Comparative Analysis of Beef Traceability Capabilities and Practices in Australia and Ontario

Authors:

Martin Gooch
Delia Bucknell
Brian Sterling

Corresponding Author:
martin@vcm-international.com

May 2015

Table of Contents

The opinions and views expressed in this report are not necessarily held or endorsed by the federal and provincial governments.

1 Introduction

The effectiveness and value of any traceability system is determined by the system itself and the rigour with which it is applied. Both factors must exist for a traceability system to be effective in enabling businesses to increase their profitability and an industry to protect its competitive interests. Enabling individual businesses (e.g., producers, input providers, processors, retailers, foodservice operators) and entire sectors to optimize the benefit that they can achieve from utilizing traceability relies on the existence of a system whose capabilities extend along the entire value chain. At the very least, a beef traceability system needs to extend from an animal's birth through to its carcass following slaughter. A second interconnected system would then provide post-slaughter capabilities, resulting in full chain traceability.

As found from a study into Australia's National Livestock Identification System (NLIS) in 2014, the three pillars of effective chain-length traceability are movement reporting, premises ID, and animal ID. The effectiveness of NLIS is further enhanced by its ability to capture and flag information on production-related incidences that could have food safety implications, such as pharmaceutical-related withholding periods and whether the animal grazed on contaminated land.

The purpose of this research is to suggest how Ontario's beef industry could act upon lessons learned from having studied NLIS and to propose a way forward. This was achieved by concisely determining which of the information gleaned from Australia is most pertinent to Ontario's beef industry and why, along with what barriers and enablers will determine Ontario's ability to benefit from acting upon the information. It also determined resources required to produce outcomes that will benefit Ontario's beef industry over the long term. To produce findings that individual businesses and policy makers can use to achieve purposeful change, the research was undertaken from a whole of chain perspective.

The research involved reviewing literature pertaining to the development and application of traceability in Canada and, most notably, Ontario. Previous beef and veal traceability projects completed by Value Chain Management International (VCMI) were also reviewed. Fifteen industry stakeholders (producers, processors, service providers, industry organizations, government officials) were then interviewed to gather their perspectives on the present situation, determining factors, and current or foreseeable initiatives that are expected to influence beef traceability in Ontario.

2   Current Situation in Ontario/Canada

The study found that, compared to Australia's NLIS, Canada does not have an effective beef traceability system at an industry level. In the opinion of most people with whom we spoke, Canada currently has a reactionary cattle identification system that, when required, can provide a level of traceability. Interviewees believe that the most valuable use of the present system is preventing the sale and exportation of meat from diseased animals. Those that are aware of NLIS stated that while changes are occurring which will reshape Canada's traceability capabilities, the present system reflects a focus on mitigating risk ahead of other considerations. Compared to NLIS, Canada's systems and capabilities do not offer the same proactive value-adding and business intelligence opportunities.

The ability to trace individual animals can depend on the availability of supplementary information, such as sale and purchase documents. The application of Canadian Food Inspection Agency (CFIA) approved RFID tags are mandatory on cattle prior to them leaving the property of their birth, and retirement of those tags on slaughter is mandatory in Canada. The need to report movements or transfer of ownership differs greatly across Canada, with only Quebec enforcing both as mandatory requirements. From a national perspective, this means that the remainder of data required to form an effective traceability system is fragmented or non-existent. Information that is gathered – such as from mandatory movement reporting for cattle going into feedlots larger than 1,000 head in Alberta and voluntary shipping manifests in Ontario – is not uploaded to the CCIA traceability database. Property Identification Codes[1] (PIDs) are only mandatory in the Canadian provinces of Quebec Alberta, Manitoba and Prince Edward Island. The location associated with an animal's tag is typically the producer's address. For systems such as the Canadian Cattle Identification Agency's Canadian Livestock Tracking System (CLTS), this need not be the location of the property on which the animal is born or the same province. Processors upload the tag number from slaughtered animals, which "retires" the tags in the CLTS and Agri-Traçabilité Quebec (ATQ) systems.

The situation described above and detailed in the comparative Appendixes A *(Australia)* and B *(Ontario/Canada)* is steadily changing. At the current pace of change, the current situation could take at least a decade to fully address. For example, mandatory movement tracking at the federal level is targeted as being achieved in 2016, though is unlikely to be introduced before 2018. None of the interviewed experts could estimate when PIDs may become mandatory across the country, because it is a provincial matter and each province manages PIDs differently, using alternative technology and practices. That said, the proposed federal movement records would make PID a mandatory requirement. Therefore, given forthcoming legislation (e.g., Part 15 of Health of Animal regulations and Safe Food for Canadians Act) and evolving market pressures (e.g., the Canada-EU Comprehensive Economic and Trade Agreement), a more integrated and effective national beef traceability system than currently exists could occur in a matter of years.

---

[1] In Canada, the acronym used for Property Identification Code or Premise Identification Number is "PID"; in Australia, the acronym used is "PIC."

3   Causes for the Present Situation

A concise description of Canada's history relating to traceability forms Appendix C. Causes for why the present situation has occurred are many and complex. Purported reasons identified by the literature review and during discussions with industry experts include

- Canadian constitution and provincial rights;[2]
- a fragmented industry culture that is typified by attitudes of adversity, distrust, and conservative perspectives;
- an industry whose structure is characterized by innumerable small players, a moderate number of influential medium-sized players, and a few very large powerful players;
- a perpetuating belief that capturing data on birth and slaughter is 80 percent of the data required for effective traceability;
- the lack of a clear financial incentive to adopt traceability;
- a lack of standardized systems;
- the lack of an overarching strategy for cattle and beef traceability;
- the general lack of an informed perspective on traceability;
- a lack of a shared belief that traceability could benefit industry;
- disagreements about who owns what data and individual businesses' right to hold versus share;
- each step in the chain making a logical decision in relation to its own interests and wants, versus from a whole of chain perspective;
- concerns about moving too far ahead of the US industry; and
- few Canadian jurisdictions outside of Quebec having introduced cross-compliance requirements regarding traceability.

These and other factors have created what could be described as a culture of inertia, which led to considerable amounts of funds being invested in the development of systems and practices that did not achieve their stated goals. While Canadian businesses have successfully established themselves as respected leaders in traceability technology and its application, and commercial businesses from the beef industry have achieved commercial success through embracing traceability systems, the overall Canadian beef industry has not developed an effective traceability system. That journey of approximately 15 years produced lessons and insights that other sectors used to effect change, with Pigtrace[3] being the most cited example mentioned during this study. Lessons learned from this second generation of traceability initiatives are being used to develop the TraceCanada initiative[4].

---

[2] The *British North America Act* Sections 92, 93 and 95 established agriculture as a concurrent jurisdiction among federal and provincial governments. It provides specific powers for provinces, and both specific and residual powers for the federal government. This results in the federal and provincial governments having significant legislative authority to make regulations, especially in agriculture and practices not conceived when the constitution was written: such as traceability.

[3] http://pigtrace.ca

[4] TraceCanada (Canadian Agri-Traceability Services) is a national, not-for-profit organization whose mandate is to build and maintain a world-class national livestock traceability service. It evolved from work completed by an industry-Government Advisory Committee on traceability. http://tracecanada.ca/

4   Use of Traceability by Individual Businesses in Ontario

In Ontario's beef industry there are innovative charismatic leaders, a number of whom are utilizing CCIA RFID tags and proprietary systems (e.g., BioTrack) to gather and analyze data gathered from birth, during production, and at slaughter to make informed management decisions from a whole of chain perspective. VG Meats are using elements of the resulting information and other technology to create QR codes that are placed on individual cuts of meat sold in retail stores. They are also using affidavit style shipping manifests to ensure that the cattle they are supplied have not been fed or treated with hormones or vaccinations of which VG Meats do not approve. The affidavit also ensures that the progeny and entire health history of animals are known. This and other initiatives are gaining increasing interest among leaders from industry and government regarding the potential value of traceability in Canada, generally.

Interviewees estimated that 10 to 15 percent of producers operating in Ontario's beef industry are readily accepting of traceability from a management perspective. Those most likely to use traceability for management purposes are medium to large operations — those where the producer works full time. Most feedlots are said to use traceability to manage inventory, identify potential health issues, and send fat cattle to processing before they are penalized for being overweight. The least likely to use traceability for management purposes are cow-calf operations.

Price is a factor in determining whether a producer considers traceability an effective management perspective and adopts it accordingly, especially given that the only real value that most producers can presently acquire from traceability is while the animal is under their control and ownership. In Canada it is highly unlikely that the breeder or final owner of a slaughtered animal is able to access information on carcass performance as producers in Australia are; for example, to estimate a bull's Estimated Breeding Value (EBV) and make informed breeding or on-farm production decisions. This is particularly the case since most processors ceased uploading carcass composition data to the Beef InfoXchange System (BIXS) database in 2013. The estimated price of on-farm traceability (weigh bars, reader, and software) ranges from $4,000 to 6,000 dollars. For comparative purposes, the Australian KoolCollect software, which was described in the NLIS case study,[5] ranges from $600 to $3,200, depending on the features required by the user. This does not include the cost of weigh bars and readers.

---

[5] http://vcm-international.com/wp-content/uploads/2014/09/Australias-Traceability-System-Case-Study-August-2014.pdf

5 Barriers to Expanding the Use of Traceability

Appendix D presents insights presented in this paper in the form of a concise SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis. Strengths and weaknesses are factors internal to Ontario's beef industry, and over which it may, therefore, be able to exert direct control and influence in relation to current traceability capabilities. Strengths are internal factors that could help Ontario's beef industry use traceability to achieve its objectives. Conversely, weaknesses are internal factors that could hinder Ontario's beef industry from using traceability to achieve its objectives. Opportunities and threats are attributes of the environment that are external to Ontario's beef industry and that may either help or hinder the provincial industry in achieving its objectives. Many of the opportunities described in Appendix D flow directly from the identified strengths and weaknesses.

The reasons that traceability is not widely used in the beef industry as a management tool is not due to a lack of infrastructure or technological capabilities; it is primarily due to a lack of understanding about the need and benefits of traceability. This lack of understanding fostered widespread resistance to change, which, in turn, led to the governance required to ensure the rigorous collection of data and analysis needed to enable effective traceability not being implemented. This, and the fact that the current traceability system was designed for risk mitigation purposes, without sufficiently considering its role in enabling commercial value to be produced by commercial enterprises, has fostered the reiterating cycle presented in the figure below.

Reiterating Circumstances That Have Shaped Canada's Traceability Capabilities

Resistance to change allowed to compromise systems' potential

Data and systems lack ability to enable creation of commercial value, negatively impacts industry leaders

Traceability viewed as a mandated cost, without benefit
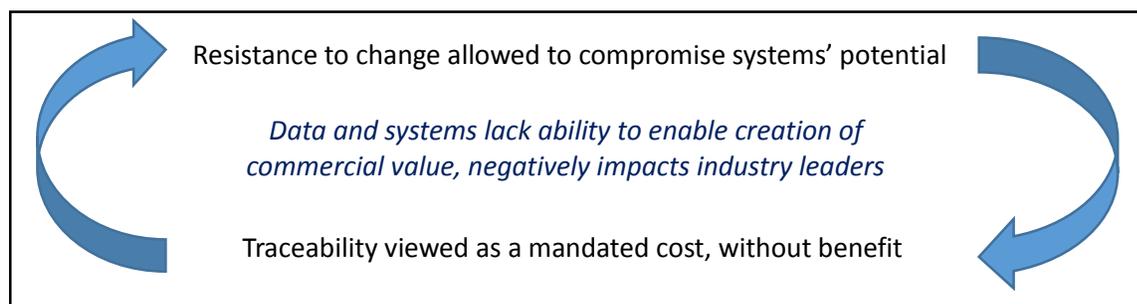
The mandated RFID ear tags are typically the only aspect of the national system that farmers can use to create value. It provides the data points required for individual businesses to capture commercial advantages by gathering information on individual animal performance. However, not having access to information on genetics, carcass performance, and other factors that occur outside of producers' operations limits the value of on-farm management systems compared to those linked to NLIS.

Due to the development of TraceCanada and the expected introduction of federal regulation that will impact traceability practices, such as the timely recording of cattle movement likely to become a federal mandatory requirement in 2016, relatively little effort has been invested into upgrading the capabilities of the CCIA system. With TraceCanada commencing operations in 2015, and sustainability initiatives that require traceability capabilities being introduced by an array of retailers and foodservice operators, the pace of change is expected to increase considerably from 2016 onwards. If movement reporting does become mandatory, with the resulting data uploaded to TraceCanada, the missing links from the Australian NLIS perspective will be 1) mandatory PIDs linked to individual RFID tags, 2) mandatory uploading of carcass data, 3) mandatory vendor declarations, and 4) access by breeders and finishers to data on carcass composition. These gaps must be

addressed if Ontario is to establish a traceability system that producers, businesses, industry organizations, governments, and researchers can use to make informed decisions and together establish a more innovative, sustainable, and profitable beef industry.

Key to success from a value-adding perspective will be implementing the governance practices required to maintain the integrity of data collected, and enabling individual producers, service providers, and wider industry stakeholders to access the data gathered by TraceCanada for commercial or industry development purposes. As has occurred in Australia, this may be best achieved by placing the onus of responsibility on individual provinces. The federal focus would be on ensuring the establishment of one rigorously enforced standardized national system.

6   Opportunities

Ontario's beef industry has considerable opportunities to capture value by utilizing traceability effectively. Compared to other provinces, the extent of opportunities is positively impacted by factors that include the number of processors that operate in the province, a concentrated population (many of whom are well educated and affluent), and Canada's largest food manufacturing cluster. The industry also possesses respected innovative leaders, direct access to the highly populated Northeastern US, access to an international logistical network, and a provincial government committed to enabling industry to compete by proactively adopting traceability practices. Capable traceability related service providers are also located in Ontario.

Initiatives in development that could enable Ontario's beef industry to further leverage the benefits of traceability include the Beef Farmers of Ontario's Beef Quality Assurance (BQA) Committee and hoped eventual program. BQA is being developed in response to determining that consistency is more important to buyers than high quality. Consistency encompasses eating quality, cut size, fat (marbling and external), size of cut, and number of cuts in a carton or by weight. Similar to Meat Standards Australia[6] (MSA), the purpose of BQA is to create a predictive common language around value by outlining definitions of quality and determining factors. Current carcass reporting systems typically do not sufficiently differentiate between yield and grade, thereby provide limited information that producers can use to guide their management decisions. It also limits customers' ability to make informed decisions on which products offer the greatest value in which situation, and why. As with MSA, effective full chain traceability will enable producers and processors to capture value by predicting which factors determine suppliers' ability to produce consistent quality cattle and subsequently beef, then proactively manage predictability into their operations. The same process will enable producers and processors to continually improve performance in relation to identified market demands, thereby capturing and retaining competitive advantage.

---

6   http://www.mla.com.au/Marketing-beef-and-lamb/Meat-Standards-Australia

7 Closing Information, Knowledge and Resource Gaps in Ontario

Listed below are options for closing gaps in information, knowledge, and resources — the purpose being to enable Ontario's beef industry to acquire the systems and the capabilities required to capture added value in potentially unique ways through traceability. This would position Ontario as the Canadian leader in utilizing traceability to achieve commercial and competitive advantage.

7.1 Education and Training in Utilizing Traceability for Commercial Purposes

Attitude is the most influential determinant of utilizing traceability from a management capability to acquire competitive advantage. The development of training and extension materials, perhaps in conjunction with the development and adoption of an objective Ontario-centric beef and red meat traceability strategy (recommendation #2), would encourage a shift in attitude towards supporting the adoption of effective traceability practices by industry. It would also inform government and industry bodies, thereby assisting in the creation of an enabling environment where industry is poised to utilize improvements in traceability infrastructure and capabilities as they evolve nationally and provincially.

7.2 Industry-Government Partnership That Oversees and Manages Infrastructure Development

A key enabler of the traceability initiatives that occurred in Victoria, Australia, and subsequently led to the development of the NLIS system, was an independent panel composed of invited visionary leaders from the red meat industry and government. The panel would determine the strategic, operational, technical, and governance considerations required to ensure effective traceability systems in Ontario, in context with the national initiatives that are occurring and developments that will occur. The panel would make recommendations to provincial and federal governments regarding policies, legislation, and investments.

Specific recommendations that the panel should consider are:

1. Determine the key data elements (KDEs) and critical tracking events (CTEs) that must be encompassed to establish an effective animal traceability system in Ontario.
2. Establish an Ontario-centric version of national Canadian database by downloading data.*
3. Introduce mandatory PIDs to all farms on which beef are born, raised, and finished.
4. Incorporate individual PID numbers with tags to create unique tags for each property of birth.
5. Enforce the mandatory uploading of PID and tag ID when registering cattle on the national database.
6. Introduce mandatory movement reporting for cattle moving within Ontario and entering Ontario from other provinces.
7. Make the uploading of retired tags, with carcass records, a mandatory requirement of all processors.

*If the development of a provincial level database – where national level data, PIDs, movement reporting, and shipping manifests are married together into one point, which can be accessed by specific stakeholders (as occurs in Australia) – was deemed a valuable step in enhancing an Ontario's traceability capabilities, the industry/government panel could transition into a board of directors that oversees the initiative.

Appendix A — Comparative Description of NLIS

Information Collection Points along the Value Chain

1. Producers
   - When transferred between properties (separate Property Identification Codes or PICs*)
2. Transportation
   - Value-added service provided by animal transportation is scanning animals as loaded onto truck
   - Data is transmitted to NLIS on delivery to destination
   - Saves receiver of animals' time.
3. Sale yard
   - For purchase by another producer
   - For purchase by processor or live exporter
4. Processor
   - In plant

Repository of Data

- All data gathered from each of the four points listed above is transmitted to the national NLIS database.
- Only one movement transaction can be registered with NLIS
- If two transactions are logged, traceability is lost. It is the responsibility of the receiver of the stock to register/input the transaction of the movement.
- The national NLIS database is legislated and managed by through Meat and Livestock Australia (MLA), but administrated operationally by the States.
- All property data, maps and PIC, along with owner information is collected/maintained by the state, but shared with NLIS database.
- National Organochlorine Residue Minimisation (NORM) program established in 1995. Each cattle producing property was given an OC residue status. This data is maintained on the Extended Residue Program database by MLA and is linked with NLIS via PICs.

*PIC - **Property Identification Code** is linked to a parcel or parcels of land in the same local government area that operate as part of a single farming enterprise. If a property is sold, the old PIC is 'disbanded' meaning it can no longer be used when recording livestock transactions, and when acquiring tags and National Vendor Declaration forms. A new PIC is issued to the new property owner. Where a farming enterprise consists of parcels of land in different local government areas, a separate PIC is typically assigned to the land in each local government area.

Benefits and Outcomes Enabled By Collection and Analysis of NLIS Data

- <u>Producer</u>
  - All animals are tagged on property. If born on property they get white tags.
    - If cattle are not born on the property or location, whereby a replacement (orange) tag is used, life-time traceability is immediately lost.
  - Some farm management programs have incorporated the NLIS** data into the programming, to enable producers to track and monitor production to varying degrees of detail.

- Grazing management
- Breeding
- Carcass weights are linked to NLIS data and producer can see final carcass weight informing production methods
- Efficient drafting of cattle by weight to establish which ones meet feedlot target, therefore enabling producers to maximize profitability
- Chemical treatment of animals triggers a withholding period.
  - Farm management programs such as Phoenix determine the dates the animals are in or out of the withholding period and therefore not eligible for slaughter.

**NLIS documentation provided on their website provides coding and process that enables the operation of third party programs

- Transportation
  - Scanner attached to the truck
  - Scanned on and off data transferred to laptop in cab
  - Value added to transportation who have automated system as scanning can be done efficiently as they enter the truck.
  - Easy billing data and tracking information for the transportation company.
  - Animal Health/Welfare – as number of animals on truck is monitored and can be verified, overloading the truck is more difficult.

- Sale Yards
  - Does not slow down processing of animals through the sale yards
  - Reporting made easier and more efficient as the scanned animals move through the yards
  - Maintains traceability
  - Emergency tags are used if animal arrives at yards without a tag, but lifetime traceability is lost.

- Processing
  - Specialized readers for processor allows complete traceability
  - Carcass weights are reported to NLIS and producers can access that information, hence allowing for feedback in the system making breeding and management decisions based on outcomes.

Capabilities and Infrastructure That Enable NLIS Traceability to Occur

- National Database (Meat and Livestock Australia)
- National Vendor Declarations (NVD) is the document that underlies the food safety of the Australian Beef Industry. It has recently transferred to an electronic document that is sent directly to the animal receiver. NVDs are purchased through the MLA; electronic NVDs are discounted in comparison to paper (booklets) of NVDs
- EU registration allows for animals from particular properties to be sold into the EU market.
- PIC maintenance (state governments)
- Scanner technology (including linking with scales on farm) and programs (private companies accredited by NLIS)

- Consistency/mandatory location of ear tags in the animal
- Third party management programs (private companies)

Outcomes Achieved

- Information and insights
  - ○ Laws that compel reporting to NLIS and specific regulations on who has to report when in various scenarios
    - ▪ E.g., animals sent to knackery or dead calves under six weeks.
  - ○ Laws are there to prosecute individuals that blatantly and continuously attempt to evade the NLIS system, not to punish occasional mistakes. However, mistakes (e.g., animal not tagged, etc.) results in no lifetime traceability and potentially lost value.
  - ○ Where applicable, disease, residue, and market access information in relation to cattle producing properties is being registered on the database.
  - ○ The database is also used to facilitate the provision of carcass feedback to producers.

- Industry Level Benefits
  - ○ Traceability
  - ○ Tracking of animal sales. If an animal is sold that has an incorrect transfer origin, an email is sent to the last known origin, and therefore owner can claim ownership — ownership protection.
  - ○ Biosecurity - management of disease and pests
  - ○ Food security - management of chemical residue
    - ▪ Some properties via their PICs are labelled with various codes indicating their chemical residue status
    - ▪ Animals administered with medication/chemical are withheld from slaughter for prescribed time depending on the medication/chemical used

- Research Benefits
  - ○ Farm management (breeding, grazing/nutrition)
  - ○ Future possibilities include development of GPS integration into tags enabling for behaviour research

- Commercial Benefits
  - ○ Consumer and market confidence due to the traceability
  - ○ Improved management and efficiency

Statuses that can be linked to a PIC, device/tag/animal

Program	Status	Description
The EW1 PIC status is disclosed when cattle with any of the following device-based statuses reside on the PIC....		
AV	AV1	Cattle vaccinated against anthrax and WHP has not expired – unfit for human consumption
DOI	DN2	Device of interest – hold carcase and contact State regulators
IMPO	IM1	Cattle imported from BSE country – unfit for human consumption
JD	JD2	Cattle diagnosed with clinical Johne's disease – unfit for human consumption
LEAD	PB1, PB2	Cattle under restrictions due to lead residues – sampling may be required at slaughter (condemn liver and kidneys)
LPA	NL2	Cattle that moved to an LPA accredited PIC within the last six months from a PIC with no LPA accreditation and an OC status – sampling required at slaughter
NARM	K1F, K1V, K3	Cattle treated with antibacterials – sampling may be required at slaughter or carcase condemned
NORM	N1F, N1V, N2F, N2V	Cattle that grazed on properties contaminated with organochlorines – sampling required at slaughter
RAM	F1, F2, F3	Cattle exposed to restricted animal material – may be unfit for human consumption, export, or SRM removal required

NLIS: EW1 fact sheet

Appendix B — Comparative Description of the Canadian Livestock Tracking System (CLTS)

Information Collection Points along the Value Chain

At present there are just two mandatory data collection points:
- Farm of origin (place of birth)
- Slaughter/ tag retirement

Provincial differences regarding movement recording include
- In Ontario, in anticipation of a mandatory declaration being introduced, sellers of cattle are being encouraged to voluntary complete paper manifest containing information on 1) number of cattle shipped, 2) PID, 3) to where cattle are being transported, and 4) vehicle.
- In Quebec, movement recording is mandatory for all beef animals, including dairy.
- In Alberta, movement recording is mandatory, if animal moved to a feedlot with 1,000+ more cattle.
- It is not a requirement that movement data is uploaded to the CCIA (even though the CCIA is capable of recording such data) or BIXS databases. This makes it difficult to utilize the systems for traceability purposes.

Repository of Data

- Agri-Traçabilité Quebec (ATQ)
  - From a historical perspective, ATQ has arguably the most effective traceability system in Canada. Quebec has enforced the mandatory uploading of PID, Animal ID and movement reporting data for longer than any other province.
  - To a limited degree, producers can access this data to make management decisions.
- Canadian Livestock Tracking System (CLTS)
  - Animal ID data in the form of ear tag numbers is collected by Canadian Cattle Identification Agency (CCIA) and maintained in their CLTS database. *This database will be replaced by TraceCanada, whose systems and processes are in development.*
  - This regulated data is only accessible by CFIA in the case of a disease outbreak or food safety issue.
- BIXS database
  - Receives downloaded data directly from CLTS. *When operational, this data may be downloaded from TraceCanada's database.*
  - BIXS is being promoted as the option to achieve the value added and economic benefits that improved traceability can provide.
  - Date of birth data can be loaded into the BIXS database and it is automatically synced with CCIA, enabling an age verification program/birth certificate printed from the CCIA site.
  - PID* codes can be uploaded to BIXS.
  - Proprietary databases and programs (e.g., BIO) source their primary input data from BIXS.

*PID – Property Identification Codes are primarily voluntary in Canada. Establishing a PID account if owning livestock is mandatory in Quebec, Alberta, Manitoba, and Prince Edward Island. CFIA tags are registered to the producers' address, which is not necessarily the property on which the animal was born or raised, unless it is a provincial-territorial generated PID.

Benefits and Outcomes Enabled by Collection and Analysis of CLTS Data*

- Producers
  - ◦ The primary use of CCIA related capabilities is the use of RFID ear tags as the data point for gathering information on animal performance while the animal is owned by a producer.
    - ▪ Feedlots are most likely to use RFID tags as a management tool.
    - ▪ Cow-calf producers are least likely to use RFID tags as a management tool.
  - ◦ Feedlots primarily use tracking capabilities offered by RFID ear tags to separate out fat cattle for processing ahead of being penalized financially, and managing inventory.
  - ◦ Feedlots can query the BIXS database to source specific cattle. A blind email is sent to the owners of those cattle with the buyers' information for them to contact if they wish. Producer personal information remains confidential if they wish it to be.

- Transportation
  - ◦ There is no collection and uploading of data to CLTS during transportation.
  - ◦ Shipping manifests are voluntary in Ontario and movement reporting is mandatory in Alberta and Quebec. Neither sets of information are uploaded to CLTS. The information is uploaded to ATQ.

- Sale Yards
  - ◦ Sales yards do not collect and upload data to CLTS, unless replaced a lost ear tag.
  - ◦ Sale yards are resistant to tracking cattle movements and change in ownership. State that it slows down the speed of commerce.

- Processors
  - ◦ Processors retire RFID tags at the time of slaughter, uploading the ear tag number to CCIA.
  - ◦ Processors primarily view traceability as a reactive means of mitigating risk associated with diseased animals or other situations that render meat unfit for human consumption.
  - ◦ That few processors view traceability as a tool for proactively capturing added value is reflected in the decision by processors to cease uploading carcass performance data to BIXS in 2013.
  - ◦ Processors can query the BIXS database to source specific cattle. A blind email is sent to the owners of those cattle with the buyer's information for them to contact if they wish. Producer personal information remains confidential if they wish it to be.

* Little data analysis occurs from a CLTS perspective. As only birth and death information is recorded for cattle in Ontario. BIXS provide limited analysis and benchmarking support, and will partner with IT companies and service providers to create value for members from the limited information that exists.

Capabilities and Infrastructure That Enable CTLS Traceability to Occur in Ontario

- Uploading CCIA ear tag numbers to Canadian Livestock Tracing System (CLTS) is mandatory prior to animals leaving the farm of their birth.
- In Ontario, recording information on activities such as animal movements and transfer of ownership is currently voluntary.
- Registering a property to generate a PID is voluntary in Ontario.
  - ◦ The introduction of the (part 15 health of animals regulations) Safe Food for Canadian Act is expected

to require the mandatory recording of animal movements and PIDs.

- Movement tracking is only mandatory for all cattle in Quebec. Movement tracking is mandatory in Alberta if cattle going to feedlots of 1,000 head or more. Elsewhere movement tracking is voluntary elsewhere.
  - ◦ Widespread movement tracking data is not uploaded to BIXS.
- A limited number of farms possess the infrastructure required to utilize the opportunities offered by reading ear tags and gathering then analyzing associated data.
- Acquiring the RFID readers, software, and weigh bars required to utilize traceability related data for management purposes is a significant cost for most farms. A typical cost is $6,000 for wand, weighing bars, software, etc.)

Outcomes Achieved

- Information and insights
  - o The Canadian cattle identification system (CCIA ear tags) is reasonably robust.
    - ▪ However, current systems lack rigour when viewed from a traceability perspective.
    - ▪ Compared to Australia, Canada was described as having the "Model T" traceability system.
  - o CCIA ear tags are used by producers to enable more informed on-farm decisions.
    - ▪ The cost of the required software and hardware is viewed as beyond the means of the smaller farms and properties that operate in Canada's beef industry.
  - o Age Verification Program, which is mandatory in Alberta, allows for animals to be identified and for their age to be verified by the CLTS database.
    - ▪ This is enabled by producers volunteering to provide date of birth data.

Challenges/Considerations

1. The Canadian approach to traceability is steadily shifting towards implementing systems that enable more proactive use of data for management purposes.
   - Slow process as encompasses factors over which federal and provincial have authority, and the agendas/ interests of individual commercial businesses.
2. Canadian system relies on the auditing of records to verify whether cattle have been treated with hormones, ractopamine, or have failed to comply with withholding periods.
   - Legally binding requirements (e.g., affidavits) occur as part of specific business arrangements.
3. The existence and enforcement of regulations required to ensure the establishment of an effective national traceability system differ by province.
   - Alberta and Quebec are generally viewed as leaders in this regard.

Costs of Traceability

A number of options exist to reduce the costs associated with on-farm traceability.

1. Contract scanning or collective ownership of scanner.
2. Upload ear tag number to the database via the internet, without the need to own a scanner.
3. "Scan in" policy at sale yards proposed as an attempt to lesson burden on individual operations.
4. Pharmaceutical companies offer groups of producers the option of having them upload information to the CLTS database.
5. Considerable increase in information/traceability required to access EU/Russian Market.
6. TraceCanada and/or BIXS have the potential to add value throughout the supply chain.
7. Shipping manifests are in paper format and underutilized. Manifests will need to be digitized and made compatible with a traceability database.
8. An Ontario centric traceability system must consider that 300,000 to 400,000 cattle move east into Ontario for finishing and processing annually.
9. Weigh scales are proactively used for herd management purposes.

Appendix C — Background on Beef Traceability in Canada

Summarized below is a brief background on the history of beef traceability in Canada and what is projected for the near future in terms of industry and government response. The purpose is to describe the context in which the Ontario industry may choose to act.

Livestock farmers and animal owners have, for a long time, viewed identification as a means of finding livestock in the event of loss or theft, making better choices in managing the animals under their care, mitigating losses due to diseases, or enhancing the value of the animals.

In the past, identification was achieved by marks, tattoos or colourants placed directly on the body of the animal, by use of a removable device attached to the animal, or by having a description of the animal documented. Many of these latter methods date back to antiquity, when ancient civilizations used such documents to verify ownership (mainly of horses). As human societies grew and expanded, concern about animal identification continued until the 18th century, when public health authorities began to more rigorously address the connection between animal and human health, leading to subsequent changes being made to regulations.

In Canada, the focus of traceability by the cattle (and most livestock) industry has been (and remains) on animal welfare and the economic ramifications of serious animal disease outbreaks. Historically, little has been done to examine the real business impact of traceability on improving margins, increasing and capturing consumer value, or on reducing other business risks.

The Canadian Cattle Identification Agency (CCIA) was established in 1998 to implement animal identification in the cattle industry. Beginning with barcode tags, the cattle industry now is required by law to identify all cattle electronically (specifically using radio frequency identification — RFID).

However, identification of animals in itself does not create a traceability system. Two other key information elements are required in order to be able to track the movement of livestock: the location data (premise or location identifier), and critical tracking events (CTEs). Since the initial BSE case in May 2003, affecting a Canadian-born animal, the CCIA has helped in many BSE investigations; but the lack of movement information in the database has been a limitation. All traceability investigations require the capability to follow information about the affected animal back to the herd of origin, as well as tracking all the animals born in the same herd within the timeframe of 12 months before to 12 months after the birth of the affected animal. Without the ability to accurately track movement, it is not possible to manage and mitigate risks associated with co-mingling.

Thus far, while all provinces reflect national standards in how traceability is implemented, the reality is that little progress has been made by the Canadian industry in preparing to gather, store, and share the data required for true animal traceability to become a reality. While some provinces have established location (premise) identification systems, there is as yet no national system for location ID. Until recently, there have been only sporadic efforts to understand animal identification and product identification at CTEs in the cattle chain.

Throughout 2013 and into 2014, the Canadian cattle industry (with support from the federal government) developed a traceability strategy called the Cattle Implementation Plan (CIP), the purpose of which is to move industry forward step-by-step to achieve full traceability in beef. TraceCanada, the organization established to produce a Canadian traceability system by combining CCIA and ATQ expertise and data into one national tracking system, is collaborating with industry to implement the CIP. Beyond beef, the TraceCanada system is intended to serve multiple commodity sectors (beef, dairy, pork, sheep, goats, elk, etc.) and to facilitate the creation of an information management system that will provide the data and mobility functionality required by those individual sectors. TraceCanada's analytical and business intelligence capabilities will be significantly

greater than those associated with the current Canadian Livestock Tracking System (CLTS). The challenge remains, however, that any traceability system is only as good as the data that is fed into it.

The intention of TraceCanada is to build a true traceability system that can access as much data as possible to meet regulatory and export market requirements. The aforementioned cattle industry strategy will help provide the principles, timeline, and planning framework for that sector's requirements; and a technical solution working group has been created to address the technology requirements for a national traceability system. There are numerous legal and governance issues that must be resolved prior to the implementation of such a system. These include the mandatory reporting of movements and cattle location, from birth to slaughter.

At the technology level, the TraceCanada system must encompass the following four important components:

1. Database – Assess the existing databases at CCIA and Agri-Traçabilité Quebec (ATQ) and decide if they are suitable for use in a national system.
2. Hardware architecture – Assess the existing infrastructure at both CCIA and ATQ to understand if it is scalable and robust enough for a national system.
3. Application development – Continue the design and development of the software applications that will perform the critical operations on the data.
4. Data exchanges – Design and develop multiple data exchange instruments with the help of partners (e.g., web forms and web services, and XML file transfer protocols).

For Ontario's beef industry to move forward within the context of the national changes occurring in beef traceability, its first priority will be to understand the broader context, and share that with all producers and industry stakeholders. The next priorities will revolve around the implementation of a technology solution. While the intention of the TraceCanada system is to access data directly from producers, this may not always be possible or financially feasible. Widely held attitudes and a conservative industry culture may also hamper the adoption of an effective traceability system that offers economic opportunities to the sector as a whole and individual enterprises. Examining the successes and lessons learned by the Australian NLIS, the Ontario beef industry can help address the initial hurdles and reluctance from individual producers.

Appendix D — SWOT of comparative effectiveness of opportunities that Ontario could derive from CLTS vs. NLIS

Strengths	Weaknesses
• Canada possesses the basis of a national beef traceability system • Industry is increasingly familiar with mandatory RFID ear tags and the need for traceability • The technical capabilities and the infrastructure required to develop effective traceability exist in Canada • Ontario possesses industry leaders who are utilizing traceability for commercial advantage • Federal and provincial governments are committed to improving traceability systems	• Current return on investment for the $$millions invested in Canadian beef traceability is likely negative • Ontario does not categorically possess an effective animal traceability system • Ontario has limited ability to use existing infrastructure to maximum effect • Industry continues to pay (estimated at C$20 million annually) for systems that are ineffective compared to their potential • Industry structure lends itself to allowing industry players to negatively impact the effectiveness of beef traceability • Lessons learned from industry leaders who are using traceability for commercial benefit are not being communicated effectively • Many in industry continue to see traceability as a cost or liability, versus a management tool that can create significant opportunity • All who break the mandatory tag regulations are penalized equally, instead of primarily focusing on those who systemically contravene regulations
Opportunities	**Threats**
• Increase the commercial value of traceability through ensuring TraceCanada results in one standardized system and standards, which transcends individual sectors and species • Utilize traceability by explicitly connecting it to commercial value adding initiatives, such as Beef Quality Assurance (BQA) • Utilize the business intelligence capabilities of traceability to improve the efficiency of Ontario's beef industry, and producers' margins • Differentiate Ontario beef in most valuable markets by linking traceability to the proposed beef quality assurance (BQA) program • Utilize Ontario's comparatively large number of small/medium processors to establish the province as a leader in effective traceability	• Canada and Ontario have limited ability to manage biological threats, such as disease outbreaks • Access to the increasingly valuable EU market for Canadian / Ontario beef could be restricted by current traceability practices

Comparative strengths and weakness relating to three key enablers of effective traceability

Strengths
- Databases exist
- Hosts data has been uploaded for some years
- Data uploaded as animals tagged
- Technological capabilities
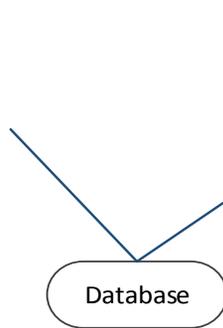
Database

Weaknesses
- No database is supported by all industry stakeholder groups and governments
- Processors no longer upload carcass data to BIXS
- Little collection of movement ID. Only in Alberta and Quebec is movement recording mandatory.
- Birth place of cattle (PIC) often unknown
- Unable to tell if cattle co-mingled and, if so, when and where
- Provinces have little say in how database is managed
- Gaps in when data uploaded
- Gaps in rigour of data uploaded
- Data inaccessible to almost all stakeholders

Strengths
- Governments' commitment to traceability
- Mandatory RFID tagging of cattle enforced
- Regulations and legislation often developed with industry input
- Capabilities of Canadian cattle traceability system ahead of that possessed by the US cattle/beef industry

Governance
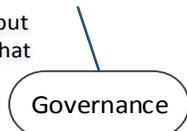
Weaknesses
- Regulations developed before the purpose of cattle traceability was fully determined
- Regulations not evolved in line with the perceived value and role of traceability
- Regulations not evolved as knowledge regarding factors determining the effectiveness of traceability has increased
- Regulations differ by species (beef, dairy, sheep)
- Critical decisions sometimes based on consensus that exists among individual stakeholder groups versus objective whole of chain reasoning
- Considerations beyond mandatory RFID tagging predominantly voluntary
- Limited ability for provinces to enforce system in own jurisdiction, for own purposes

RFID Ear tags

Strengths
- Mandatory on all cattle
- Predominant single source of supply (manufacturer)
- Supply arrangements to producers reasonably well managed
- Address of breeder registered at time of purchase
- Provides a data point that enables producers can gather data on performance while in their ownership
- Provides ability to access available data on animal from management databases: e,g, BIXS, BIO, ATQ.

Weaknesses
- No unique code that is "hardwired" to PID of birth
- Limited testing of tags' durability
- Not connected to property of birth
- No consistent national requirement of mandatory PID registration
- System of supplying tags to producers lacks rigour
- Half and full duplex tags allowed
- No immediate discernable difference between original and replacement tags