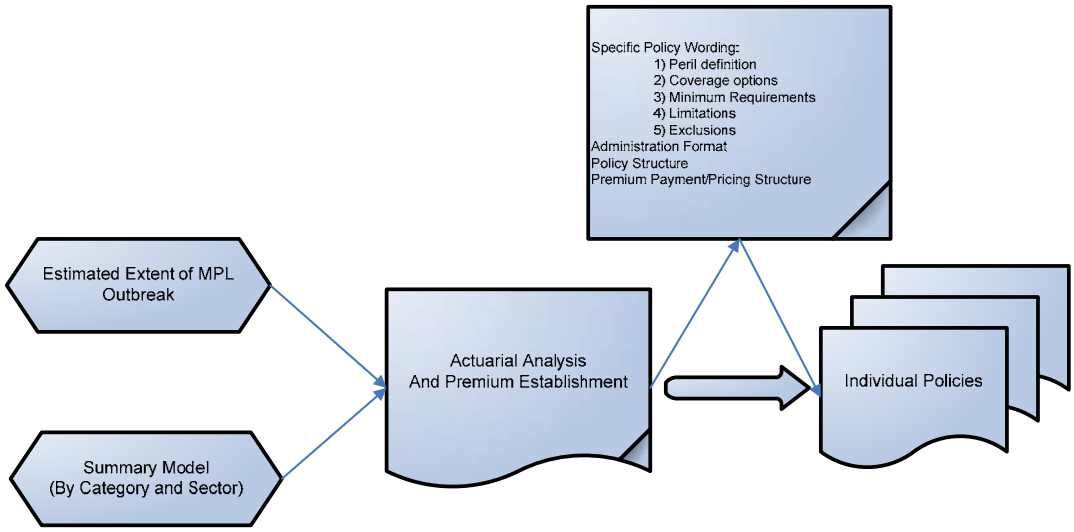
The second component typically involves a modelling process to quantify the loss pattern (financial) should an event occur. Information on the individual policyholder/subscriber, as well as the population of policyholders as a whole, needs to be considered. Ultimately, the intent is to develop a Loss Quantification Model (LQM) that is robust enough to provide an assessment of loss for any of the outbreak scenarios identified in Figure 1.

Figure 2: The Process – Extent of Possible Loss Scenarios



The final stage in the process is to link the potential rate of infection and the LQM in the context of an insurance policy. This involves the translation of the potential disease outbreak scenarios combined with the economic impacts that they would have into an insurance framework. The policy wording that would be developed to address these issues would provide specific parameters around which indemnification would occur. This stage also involves an actuarial analysis to determine the premium cost for individual policies.

Figure 3: The Process – Actuarial Analysis



Experience From Ontario

In late 2005, the Livestock and Poultry Council of Ontario, Canada (LPC) appointed BMS Group Ltd. (BMS) and CMi plc (CMi) to undertaken an evaluation of levels of exposure to livestock diseases and standards of risk management on a representative sample of farms across ten livestock industry sectors. The project was sponsored by the Federal Government's Private Sector Risk Management Partnership (PSRMP) initiative.

The primary project objective was to assist the livestock industry to develop risk transfer solutions for disease-related exposures, which take into account measures adopted by farmers to prevent or mitigate losses.

A key element of this approach was to develop a process that would assist the industry to secure increased involvement of the private sector insurance industry in the indemnification process through the provision of both insurance products and underwriting capacity.

One of the key deliverables of the process was to develop a Risk Score based on the specific risk profile for each farm. This information can then be utilized by the indemnifier, e.g., a sector association operating a pool system, or the private sector insurer, to determine the scope and cost of cover. The data can also be used to provide a profile of the industry as a whole or by species, disease type or industry sector.

There were two separate phases of activity that were followed. The first involved a risk assessment process that was conducted by 8 local assessors, trained by CMi, who carried out 114 assessments across 10 different livestock sectors in Ontario.

Once this process was completed, the team initiated the next phase of the study which was to develop pilot project insurance products for four specific poultry diseases including: Avian Influenza (AI), Infectious Laryngotracheitis (ILT), Newcastle Disease, and Fowl Typhoid. To this point, the OLPC has only been focused on the development of an insurance product for AI with the intent of adding the other diseases to the policy after the one for AI has been developed.

CMi trained personnel from the Egg Farmers of Ontario (EFO), the Chicken Farmers of Ontario (CFO) and the Ontario Broiler Hatching Egg Commission (OBHEC) to be able to conduct the on-farm risk assessments. These individuals were then responsible for conducting the additional assessments required in order to provide the risk data to the actuaries.

These agencies then conducted full biosecurity risk assessments on over 400 poultry producers in Ontario. At the same time, CFIA used their NAADSM to assess the probability of and extent of potential AI outbreak scenarios. This information was provided to Endurance Re along with a full LQM for their use in developing premiums and policies for the sector.

During the interviews with individuals directly involved in the OLPC process (Page 5) we specifically targeted areas where their experience could offer important experience relevant to the process in BC. This involved 6 key questions:

1. Data collected and gaps – a large amount of data was collected in the process. There was a significant amount of time spent ensuring that the questionnaire reflected the specific operating reality of the industry in Ontario in order to ensure that the risk assessment measured relevant factors.

   One of the main gaps in the process was that the information collected was not effectively used in the development of the NAADSM parameters and was only used in the actuarial analysis. Ideally, this information could be incorporated into the NAADSM so that the scenarios could adjust for different levels of biosecurity. Incorporating this type of information was felt to be an area where additional work

should take place. This work would have to be completed by a committee, including individuals that are very familiar with both the NAADSM and the risk assessment process.

A second gap related to the need for additional information regarding the traffic pattern on-farm. This weakness has been addressed in the information provided in Appendix 2 of this report.

2. Sample size specifics – there was an attempt to obtain a statistically valid sample of information for the risk assessment report. As a result of the number of farms in the overall population, it was necessary to get over 50% (55) of the broiler breeders, 25% (115) of the commercial layers, and 10% (135) of the broilers. The number of surveys required will vary by region based on the need for statistical significance and the number of producers in the overall population.
3. Data collection specifics – a number of different options were tried including an internet survey and hiring summer students to collect information. In the end, the conclusion was that the level of detail required and the need to understand how to properly audit the farm results in the need to use qualified farm auditors. The OFFS auditors appear to be the best option, and there is strong motivation to combine the biosecurity, OFFS, animal care audit process into a single data collection exercise.
4. Survey transcription and data storage issues – while data storage was not a serious issue for the Boards, the various collection processes attempted created a number of transcription issues. Ultimately, the conclusion was that it makes sense to have a single point of data entry. This significantly reduces the problems with interpretation and helps to ensure that data integrity is ensured.
5. Data integrity issues – the main issue here is with the survey itself and how closely the producers follow the elements on an on-going basis. While the gates may be locked when the inspector comes to conduct the audit, on-going diligence is required to ensure that the score achieved on the day of the survey is reflective of the actual risk on a going concern basis. This problem is not unique to this process and as the audits become random (the intent in Ontario) this issue should sort itself out.
6. General comments on the process – ultimately, the process required a significant amount of interaction among all stakeholders and involved a number of iterations to ensure that the process worked. While there are lesions to be learned for BC, the need to interact and proceed through a number of logical iterations cannot be avoided. Each province operates slightly differently and has different risk exposure characteristics and infrastructure issues. The only way to ensure that all of these are considered is to follow a well defined process and build experience in a sequential fashion. There does not appear to be any shortcuts.

While the OLPC process is not yet completed – it is expected that the policies will be available in the spring of 2009 - there are a number of key lessons learned that are relevant to B.C. The following table summarizes these in terms of strengths and weaknesses of their approach.

Table 1: Strengths and Weaknesses From Ontario Experience

Strengths	Weaknesses
➡ Single point of responsibility for process – ***Deborah Whale managed the process and delegated the day-to-day activities to Gary Hutchings (BMS). Each Board was ultimately individually responsible for the necessary deliverables, but this was coordinated very carefully***	➡ Length of time taken between re-insurance premium runs – ***despite all that has been accomplished; the reality is that there is virtually no history for the actuaries to rely on in making their decisions. As a result, they are very conservative when conducting the analysis. This results in significant delays anytime additional runs are requested and suggests that if BCMAL can get involved in the process with the actuaries that it might lead to some efficiencies.***
➡ Cooperation among various boards, producers, CFIA, provincial government brokers and re-insurance industry contacts ***– there was a significant amount of goodwill displayed among the stakeholder group.***	➡ Addition of another survey on producers – ***producers are somewhat overwhelmed with the number of people coming on their farms and asking questions. Anything that can be done to reduce survey fatigue should be considered.***
➡ Identification of farms where additional resources must be spent addressing biosecurity issues that are putting the industry at risk – ***the three Board contacts all***	

Strengths	Weaknesses
agreed that the information collected throughout the process is of significant use even if the insurance product did not end up being subscribed to. ➡ The development of a very good understanding of how the poultry industry works on the part of the re-insurance industry – ***one of the main reasons why the insurance industry has not been active in this sector is a lack of knowledge about how it operates. This process has served to provide the re-insurance world with an excellent background to the sector.*** ➡ Sharing of resources for running the NAADSM – development of necessary experience with individuals that run the Super Computer at the University of Guelph – ***the NAADSM requires a significant amount of computing power. It also requires a significant amount of subjective data analysis ability. Now that this has been developed it is available to other groups wishing to make use of it across the country.*** .	➡ Numerous approaches taken on survey prior to finalizing an appropriate approach – ***since this was the first time through, the OLPC attempted a number of different data collection techniques. This resulted in a problem with data integrity which ultimately required additional resources to sort out.*** ➡ Lack of a formal link between the RiscoGen findings and the NAADSM parameter development – ***the NAADSM is a very powerful analytical tool that has to make a number of assumptions regarding disease parameters. Many of these decisions could be significantly improved if the information from RiscoGen parameters could be incorporated. As a result, there is a need to conduct additional analysis among the various stakeholders in order to determine how best to accomplish this goal***.

BC Specific Insurance Development Process

Given what was learned in Ontario, the typical approach to insurance coverage development and the specific characteristics of the B.C. poultry industry, there would appear to be few specific areas of activity that need to be addressed. Once the activities are fully understood in the context of their relevance to the project, then it is possible to develop a priority ranking of how to proceed based on the nature of the relationships across the various activity areas.

We have identified four different areas of activity that need to be considered as part of this process:

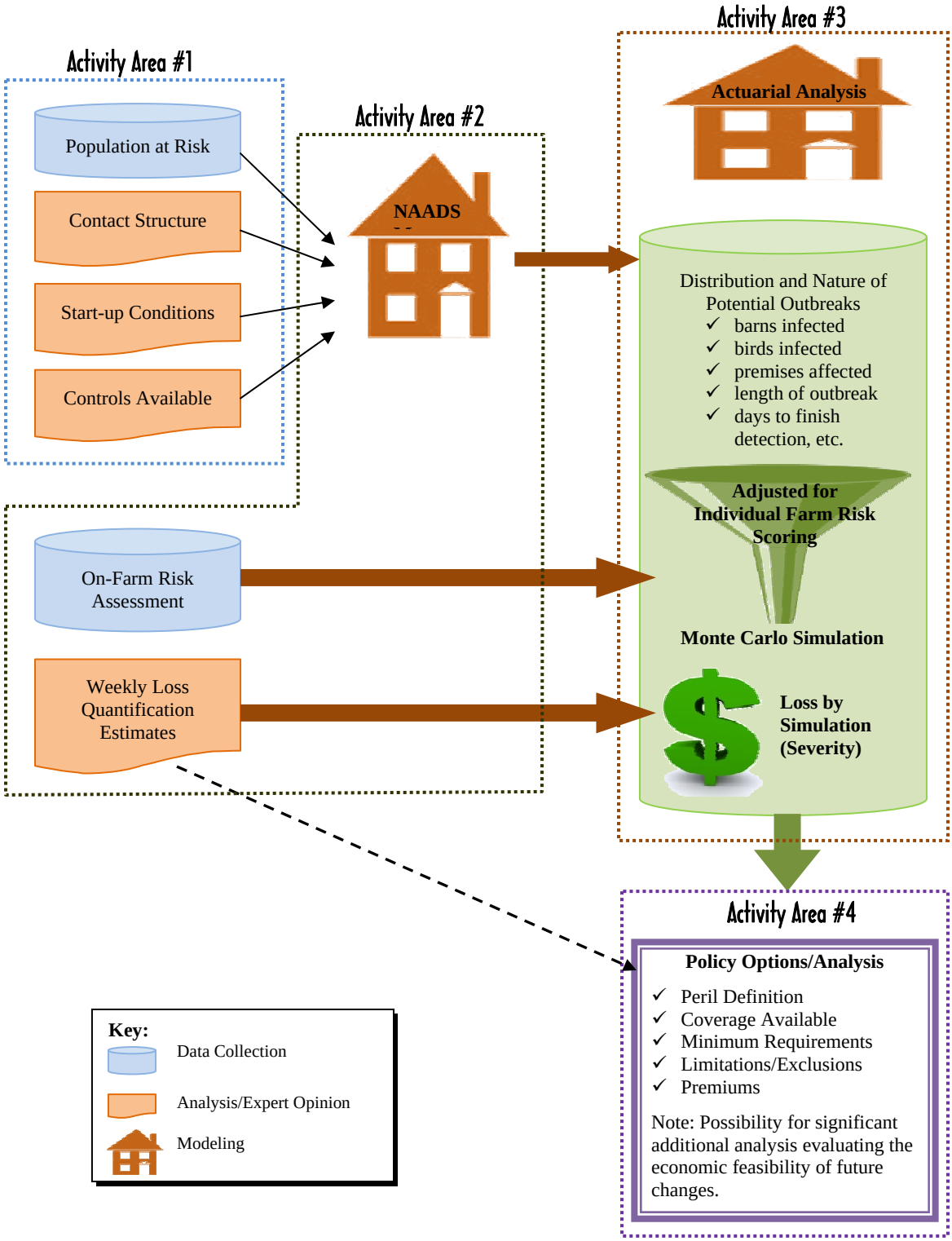
1. Activity Area #1 involves developing the information that is needed in order to populate the NAADSM. There are four elements of activity that need to be conducted in preparation to run the model. The specifics of each element are outlined in detail in the following tables.

2. Activity Area #2 involves collecting and organizing the information for the actuarial analysis. This includes running the NAADSM and also includes conducting the on-farm risk assessments, and developing the weekly loss quantification estimates (financial analysis). It is important to note that there is no reason that elements of this area could not be conducted concurrently with Activity Area #1. However, we would argue that the preparation for the NAADSM is the initial focus due to the fact that the model itself cannot be run in-house, meaning that sufficient lead time must be committed. In addition, please note that we have provided a detailed outline of priority activities for the process in the next section of this report.

3. Activity Area #3 involves those activities directly related to running the actuarial analysis. This incorporates the results of the NAADSM as well as the on-farm risk assessments and the financial analysis in the development of an actuarial report. The intent here would be to clearly define the cost per unit of risk in the form of an insurance premium.

4. The final, Activity Area #4, involves the potential insurance policy development process. This involves all stakeholders working closely together in order to define the policy wording, identifying compliance factors and any relevant exclusions and deductibles.

Figure 4: Indemnification Policy Development Process (Macro)



Elements Within the Process

There are six specific elements that need to be coordinated. These elements are directly related to the Activity Areas, and are discussed in context below. In each case we have identified the element to be completed, what it would be used for, how it is defined/distinguished from other elements, and the specific information required. In most cases we have also provided a detailed example of the information collection matrix in the Appendix. The priority of implementing these elements is discussed after all the elements are fully described. Please note that these do not include the negotiations that would be required to make use of the NAADSM or the actuarial analysis itself. These are discussed later in the report.

Elements #1 to #4 are all part of Activity Area #1 and are directly related to collecting and organizing the information that would be required for CFIA to run the NAADSM.

Element #1	Used For	Definition/Description	Specific Information Required
Population At Risk	NAADSM	Outlines specific demographics for the population being studied. In this case it would be the information for: ➡ Broilers ➡ Turkey ➡ Broiler Breeders ➡ Layers	In as much detail as possible: 1. Specific premise id and coordinates (geo-position) 2. Number of birds/premise at a point in time 3. Size of barns/premise 4. Number of barns/premise 5. Capacity of operations/premise 6. Position of barns on the premise There is also a need to determine how to address the nature of the backyard and/or commercial specialty flocks. In Ontario they used a random distribution of the available data.

Element #2	Used For	Definition/Description	Specific Information Required
Contact Structure	NAADSM	There is a need to assess the frequency and extent of contact/movement across stakeholder locations for all sectors and for all potential contacts. This involves both product and personnel. In the OLPC analysis this was developed via expert opinion which was then validated with an industry survey. Essentially, this involves identifying pairs of source to recipient – ➡ Direct - movement of birds ➡ Indirect – people and equipment ➡ Local – airborne and anything else that would be indirect but not able to pinpoint. The ultimate effect of this element is to be able to determine the likelihood of transmission following indirect and/or direct contacts. As a result,	The contact structure assessment provides a complete picture of: 1. Bird/egg movement 2. People/trucks/input product movement 3. All indirect contact movement – both suppliers and service sectors Ultimately there is a need to develop a “frequency of movement distribution” along with a “distance of movement distribution”. The NAADSM works best when this is developed using a triangular distribution involving mean, median and mode assessments on a per day basis. Eg: the shortest distance traveled the longest and the median or most likely. Appendix 1 provides examples of the basic information that is required, in order to start the process of developing the appropriate information for the contact structure development. The nature of the information required is further defined in Appendix 7. While there is a template for compiling this information it is strongly

Element #2	Used For	Definition/Description	Specific Information Required
		there is the potential to augment this element with information from the biosecurity score from the industry survey.	advised that this template be provided directly from Carolyn Dubé (CFIA) during a formal consultation. This information needs to be interpreted by Dr. Dubé and it is critical that all of the data collection nuances be fully understood up front. In addition, Dr. Dubé is constantly updating and improving the model. This potentially results in changes to the data requirements, or how the data is organized.

Element #3	Used For	Definition/Description	Specific Information Required
Start-up Conditions	NAADSM	There are two elements to this. The first relates to the relative density of the area where the first event occurs. The second relates to the number of farm/premises that the event occurs in.	The assumptions made involve determining locations of: 1. High density 2. Medium density 3. Low density 4. Very low density The origin of the event starts with one premise, then it is assumed to move from 5-50 premises in increments of five. As with Element 3, this process requires a formal meeting with the individuals charged with running and interpreting the results of the NAADSM for BC. An overview of the basic information required can be observed in Appendix 7.

Element #4	Used For	Definition/Description	Specific Information Required
Controls Available	NAADSM	The controls reflect the activities taken once there is a suspicion that something unusual is occurring through the eradication of the problem. This element of the model also considers how long it is estimated to take to set up (start) the process, including the estimated delay in order to prepare for destruction. This also involves setting priorities for destruction.	This involves determining the: 1. Probability of detection – this involves estimating the number of days to detect the first case; the probability that the producer picks up the signs; the probability that they will report (how long will they delay); the probability that it will be diagnosed correctly. 2. How the flock(s) are quarantined – the quarantine process only involves the activities taken on the individual index operations (positive diagnosis) and is related to how effective the quarantine procedures are. 3. What movement controls are established – this would be defined as per the AI Hazard Specific Plan (CFIA). There is a need to evaluate how effective these controls could be given the nature of the geography in the area. 4. What culling protocol is used – three options are modeled including the destruction of the index farm, trace-out farms, and ring (preventative culling). One issue that needs to be assessed is how effective the trace-outs (both forward and backward) could be by testing logbooks. 5. Vaccination (if used)

The data requirements for the NAADSM are very specific and are clearly outlined in the "*User's Guide for the North American Animal Disease Spread Model 3.0*". We have also included the main parameter descriptions in Appendix 7&8.

The final two elements that need to be considered for specific action are related to providing the necessary information for the actuarial analysis (Activity Area 3). As with the data collection for the NAADSM it is strongly encouraged that CMi be contacted directly to discuss this data collection process. CMi can:

- arrange for training of inspectors
- outline and incorporate specific changes necessary to adjust for the operating reality in BC
- and further refine the collaboration with the individuals running the NAADSM.

Ultimately it is essential to recognize and address the fact that the survey tool used in Ontario may need to be adjusted for the situation in BC. The reinsurance world has accepted the tool provided by CMi and it is critical in our opinion to keep them engaged in the process.

Element #5	Used For	Definition/Description	Specific Information Required
On-Farm Risk Assessment	Actuarial Analysis	This involves significant data collection on-farm. Essentially, it identifies factors that create risk exposure associated with disease occurrence, detection, and control. Each of these factors is given a specific score that is related to the impact that they would have on the ultimate size/nature of the outbreak and its resulting costs. The concept is that two operations with exactly the same biosecurity may have different risk exposure simply due to geographic location and/or numerous other factors. These factors may be within or outside the direct control of the producer.	A detailed outline of the specific data requirements can be found in Appendix 2. This survey is a compilation of the final versions used in Ontario, with additional categories as suggested by interviewees, based on the results from the OLPC process. Data collection involves 8 different risk categories: 1. Contact issues and integrity 2. Cleaning and sanitation 3. Hygiene 4. Feeding 5. Water management 6. Isolation and inspection 7. Waste management 8. Record keeping

Element #6	Used For	Definition/Description	Specific Information Required
Weekly Financial Loss Quantification Estimates	Actuarial Analysis	The key element in estimating the maximum potential loss that requires coverage. This is based on the estimated loss for producers associated with the outbreak. This would include: - Production loss - Cleaning and disinfection loss - Business interruption/consequential loss It is important to consider the reality that non-infected farms within an established disease control zone also incur losses and these need to be considered as well.	For each commodity there is a need to determine (for cycles of relevance): 1. Detailed weekly revenues 2. Detailed weekly fixed costs 3. Detailed weekly variable costs 4. Transaction costs 5. Additional cleaning and disinfection costs It is critical that these costs accurately reflect the operating reality for each of the commodity types – need to consider both broilers and heavy toms for turkey, or an 8 – 12 week cycle for broilers etc.. A detailed worksheet outlining the information categories required by sector, can be found in Appendices 3, 4, 5, and 6. In addition, Appendix 9 outlines how some of these elements can also be considered as part of the NAADSM process.

How To Proceed - Priority Ranking With Suggested Deliverables And Responsibility

The previous section has outlined the basic activities that need to be conducted, in addition to providing a summary of the necessary data elements that would be required.

To this point we have neither applied a priority ranking on these activities, nor have we discussed various protocols of understanding that would need to be negotiated. Ultimately, the process must consider all the elements and activities outlined. However, there is a logical process flow that should be followed, in our opinion, in order to ensure effective and efficient project management.

The following discussion outlines the proposed process. We have identified three specific priorities that the BC RMSC needs to address in order of relevance. We have also suggested that tasks be allocated to specific working groups in order to clearly separate the responsibility for each.

It is understood that in some cases, the working groups will have extensive overlap in terms of personnel. This is not unexpected, and in fact it re-enforces the need to clearly delineate the working group activities so confusion across activities is minimized.

We have organized these activities using a project planner (Microsoft Project). This information has been provided for the use of the management team in electronic form. A summary of the process is provided in the following tables.

Priority Area #1 – NAADSM Elements and Use

Considerations

There are actually two specific issues that need to be considered in relation to the NAADSM:

1. The first is the need to get started collecting the data on the demographics of the sector (Element #1) and the contact structure as outlined in Element #2.
2. A second area of concern is the need to secure/ensure that there is sufficient capacity and expertise to run the model effectively.

It is our opinion that this priority area should be addressed using three working groups. The following table identifies the steps to be taken, assigned responsibility, composition, and any additional considerations necessary for each of these working groups.

Please note, that while we have identified a number of steps within this priority area, we would suggest that they be initiated concurrently.

Steps	Assigned Responsibility	Working Group Composition	Additional Considerations
Defining Population at Risk	This involves collecting the information described previously under Element 1.	Given the nature of the exercise, we would suggest that this be allocated to the various commodity boards. We would also suggest that someone who is familiar with the GIS system to be used be involved in helping direct this activity.	In our opinion the first step is to contact the individuals responsible for running and interpreting the NAADSM (Carolyn Dubé). While they do not have a specific template for data entry, they can certainly help to guide the data collection process and provide tremendous insights around how to use the data that BC may already have available. Given the fact that there is a need to identify/address backyard flocks, there must be some public involvement in this process. The OLPC process estimated the extent of this issue, however, it was suggested that additional focus be placed on this aspect of data collection.
Defining the Contact Structure	This involves the collection of the specific information identified previously under Element 2. It must also be stressed that this is more than a data collection exercise. There is a need for significant expert involvement in triangulating the potential contact points as this forms a critical component of the NAADSM analysis.	This needs to be a multidisciplinary team involving, all aspects of the value chain for each sector, in addition to the CFIA and provincial vets. ➡ Producers ➡ Hatcheries ➡ Feed ➡ Vets ➡ Trucking ➡ Other service sectors	It is important to note that some of the questions that need to be addressed in this analysis will be validated in the on-farm survey. However, the experience in the OLPC suggests that having the expert committee involved in doing the initial cut of the process is of significant value.
Capacity and Expertise for the NAADSM	Running the model requires a significant amount of expertise and judgment capabilities. We feel strongly that there needs to be a team of people from BC working together right from the start of this process in order to ensure that all model infrastructure aspects are considered.	This team must include representatives from the province and CFIA. This is mostly a veterinary issue, but they need to agree to the risks. The obvious starting point for this would be either Dr. Carolyn Dubé or Dr Carolyn Inch from CFIA.	Input from those directly involved in the OLPC project suggest that it would make sense to utilize the resources and experience of those who were involved in processing Ontario's data. This is not to suggest that someone in BC should not be trained to work on the model. However, Neil Harvey (at the University of Guelph) has worked directly with this process on the "Super Computer" and is familiar both with the analysis required and with the actuarial requests that have come from the re-insurers.

It is important to note that there is apparently no single template where information can simply be slotted into a table and provided to the NAADSM administration. The diverse nature of the operating reality of the industry in each province means that there has to be significant interaction among the groups in the specific geographic region order to ensure that the structure specific to the BC industry is clearly understood and modelled correctly.

As a first step, the industry needs to literally draw out their operating system and present it in the form of a detailed flow chart clearly illustrating all of the specific elements that are a part of the process. A quantification of the activities at each of the notes is required.

The next step in the process is to outline how movement of birds, products and services occurs and what is the shortest, longest and most likely movement pattern that occurs. This effectively provides a distribution of activity around each of the contact points.

This is then used as the starting information that will be further qualified by the modellers. Despite all the work that has been completed in Ontario, it is expected that the exercise in BC will still require a number of iterations and a significant amount of interaction between the stakeholder group and the NAADSM modelling team in order to ensure that all the nuances of the industry are clearly understood and correctly modelled.

Priority Area #2 – Additional Considerations for Inputs to the Actuarial Assessment

Considerations

Once again there are two specific action elements within this priority area. These include:

1. On-Farm Risk Assessments (Element 5)
2. Developing the Loss Quantification Analysis (Element 6)

Each of these areas would require their own working group. While both are part of the same priority area, the on-farm risk assessments would take longer to complete, and therefore is of higher relative priority in terms of initiating the process.

Steps	Assigned Responsibility	Working Group Composition	Additional Considerations
On-Farm Risk Assessments	This involves collecting the information described previously under Element 5.	Commodity boards need to be the key participants here, since the experience of the OLPC suggests that using the board inspectors (OFFS) is the best approach. We would also suggest that a representative from the certifying agency (CMi) be associated with the development of the testing protocol. This is extremely important, as the data collection tool has to be adjusted in order to address the industry specifics of the BC operating reality. Risk in Ontario and BC may be quite different and these differences must be identified and addressed in the survey tool.	These surveys should be in-person. Experience in Ontario suggests phone/fax/internet systems do not provide the necessary compliance. There are a number of other important considerations: ➡ Producers need to be warned that this is occurring and provided with justification as to why they should participate ➡ A single source for data entry is necessary in order to ensure consistency in interpretation ➡ Expect the survey process to take approximately 2 – 3 hours ➡ Given the need to have a statistically valid sample size and considering the relative size of the industry in BC the initial sample

Steps	Assigned Responsibility	Working Group Composition	Additional Considerations
			would likely involve all turkey producers, all broiler breeder producers, 50% (60) of the commercial layers, and approximately 25% (80-90) broilers in order to get a sufficient sample size ➡ Auditors would need to be trained by the certifying agency (CMi). Based on the information obtained in Ontario this would cost approximately $7,000 for the two day course. We would anticipate that the industry could train all of the necessary auditors during this session. ➡ Current estimates of additional costs associated with the risk assessment include approximately $250/audit assuming that the auditor is able to complete two audits per day. [2] In addition, it costs approximately $30,000-$40,000 per run to analyze the risk assessment data and provide the necessary risk elements to run the actuarial model. It is expected that this would be an annual cost that the actuaries would apply in order to run the on-farm risk information. In the absence of an actual policy in place – in which case the price would be included in the total premium paid – this cost would have to be paid by the agency requesting the assessment. In the OLPC situation it was paid as part of the Federal Government's contribution. .
Weekly Loss Quantification Estimates		Given that this requires the application of cost of production information it is suggested that this team be lead by representatives from the various producer boards. Since it also requires the estimation of heath of animal payments, representation from CFIA would also be recommended.	It is essential that the loss categories are consistent with the nature of the modeling process that the actuaries want to conduct. As a result, the data needs to be as disaggregate as possible.

[2] This figure is based on an annual cost of $100,000 per year for salary, benefits, expenses, and assumes 180 working days per year.

Priority Area #3 – Considerations on Use of/Extension of Analysis

Considerations

Once again there are two main elements to be addressed in this priority area.

1. Negotiations on the extent to which the actuarial analysis is a black box
2. The potential to extend/add utility to this analysis via assessing the economic feasibility of various policy objectives for the sector

The first element relates mainly to the need to negotiate with Endurance Reinsurance to determine the extent to which the province could obtain the risk model algorithms. According to BMS, Endurance is interested in sharing this with BC. However, the terms and conditions of this relationship needs to be carefully negotiated in order to ensure the private/public partnership roles and obligations are clearly understood by both parties. This element was not an issue with the OLPC project so there will undoubtedly be some form of learning curve. However the fact that BCMAL is involved with reinsurers through their crop insurance program should help facilitate this process.

Assuming that the first element is sorted out, the next opportunity is to expand the model in order to develop assessments of issues that up until now have been very hard to quantify. As an example the insurance model enables the assessment of risks associated with industry concentration by illustrating how premiums would adjust should concentration be changed. Another example would be to demonstrate in a quantitative way how the existence of backyard flocks affects the risks faced and premiums paid by commercial producers.

Steps	Assigned Responsibility	Working Group Composition	Additional Considerations
Negotiations with Endurance Re	The goal of this process would be to establish a reciprocal agreement whereby the province could fully understand how the risks are being quantified in the current actuarial model.	Ultimately this would be of interest to the BC RMSC, with specific interest on the part of BC MAL.	We would anticipate that Endurance would be more willing to do this if the province was willing to consider being part of the re-insurance pool. We would strongly suggest that the province work through BMS on this issue, since they have been the ones who have brought the markets to the table to this point, and have also been working with other re-insurers to coordinate the OLPC package.
Extension of the Analysis	There is need to determine how to make additional utility from the efforts that would be expended.	In our opinion this working group would be a sub-committee from the current BC RMSC. Ultimately we see this process as being the perfect opportunity to more accurately quantify various policy decisions that need to be considered in the BC poultry industry.	

Summary And Conclusions

The preceding analysis and documentation has allowed us to meet all of the objectives specifically outlined in the Letter of Engagement dated September 22, 2008, and confirmed in the Service Agreement between Serecon and IAF dated November 21, 2008.

The following table lists the six specific objectives/deliverables to be addressed, and identifies when the results can be observed in this report. As outlined in the table, the majority of the objectives are actually addressed in a number of places throughout the Report.

Summary of Deliverables and Success in Achieving Them

Objective	Where it is Addressed
1. Design process similar to RiscoGen data collection process in Ontario	Activity Area #2; Element #5; Priority Area #2
2. Detailed data requirements list – industry demographics	Appendix #1; Activity Area #1; Element #1&2; Priority Area #1
3. NAADSM data requirements	Activity Area #1; Elements #1-4; Appendix 7-9
4. BC investment in the premium development model	Priority Area #3
5. Specific steps/actions/deliverables for implementing the risk assessment and disease modelling process	"How To Proceed – Priority Ranking With Suggested Deliverables and Responsibility"
6. Work to ensure buy-in with re-insurance	Interviews with Endurance, CMi, BMS & the design of the process

The key finding is that a logical and sequential approach, incorporating the key learnings from Ontario, and cooperation among various stakeholder groups, will be necessary in order to ensure the assessment and development of efficient and effective insurance/indemnification solutions related to poultry disease management.

This approach involves a significant amount of interaction among the stakeholder groups and interactions of specific activities within these groups. Given the complexity of the process and the diversity of the stakeholder base, perhaps the most important finding from the Ontario experience is the need for an assigned individual to drive the process itself. Ultimately, even the most effective and efficient structural approach is likely to falter if it is not managed by an individual that has significant ownership of the process.

Much of the information that would typically go into a concluding section has already been included in the preceding work. We have attempted to organize this document in a way that enables the strategic use of the conclusions, rather than just providing a list at the end. However, the MS Project Outline provided under separate cover (soft copy) summarizes the project process most effectively. It is intended as a starting point for the process and has the flexibility to account for any changes and help in the on-going monitoring of the project vs. targeted deliverables. It matches the process proposed in this document, so that the report can be used as a reference guide an add context if required.

Ultimately, after considering all of the information that we have been provided, it is our opinion that there is a significant opportunity for the BC RMSC to advance their agenda by incorporating the principles outlined in this report.

We have suggested three specific priority areas of focus, with a total of six different working groups that would be focused on accomplishing the tasks set for them in this document.

The OLPC has expended a significant amount of energy in the process in Ontario, and while the actual insurance product has not been delivered as of yet, all participants agree that the process was worth it even if the product does not work out in the end.

This would be even more relevant if BC can negotiate with Endurance to have more insight into their actuarial assessment process. Knowledge of and involvement in this process would enable a much more effective cost benefit analysis structure for policy decisions in the province.

In addition to the Priority Areas detailed in this document, we would also conclude that it would make sense for the BC RMSC to seriously consider:

1. Working with the various stakeholders to consolidate the biosecurity, OFFS, animal welfare, and risk assessment surveys into a single survey instrument. This would mean that inspectors would only have go on the farm one time to collect information.
2. Working closely with the CFIA to ensure that the expertise that is available for the NAADSM is maintained. This model provides significant opportunities for policy assessment relating to the impacts of biosecurity and other operational issues. The more that this model can be supported and augmented the more useful that it would be.

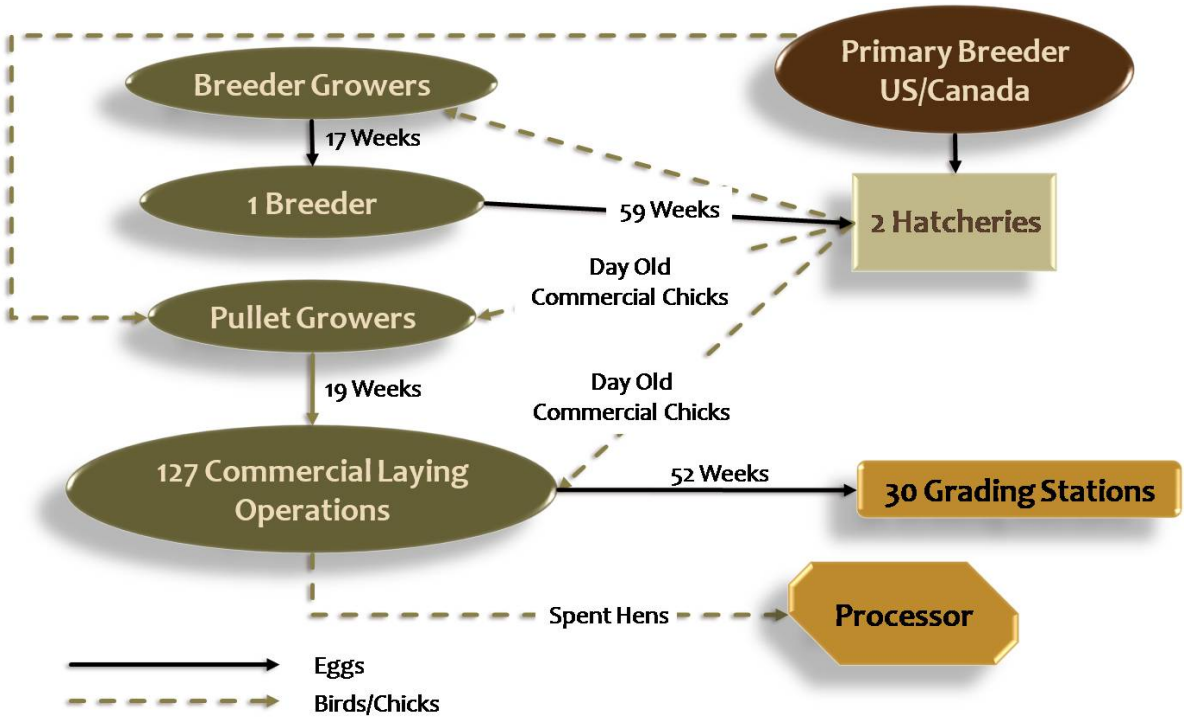
As a final note, Deborah Whale (OLPC) has managed to navigate the stakeholders of the OLPC project through a very difficult process involving a significant amount of staff time, capital expenditure, and compromise on all parts. She has always been of the opinion that the process needs to be expanded to other provinces and her insight would be of tremendous value to the individuals charged with leading the BC Project. We would strongly encourage the BC RMSC to maintain contact with her and utilizes her expertise in this area where possible.

We would also suggest that Mr. Bruce Stephens (AAFC) also has a significant amount of knowledge and experience in this process. His expertise should also be utilized where possible .

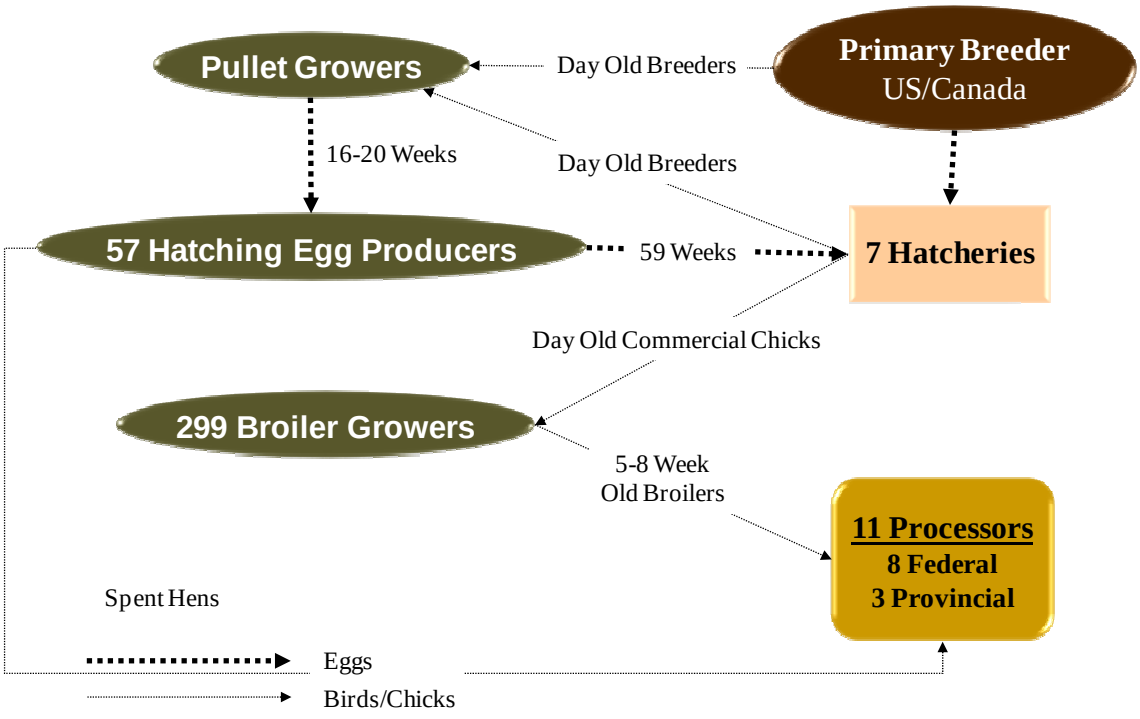
Appendix 1

Starting Point For The Contact Structure Analysis

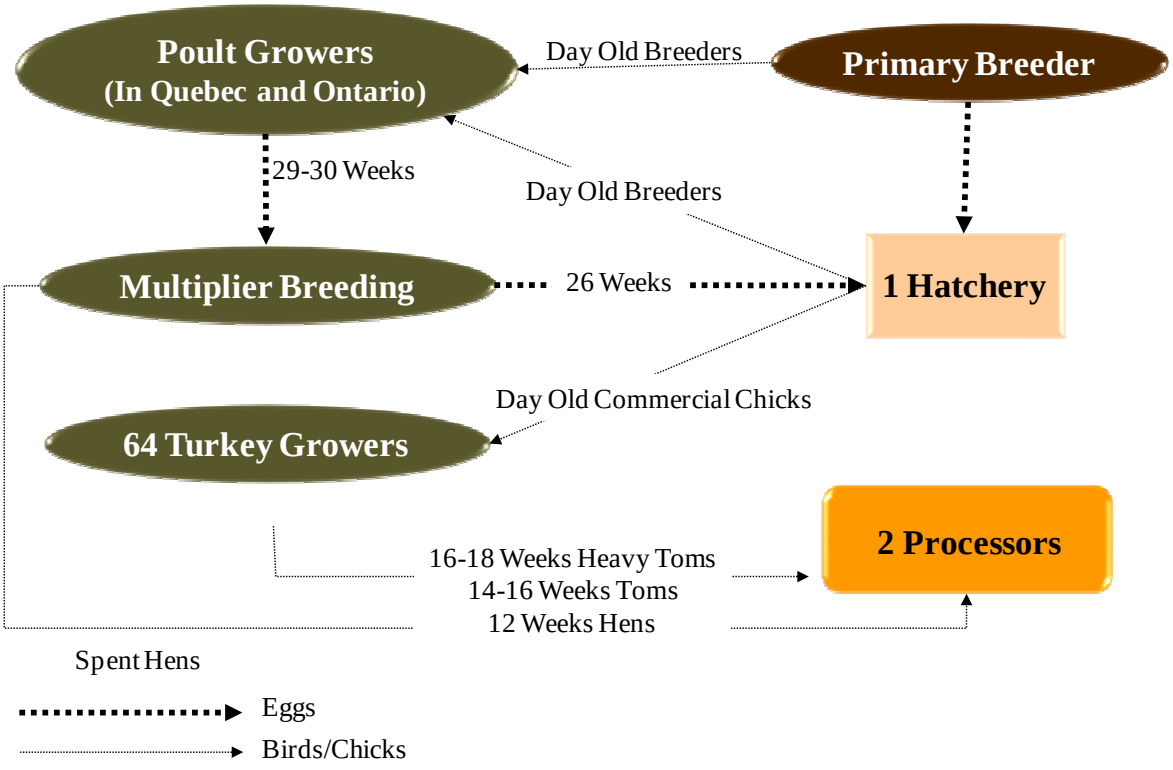
Starting Point For The Contact Structure Analysis
(Layer Industry Example)



Starting Point For The Contact Structure Analysis
(Broiler And Broiler Breed Industry Example)



Starting Point For The Contact Structure Analysis
(Turkey Industry Example)



Appendix 2

Risk Assessment Survey

Birds – Section 1 – Contact Issues And Integrity

Question	Answer	Guidance Notes
1. *Are all farm access points secure against accidental entry?*	1 Yes – all lockable	The factors that can influence the integrity of a site are the geographical location and the local topography. The ability to maintain a site free from risk of disease entry is influenced by the activities on the site by its layout and the activity of neighbours. The best farm is where a discrete parcel of land is within a ring fence with a single point of entry. A poor farm is one where the parcels of land are separated or intersected by roads and public access footpaths and tracks.
	2 Yes – most lockable	
	3 No	
2. *What is the distance from the nearest bird building to the public road / urban area?*	1 <20 meters	
	2 Between 20 and 49 meters	
	3 >50 meters	
3. *What is the distance from the nearest bird building to a river or wetland area?*	1 <20 meters	
	2 Between 20 and 49 meters	
	3 >50 meters	
4. *What is the proximity of the nearest livestock farms?*	1 <1 km	An obvious source of disease contagion is other animals of the same species. Where the farms stock has nose to nose contact with stock on neighbouring farms, then the risk of the passing of disease is at its highest. It is also worth considering wind direction in relation to proximity as there is some evidence that under certain conditions, the spread of certain viruses can be assisted in this way.
	2 Between 1 and 5 km	
	3 Between 5 and 10 km	
	4 >10 km	
5. *What is the proximity of the nearest commercial poultry farm?*	1 <0.5 km	An obvious source of disease contagion is other poultry. Where the farms stock has nose to nose contact with stock on neighbouring farms, then the risk of the passing of disease is at its highest. It is also worth considering wind direction in relation to proximity as there is some evidence that under certain conditions, the spread of certain viruses can be assisted in this way.
	2 Between 0.5 and 1 km	
	3 Between 1 and 2 km	
	4 Between 2 and 3 km	
	5 Over 3 km	
6. *What is the proximity of the nearest back yard / non-commercial poultry farm?*	1 <0.5 km	An obvious source of disease contagion is other poultry. Where the farms stock has nose to nose contact with stock on neighbouring farms, then the risk of the passing of disease is at its highest. It is also worth considering wind direction in relation to proximity as there is some evidence that under certain conditions, the spread of certain viruses can be assisted in this way.
	2 Between 0.5 and 1 km	
	3 Between 1 and 2 km	
	4 Between 2 and 3 km	
	5 Over 3 km	
7. *Approximately how many commercial poultry farms within a 5 km radius?*	1 One only	
	2 2 or 3	
	3 4 or 5	
	4 Between 5 and 10	
	5 None	
	6 Over 10	
8. *Approximately how many back yard / non-commercial poultry farms within a 5 km radius?*	1 One only	
	2 2 or 3	
	3 4 or 5	
	4 Between 5 and 10	
	5 None	
	6 Over 10	

Question	Answer	Guidance Notes
9. *Are bird barns kept locked?*	1 Yes	
	2 No	
10. *Is the farm entrance managed in such a way as to minimize cross-contamination?*	1 Yes	The farm entrance should be managed in such a way as to minimize cross-contamination between incoming and outgoing traffic and visitors to the domestic residence.
	2 No	
11. *Do neighbouring / adjoining farms have any poultry or livestock?*	1 None of the neighbouring farms have any poultry or livestock	An obvious source of disease contagion is other poultry or livestock. Where the farms stock has nose to nose contact with stock on neighbouring farms, then the risk of the passing of disease is at its highest. It is also worth considering wind direction.
	2 Neighbouring farms have livestock, but there is no adjoining land to which their stock have access or on which animal manure is transported, handled or spread	
	3 Some birds on neighbouring farm, but no adjoining land to which their stock have access or on which animal manure is transported, handled or spread	
	4 Neighbouring farms have birds and there is land adjoining the bird barns to which their stock have access or on which animal manure is transported, handled or spread	
12. *Are there any other businesses / activities operating from the farm?*	1 Yes – poultry related	Other businesses are seen as belonging to the farm and as such escape disease precautions. Businesses within the farm environs that have contact with livestock at other locations are the highest risk. Businesses that have no contact with livestock are of lower risk, but all who venture onto the highway, in vehicles or on foot, have the potential to become contaminated with infective material. Same species to include 4H Club and farmer tours.
	2 Yes – livestock related	Blacksmith, farrier, horse boarding, etc.
	3 Yes – other agriculture but no livestock or poultry contact	Seeds / fertilizers, custom operator, farm machinery hire / repair, clipper sharpening, farm shop, etc.
	4 Yes – non-agriculture	Non-agriculture related, e.g., offices, storage, mail-order, freight trucker, rentals, Bed and Breakfast
	5 Combination including livestock or poultry related	
	6 Combination including non-livestock or poultry related	
	7 None	
13. *Which farm residents, that have contact with the farm's birds, have off-farm employment?*	1 None	
	2 Off-farm employment, but outside agriculture and no livestock contact	
	3 Off-farm within agriculture, but with no livestock contact	
	4 Off-farm with some indirect livestock contact	
	5 Off-farm with direct different species contact	
	6 Off-farm with direct same species contact	

Question	Answer	Guidance Notes
14. *Which people have contact with birds and bird areas?*	1 Family or staff, all of whom live on site	Staff who live away from the farm pose the same risk of bringing disease onto the farm as many other visitors. Typically disease will be carried on their clothing and footwear.
	2 Staff, all live off-site	
	3 Family / staff, some live off-site	
	4 Family or staff, plus use of Agency staff	Regular (but not dedicated) agency / contract staff
	5 Use Agency staff only. No family or staff involvement	
	6 It is not possible to avoid unauthorized persons coming into contact with the birds	
15. *Do family or staff have contact with poultry on another farm?*	1 Yes, some contact	Staff who live away from the farm pose the same risk of bringing disease onto the farm as many other visitors, the most common risk comes from staff who are part-time farmers themselves and keep poultry or livestock.
	2 No contact	
16. *Do family or staff have contact with livestock on another farm?*	1 Yes, some contact	Staff who live away from the farm pose the same risk of bringing disease onto the farm as many other visitors, the most common risk comes from staff who are part-time farmers themselves and keep poultry or livestock.
	2 No contact	
17. *How much time elapses between family or staff having contact with birds on another farm?*	1 Less than 12 hours	Having said that, the most common risk comes from staff who are part-time farmers themselves and keep the same species, or disease carrier species, of livestock at home or otherwise come into contact with them. Obviously, it is desirable for the longest break.
	2 12 – 23 hours	
	3 24 – 47 hours	
	4 48 hours+	
	5 Not applicable	
18. *How much time elapses between family or staff having contact with livestock on another farm?*	1 Less than 12 hours	The most common risk comes from staff who are part-time farmers themselves and keep livestock or poultry at home or otherwise come into contact with them. Obviously, it is desirable for the longest break.
	2 12 – 23 hours	
	3 24 – 47 hours	
	4 48 hours+	
	5 Not applicable	
19. *Which vehicles are allowed onto the farm?*	1 None	Lowest risk visitor is one who does not get involved with the animals, such as a visitor to the house. The visitors who get involved in going around and coming into contact with surfaces that stock will have access to, is next highest risk. The highest risk are those that get directly involved in handling stock, e.g. a vet or Animal Health Technician. Not only have they had intimate contact with stock, but they are likely to have had the same level of contact with stock on other farms.
	2 Essential vehicles only	E.g. livestock and feed trucks only.
	3 All – no restrictions	
20. *What is the procedure for admitting visitors?*	1 None allowed on site	Given that many diseases can be spread by surfaces such as vehicle tires and footwear coming into contact with the disease and then transmitting it on, any visitor to the farm poses a risk of introducing disease. Visitors can be categorized into three types.
	2 12 hours same species	
	3 12 hours different species	
	4 24 hours same species	
	5 24 hours different species	
	6 48 hours+ any species	
	7 No restrictions	

Question	Answer	Guidance Notes
21. To what extent are vehicles and machines shared with other farms?	1 Not shared	The best situation is that the farm is physically and operationally separate from all other farms and that machinery such as tractors, ATV, feeders and materials handlers stay on that farm.
	2 1 other farm	
	3 >1 other farm	
	4 Some rented or borrowed	
	5 Combination of shared, rented or borrowed	
22. To what extent are custom operators used?	1 Feed and harvest only	
	2 Including manure handling	
	3 Not used	
23. What is the status of equipment used on the farm?	1 Not shared	Equipment = e.g. vaccinators, catching frames, etc. The best situation is that the farm is physically and operationally separate from all other farms and that equipment stays on that farm.
	2 Shared with a single partnership farm	
	3 Shared with a multiple group of partner farms	
	4 Contractor for routine procedures	
24. What are the defined biosecure area(a)?	1 The whole site is a single biosecure area	
	2 Individual production units classed as separate biosecure areas	
	3 Controlled access zone less than 15 m around each production unit / barn and barn entry is also restricted	
	4 Controlled access zone at least 15 m around each production unit / barn and barn entry is also restricted	
	5 None	
25. What are the access procedures to the biosecure area(s)?	1 A single biosecurity activity allows access to the site	
	2 A single biosecurity activity allows access to the production units / barns	
	3 One biosecurity activity allows access to a controlled zone and another activity is needed to gain access to the birds / bird areas	
	4 3 biosecurity activities needed – to the site, to the controlled zone and to the birds / areas	
26. Is the domestic residence outside the biosecurity area?	1 Yes	
	2 No – whole site is single biosecurity area and house within this	
	3 House within site biosecurity area, but outside the controlled zones areas	
27. What is the farm stocking policy?	1 Single age farm, no thinning	
	2 Single age farm with thinning	
	3 Multi-age farm, no thinning	
	4 Multi-age farm with thinning	

Question	Answer	Guidance Notes
28. *Are appropriate warning signs used?*	1 Yes – clearly displayed and approved signage	Prominent signage should restrict access and provide clear directions to the farm office or give contact information. Signs at secondary access points should give directions to the primary access.
	2 Clearly displayed, but not much information	
	3 Limited / poorly displayed signs	
	4 No relevant signs	
29. *Are any birds ever moved off the farm, with the expectation that they will return?*	1 No	
	2 Yes	
30. *How are birds transported to the farm?*	1 Own transport	
	2 Another farmer	
	3 Hatchery transport	
	4 Brooder / point of lay transport	
31. *How are birds transported from the site?*	1 Own transport	
	2 Another farmer	
	3 The site is single age and a professional hauler is used	
	4 The site is multi-age and a professional hauler is used	
32. *Where another farmer or commercial trucker is used, do they make multiple pick-ups?*	1 Not permissible	
	2 Request first collection	
	3 No specific constraints	
	4 Not applicable	
33. *How are eggs transported from the site?*	1 Own transport	
	2 Another farmer	
	3 A professional hauler is used	
34. *If anything other than own transport is used to transport eggs from the farm premise?*	1 Yes	
	2 No	
35. *On how many sites are birds kept?*	1 One	
	2 Two	
	3 Three or more	

36. *Number of Contacts with:*	Last 30 Days	Annual Estimate
Catching crews		
Vaccination crews		
Feed representatives (evaluation of birds)		
Cleaning crews		
Manure hauler		
Farm workers – shared employees between farms		
Veterinarians (could be the feed representative) – not including staff vets		
Unsanctioned product movers – buy eggs and move them		
Agricultural visitors (includes other farmers)		
Government inspectors		
Chick representatives		
Processing representatives (hatcheries, egg or slaughter plant processor)		
Mid-cycle vaccination (aerosol or water)		
Maintenance workers (physical structure)		

Question	Answer	Guidance Notes	
		Last 30 Days	Annual Estimate
Service providers – plumbers			
Feed trucks			
Egg trays – pickups			
Marketing board representatives			
Service people – gas, power, electric			
Non-agricultural visitors (includes school visits, etc.)			

Birds – Section 2 – Cleaning And Sanitization

Question	Answer	Guidance Notes
1. *What type of cleansing and disinfection is undertaken on machinery arriving at the farm?*	1 All machinery exclusively used and custom operators not used	
	2 Completely cleaned and disinfected	
	3 Tires, operator platforms and load carrying areas cleaned and disinfected	
	4 Cleaning only to tires, operator platforms and load carrying areas	
	5 Tires, operator platforms and load carrying areas disinfected only	
	6 Tires cleaned and disinfected	
	7 Tires cleaned only	
	8 Tires disinfected only	E.g. visiting vehicles required to drive over disinfectant impregnated mat.
	9 No action taken	
2. *Is the loading dock constructed so as to ease cleaning / disinfecting?*	1 No	
	2 Yes	
3. *Is there enough room to get trucks off the road before the primary production facility?*	1 Yes	
	2 No	
4. *Is equipment cleaned / decontaminated before use in barns?*	1 Yes – every time before being taken into the barn	
	2 Yes – most times before being taken into the barns	
	3 No	
5. *What is the capability of the barns to be cleaned, pressure washed and disinfected?*	1 All	The best situation is one where there is a break between stock in a shed sharing the same airspace with a period when the building is empty. This then allows the building to be cleaned.
	2 >75%	
	3 25 – 75%	
	4 <25%	
	5 Not applicable	
6. *What are the cleaning and disinfection procedures for the barns?*	1 Clean, wash, disinfect, rest	
	2 Clean, wash, rest	
	3 Clean, rest	
	4 Cleaned only	
	5 Not cleaned or rested	
	6 Not applicable	
7. *Which type of cleaning and disinfection products are used for the barns?*	1 Approved chemicals / dilutions – in date	Include reference to chemicals used for vehicle and visitor disinfection
	2 Unlabelled / unknown chemicals / dilutions	
	3 No chemicals	
	4 Not applicable	

Question	Answer	Guidance Notes
8. *What are the between flock cleaning and disinfection procedures for the in-barn equipment?*	1 Feeders and drinker lines washed (flushed) and disinfected	
	2 Feeders only washed and disinfected	
	3 Drinker lines only washed (flushed) and disinfected	
	4 Feeders and drinker lines not washed (flushed) or disinfected	
9. *How is the effectiveness of cleaning checked?*	1 Post cleaning swabs of all surfaces taken which show low TVC and Salmonella	Post cleaning swabs should be taken from the walls, floors, posts and fan shafts results should show low TVC and Salmonella before the barn is re-stocked.
	2 Some post cleaning swabs taken and show low TVC and Salmonella	
	3 No post cleaning swabbing undertaken	
10. *What type of cleansing and disinfection is undertaken on visiting vehicles?*	1 Not applicable – no vehicles allowed	Visiting vehicles tires, wheel wells, mud flaps and driver and passenger floor mats should be cleaned of organic matter and then disinfected.
	2 Properly cleaned and disinfected	
	3 Disinfected only – not cleaned	
	4 Only partly cleaned and disinfected	
	5 Only tires are cleaned and disinfected	
	6 Tires are disinfected but not cleaned	E.g. visiting vehicles required to drive over disinfectant impregnated mat.
	7 No action taken	

Birds – Section 3 – Hygiene

Question	Answer	Guidance Notes
1. *How is the bird barn perimeter managed?*	1 Clear of debris and with an apron of concrete and pea stone	
	2 Clear of debris and long vegetation	
	3 Some cover for rodents and insects	
	4 Abundant cover for rodents and insects	
2. *What is the overall appearance of the farm?*	1 Whole site presents a tidy appearance	Areas and situations near livestock buildings that can harbour pests and vermin are to be avoided. These can include long vegetation and redundant farm machinery.
	2 Areas containing livestock present tidy appearance	
	3 Some degree of unnecessary debris in general yard areas	
	4 Whole site presents an untidy and unacceptable image	
3. *Are domestic animals, wild mammals, birds and pets excluded from the premise?*	1 Yes	
	2 No	
4. *Are measures taken to avoid birds coming into contact with insects?*	1 Yes	Biting (or skin piercing) insects can act as vectors for many diseases. Consider mosquitoes, flies, horse flies and ticks. Methods include wet land drainage, sprays, dips, fans for constant air movement and removing or relocating attractants such as manure heaps.
	2 No special measures taken and insects are a problem	
	3 Insects are not a problem	
5. *Are suitable staff facilities available?*	1 Yes	Good staff facilities will include change room, lunch room and washroom are available.
	2 No	
	3 Not applicable	
6. *Are all visitors instructed to wash their hands before and after handling any birds?*	1 Yes	If possible, question a member of the farm staff.
	2 No	
	3 Not applicable	
7. *Are all visitors instructed to wash their hands before and after handling any dead birds?*	1 Yes	If possible, question a member of the farm staff.
	2 No	
	3 Not applicable	
8. *What bedding is used and where is it sourced?*	1 Home produced or locally purchased straw / corn cob	
	2 Home produced shavings	
	3 A mixture of straw and home produced shavings	
	4 Purchased shavings	
	5 A mixture of straw and purchased shavings	
	6 Not applicable	
9. *How frequently is bedding material fully replaced?*	1 Every flock	
	2 Less frequently	
	3 Not applicable	

Question	Answer	Guidance Notes
10. *How is bedding stored?*	1 In an appropriate manner	
	2 In an inappropriate manner	
11. *Are foot baths / mats used?*	1 Foot baths are used	
	2 Foot mats are used	
	3 No footbaths / mats and no other adequate system for clean footwear	
	4 No footbaths / mats but there is another adequate system for clean footwear	
12. *Is the location of all footbaths / mats appropriate and conducive to use?*	1 Yes	
	2 No	
	3 Not applicable	
13. *Are the chemicals and dilutions used in the footbath / mat appropriate and are records maintained?*	1 The chemicals / dilutions used are appropriate and records are kept	
	2 The chemicals / dilutions used are appropriate, but no records are kept	
	3 Not applicable	
	4 The chemicals / dilutions are not appropriate	
14. *How are eggs stored and handled?*	1 In an appropriate manner	
	2 In an inappropriate manner	
15. *Is site dedicated protective clothing provided?*	1 Yes – for all staff and visitors	Site dedicated protective clothing should be supplied by the site for all personnel. All clothing should be washed or discarded between flocks. Visitors should be supplied with protective clothing which must be retained on site after use.
	2 Yes – for all staff only	
	3 Yes – for some staff	
	4 For all visitors, but not all staff	
	5 No	
16. *Are there any domestic waterfowl on the farm?*	1 Yes	
	2 No	
17. *What is the condition of the driveway at the primary access?*	1 Concrete, asphalt, etc. and in good condition	
	2 Concrete, asphalt, etc., but potential for standing water	
	3 Not concrete / asphalt, etc., but in good condition	
	4 Not concrete / asphalt and poor condition with potential for standing water	

Birds – Section 4 - Feeding

Question	Answer	Guidance Notes
1. *What feed is purchased?*	1 Heat treated rations	
	2 Chemical treated rations	
	3 Combination of heat and chemical treated rations	
	4 Untreated feed materials / rations	
	5 Combination of heat and chemical treated and untreated rations	
	6 None	
2. *Are rations routinely medicated?*	1 Yes	
	2 No	
3. *Where are rations sourced?*	1 Home produced (non-commercial supplier)	
	2 Commercial supplier	
	3 Non-commercial supplier	
	4 Combination	
4. *Where are feed materials sourced?*	1 Commercial supplier	(Including grit / oyster shell).
	2 Non-commercial supplier	
	3 Not applicable	
5. *Where are feed bins located?*	1 Feed truck does not have to enter the outer biosecure area	
	2 Feed truck enters the outer biosecure area, but does not have to enter the inner biosecure area	
6. *Under what conditions is feed stored?*	1 Fully enclosed, vermin proof	
	2 Partially enclosed	
	3 Open	
7. *How is spilt feed dealt with?*	1 Immediately cleaned up and used or disposed of appropriately	
	2 Left for a while before being cleaned up and used or disposed of appropriately	
	3 Not cleaned up and used or disposed of appropriately	
8. *What is the feeding method for housed stock?*	1 Covered feeders	
	2 Open feeders / feed track in building	
	3 Floor fed	
9. *What is the procedure for feeder replenishment?*	1 Restricted (feeder emptied after each feed)	
	2 Ad lib automatic	
	3 Ad lib manual	
	4 Not applicable	
	5 Feeders are cleaned less frequently than weekly	
10. *Is any feed shared with another farm or another of your sites?*	1 Yes, with another site(s)	
	2 Yes, with another farm	
	3 No, never	

Birds – Section 5 – Water Management

Question	Answer	Guidance Notes
1. *What is the source of drinking water?*	1 Municipal	
	2 Drilled well	
	3 Spring, pond or stream	
	4 Natural / collected rain water	
2. *Is the drinking water regularly tested and shown to be free from pathogens?*	1 Yes	
	2 No	
	3 Not applicable	
3. *Is the drinking water treated to ensure that it is potable?*	1 Yes	
	2 No	
	3 Not applicable	
4. *Is water routinely medicated?*	1 Yes	
	2 No	
5. *How is water stored?*	1 Covered tank / cistern	
	2 Non-covered tank / cistern	
	3 Mobile water tanker	
	4 Not applicable	
6. *Which type of drinkers are used?*	1 Nipple	
	2 Cup	
	3 Bell	
	4 Trough	
	5 Any combination excluding troughs	
	6 Any combination including troughs	

Birds – Section 6 – Isolation And Inspection

Question	Answer	Guidance Notes
1. *Is the health status of purchased stock known?*	1 Yes, full health status and from a quality assured hatchery	
	2 Vague	
	3 No	
2. *What is the inspection frequency for signs of disease?*	1 At least twice daily from a distance of no more than 2 meters	
	2 Once daily from a distance of no more than 2 meters	
	3 At least twice daily from a distance greater than 2 meters	
	4 Once daily from a distance greater than 2 meters	
	5 Less than once per day	
3. *What triggers a veterinarians visit to the farm?*	1 The veterinarian visits regularly for planned activities and attends in the event of emergencies	
	2 The veterinarian attends the farm only in emergencies	
4. *Does the farm have a written health plan?*	1 Detailed and developed with veterinary input	
	2 Detailed but not developed with veterinary input	
	3 Plan, but not detailed	
	4 No	
5. *What approach is taken to deal with under performing birds?*	1 All sick or injured birds are humanely dispatched immediately and diagnosis made	
	2 All sick or injured birds are humanely dispatched immediately	
	3 Birds penned separately within the same building until they improve, or if clearly diseased or injured, are humanely dispatched immediately	
6. *Does the farm have a vaccination program?*	1 No	Either on its own or in conjunction with the hatchery.
	2 Yes – vet controlled	
	3 Yes – but no vet involvement	
7. *According to the farm vaccination program, who administers the vaccines?*	1 Vaccines administered by the veterinarian	
	2 Vaccines administered by competent staff	
8. *Are used vaccine containers and equipment disposed of safely?*	1 Yes	
	2 No	
	3 Not applicable	

Question	Answer	Guidance Notes
9. *Is a Salmonellae control program being followed?*	1 Yes	
	2 No	
10. *Is a coccidiosis control program being followed?*	1 Yes	
	2 No	
11. *Is a mycoplasma sampling and control program being followed?*	1 Yes	
	2 No	
12. *Is a necrotic enteritis control program being followed?*	1 Yes	
	2 No	
13. *What aids the clinical recognition of a disease in the birds?*	1 Previous practical experience / knowledge	
	2 Guidance literature	
	3 Regular veterinary contact	
	4 Active on-going vet contact as part of health plan	
	5 All of the above	
	6 None of the above	
14. *Where a veterinarian is routinely involved, how many planned visits are there per year?*	1 One	
	2 Two	
	3 Three	
	4 Four	
	5 Five	
	6 Six	
	7 More than six	
	8 No planned veterinary involvement	
15. *Does the farm have a policy for early disease detection and diagnosis?*	1 Yes	
	2 No	

Birds – Section 7 - Waste

Question	Answer	Guidance Notes
1. *How are carcasses retrieved and stored?*	1 Dead birds are immediately removed from their pens and stored away from other birds and away from vermin	
	2 Dead birds are removed from their pens daily and stored away from other birds and away from vermin	
	3 Dead birds are removed from their pens but not stored away from other birds and away from vermin	
	4 Dead birds are not removed from their pens every day	
2. *How are carcasses disposed?*	1 Frozen and stored for rendering off site	
	2 Disposed of on site by incineration	
	3 On site by composting or by burial at a suitable depth and location	
	4 Removed from site via boundary transfer	
	5 Removed from site – access allowed to external party	
	6 Left where fallen / muck heap / or not sufficiently buried	
3. *How is litter / manure removed from the building?*	1 Automatic daily	
	2 By machine at the end of the flock	
4. *How is litter / manure handled?*	1 Litter / manure is stored on site	
	2 Litter / manure is removed from the site	
5. *How far from a barn is litter / manure storage?*	1 Adjacent to barn	
	2 Outside the controlled zone	
	3 Not stored – removed from the site	
6. *How is manure spread?*	1 Litter / manure from the site is spread onto land near to the site	
	2 Litter / manure from the other poultry sites is spread onto land near to the site	
	3 Not applicable	
	4 Litter / manure is removed from the site	
7. *How are used vaccine vials disposed of?*	1 Safely, away from birds	
	2 Not safely disposed of	
	3 Not applicable	

Question	Answer	Guidance Notes
8. *Are wastes from other sites brought onto the farm?*	1 Only animal manure for soil fertility building purposes that is sufficiently treated before spreading	
	2 Human sewage waste or abattoir waste (e.g. washings) is applied to grazing land	
	3 No wastes from other sites brought onto the farm	
9. *What is the proximity of the nearest commercial landfill site?*	1 <1 km	The tip itself might pose a problem with waste being dropped on the road on the way to the tip, but the biggest threat probably comes from it being an attractant to rodents and wild birds.
	2 Between 1 and 2 km	
	3 Between 2 and 3 km	
	4 Over 3 km	
10. *What is the proximity of the nearest human sewage works?*	1 <1 km	
	2 Between 1 and 2 km	
	3 Between 2 and 3 km	
	4 Over 3 km	

Birds – Section 8 - Records

Question	Answer	Guidance Notes
1. *Are full records of bird movements maintained?*	1 Yes 2 No	Full records will include all bird purchases, deaths and movements off the farm.
2. *Are flock performance records maintained?*	1 Yes 2 No	
3. *Are feed samples retained?*	1 Retained at the farm 2 Retained by the commercial supplier 3 Not retained	
4. *Are feed delivery slips or invoices retained?*	1 Retained for more than 12 months 2 Retained for 6 – 12 months 3 Not retained 4 Not applicable	
5. *Are delivery slips or invoices for bedding retained?*	1 Retained for whole production cycle 2 Retained for less than whole production cycle 3 Not retained 4 Not applicable	
6. *What is the pest control policy?*	1 Routinely implemented pest control policy with supporting records 2 In response to identified pest problem plus supporting records 3 Ad hoc with records 4 Ad hoc without records 5 None, but no evident problem 6 None, evident problem	(Vermin, birds and flies) rats, mice, birds and insects are all vectors for disease.
7. *Who undertakes the pest control activity?*	1 Professional 2 Trained farm staff 3 Untrained farm staff	
8. *Does the farm have written biosecurity procedures?*	1 Written and available 2 Written – not available 3 Non-written 4 None	
9. *Are farm staff trained in biosecurity procedures?*	1 Yes, trained, knowledgeable and records of training maintained 2 Yes, trained and knowledgeable but no records of training are maintained 3 Staff are not trained	Staff should be trained, knowledgeable and records of training should be maintained.
10. *What is the content of the employee biosecurity policy?*	1 Full policy 2 Policy does not specify full requirements 3 No policy	An employee policy should require that staff have no contact with other birds, wear only the clothes provided for that unit and always use toilet facilities and not any of the biosecure areas.

Question	Answer	Guidance Notes
11. *Is a full visitors log maintained?*	1 Full	A full visitors record would include date, time of arrival, name, organization, vehicle license plate number, date of last contact with the species in question, date of last contact with any other species, location of the immediately previous visit. Whilst this does not prevent disease as such, it is invaluable in tracing farm visitor movements should a disease outbreak occur.
	2 Incomplete	
	3 None	
12. *Are warning systems in place to signal emergencies?*	1 Yes	Such as break-ins, power and water failure and fire.
	2 No	
13. *Are emergency procedures planned?*	1 Yes	Emergency procedures for eventualities including power or water failure and major disease outbreak should be planned and rehearsed.
	2 No	
14. *Is a unit site plan readily available?*	1 Yes – plan complete and available	A complete plan will include: position and size of poultry houses and access points; all auxiliary bird areas and their purpose; location of fire extinguishers and first aid; water sources; position of pest control baiting points and designated biosecure area.
	2 Available, but not complete	
	3 Complete, but not available	
	4 No plan	
15. *Is disaster recovery planned?*	1 Yes	
	2 No	
16. *Is specific information maintained for each flock to provide evidence of traceability?*	1 No	The record must begin from the day that the flock arrives. It should include the number of birds and day old chicks delivered, the date delivered, their origin, culls and mortality and date of sale / transfer and destination.
	2 Yes	
17. *Farm Waste Management Plans?*	1 Yes – for all sites	All sites should have a written Waste Management Plan and if pesticides are used, this should include correct procedures for disposal of empty containers.
	2 Yes – one plan covers all sites	
	3 Plan(s), but not for all sites	
	4 No plan	

APPENDIX 3
BROILER VALUATION EXAMPLE

(Sample Data For Illustrative Purposes)

25-Jan-08 **Broiler Valuation - 2.1 kg (40 - 42 days)**

Cost Category	Variable	Total ($/Bird)	$/kg	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	
	Feed	1.192	0.57	0.052	0.118	0.203	0.286	0.346	0.187	
	PT Labour	0.014	0.01	0.002	0.002	0.002	0.002	0.002	0.002	
	Custom Charges	0.074	0.04	0.030	-	-	-	-	0.044	
	Other	-	-	-	-	-	-	-	-	
	Total Variable	1.280	0.61	0.084	0.120	0.205	0.288	0.348	0.234	
Fixed			-							
	Chicks	0.589	0.28	0.589						
	Bedding	0.024	0.01	0.024						
	Administration Levies	0.037	0.02						0.037	
	Repairs & Maint	0.043	0.02	0.007	0.007	0.007	0.007	0.007	0.007	
	FT Labour	0.120	0.06	0.020	0.020	0.020	0.020	0.020	0.020	
	Deprec & Capital	0.392	0.19	0.065	0.065	0.065	0.065	0.065	0.065	
	Other	0.260	0.12	0.043	0.043	0.043	0.043	0.043	0.043	
	Total Fixed	1.464	0.70	0.749	0.136	0.136	0.136	0.136	0.173	
			-							
Total Costs		2.74	1.31							
Total Revenue	130.7 cents/kg live weight price Period A82	2.74							2.7447	

Feed Ratios	0.044	0.099	0.17	0.24	0.29	0.157		1
Estimates of FMV							Avg	
Industry	1.55	1.67	1.87	2.16	2.51	2.7447		2.09
CFIA	0.83	1.089	1.43	1.85	2.34	2.7447		1.71
	0.72	0.58	0.44	0.31	0.17	-		0.37
Difference (%)	53.8%	65.3%	76.3%	85.7%	93.1%	100.0%		

25-Jan-08 **Broiler Valuation - 1.7 kg (32-34 days)**

Cost Category	Variable	Total ($/Bird)	$/kg	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	
	Feed	1.000	0.59	0.075	0.130	0.201	0.271	0.321	-	
	PT Labour	0.011	0.01	0.002	0.002	0.002	0.002	0.002	-	
	Custom Charges	0.059	0.03	0.023	-	-	-	0.035	-	
	Other	-	-	-	-	-	-	-	-	
	Total Variable	1.070	0.63	0.101	0.133	0.204	0.274	0.359	-	
Fixed			-							
	Chicks	0.589	0.35	0.589						
	Bedding	0.019	0.01	0.019						
	Administration Levies	0.029	0.02					0.029		
	Repairs & Maint	0.034	0.02	0.007	0.007	0.007	0.007	0.007	-	
	FT Labour	0.094	0.06	0.019	0.019	0.019	0.019	0.019	-	
	Deprec & Capital	0.310	0.18	0.062	0.062	0.062	0.062	0.062	-	
	Other	0.205	0.12	0.041	0.041	0.041	0.041	0.041	-	
	Total Fixed	1.281	0.75	0.736	0.129	0.129	0.129	0.158	-	
			-							
Total Costs		2.35	1.38							
Total Revenue	135.1 cents/kg live weight price Period A82	2.30						2.3001		

Feed Ratios	0.0754	0.1304	0.2014	0.2714	0.3214	0		1
Estimates of FMV							Avg	
Industry	1.33	1.46	1.67	1.94	2.30			1.74
CFIA	0.84	1.099	1.43	1.83	2.30			1.50
	0.49	0.36	0.24	0.11	-	-		0.20
Difference (%)	62.9%	75.1%	85.8%	94.5%	100.0%			

APPENDIX 4

SAMPLE CALCULATIONS OF COMPENSATION VALUES FOR LAYERS

(For Illustrative Purposes)

A	B	C	D	E		
Week	Revenue Foregone ($/bird)	Variable Cost Foregone (Variable $/Bird)	Fixed Cost Remaining ($/bird)	Max FMV Estimate ($/bird)	CFIA Est. ($/bird)	% of Expected
1	38.48	27.64	9.67	**13.10**	1.63	12%
2	38.48	27.51	9.66	**13.23**	1.76	13%
3	38.48	27.37	9.65	**13.37**	1.90	14%
4	38.48	27.22	9.64	**13.53**	2.05	15%
5	38.48	27.04	9.63	**13.70**	2.22	16%
6	38.48	26.86	9.62	**13.89**	2.40	17%
7	38.48	26.61	9.61	**14.14**	2.65	19%
8	38.48	26.42	9.60	**14.32**	2.83	20%
9	38.48	26.23	9.59	**14.52**	3.02	21%
10	38.48	25.94	9.58	**14.81**	3.31	22%
11	38.48	25.74	9.57	**15.00**	3.49	23%
12	38.48	25.55	9.55	**15.19**	3.69	24%
13	38.48	25.35	9.54	**15.39**	3.88	25%
14	38.48	25.16	9.53	**15.59**	4.08	26%
15	38.48	24.96	9.52	**15.79**	4.28	27%
16	38.48	24.61	9.51	**16.14**	4.62	29%
17	38.48	24.38	9.50	**16.37**	4.85	30%
18	38.48	24.16	9.49	**16.58**	5.06	31%
19	38.48	23.75	9.06	**16.73**	4.96	30%
20	38.38	23.33	8.90	**17.04**	4.87	29%
21	38.12	22.91	8.73	**17.21**	4.77	28%
22	37.66	22.48	8.56	**17.18**	4.68	27%
23	37.00	22.04	8.39	**16.95**	4.58	27%
24	36.24	21.60	8.22	**16.64**	4.49	27%
25	35.43	21.15	8.05	**16.28**	4.39	27%
26	34.60	20.69	7.89	**15.91**	4.30	27%
27	33.76	20.24	7.72	**15.52**	4.20	27%
28	32.89	19.78	7.55	**15.11**	4.11	27%
29	32.03	19.32	7.38	**14.71**	4.01	27%
30	31.17	18.87	7.21	**14.30**	3.91	27%
31	30.31	18.41	7.04	**13.90**	3.82	27%
32	29.46	17.95	6.88	**13.51**	3.72	28%
33	28.59	17.49	6.71	**13.11**	3.63	28%
34	27.75	17.03	6.54	**12.72**	3.53	28%
35	26.90	16.56	6.37	**12.34**	3.44	28%
36	26.07	16.10	6.20	**11.98**	3.34	28%
37	25.24	15.64	6.03	**11.61**	3.25	28%
38	24.42	15.17	5.87	**11.24**	3.15	28%
39	23.59	14.71	5.70	**10.89**	3.06	28%
40	22.77	14.24	5.53	**10.52**	2.96	28%
41	21.96	13.78	5.36	**10.18**	2.86	28%
42	21.15	13.32	5.19	**9.83**	2.77	28%
43	20.36	12.86	5.02	**9.50**	2.67	28%
44	19.56	12.39	4.86	**9.17**	2.58	28%
45	18.77	11.93	4.69	**8.84**	2.48	28%
46	17.98	11.47	4.52	**8.51**	2.39	28%
47	17.20	11.01	4.35	**8.19**	2.29	28%
48	16.42	10.55	4.18	**7.87**	2.20	28%
49	15.65	10.09	4.01	**7.56**	2.10	28%
50	14.86	9.63	3.85	**7.23**	2.00	28%
51	14.09	9.17	3.68	**6.92**	1.91	28%
52	13.34	8.71	3.51	**6.63**	1.81	27%
53	12.57	8.25	3.34	**6.32**	1.72	27%
54	11.83	7.79	3.17	**6.03**	1.62	27%
55	11.08	7.33	3.00	**5.75**	1.53	27%
56	10.33	6.87	2.84	**5.46**	1.43	26%
57	9.61	6.42	2.67	**5.19**	1.34	26%
58	8.87	5.96	2.50	**4.91**	1.24	25%
59	8.15	5.50	2.33	**4.66**	1.15	25%
60	7.43	5.04	2.16	**4.39**	1.05	24%
61	6.73	4.58	1.99	**4.15**	0.95	23%
62	6.03	4.12	1.83	**3.91**	0.86	22%
63	5.34	3.66	1.66	**3.68**	0.76	21%
64	4.64	3.20	1.49	**3.44**	0.67	19%
65	3.95	2.73	1.32	**3.22**	0.57	18%
66	3.27	2.28	1.15	**3.00**	0.48	16%
67	2.61	1.82	0.98	**2.79**	0.38	14%
68	1.95	1.37	0.82	**2.59**	0.29	11%
69	1.31	0.91	0.65	**2.40**	0.19	8%
70	0.66	0.46	0.48	**2.21**	0.10	4%
71	-	-	-	**2.00**	0.00	

APPENDIX 5

SAMPLE CALCULATIONS OF COMPENSATION VALUES FOR HATCHING EGGS

(For Illustrative Purposes)

Week	Revenue Foregone ($/bird)	Variable Cost Foregone (Variable $/Bird)	Fixed Cost Remaining ($/bird)	Max FMV Estimate ($/bird)	Feed Cost	Mgmt	CFIA Est. ($/bird)	% of Expected
1	41.53	23.73	12.23	17.81	0.020	0.015	6.63	37%
2	41.53	23.52	12.15	18.02	0.042	0.015	6.85	38%
3	41.53	23.38	12.06	18.15	0.056	0.015	7.09	39%
4	41.53	23.24	11.98	18.29	0.061	0.015	7.33	40%
5	41.53	23.09	11.89	18.45	0.077	0.015	7.58	41%
6	41.53	22.92	11.80	18.61	0.089	0.015	7.85	42%
7	41.53	22.75	11.72	18.79	0.099	0.015	8.13	43%
8	41.53	22.56	11.63	18.97	0.107	0.015	8.42	44%
9	41.53	22.37	11.55	19.17	0.116	0.015	8.71	45%
10	41.53	21.90	11.46	19.63	0.122	0.015	9.01	46%
11	41.53	21.70	11.37	19.84	0.126	0.015	9.32	47%
12	41.53	21.49	11.29	20.04	0.128	0.015	9.62	48%
13	41.53	21.28	11.20	20.25	0.130	0.015	9.93	49%
14	41.53	21.07	11.11	20.46	0.132	0.015	10.24	50%
15	41.53	20.86	11.03	20.67	0.136	0.015	10.56	51%
16	41.53	20.23	10.94	21.30	0.142	0.015	10.88	51%
17	41.53	19.91	10.75	21.63	0.154	0.036	11.23	52%
18	41.53	19.57	10.56	21.96	0.164	0.036	11.60	53%
19	41.53	19.23	10.37	22.31	0.174	0.036	11.97	54%
20	41.53	18.87	10.18	22.67	0.186	0.036	12.36	55%
21	41.53	18.41	9.99	23.13	0.195	0.036	12.75	55%
22	41.53	18.03	9.80	23.50	0.204	0.036	13.15	56%
23	41.53	17.64	9.61	23.89	0.213	0.036	13.57	57%
24	41.46	17.24	9.42	24.22	0.232	0.036	14.00	58%
25	41.12	16.80	9.21	24.32	0.265	0.036	14.32	59%
26	40.51	16.33	8.98	24.18	0.290	0.037	13.91	58%
27	39.65	15.87	8.74	23.78	0.290	0.037	13.50	57%
28	38.53	15.40	8.48	23.12	0.290	0.037	13.09	57%
29	37.31	14.94	8.22	22.37	0.290	0.037	12.68	57%
30	36.02	14.38	7.96	21.64	0.290	0.037	12.27	57%
31	34.65	13.91	7.69	20.73	0.290	0.037	11.87	57%
32	33.20	13.45	7.41	19.75	0.290	0.037	11.46	58%
33	31.71	12.98	7.14	18.73	0.290	0.037	11.05	59%
34	30.23	12.52	6.87	17.71	0.287	0.037	10.64	60%
35	28.77	12.05	6.59	16.72	0.286	0.037	10.23	61%
36	27.32	11.59	6.32	15.74	0.287	0.037	9.82	62%
37	25.90	11.12	6.05	14.78	0.286	0.037	9.41	64%
38	24.49	10.66	5.77	13.84	0.286	0.037	9.00	65%
39	23.11	10.19	5.50	12.91	0.283	0.038	8.59	67%
40	21.74	9.73	5.23	12.01	0.283	0.038	8.18	68%
41	20.39	9.27	4.96	11.13	0.283	0.038	7.77	70%
42	19.07	8.80	4.69	10.27	0.283	0.038	7.36	72%
43	17.77	8.34	4.42	9.43	0.283	0.038	6.96	74%
44	16.49	7.88	4.16	8.61	0.279	0.038	6.55	76%
45	15.23	7.42	3.89	7.81	0.279	0.038	6.14	79%
46	14.00	6.96	3.62	7.04	0.279	0.038	5.73	81%
47	12.79	6.49	3.36	6.29	0.279	0.038	5.32	85%
48	11.60	6.03	3.09	5.57	0.280	0.038	4.91	88%
49	10.44	5.57	2.83	4.87	0.278	0.038	4.50	92%
50	9.31	5.11	2.57	4.20	0.278	0.038	4.09	97%
51	8.26	4.65	2.31	3.61	0.277	0.039	3.68	102%
52	7.23	4.19	2.05	3.05	0.278	0.039	3.27	107%
53	6.23	3.72	1.79	2.51	0.278	0.039	2.86	114%
54	5.26	3.26	1.53	2.00	0.278	0.039	2.45	123%
55	4.31	2.80	1.27	1.51	0.276	0.039	2.05	135%
56	3.39	2.34	1.02	1.05	0.276	0.039	1.64	156%
57	2.49	1.87	0.76	0.62	0.276	0.039	1.23	198%
58	1.63	1.30	0.51	0.33	0.276	0.039	0.82	249%
59	0.79	0.77	0.25	0.01	0.280	0.039	0.41	3714%
60	0.00	0.00	0.00	0.00	0.281	0.039	0.00	

Appendix 6

Sample Turkey Valuation – Hens

(For Illustrative Purposes)
(7.77 kg/Bird)

Cost Category / Variable	Total ($/Bird)	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13
Feed	5.100	$0.0633	$0.0930	$0.1637	$0.2381	$0.2616	$0.3359	$0.4126	$0.4725	$0.5205	$0.5843	$0.6181	$0.6766	$0.6594
Veterinary & Medicine	0.025		$0.0028			$0.0198		$0.0028						
Utilities	0.075	$0.0195	$0.0156	$0.0117	$0.0039	$0.0039	$0.0039	$0.0039	$0.0039	$0.0023	$0.0016	$0.0016	$0.0016	$0.0016
Vehicle and Equipment Operation	0.101	$0.0078	$0.0078	$0.0078	$0.0078	$0.0078	$0.0078	$0.0078	$0.0078	$0.0078	$0.0078	$0.0078	$0.0078	$0.0078
Custom Catching	0.160													$0.1600
Other	0.088	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007
Total Variable	5.549	0.097	0.126	0.190	0.257	0.300	0.354	0.434	0.491	0.537	0.600	0.634	0.693	0.836
Fixed														
Poults	1.860	1.860												
Other	4.700	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362
Total Fixed	6.560	2.221	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362
Total Costs	12.1092													
Total Revenue	12.1092													
Estimates of FMV														
Industry		6.66	6.78	6.97	7.23	7.53	7.88	8.32	8.81	9.35	9.95	10.58	11.27	11.95
CFIA		2.32	2.81	3.36	3.98	4.64	5.35	6.15	7.00	7.90	8.86	9.86	10.91	11.95
Difference (%)		34.8%	41.4%	48.2%	55.0%	61.6%	67.9%	73.9%	79.5%	84.5%	89.1%	93.2%	96.8%	100.0%
Other Expenses Adjusted to Reflect Increased Labour at Start of Flock														
Total Expenses by Week (excl. Other and Catching)	7.249	1.957	0.126	0.190	0.257	0.300	0.354	0.434	0.491	0.537	0.600	0.634	0.693	0.676
Labour as a % of Total (estimated)	100%	25%	10%	10%	10%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Other (pro-rated by Weekly Expenses)	4.70	1.18	0.47	0.47	0.47	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Adjusted CFIA Estimate of FMV (cumulative weekly expenses + weekly other)		3.13	3.73	4.39	5.11	5.65	6.24	6.91	7.63	8.41	9.24	10.11	11.04	11.95
Difference (%)		47%	55%	63%	71%	75%	79%	83%	87%	90%	93%	96%	98%	100%

Appendix 7
Input Parameters Used In NAADSM For Disease And Disease Spread

Parameter Description	Parameter Type	Level of Application
Disease Parameters		
Latent period	Probability density function (days)	Production type
Subclinically infectious period	Probability density function (days)	Production type
Clinically infectious period	Probability density function (days)	Production type
Naturally immune period	Probability density function (days)	Production type
Direct contact spread parameters		
Mean rate of animal shipments	Rate (number of recipient units per source unit per day)	Combination of source and recipient production types
Movement distance	Probability density function (km)	Combination of source and recipient production types
Shipping delay	Probability density function (days)	Combination of source and recipient production types
Probability of infection of the recipient unit, given exposure to an infected unit	Probability, 0 to 1	Combination of source and recipient production types
Movement rate multiplier	Relational function: scalar value as a function of the number of days since first detection of the outbreak	Combination of source and recipient production types
Can latent units spread disease by direct contract?	Yes/no	Combination of source and recipient production types
Can subclinically infectious units spread disease by direct contact?	Yes/no	Combination of source and recipient production types
Indirect contact spread parameters		
Mean rate of animal shipments	Rate (number of units receiving shipments from the source unit per day)	Combination of source and recipient production types
Movement distance	Probability density function (km)	Combination of source and recipient production types
Shipping delay	Probability density function (days)	Combination of source and recipient production types
Probability of infection of the recipient unit, given exposure (receipt of animals) from an infected unit	Probability, 0 to 1	Combination of source and recipient production types
Movement rate multiplier	Relational function: scalar value as a function of the number of days since first detection of the outbreak	Combination of source and recipient production types
Can subclinically infectious units spread disease by indirect contact?	Yes/no	Combination of source and recipient production types
Airborne transmission parameters		
Probability of infection at 1 km from source	Probability, 0 to 1	Combination of source and recipient production types
Wind direction, given as a range (start and end)	Degrees, 0-360, where 0 indicates north	Combination of source and recipient production types
Maximum distance of spread	Scalar value (km)	Combination of source and recipient production types
Airborne transport delay	Probability density function (days)	Combination of source and recipient production types

Appendix 8
Input Parameters Used In NAADSM For Disease Detection And Control

Parameter Description	Parameter Type	Level of Application
Disease Parameters		
Probability of observing clinical signs in an infected unit	Relational function: probability (0 to 1) as a function of the number of days a unit has been in an infectious clinical state	Production type
Probability of reporting units with observed clinical signs	Relational function: probability (0 to 1) as a function of the number of days since the first detection of an outbreak	Production type
Parameters for tracing out		
Probability of a trace-out investigation succeeding when direct contact has occurred	Probability, 0 to 1	Production type
Period of interest for trace-out investigations of direct contacts	Fixed integer value (days)	Production type
Probability of a trace-out investigation succeeding when indirect contact has occurred	Probability, 0 to 1	Production type
Period of interest for trace-out investigations of indirect contacts	Fixed integer value (days)	Production type
Destruction parameters		
Delay to begin a destruction program	Fixed integer value (days)	Entire scenario
Destruction capacity	Relational function: number of units that can be destroyed as a function of the number of days since the first detection of an outbreak	Entire scenario
Destruction priorities	Rank order of reasons for unit destruction, as described in the text	Entire scenario
Does detection of an infected unit trigger a destruction ring?	Yes/no	Production type
Radius of destruction ring, if a ring is triggered	Fixed value (km)	Production type
Will units be destroyed in a ring destruction program?	Yes/no	Production type
Will units identified by trace-out after direct contact be destroyed?	Yes/no	Production type
Will units identified by trace-out after indirect contact be destroyed?	Yes/no	Production type
Vaccination parameters		
Number of units that must be detected before vaccination begins	Fixed integer value (number of detected units)	Entire scenario
Vaccination capacity	Relational function: number of units that can be vaccinated as a function of the number of days since the first detection of an outbreak	Entire scenario

Parameter Description	Parameter Type	Level of Application
Vaccination priorities	Rank order of reasons for unit vaccination, as described in the text	Entire scenario
Does detection of an infected unit trigger a vaccination ring?	Yes/no	Production type
Radius of vaccination ring, if a ring is triggered	Fixed value (km)	Production type
Will units be vaccinated in a ring vaccination program?	Yes/no	Production type
Minimum time between vaccinations	Fixed integer value (days)	Production type

Appendix 9
Input Parameters Used In NAADSM For Determining Direct Costs Associated With Disease Control

Parameter Description	Parameter Type	Level of Application
Parameters associated with destruction		
Appraisal	Dollar amount per unit	Production type
Cleaning and disinfection	Dollar amount per unit	Production type
Euthanasia	Dollar amount per animal	Production type
Indemnification	Dollar amount per animal	Production type
Carcass disposal	Dollar amount per animal	Production type
Parameters associated with vaccination Number of animals that can be vaccinated at the baseline cost	Fixed integer value	Production type
Baseline cost of vaccination	Dollar amount per animal	Production type
Additional cost incurred when the number of animals vaccinated exceeds the threshold set above	Dollar amount per animal	Production type
Cost of vaccination site set-up	Dollar amount per unit	Production type

APPENDIX III

BACKGROUND

Industry Government Working Group

In 2006 a Poultry Industry Government Working Group (IGWG) was formed to discuss the initiatives in the poultry industry to resolve delays and hurdles in implementing policies and practices to reduce the incidence of Avian Influenza in the BC poultry industry. The IGWG is comprised of representatives from BC Ministry of Agriculture and Lands (BCMAL), Agriculture and Agri-Food Canada (AAFC), the Canadian Food Inspection Agency (CFIA), the four BC feather boards , the BC Poultry Associations, the BC Specialty Bird Association, and the feed, processing and hatchery sectors.

The IGWG recognized that there was a need to better understand the risks faced by the BC poultry industry related to disease spread. As a result the Risk Analysis Steering Committee, was formed to steer a comprehensive risk analysis of the BC poultry industry.

Rationale for the Risk Analysis Report

The risk analysis was undertaken as a result of the outbreak of highly pathogenic Avian Influenza (AI) in 2004 and a second incident of low pathology AI in 2005.

The 2004 outbreak had a gross economic impact of approximately $380 million to the BC Poultry Industry. Total net margin and out of pocket costs of $63.3 million were comprised of losses to farms after Health of Animal Act payments of $30.5 million; $10.9 million to farm supply companies and $21.9 million to processors: One feed company closed and one merged with another. There were major financial and social impacts related to employment losses particularly in the Fraser Valley.

In 2005, an AI low pathogenic strain of H5 was detected in waterfowl in the specialty bird industry resulting in compensation costs and long-term financial loss to the specialty bird industry including market impacts and brand damage. All poultry production operations within a 5 km zone of the index farm were directly impacted by disease control actions with the entire industry being negatively impacted by local, national, and global reactions.

In addition to the compensation requirements for producers, several hundred million dollars worth of public and private sector industry resources including staff and management, as well as material resources were expended to deal with the impacts and the recovery.

World, national and provincial health officials as well as the general public expressed concerns about the potential public health risks associated with AI of the H5 subtype. There exists a potential for market damage to grow as the consumer is sensitized with negative market messages.

Export markets which are necessary for continued growth in BC poultry production were severely impacted by notifiable AI in BC. The ability of processors to move several of their meat products into the export markets was impacted. Inability to export legs on back restricts BC processors ability to provide their domestic markets with white meat as production must be reduced because, dark meat builds up in inventory. This requires them to pay for imports of expensive white meat. Some BC processors also lose the opportunity to benefit from moving whole body chicken or cut up chicken from their kill plants to their integrated further processing operations.

Specialty producers of waterfowl, Taiwanese Chicken's and Silkie birds were negatively impacted by export and domestic market losses, valuable breeder stock losses, brand damages and disruption of their vertically integrated production and processing facilities, leading to major financial losses.

Neither federal *Health of Animals Act* compensation nor the AgriStability program was perceived by either industry or government as being fully compensatory. However, it was also recognized that frequent use of the public treasuries for compensation for federally reportable diseases such as AI, without a plan to evaluate and mitigate the risks, is not sustainable over the long run.

Further, there was and continues to be the risk of outbreaks of non-reportable diseases that can cause severe financial damages to the poultry industry such as Swine flu in Turkeys for which compensation is not available.

The Risk Analysis of the BC Poultry Industry

The purpose of the risk analysis was to make recommendations on infrastructural and operational conditions which put at risk safe animals, safe food and sustainable markets in the BC poultry industry.

The two main objectives of the report were to identify and assess risk factors which predispose the poultry industry to infectious disease outbreaks; and, to provide opportunities and mitigation risk management options to industry and government.

Executive of BCMAL championed the process. The report was funded by Investment Agriculture Foundation through the Industry Advisory Management Committee (IAMC using funds provided by BCMAL and AAFC). A Risk Analysis Steering Committee (RASC) was formed comprised of representatives from the poultry industry, BCMAL, AAFC and

CFIA. The committee was comprised of expert knowledge of various poultry sectors, financial and capital investment analysis, as well as strategic planning. The RASC hired and provided guidance to Serecon Consulting Inc., a consulting firm to carry out an independent objective analysis and report. Broad industry/ government consultation contributed to the reported outcomes through interviews conducted by the consultant.

The report entitled "Risk Analysis of the BC Poultry Industry, Final Recommendations, Strategies and Analysis Reports" was completed in May 2007. The report was presented to the Industry Government Working Group (IGWG) in November 2007. The report is publically available on the IAF website.

Stakeholder input and the process

More that 50 stakeholders within the various sectors of the poultry industry were consulted by Serecon to identify the risks. More than 30 risks were identified. These risks were then reduced to eight main causative risks and further reduced and prioritized by evaluating the risks on the basis of their "impact potential" and "probability of occurring". A gap analysis was then carried out to determine where existing programs were insufficient to protect against the risks. It was decided that an integrated response involving universal bio-security, proactive surveillance and infrastructural/business intensity changes in the poultry industry were required, backed by a strong financial compensation package. Failure to implement any of these elements would reduce the effectiveness of the recommended mitigating solutions to less than optimal. Benefit cost analysis was carried out on each mitigating solution. The benefit to government vs. the private sector, of a healthy vs. non-healthy poultry industry was quantified. Guidance was provided on an ongoing basis by the RASC who reported on progress to the Poultry Industry Advisory Committee.

Key recommendations of the RASC report

Industry and government need to implement the "intermediate response option" which consists of an integrated response that optimizes risk reduction by, implementing "proactive surveillance", developing a comprehensive "shared risk management compensation program, implementing "universal bio-security" across all sectors and all bird types, and, lastly, by addressing growing "business intensity and industry concentration".

a) For early detection and to reduce the intensity of disease outbreaks the industry, establish an on-going active surveillance program, inclusive of all production sectors and supported by a compensation system that compensates industry for their economic losses and recovery costs in the event of detection and business disruption/closure.

b) The industry and government develop and implement an integrated financial management and compensation program "The Shared Risk Management System" that provides funding mechanisms for recovery from disaster, self insurance, government supported production insurance, private insurance and compensation that substantially protects the industry from the significant perils it will face due to disease risks, and which will serve to sustain and grow the industry.
c) Universal bio-security program that encompasses the full value chain inclusive of allied supply and service industries, through the production and processing sectors and provides inducements and guidance for the inclusion of the non-regulated and small/specialty flocks to participate in bio-security be implemented.
d) BC poultry industry undertake a series of progressive dealing with the degree of business intensity and density in the Fraser Valley. This would involve the concurrent steps of finalizing an acceptable long-term plan for the compartmentalization and the industrial clustering of the industry into bio-secure zones; implementing a plan which leads to the transfer of high risk, high valued poultry enterprises to locations determined to reduce risk and fit with the overall plan; and undertaking the other operational and structural actions as outlined in the intermediate response option.
e) Develop geographical zones that could function independently in the event of a disease outbreak. This would involve regionalization or compartmentalization consistent with OIE guidelines. These results must be recognized by the international trade community to mitigate exposure of the BC poultry industry to potential province wide export bans.

Issues Identified

The top issues identified were related to the recommendations:

a) the implementation of these recommendations need to be implemented in a manner that maintains the competitive position of BC's poultry industry.
b) how do you align who pays the costs of implementation with who benefits?
c) how does government vs. the private sector benefit from a healthy vs. a non-healthy poultry industry?
d) how do you deal with the variability in the perceptions of risk?
e) how do you deal with the fact that allied industries are not compensated by government when Avian Influenza outbreaks occur or low path H5 or H7 are picked up by a surveillance program?
f) who pays the trade related losses should an initial surveillance sweep detects low pathology H5 or H7 in flocks?
g) which of the recommended responses shows the greatest benefit/cost and which of the components of the integrated responses (i.e. Universal bio-

security, or surveillance, or removing business intensity) shows the greatest benefit cost?

h) who obtains the benefits from a healthy vs. a non-healthy industry and how does this impact/reflect upon responsibility for cost-sharing in mitigation programs?

Findings-Worst Case Scenario

The total impacts of future animals disease risks on the BC primary and secondary poultry sectors (excluding domestic consumption and export) are expected to result in losses between $1.3 billion and $2.1 billion over the next 10 years, if the industry is not healthy. Including the broader impacts on allied and related industries, the total economic loss over 10 years of allowing Low Path H5 and H7 to simmer in the industry and randomly convert to High Path AI, and high path to randomly occur without preventive proactive prevention programs, is expected to range between $2.4 and $3.9 billion.

The key to resolving these issues is to get all parties into a common understanding that the solutions to the biological disease problem are not mutually exclusive of the economic impacts and that an integrated coordinated solution is required.

Value of the Risk Analysis Report

The independent value of the RASC report is that it quantified the benefit cost of the various mitigating strategies allowing implementation priorities to be established. Further, the report quantified the allocation of benefits to the private and public sector of a healthy industry versus a non-healthy industry, thereby laying the basis for objective decision making on appropriate program cost allocations between the public and private sectors.

Risk Analysis Report as a Policy Challenge

The RASC report is a public policy challenge and is recognized as such by both government and industry. This necessitates that the recommendations in the report be addressed.

Risk Mitigation Steering Committee and its Framework

Subsequent to the presentation of the RASC report to the IGWG in November of 2007, the RASC was reconvened to develop a process for further work and more in-depth investigation to guide industry/government in the mitigation of the risks identified in the RASC report. RASC reconvened on January 23, 2008 at which time it was renamed "Risk Mitigation Steering Committee" (RMSC). RMSC developed a Framework and

vetted it by BCMAL executive on March 17, 2008 to obtain authorization and to discuss process, accountabilities, leadership and to obtain further guidance.

RMSC was tasked with developing a draft plan as to what in the report is do-able and what resources are required, as well as what the process will be to lay the basis for implementation by the industry and government of the recommendations of the RASC report.

The Industry Government Working Group is seen as a vehicle for consultation and more than a proxy for industry due to strong leadership in that group and representation of broad stakeholder interests.

The purpose of the RMSC is to facilitate, support and advise towards development and implementation of integrated solutions to mitigating the risks in the poultry industry. The objective is to develop a detailed plan and time line to address the recommendations of the RASC report with participation of industry and governments. This plan is to provide guidance to implementation. Through a number of iterations with the IGWG a final consensus plan will be developed.

There are three main elements under which further work towards implementation of risk mitigating strategies need to be developed-universal bio-security, surveillance and industry concentration/business intensity. The three elements need to be closely integrated with respect to communications and development of solutions. Activities and time lines are to be developed for each of the elements. The approach under each of the elements may be different and follow different time tables**.**

Surveillance/Insurance elements were considered a priority. For potential actions/tasks to be completed the following framework was authorized.

- make RMSC one of the key contact points for national surveillance/insurance;
- make RMSC a key point of contact for industry with respect to the Ontario production insurance pilot for poultry; and
- make RMSC the vehicle for: inputting into the design and development of poultry surveillance and insurance programs; facilitating poultry industry input into poultry surveillance and insurance programs; assessing the feasibility of the Ontario pilot of poultry insurance for BC poultry; and recommending implementation of strategies for insurance programs (indemnification, premiums, voluntary vs. mandatory, extent) and broader impact on all stakeholders.

Accountability:

Harvey Sasaki, provides executive level leadership and holds the RMSC accountable for a plan and process steps, a consideration of resources and presentation to the Industry Government Working Group of the Strategic Plan for validation.

Setting the Foundation for Developing Poultry Insurance in BC

In the fall of 2008 RMSC using funding from the IAF, provided by BCMAL through the IAMC hired Serecon Management Consulting Inc. to investigate the status and process of the Ontario initiative to develop an indemnification program for Ontario poultry producers. The objective of this work was to investigate the list of detailed data elements and other information required from industry in order to implement the risk identification and assessment process in BC. This involved reviewing the North American Animal Disease Spread Model and the Riskogen process to gain knowledge of the data collection needs and requirements and contacts between farm operations for running the disease spread model in British Columbia. Further, the project was directed at identifying the hurdles and shortfalls of the process used in the Ontario Livestock Poultry Council Project so as to maximize the efficiency of implementation of the process in BC. This report was completed in January of 2009 and presented to the IAMC. At the same time two veterinarians were funded by BCMAL to attend training in Colorado on the NAADSM.

Future Role of the RMSC

The RMSC was formed to develop a plan for the implementation of recommended risk mitigation strategies identified in the RASC report. Committee membership was based on the skill sets required to investigate and evaluate those recommendations. This work is completed and summarized in the RMSC recommendations. To proceed further requires the formation of work teams that have the necessary technical skills and the resources to fully develop and implement the recommendations. The RMSC has the appropriate structure and expertise to manage and coordinate the formation of the work teams and is prepared to do so.