Act 83

Legislative Report

Use of Electronic Identification Systems for Livestock Management

in

Vermont

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by the

Vermont Agency of Agriculture, Food and Markets

Executive Summary

A robust livestock traceability system benefits individuals, businesses and organizations responsible for managing Vermont livestock throughout the birth to slaughter continuum, consumers of animal-origin products and animal health officials charged with minimizing the impact of disease outbreaks and similar emergencies. The Vermont Agency of Agriculture provides resources and the Vermont Legislature has enacted laws to support animal traceability, allowing many production livestock animals to be tracked from birth to slaughter regardless of their movements within or outside of Vermont. Most Vermont stakeholders investing in traceability tools have utilized free or inexpensive visual identification tags to try and accomplish bookend, or birth to death, traceability of their production animals. While sometimes adequate for uncomplicated business models, the exclusive use of visual identification tags without concurrent investment in traceability information management systems can be limiting.

Vermont producers of all sizes may gain competitive advantages by using radio frequency identification (RFID) devices in their livestock animals and investing in the associated infrastructure to allow efficient flow of electronic animal movement data between nodes throughout animals' lifespans. Although the U.S. Department of Agriculture has not yet federally mandated the use of RFID systems in livestock, Vermont should explore ways to support the use of this technology by farmers with business models that can benefit from it. Farmers who need to maintain accountability to livestock product label claims, export livestock internationally, or utilize the animal health and production data tracking capabilities of RFID technology can benefit from these advanced systems. Although the investment costs associated with RFID system implementation likely exceed the start-up cost of a visual system, the market advantage and operational efficiency gains make this a worthwhile investment for some Vermont enterprises.

Vermont has enjoyed a reputation within New England as the state with the most robust animal traceability program, thanks to the technical assistance and education that the Agency provides to livestock farmers and businesses, the data management capabilities maintained by the Agency, the intrastate movement ID laws the Legislature has enacted, and the compliance and enforcement protocols in place at the state level. Vermont farmers and livestock business owners also contribute to this reputation, and the State should support those who are interested in transitioning to RFID use by working to ensure comprehensive tool sets are made available to those who can operationally or financially benefit from their use. The rationale for doing this and the associated recommendations are contained within this report.

Background

Act 83 passed during the 2019 legislative session tasked the Agency of Agriculture, Food and Markets (Agency or VAAFM) with submitting to the Senate Committees on Agriculture and on Appropriations and the House Committees on Agriculture and Forestry and on Appropriations a report regarding the use of radio frequency identification (RFID) tags and readers by livestock owners and federally inspected commercial slaughter facilities in the State. The Act further mandated that the Secretary consult with the Vermont Grass Farmers Association, the Vermont Sheep and Goat Association, and the Vermont Agricultural Fairs Association in the development of the report. The Agency is pleased to submit this report to the committees of jurisdiction and is happy to provide further information and answer questions informally or during testimony. The Agency points of contact for this report are Dr. Kristin Haas and Dr. Shelley Mehlenbacher, VAAFM state veterinarians.

To provide feedback and data for this report, the Agency convened and sought feedback from the Vermont Animal Disease Traceability Working Group (ADT WG), whose members include representatives from the following organizations or areas of experience:

- Vermont Beef Producers Association
- Vermont Grass Farmers Association
- Vermont Sheep and Goat Association
- Vermont Farm Bureau
- Vermont Agricultural Fairs Association
- UVM Extension – 4H
- NOFA
- Slaughter plants
- Livestock Auction Market
- Dairy farmer
- Beef farmer
- Large animal veterinarians
- Dairy Herd Improvement Association (DHIA)

The ADT WG met once in person and once by conference call following adjournment of the 2019 legislative session. Additional discussion pertinent to this report was held via email, and all ADT WG members had opportunity to review this document prior to its submission. The report is organized in a Q & A format that mirrors the mandate in Act 83, and it includes an executive summary, which summarizes the main points in a concise manner.

Act 83 requires the following:

(1) a summary of the current Agency practice of providing metal or plastic animal identification tags to livestock owners at no or low cost;

(2) a summary of any existing or pending federal requirements for the use of RFID tags and readers by livestock owners or federally inspected commercial slaughter facilities;

(3) a summary of how RFID tags and readers are used to manage livestock or track animals through the slaughter process, including the benefits of RFID in comparison to metal or plastic animal identification tags;

(4) an analysis of whether RFID tags and readers are beneficial for the management or slaughter of all livestock, including whether use of RFID tags and readers is appropriate for certain livestock types, small farms, or small slaughter facilities;

(5) an estimate of the cost of equipping a farm or a federally inspected commercial slaughter facility with RFID tags and readers;

(6) a recommendation of whether the State should provide financial assistance to livestock owners or federally inspected commercial slaughter facilities for the purchase of RFID tags and readers, including eligibility requirements, cost-share, timing, or other criteria recommended by the Secretary of Agriculture, Food and Markets for the provision of RFID tags readers to livestock owners or federally inspected commercial slaughter facilities in the State

This report provides detailed responses to each of these requests.

<u>Findings and Recommendations</u>

Provide a summary of the current Agency practice of providing metal or plastic animal identification tags to livestock owners at no or low cost.

Animal identification tags can be categorized as official and non-official, and multiple tag designs are available in both categories. Official tags are federally required for livestock moving interstate (with some exceptions) and internationally and are required by Vermont law for livestock moving within the state. Examples of official tags include the electronic RFID 840 tags described and referenced throughout this report and visual metal tags containing a two-digit state code (13 for Vermont), an alpha-numeric identification number that is unique to a single animal and the USDA shield. Unofficial tags include plastic "bangle" tags used by farmers to informally identify individual animals by number or name and metal tags that lack the USDA shield.

The Agency has been distributing official and unofficial metal tags to Vermont farmers, licensees and veterinarians at no charge since at least the mid-1960s, possibly longer. The Agency has maintained ledger books containing a continuous record of the tag numbers that have been distributed to various stakeholders for application in livestock.

In 2010, the Agency modernized its tag distribution program to better ensure traceability of Vermont livestock. The Agency began maintaining an electronic record of all tags dispensed that allows for efficient tracking and sorting of data during animal disease and drug residue traces. Around the same time, the Agency established written agreements with DHIA and Dairy One that established record keeping and data submission requirements for these companies that source their official tags from the Agency and distribute/apply tags to their customers' cattle. The Agency also eliminated the requirement for veterinarians to submit tag application data and instead mandated that those professionals maintain their own tag application records and make them available to the Agency upon request. More recently,

the Agency implemented an accountability system for all stakeholders receiving official tags by requiring recipients to sign an agreement stating that they will not facilitate the use of their assigned tags in animals that do not belong to them (e.g. they will not share the tags with fellow livestock owners).

The Agency currently dispenses official metal tags at no charge to veterinarians, livestock owners, licensed livestock dealers and livestock markets. Most tag orders are now filled in person by an Agency animal health specialist, which allows the Agency to provide education and technical assistance related to tag application and maintenance. First-time tag recipients also receive a free pair of tagging pliers for application of the devices. In addition to maintaining tag records electronically, the Agency can enter "events" in its database of record associated with movement, death, purchase and sale of officially identified livestock in the system, further enhancing the Agency's livestock traceability capabilities.

Summarize any existing or pending federal requirements for the use of RFID tags and readers by livestock owners or federally inspected commercial slaughter facilities

The USDA's Animal Disease Traceability (ADT) regulation, promulgated in 2013, established general requirements for livestock moving interstate, including official ID unless specifically exempted. In 2017, the Agency worked with the legislative committees on agriculture to statutorily require all livestock moving intrastate to be identified with a form of ID that is deemed "official" per the federal ADT regulation.

Over the past 18 months and under the perceived authority of its ADT regulation, the USDA worked with state animal health officials and other US animal agriculture stakeholders to establish parameters under which the US would transition to required use of electronic identification (EID) tag technology for cattle. USDA established an implementation timeline for requiring adult cattle and calves moving interstate to be identified with EID tags and concurrently phasing out the use of visual (metal) ear tags for that same purpose. The USDA-proposed timeline would have required that by 2023, all cattle moving interstate would have to be identified with EID tags and would have prohibited the manufacture and use of visual (metal) tags for official identification purposes. Because 6 V.S.A. utilizes a definition for official ID that mirrors that of the ADT regulation, this federally mandated timeline would have required all livestock moving *within* Vermont to have EID in place and would have eliminated the Agency's ability to obtain and dispense visual (metal) ear tags to farmers, licensees and veterinarians at no charge.

In October 2019, the USDA informed stakeholders it was backing away from this timeline, citing concerns from Secretary Perdue's office regarding the process used to establish the implementation framework. USDA is now reconsidering its options, and currently, there is no transition timeline. Although USDA states details of a transition to EID will be shared as soon as they are available, the Agency feels strongly that Vermont should continue to facilitate the use of EID for those individuals and sectors who value and benefit from it.

Summarize how RFID tags and readers are used to manage livestock or track animals through the slaughter process, including the benefits of RFID in comparison to metal or plastic animal identification tags;

EID tags, also known as RFID ear tags are available for all species of domestic livestock and carry a unique identification number that allows animals to be electronically recognized and individual animal data to be stored automatically. EID tags have a 15-digit number that begins with the numbers 840 (the

USA country code) followed by 12 digits that are unique to the individual animal. The 15 digits are also imprinted on the ear tags, allowing the handler to visually read the tag and electronically scan it to capture the ID numbers and maintain the data electronically.

If an animal is individually identified at birth with an EID tag, a farmer may more easily monitor it throughout its life and track individual and performance data, which can include:

- Birth date
- Sex
- Sire and dam
- Genetic abnormalities
- Gestation data
- Tattoo/ herd ID
- Height & weight estimates and body condition
- Udder quality
- Offspring
- Disease
- Veterinary records

Some Vermont dairy farmers benefit from EID systems for even more sophisticated herd management. EID systems can be used as dairy cow Fitbits and capture numerous pieces of metabolic and other data. They can be used to automatically feed cattle with correct individual rations, and they can count cow steps, monitor cud chewing frequency, track milk production and capture other information that serves as indicators of overall health. Despite these potential benefits of EID, investing only in the EID ear tags can make on-farm data capture more difficult and hinder animal traceability. In these instances, the farmer must either hand-record a 15 digit number rather than the nine digit number associated with non-EID tags (takes longer and increased chance for recording errors) or may choose to record only a non-official ID (bangle or back tag) which may interfere with that animal's traceability once it leaves the farm. To realize the full benefit of RFID tag use on the farm, livestock owners and handlers must invest in associated infrastructure and maintain a more comprehensive RFID system.   An RFID system consists of the following components:

- The 840 tags themselves, which house the transponder that hold and sends the identification information when scanned with a reader
- 840 RFID tag reader, which energizes the transponder of the tag, receives identification information, and sends it to data collectors for electronic storage
- Data collectors, such as smart phones or computers, that receive the identification information from the scanners and store it electronically
- Data processors, such as excel spreadsheets or other software systems, that use the information and provide outputs of data as needed by the farmer or livestock handler

Electronic identification systems are not only important on individual farms to uniquely identify a specific animal and track its related data efficiently, they are also important when buying, selling, transporting and slaughtering livestock. They are critical components of a bookend electronic traceability system, which accurately tracks an animal from birth to death and then requires that animal's EID to be permanently retired. A reliable chain of custody is important to farmers, retailers and

consumers because it ensures accountability to label claims the farmer may be making on food products derived from livestock, such as "grass fed" or "organic". Electronic EID records can be leveraged when buying livestock from auction or presenting livestock for slaughter. A reliable animal traceability system also allows state and federal animal health officials to maintain, transfer and search for particular animals when needed, such as during violative drug residue and animal disease investigations. Ensuring that animal health officials can efficiently respond to a disease outbreak minimizes the economic and operational burdens on all parties. It is possible to realize these same benefits with the use of visual identification systems, but the EID systems are more nimble and better accommodate the more complex livestock movements that occur in today's modern animal agriculture economy. Vermont farmers ship livestock and livestock products interstate and internationally and are faced with transitioning to EID systems to meet market demands that are steadily evolving.

840 RFID tags can be purchased from multiple tag companies by anyone having a federally issued premises identification number (PIN), which is tied to the physical location of the farm's livestock. PINs can be obtained by Vermont producers in two ways:

1) Contact the Animal Health Section of the Vermont Agency of Agriculture
2) Contact the regional USDA APHIS Veterinary Services Office in Sutton, MA

Once the tag purchaser's PIN is validated, it is recorded in a USDA APHIS Veterinary Services database with the tag numbers that are being purchased. Farmers can receive a spreadsheet that contains the number series of each of the 15-digit tags they order.

All series of 840 RFID tags that are issued to individuals through tag companies are stored in a USDA database that VAAFM Animal Health Section staff access routinely to trace RFID tag numbers or otherwise manage data for traceability purposes.

Vermont dairy farmers purchase more RFID tags than other sectors within the state. The Agency utilizes a small, finite funding amount from USDA to purchase RFID tags and issue them at no charge to Vermont livestock farmers, generally beef and swine producers on a one-time, first come first served basis.

Individuals within several Vermont stakeholder categories may apply and manage official ID tags, including EID devices. In Vermont, 840 RFID tags are placed into a livestock animal's ear by either a farmer, veterinarian, or livestock dealer. Vermont state law requires livestock to be officially identified prior to leaving the farm with either a visual or RFID tag. If the animal is being transported to slaughter by a livestock transporter or dealer, those individuals are required to maintain official ID records. Some slaughter plants record all ear tags on the livestock presented for slaughter, and some do not maintain comprehensive records. Most sheep and goat producers utilize tattoos or Scrapie tags for ID. Scrapie tags are also purchased from tag companies and require a PIN.

ADT WG members stated that the main reasons for placement of official identification in livestock on VT farms are for brucellosis vaccination, intrastate movement, and for domestic and international export. ADT WG members agree that application of official identification, including visual and RFID tags, can be done most efficiently as animals leave the farm.

 Application of visual and RFID tags into an animal's ear is a similar process, and animals must be restrained, generally in a head lock. RFID tags are applied in the center of the ear, whereas metal tags are applied to the upper margin. There is less room for error when applying metal tags as the handler

must take care to avoid constricting the ear margin, particularly with calves as the ear will grow as the calf grows.

RFID tags can be read using a portable scanner held on average 2.5 to 3 feet away from the tag and are more applicable to individual producers. Fixed panel readers can be utilized by handlers at comingling sites, such as livestock markets, to electronically read ear tags while the livestock move single file through a chute. No businesses in Vermont currently use panel readers. In contrast, reading a visual (metal) tag generally requires more restraint, particularly of the animal's head, to steady the ear, remove debris and visually read the tag. This does not always work well and can be unsafe. RFID tags avoid any physical handling of the head to read the tag. Metal ear tag numbers must be manually recorded so accuracy may be compromised, whereas RFID tag numbers can be captured with a scanner that stores them electronically and can transfer them to another device, generally a PC computer or laptop. Some systems allow the RFID tag numbers to be read and scanned directly into a smart phone.

Examples of countries, states, and programs that successfully utilize RFID systems:

- o Canada mandated the use of RFID for tracking livestock over 10 years ago in response to a nationwide scare of Mad Cow Disease.
- o Australia and New Zealand require certain types of livestock to be tracked via RFID tags to prevent the spread of disease and to protect the public.
- o Michigan has a state-wide mandate that requires livestock to be tracked with RFID tags, which was implemented after a bovine tuberculosis scare.
- o The National Dairy Expo requires all livestock to be tracked with RFID to uniquely identify animals and contain the spread of disease.

The benefits of an EID system include improved animal traceability through expedited data collection and result in more reliable electronic records that are generated with less handler risk and are easily shared. Metal ear tags rely on more intimate animal restraint, visual reading and recording of a series of numbers and letters, and manual recording of the tag number, often multiple times throughout the animal's life.

Analyze whether RFID tags and readers are beneficial for the management or slaughter of all livestock, including whether use of RFID tags and readers is appropriate for certain livestock types, small farms, or small slaughter facilities;

The use of EID systems benefits the management of all livestock, regardless of the type and size of the facility. Electronic scanning and data transfer often is safer and more efficient than dependence on a visual system. Potential benefits of using an EID system in the farm-to-slaughter chain include:

- Time and labor savings
- Elimination of data entry errors
- Faster data transfer
- Enhanced and accurate tracing of diseased animals
    - o Results in smaller outbreak and less economic/operational impact to producers, industry, nation
- Ability to meet expectations of foreign markets
- Maintenance of line speeds at slaughter plants

- Achievement of domestic and international market access advantages
- Ability to efficiently track livestock and livestock products
  - International trading partners already utilizing this technology may require the US to implement similar standards
- Ensure animal authentication
  - Authenticity can be guaranteed during a transaction by scanning the animal's official, tamper-proof RFID ear tag and receiving records from a national database
- Maintain access control
  - If livestock are directed through a chute or funnel, a scanner can read each RFID tag and, in conjunction with software, sort an individual animal into a specific pasture or building
- Ability to capture animal metabolic data and efficiently track production and other attributes

Most ADT WG members stressed the safety advantage of using EID systems and the importance of adequate restraint facilities when handling livestock for tag application, vaccination, or veterinary care. Reading metal tags or tattoos can be difficult and dangerous if animals are not appropriately restrained. Tattoos over time can fade and become unreadable. It is safer to scan a tag than restrain a heavy cow head, hold the ear steady, and read the tag number. It is also safer to tag the animals as young stock when they are smaller and more easily restrained versus a 1200-pound dairy cow or a 600-pound sow. It can be dangerous for people down the production chain (e.g. veterinarians, livestock dealers, new owners, slaughter facilities) to place RFID or visual tags in dangerous situations or in dangerous animals.

A member of the Vermont Beef Producers Association shared that the use of RFID tags brings a higher price at beef sales held in NY and PA because livestock buyers at auctions in those states feel that the use of RFID tags correlates with a more robust herd management and preventive health care plan. Healthier livestock are more valuable to a buyer who plans to raise and feed out the animals.

Carcass quality and label claim accountability are additional drivers for EID system use. Some state lamb boards use RFID for tracing high quality carcasses. NOFA requires producers to have a reliable animal identification system to ensure the animal is organic but does not require the identification system to consist of official identification.

According to members of the ADT WG, the use and benefit of RFID tags on Vermont dairy farms varies. Some may use the RFID tag in the same manner they use official metal tags and some farms may only use non-official ID to manage their animals. Some dairy farms may not apply official tags until the animal leaves the farm for sale or slaughter. Dairy farms with Lely robotic calf feeders may only use RFID tags for calf feeding and not utilize the tags as part of a management strategy after their transition. Other dairies with robotic milkers utilize RFID tags in the milking herd. Farmers who utilize these systems are already purchasing RFID tags for feeding and milking purposes but are not necessarily using the tags for additional management purposes. Dairy farmers who also raise beef may also place RFID tags in their beef herd because they are already using the tags for their dairy animals. Breed registration organizations, such as the Holstein Association, allow dairy farms with registered livestock to utilize the RFID tag number as the registration number.

Certain livestock shows, including 4H, mandate RFID use. Therefore, farms that show dairy animals, or lease dairy animals to 4H students, will use RFID tags.

Some ADT WG members stated that implementation of RFID tags will be of little benefit to producers. One member suggested that if farms are expected to provide the labor and facilities to tag animals, then the cost of the tags/readers should fall to other members along the supply chain who will realize a direct benefit from the use of EID systems. Some members felt that the benefits and efficiencies of RFID technology will be realized by the slaughter industry, regulatory personnel, and the general public (as livestock identification relates to food safety and public health), versus the producers themselves.

Livestock market representatives on the ADT WG shared that they prefer livestock to already be tagged before being sent through the market. Vermont markets that ship livestock to Canada already utilize EID systems and generate electronic export paperwork because they must meet that country's import requirements, which include use of RFID tags.

Provide an estimate of the cost of equipping a farm or a federally inspected commercial slaughter facility with RFID tags and readers

Livestock businesses interested in determining a specific implementation estimate must first determine business needs and areas they wish to address, which could include managing records; locating, medicating or monitoring livestock; and collecting and maintaining veterinary data. Business owners should research and obtain price quotes on the capabilities and the hardware required to address their needs and determine the overall implementation cost.

Input on non-specific EID system adoption costs was solicited from the ADT WG. Where ranges of probable costs of adoption were available, the median or upper range of cost estimates is used.

Implementation costs for off-farm animal agriculture businesses such as slaughter facilities and auctions vary depending on the type of system that is needed, the facility, and the facility's current technological capabilities. Costs may include the RFID tags, handheld scanners or panel readers, smartphones, PC or Mac computers or laptops, and data management software.

On-farm RFID tag use requires minimal software investment. Equipment needed includes the tags, an RFID scanner, a computer, and a spreadsheet. Smartphones and tablets can also be utilized during tag scanning and data transfer activities.

RFID tags are available for purchase from different tag companies and range from $1.70 - $3.00 per tag. RFID button tags combined with a bangle tag for easier visual readability are more costly and are estimated between $4.00 -$7.00 per tag. Individual scanners are approximately $280 for handheld versions and up to $1300 for longer wand scanners. The cost of panel readers is based on the production set-up and are too variably priced to include in this document.

A cost estimate to equip livestock farmer, livestock market/dealer and slaughter businesses was provided by members of the Vermont ADT WG:

- The largest expense for EID system implementation on dairy farms is likely the RFID tag purchase cost. Cost for tags on an annual basis based on number of calves, considering cull rates and replacement animals, is included below. It was noted that this is a similar cost breakdown as the SFO/MFO/LFO certifications.
  - Small farm: $550
  - Medium farm: $1500

- o Large farm: $2400
- o One handheld scanner at approximately $300. Cost will vary depending on the type of scanner preferred.
- o Tagging bull calves with RFID tags presents a financial challenge. These calves are the production class with the lowest value and highest residue risk. From an antibiotic residue standpoint, they are one of the most important classes of livestock to reliably track, yet the cost of placing an RFID tag in their ear is likely prohibitive. Currently they are worth approximately $5/animal. The 2020 VAAFM housekeeping bill proposes to address this issue by affording some flexibility to the Secretary by exempting certain classes of livestock from RFID requirements when moving intrastate, should USDA decide to mandate use of RFID at the federal level.
- Livestock market costs will primarily be incurred for initial set up, which includes panel readers, handheld scanners, and software modification. The markets prefer that livestock are tagged on the farm of origin, as required by Vermont statute, but will need to keep RFID tags on hand for those animals arriving untagged.
  - o 2-3 handheld readers at approximately $300 each. Cost will vary depending on the type of scanner preferred.
  - o Panel readers to capture RFID numbers as the animals walk through the alleys
  - o Modification to existing business software program – cost unknown at the time of the drafting of this report.
  - o RFID tags for application.
- Slaughter plant cost will primarily be incurred for initial set up, as livestock should present already tagged. Set-up cost will vary depending on plant design and current technological capability.

Recommend whether the State should provide financial assistance to livestock owners or federally inspected commercial slaughter facilities for the purchase of RFID tags and readers, including eligibility requirements, cost-share, timing, or other criteria recommended by the Secretary of Agriculture, Food and Markets for the provision of RFID tags readers to livestock owners or federally inspected commercial slaughter facilities in the State

The ADT WG members support a state-funded cost-share program for implementation of EID systems within Vermont but also recognize the difficulty in establishing inclusive criteria to qualify for the assistance. An additional challenge from the perspective of VAAFM would be possible difficulty determining the flow of funds between the private and public sectors relative to the state contracting and granting requirements. Participants suggested that most markets will be positively influenced if the costs of reading and transmitting data are shared with the entity requiring the data or all stakeholders along the birth to slaughter continuum.

Members felt that RFID technology aids public health and food safety by allowing contaminated product to be traced from plate/farmers market/food hub back to the farm of origin. As Vermont's agricultural landscape continues to diversify, there is an increase in small scale producers who market their livestock-derived products locally. Traceability needs to be facilitated at this local level and therefore RFID technology should be made available to Vermont producers.

Cost-share feedback from ADT WG members included the following:

- If a cost-share program is implemented, availability of EID system components that can be purchased under that program and application periods to do so should be continuous.
- The cost of the program should be split between stakeholders (producers, regulators, processors, and the general public). The producer contribution should consist of the labor and facilities necessary to tag every animal before it leaves its premises of origin. A mechanism to split the cost of tags and readers among the remaining stakeholders should be developed and would be challenging.
- It may be easiest to align a cost-share structure with the current water-quality tiered criteria (RFO, SFO, MFO, LFO). A farm would be eligible proportionately to the amount of their farm permit fee.
- A program intended to consolidate scanner needs could be considered. Some farms and events, such as fairs or 4H shows, may only need a scanner intermittently and participants discussed establishing a scanner share option.
- Funding to help equip livestock markets and slaughterhouses with readers and training should be made available.
- The State should provide guidance on which types of tags would be acceptable in which species. RFID tags currently come in two configurations, HDX and FDX. HDX tags are more expensive but can be read with panel readers OR handheld readers, can be read from greater distances, require less power to read, and don't experience interference from metal/loud animal handling facilities. FDX tags are less expensive and can be made physically smaller, but they don't work as well with panel readers and do experience interference from metal handling facilities. FDX tags have been used in other countries for minor species such as deer and sheep which are frequently worked outdoors or in wooden handling systems. If panel readers are going to be used at livestock markets/slaughterhouses and a state financial program prioritizes cattle, then HDX tags may be a better choice despite the higher initial cost.