Regulatory Impact Analysis & Initial Regulatory Flexibility Analysis

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Policy & Program Development

Policy Analysis & Development

Summary

We are proposing to amend the animal disease traceability regulations to recognize only eartags that are both visually and electronically readable as official eartags for use for interstate movement of cattle and bison that are covered under the regulations. We are also proposing to clarify certain record retention and record access requirements. These proposed changes would enhance the ability of State, Federal, and private veterinarians, and livestock producers to quickly respond to high-impact diseases currently existing in the United States, as well as foreign animal diseases that threaten the viability of the U.S. cattle and bison industries. The benefits of animal disease traceability include: enhancing the ability of the United States to regionalize and compartmentalize animal health issues, minimizing the costs of disease outbreaks, and enabling the reestablishment of foreign and domestic market access with minimum delay following an animal disease event.

APHIS conducted a benefit-cost analysis to determine how the transition to electronic identification (EID) tags would affect the cattle and bison industries. Our analysis suggests that approximately 11 million cattle are currently tagged with official non –EID eartags per year. The proposed rule would not change the number of cattle tagged, but it would increase the costs associated with tagging. The estimated average annual cost of purchasing approximately 11 million EID tags, instead of the visual only tags, is approximately $26.1 million dollars per year, or $30.45 per cattle or bison operation.

Radio frequency identification (RFID) technology, a type of electronic identification, has been available in the livestock industry for many years. APHIS has evaluated the cost structure of different RFID technologies, commonly known as FDX and HDX. Both technologies work well and have similar qualities. This report describes the cost structure of these EID eartags. We provide 10 years of historic population levels for cattle and bison in order to provide the reader with a range of cost estimates based upon a fluctuating cattle and bison population.

EID technology is a vital component to efficient and accurate traceability of cattle and bison. It benefits stakeholders by significantly reducing the numbers of animals and response time involved in a disease investigation.

One of the most significant benefits of the proposed rule would be the enhanced ability of the United States to regionalize and compartmentalize animal disease outbreaks more quickly. Regionalization is the concept of separating subpopulations of animals in order to maintain a specific health status in one or more disease-free regions or zones. This risk-based process can help to mitigate the adverse economic effects of a disease outbreak. Traceability of animals is necessary to form these zones that facilitate reestablishment of foreign and domestic market access with minimum delay in the wake of an animal disease event. Having an EID system in place would, therefore, minimize not only the spread of disease but also the trade impacts an outbreak may have.

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Introduction

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) is proposing to amend the animal disease traceability regulations, currently codified at title 9, *Code of Federal Regulations* (9 CFR) part 86. The primary proposed change is that beginning 6 months after the publication of any final rule following the proposed rule, APHIS would only recognize identification devices (e.g., eartags) as official identification for cattle and bison if the device is both visually and electronically readable (EID) in order to more rapidly and effectively conduct animal disease investigations and trace animal movements covered under the regulations. In addition, we are proposing to clarify certain record retention and record access requirements. The proposed changes would enhance the ability of State, Federal, and Tribal governments, and private veterinarians and livestock producers, to quickly respond to high-impact diseases currently existing in the United States, as well as foreign animal diseases that threaten the viability of the U.S. cattle and bison industries.

APHIS has primary responsibility for controlling and eradicating communicable diseases of livestock and preventing the introduction and dissemination of any pest or disease of livestock into the United States. The regulations at 9 CFR Part 86 provide the requirements for identification and documentation for certain classes of cattle and bison to move interstate. The rule covers all sexually intact cattle and bison 18 months of age or older, all female dairy cattle of any age, male dairy animals born after March 11, 2013, cattle and bison of any age used for rodeo or recreation events, and cattle or bison of any age used for shows or exhibitions.

Animal disease traceability entails knowing when and where diseased and at-risk animals are, and where they've been. This traceability ensures a rapid response when animal disease events take place. Although animal disease traceability does not prevent disease, an efficient and accurate traceability system reduces the number of animals and response time involved in a disease investigation, which in turn, reduces the economic impact on owners and affected communities.

We believe that the proposed rule will help State and Federal veterinarians trace potentially infected and exposed animals more rapidly and accurately. APHIS proposes a transition to EID technology as the official identification for cattle and bison. An expansion of the use of EID will allow Federal, State, and Tribal governments and private entities to use existing technology and infrastructure to more rapidly control diseased animals in the United Sates. Beginning 6 months after publication of any final rule following the proposed rule, eartags that are both visually and electronically readable would become the only official identification approved for interstate movement of cattle and bison that require tagging under Part 86.

Generally, the benefits of animal disease traceability stem from an enhancement of the ability of the United States government to regionalize and compartmentalize animal health issues more quickly. The rapid and effective control of animal diseases minimizes losses to the industry and enables the re-establishment of foreign and domestic market access with minimum delay.

APHIS-approved official EID tags may be read both visually and electronically. Aside from the costs associated with the purchase of the new tags, APHIS does not anticipate that additional costs will be imposed on producers, regardless of whether or not they currently own electronic reading equipment. This document provides a benefit-cost analysis, as required by Executive Orders 12866 and 13563, which direct agencies to assess all costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety effects, and equity). Executive Order 13563 emphasizes the importance of quantifying both costs and benefits, of reducing costs, of harmonizing rules, and of promoting flexibility. This document also examines the potential economic effects of the rule on small entities, as required by the Regulatory Flexibility Act.

Overview of the Action and Affected Entities

Regulatory Context

In 2013, APHIS published a final rule establishing, in a new 9 CFR part 86, the minimum national official identification and documentation requirements for the traceability of livestock moving interstate. The species covered under the traceability regulations established by the 2013 final rule include cattle and bison, sheep and goats, swine, horses and other equids, captive cervids (e.g., deer and elk), and poultry. These regulations specify approved forms of official identification for each species but allow the livestock covered under this rulemaking to be moved interstate with another form of identification, as agreed upon by animal health officials in the shipping and receiving States or Tribes.

In the economic analysis that accompanied the 2013 final rule, APHIS stated that low use levels of official identification tags led to a high volume of testing during animal disease investigations, and that this resulted in investigations of long duration. We noted, for example, that bovine tuberculosis disease investigations frequently exceeded 150 days. APHIS anticipated that implementing the 2013 rule would enable animal health officials to shorten investigation timelines, control the spread of certain diseases more quickly, and reduce the number of quarantined or disposed of animals.

In January 2017, APHIS staff officers met with State officials and APHIS Veterinary Services field officers to gather input on what was working well in the traceability program and what gaps remained.[1] On April 24, 2017, a notice was published in the Federal Register (82 FR 16336, Docket No. APHIS-2017-0016) announcing a series of public meetings aimed at soliciting comment on the animal disease traceability program. A total of nine public meetings were hosted by APHIS between April and July of that year, and an additional meeting was

[1] USDA, APHIS. 2017. Animal Disease Traceability Assessment Report. Available at: https://www.aphis.usda.gov/traceability/downloads/adt-assessment.pdf. Last accessed on July 27, 2022.

hosted by the Kansas Department of Agriculture. As discussed in the April 2017 notice, the purpose of the meetings was to "hear from the public about the successes and challenges of the current ADT framework."

The notice and meetings generated 462 written public comments. A working group composed of State and Federal officials, formed in March of 2017, was further tasked with listening to the discussions and preparing a final report summarizing input from the meetings and making proposals to address gaps in the traceability system. The report was presented at the National Institute for Animal Agriculture fall public forum in September of 2017 and published in April of 2018.[2]

During the remainder of 2017, 2018, and 2019, APHIS personnel frequently met with stakeholders to discuss questions and topics that arose during the 2017 outreach meetings. In addition to individuals and industry organization meetings, APHIS officers met with State officials as well as industry stakeholders at national public forums including the United States Animal Health Association and the National Institute for Animal Agriculture forum.

These officers found that many producers had embraced the benefits of electronic identification and enhanced record keeping. Although not all stakeholders agreed, a majority found that electronic records and electronic identification were of significant value and that these tools were needed to protect the industry from disease outbreaks.

On July 6, 2020, APHIS published a Federal Register Notice [Docket No. APHIS-2020-0022] a notice in which we announced our proposal to approve only tags that were both electronically and visually readable as the official eartags for use in interstate movement of cattle and bison that are covered under the regulations. The transition away from visual only eartags was intended to allow for more rapid and effective animal disease tracing. Notably, under Part 86, the APHIS Administrator has authority to approve official identification tags and methods; however, APHIS posted APHIS-2020-0022 to assure transparency in the proposed policy change and to request comments from the public.

Comments on the 2020 Notice suggested that stakeholders were concerned about the costs associated with the purchase of new EID eartags and readers, the retention time of EID eartags, and APHIS's legal authority to change the eartag requirements using a notice-based procedure rather than a rulemaking. Other commenters expressed opposition to mandatory animal identification and government regulations in general. After reviewing these comments, we determined that withdrawing our recognition of visual-only eartags as official eartags for cattle and bison moving interstate would constitute a change in our regulatory requirements of sufficient magnitude to merit rulemaking rather than the notice-based process we originally envisioned. We therefore decided that rather than finalizing the notice, we would withdraw it

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[2] USDA, APHIS. 2018. Animal Disease Traceability, Summary of Program Reviews and Proposed Directions from State-Federal Working Group, April 2018. Available at: https://www.aphis.usda.gov/publications/animal_health/adt-summary-program-review.pdf. Last accessed on July 27, 2022.

and use the rulemaking process to put forward the proposal, as well as some additional changes to the regulations, pertaining to recordkeeping, among other things.

We believe that this proposed rule will lead to more accurate traceability and record retention. These improvements will help make animal disease outbreaks less costly for producers and facilitate the interstate movement of animals.

Overview of the Disease Tracing and Disease Response Process

Documenting the Interstate Transportation of Livestock

Under current regulations, unless explicitly exempted, livestock being moved interstate must be accompanied by an interstate certificate of veterinary inspection (ICVI). Typically, an accredited veterinarian is responsible for inspecting the cattle and recording information including the species, number of animals, purpose of movement, address at which the animals were loaded for interstate movement, destination address, names of the consignor and the consignee (and their addresses), and official identification number of each animal or group of animals moved.[3]

If the animals being moved interstate have been tagged with EID tags, the tag numbers may be read visually or electronically before being recorded on the ICVI. If the animals are tagged with non-EID tags, the tag numbers can only be read visually.

Reading ear tags electronically does not require restraint of animals because the animal identification number is captured almost instantaneously by scanning the ear tag with a reader. Once the tag is scanned, the electronically collected tag number can be rapidly and accurately transmitted from the EID reader to a connected electronic database and used to complete electronic ICVIs. However, if non-EID tags have been used, the animal must be restrained to allow the ear tag number to be read and recorded. Often, the ear tag must be cleaned before the number can accurately be read. The ear tag number may be recorded on paper or manually entered in a database and errors can occur while reading, transcribing, or entering the ear tag numbers. All APHIS approved EID tags are required to be visually readable at arm's length while the metal NUES tags have no readability standards.

The Disease Tracing Process

State, Tribal, and Federal animal health officials begin the disease tracing process when there is a report or suspicion of a foreign, or regulatory program, animal disease. The first step in the disease tracing process is the identification of an animal that has a positive test result, lesions discovered at slaughter, or clinical signs of disease. All official identification, such as metal

[3] Accredited veterinarians perform federal regulatory functions required by cooperative state/federal animal disease control and eradication programs. Their authority stems from the Animal Health Protection Act. APHIS has oversight over the training of accredited veterinarians and many of their responsibilities.

'brite' identification tags or 840 numbered tags, and un-official identification, such as backtags and management tags and brands, on the animal are reported to the regulatory officials.[4]

Next, an accurate history of the identified animal's movement is constructed using all available documentation. These documents may include sales slips, owner-shipper statements, Interstate Certificates of Veterinary Inspection, test charts, and vaccination records. Interviews of people involved with the identified animal may also be conducted.

Once a movement history is constructed, State Veterinarians, Federal Area Veterinarians in Charge, and animal health officials in the field, collect additional information about the identified animal, such as dates of animal movement or testing, and the herd of origin of the infected animal from sources out in the field (livestock markets, slaughter plants, farms, ranches, veterinary clinics). This information allows animal health officials to identify other animals that may have been exposed to the animal being traced. Throughout the process of disease tracing, official identification that has been read and recorded on documents could be EID or visual only (non-EID).

Once the disease tracing process is complete, an animal health official begins the appropriate disease response. This response varies from case to case. However, if exposure to a disease of consequence has been identified, a State, Tribal, or Federal animal health official will visit farms of interest to review farm records, inspect animals for clinical signs of disease, and discuss the need for quarantine or additional testing. Notably, all animal health officials have access to EID readers.[5] So, if animals on the farm of interest have been tagged with EID tags, this phase of the investigation can proceed extremely quickly and with minimal disruption to the herd (particularly when the potential for exposure is eliminated through review of animal ID and movement records). If non-EID tags have been used, or if animals have not been tagged, this phase of the investigation can require extensive interaction with animals on the farm for quarantine and testing, which can disrupt normal herd operations.

Improvements in Traceability Performance over Time

APHIS partners with State animal health officials each year to test the performance of States' animal disease traceability systems. Results of the 2022 test exercises show that when State officials are provided an identification number from an official identification eartag (visual or EID) that has been entered accurately into a data system, over half of States can trace animals through any one of the traceability performance measures in less than 1 hour. State animal health

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[4] For an exhaustive list of official forms of animal identification please consult 1) Title 9 of the Code of Federal Regulations at part 86 (CFR 86.1), or 2) the APHIS Veterinary Service website: https://www.aphis.usda.gov/traceability/downloads/adt-general-standards.pdf.

[5] For additional information about the APHIS Animal Disease Tracing Process please visit: https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/SA_Traceability. APHIS provides a simulated disease tracing scenario at: https://www.aphis.usda.gov/animal_health/traceability/training/slowburn/story_html5.html.

officials are asked to answer the following four questions during Traceability Performance Measure (TPM) exercises:

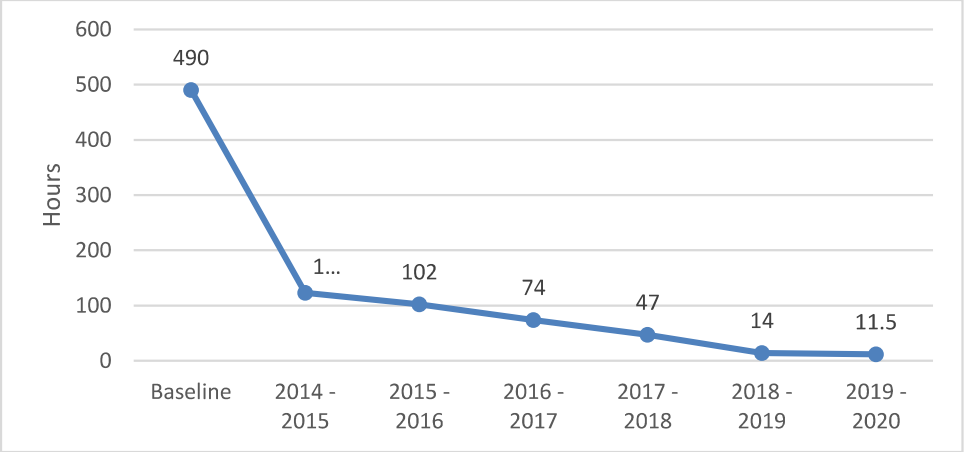
1) In what State was an inbound animal officially identified prior to entering your State?
2) Where in your State was the animal officially identified?
3) From what State was an inbound animal shipped?
4) From what location in your State was an outbound animal shipped?

Performance measures 2, 3 and 4 provide a benchmark measure of a state's ability to properly administer, record, and retrieve documents pertaining to official livestock identification and interstate movement.

Two values are measured for each TPM. The "Percent Successful" value reflects how often the information was successfully retrieved, while the "Time" value reflects the average elapsed time it took the State to complete each activity. When recording the elapsed time, the start time is when the State is notified of the official identification number and the end time is when the State finds the information to answer the question posed by the TPM.

Since 2013, APHIS has partnered with States and Tribes to assess the ability of state governments to trace animals through a series of test exercises each year. Each exercise measures the time required for State officials to trace the movement of an animal with an official ID tag number. The average time for all States to complete three traces is used as an annual metric. The baseline time for tracing prior to implementation of the 2013 regulation was 490 hours. By FY2020, States had reduced that time to 11.5 hours (Figure 1). This suggests that it is over 42 times faster to trace an animal in FY2019 than it was prior to the implementation of the 2013 regulation.

Figure 1 - The Average Time to Complete Three Animal Traces has Decreased over Time



Note: The national baseline values were calculated using data collected in 2009, 2010, and 2011

Source: USDA, APHIS. 2020. Animal Disease Traceability Performance Measures, Fifth Year Comparison to National Baseline Values, February 2020.

Generally, APHIS finds that decreases in trace times were driven by the transition from paper to electronic records and sustained educational outreach by staff in APHIS Veterinary Services.[6] Analysis of trace performance metrics from 2016-2017 suggest that completing a trace with paper records takes over 10 times as long as completing a trace with electronic records. APHIS contends that increases in the use of electronic identification devices can further improve the speed at which an animal can be traced.

In 2020, National Priority Tracing was instituted, and traces were administered with advance notice so that cooperators could prioritize them as if they were actual disease investigations. The ability to prioritize traces further reduced trace completion times (i.e., the elapsed times). By 2022, more than half of states were able to complete any of the four trace exercises in about a half hour.

Although cooperators' abilities to complete the TPMs has improved, each year a portion of the TPMs could not be completed and were terminated due to an inability to locate records and data. For instance, from April 2021 to March in 2022, 30% of all trace exercises were conducted using metal NUES tags; however, 70% of the traces that were terminated were cases in which metal NUES tags had been used.

Official Identification Device Requirements and Identification Devices

Figure 2 illustrates the current interstate movement requirements for Cattle and Bison and animal disease traceability. Official identification is currently required for:

1) cattle and bison included in Federal animal disease programs (e.g. programs for brucellosis or tuberculosis),

and,

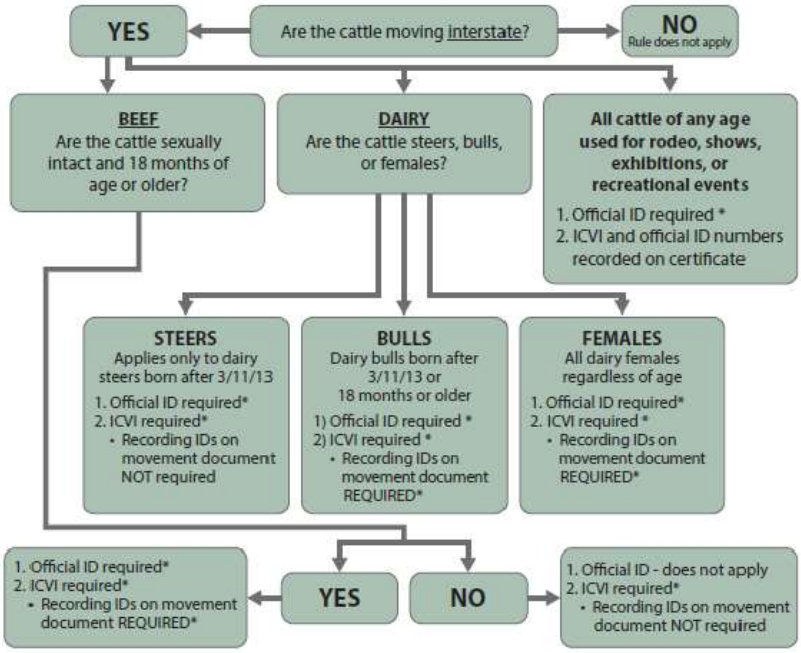
2) animals that move interstate that are:
    a. sexually intact cattle and bison 18 months of age or over,
    b. female dairy cattle of any age and all dairy males born after March 11, 2013,
    c. cattle and bison of any age used for rodeo or recreational events, and
    d. cattle and bison of any age used for shows or exhibitions.

Cattle or bison that are exempt from official identification requirements include: animals moving directly to slaughter or to an APHIS approved livestock market; cattle or bison in

[6] USDA, APHIS. 2022. Animal Disease Traceability, National Priority Tracing, Summary Report, 2013-2022 Cooperative Agreement Periods. Available at: https://www.aphis.usda.gov/traceability/downloads/adt-trace-perf-report-2013-2022.pdf. Accessed on August 23, 2022.

commuter herds that graze between two States or Tribes under a commuter herd agreement;[7] and, cattle or bison that are moved between shipping and receiving States or Tribes with another form of identification, as agreed upon by animal health officials in the shipping and receiving States or Tribes.[8] Animals that do not move interstate nor meet the criteria above are not required to have official identification under the animal disease traceability (ADT) rule.

Figure 2 – Interstate Movement Requirements for Cattle and Bison



Source: USDA, APHIS. 2014. Federal Animal Disease Traceability – Summary of Federal Interstate Movement Requirements by Species. Available online at: https://www.aphis.usda.gov/traceability/downloads/adt-trace-flowchart-cattle.pdf

The proposed rule revises the definition of *dairy cattle* so that it includes cattle that are reared under the same management practices as purebred dairy cattle. This change is intended to help account for the fact that cattle management practices can affect the risk of animal diseases. Historically, APHIS has instructed dairy cattle operations that beef-dairy cross calves should follow the same traceability regulatory requirements as purebred dairy calves (to improve disease

[7] In this rule, a commuter herd is defined as a herd of cattle or bison moved interstate during the course of normal livestock management operations and without change of ownership directly between two premises, as provided in a commuter herd agreement. A commuter herd agreement is defined as a written agreement between the owner(s) of a herd of cattle or bison and the animal health officials for the States and/or Tribes of origin and destination specifying the conditions required for the interstate movement from one premises to another in the course of normal livestock management operations and specifying the time period, up to 1 year, that the agreement is effective. A commuter herd agreement will be subject to annual renewal. Meeting commuter-herd requirements in lieu of official identification requirements will still provide adequate traceability in our view.

[8] Additional exemptions are detailed in §86.4 Official identification (b)(1).

management and animal disease traceability). Consequently, we expect the proposed codification of the definition of *dairy cattle* to impact a small number of producers. For the purposes of this RIA, we assume that this codification will not increase the number of producers needing EID tags. Because we do not have data on the number of cattle likely to be affected by this change in definition, we are requesting public comment on this issue.

Under the proposed rule there are no changes to the regulations covering the location of the tag on the animal, or to amount of time or energy required to place the tag. Some commenters contend that the official EID devices tend to fall off animals more frequently than the NUES tags. However, official RFID tag manufacturers are required to provide data that supports high long-term retention in cattle (including laboratory testing and field trials). Reports of tag retention failures of official tags are investigated and may result in removal of the company's approval for the tag. From the period between 2013 and 2022, only one company has had approval removed due to tag failure. APHIS has assessed EID tags and found that they have long-term retention in cattle.

APHIS contends that the implementation of this proposed rule does not require producers and markets to purchase additional equipment (readers, computers, and software) to read the tags. Official EID tags can continue to be read in a visual manner and the numbers recorded manually if the producers or market choose not to purchase electronic reading equipment. If electronic readers are not available, the tag numbers may be read and recorded manually, as with the non-EID tags.

As illustrated in Figure 3, APHIS requires that all newly approved official EID tags have a visual component and be easily and reliably readable for a person with 20/20 vision from a distance of two-and-a-half feet (30 inches). This requirement should make the EID tags proposed by APHIS substantively easier to read than the current metal National Uniform Eartagging System (NUES) tags that are currently used, which have no readability standards.

Historically, APHIS has provided States with approximately 4 million metal 'brite' identification tags per year and 4 million metal brucellosis vaccination tags per year. Based on conversations with state officials, APHIS estimates that States have purchased and supplied producers with approximately 2.5 million official metal identification tags per year. Approximately 700,000 plastic non-EID visual official identification tags per year are purchased directly by accredited veterinarians and livestock producers. Official ID tags are not permitted to be reused.[9] Therefore, we estimate the total number of official non-EID tags distributed by State

[9] Manufacturers of official eartags must document that the tags they produce are "tamper-evident." In practice, this means that devices contain a tamper-evident locking mechanism designed for one-time use. This mechanism ensures that an eartag cannot be removed from one animal and reapplied to another animal without evidence that this action has occurred. See USDA, APHIS. 2019. Animal Disease Trackability, General Standards, Version 2.8 (https://www.aphis.usda.gov/traceability/downloads/adt-general-standards.pdf) for additional information.

and Federal governments, or purchased by accredited veterinarians and livestock producers, to be approximately 11 million per year.[10]

On average, 11 million tags is approximately 11% to 12% of the cattle and bison in the domestic inventory. We estimate that these are the average percentages of cattle that would be required to have EID tags instead of visual only tags each year under the proposed rule. However, it is not the full population covered by the proposed rule. For instance, our estimates do not account for producers that already purchase EID, because the proposed rule would not affect the costs incurred by those producers.

Figure 3 – Examples of NUES Identification Devices and Official EID Devices

Note: All official APHIS approved EID tags must be readable 1) visually from 30 inches and, 2) electronically with a reader.
Source: USDA, APHIS. 2013. Animal Disease Traceability Framework – Official Eartags – Criteria and Options. Available online at: https://www.aphis.usda.gov/traceability/downloads/ADT_eartags_criteria.pdf

Market Overview of the Cattle & Bison Industries

On January 1, 2021, the cattle inventory in the United States was 93.6 million head.[11] Cattle production accounted for $66.5 billion in forecasted cash receipts in 2021, approximately 17 percent of the $391 billion in total cash receipts from agricultural commodities in 2021.[12] The United States has the largest fed-cattle industry in the world and is the world's largest

[10] This estimate does not account for animals that are tagged more than once, as discussed in CFR 86.4(c), tags that are distributed but not used, or direct purchases of tags by producers. Generally, APHIS expects these volumes to be small.

[11] USDA, NASS. 2021. Cattle, January 1,2021. Available at: https://downloads.usda.library.cornell.edu/usda-esmis/files/h702q636h/n009ww19g/9880wj45t/catl0121.pdf. Last accessed on July 27, 2022.

[12] USDA, ERS. 2022. Cattle & Beef Sector at a Glance. Available at: https://www.ers.usda.gov/topics/animal-products/cattle-beef/sector-at-a-glance/. Last accessed on July 27, 2022.

producer of beef, primarily high-quality grain-fed beef for domestic and export use. The beef industry is roughly divided into two production sectors, cow-calf operations and cattle feeding.

Cow-calf operations are primarily focused on maintaining a herd of beef cows with the purpose of raising calves. Cow-calf operations are located throughout the United States, often on land not used for crop production. In 2017, the average beef cow herd had about 44 head, but operations with 100 or more beef cows comprise 9.9 percent of all beef operations and 56 percent of the beef cow inventory.[13] Operations with 50 or fewer head are largely part of multi-enterprises or are supplemental to off-farm employment.

When calves are weaned, producers must decide if they should retain some heifer and bull calves to replace older cows and bulls or to expand their herd. The remaining bulls are castrated to become steers and, together with the other heifers, are sold into the feeding system for slaughter. Cattle feeding is concentrated in the Great Plains but is also important in parts of the Corn Belt, Southwest, and Pacific Northwest. Feedlots with less than 1,000 head of capacity comprise the vast majority of U.S. feedlots but market a relatively small share of fed cattle.[14] In contrast, lots with 1,000-head or greater capacity compose less than 5 percent of total feedlots, but market 80 to 85 percent of fed cattle. Feedlots with 32,000 head or more of capacity market around 40 percent of fed cattle. The retail equivalent value of beef produced in the U.S. in 2019 was $111.2. billion.[15] The ten-year average farm cash receipts for cattle/calves and dairy products (2010-2019) were $64.8 billion and $36.5 billion, respectively.[16]

The amount of beef exported and imported is mainly affected by domestic beef production. Cattle production tends to follow a multiyear cycle that can cause the domestic beef supply to vary. When the cattle herd contracts, more domestic cows and bulls are slaughtered, increasing domestic availability of lean beef, and decreasing the need for imports.

Most beef produced in and exported from the United States is grain-fed and marketed as high-value cuts. In 2020, the United States was ranked as the third-largest beef exporter, although it has historically been a net importer of beef and veal products (Figure 4). In part this is because the United States exported record volumes of beef to China in 2020. In 2017, the United States regained market access to China for certain beef and beef products (after being banned in 2003 due to an outbreak of Bovine Spongiform Encephalopathy). Since reopening, the United States has exported increasingly large volumes to China. This increase stems from China's commitment to purchase an additional $200 billion of American-made goods and services over 2020 and 2021 under the U.S. China Phase 1 trade agreement. As a result, U.S.

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[13] USDA, ERS. 2022. Cattle & Beef Sector at a Glance. Available at: https://www.ers.usda.gov/topics/animal-products/cattle-beef/sector-at-a-glance/. Last accessed on July 27, 2022.

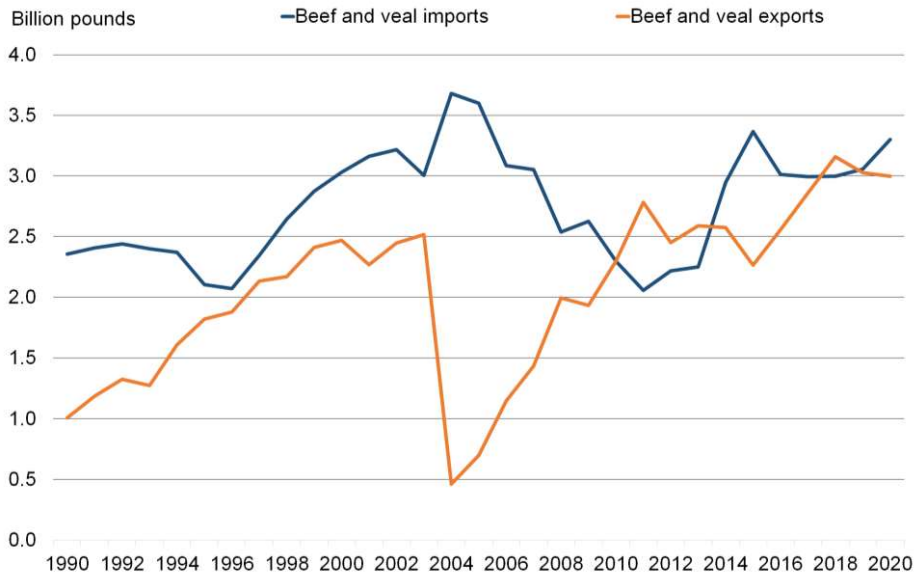
[14] USDA, ERS. 2022. Cattle & Beef Sector at a Glance. Available at: https://www.ers.usda.gov/topics/animal-products/cattle-beef/sector-at-a-glance/. Last accessed on July 27, 2022.

[15] USDA, ERS. 2022. Cattle & Beef: Statistics and Information, Table 1, U.S. beef industry. Available at: http://www.ers.usda.gov/topics/animal-products/cattle-beef/statistics-information.aspx. Last accessed on July 27, 2022.

[16] USDA, ERS. 2022. Cash Receipts, by Commodity Groups and Selected Commodities, United States and States. Available at: http://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/annual-cash-receipts-by-commodity.aspx. Last accessed on July 27, 2022.

beef exports to China rose to 119 million pounds, 4 percent of total export volume, becoming our seventh largest market in 2020. Effective March 17, 2020, the restrictions on U.S. beef and beef products to China have been removed. U.S. producers exported 2.96 billion pounds of beef in 2020, a decrease of 2 percent from 2019.

Figure 4 – U.S. beef trade, 1990 - 2020



Source: USDA, ERS. 2022. Cattle & Beef Sector at a Glance. Available at: https://www.ers.usda.gov/topics/animal-products/cattle-beef/sector-at-a-glance/. Last accessed July 29, 2022.

In 2020, the top 5 U.S. beef export markets (which account for 78.7 percent of total beef exports by volume) were: Japan, South Korea, Mexico, Canada, and Hong Kong (Figure 5). The United States' two largest beef markets, Japan, and South Korea accounted for about 50 percent of U.S. beef exports. The third and fourth top markets, Mexico, and Canada, account for more than 20 percent of total exports. Hong Kong accounts for 7 percent of beef exports in 2020.

The U.S. imported approximately 3.3 billion pounds of beef in 2020. Canada, the largest beef supplier, accounted for 25 percent of this total (Figure 4). The United States' second and third largest beef sources were Australia and Mexico, each of which provided approximately 20 percent of the total. New Zealand and Brazil, the fourth and fifth major suppliers (respectively), shipped 15 and 7 percent of U.S. beef imports. Most of the beef imported is fresh boneless beef trimmings that go into processed products such as ground beef.

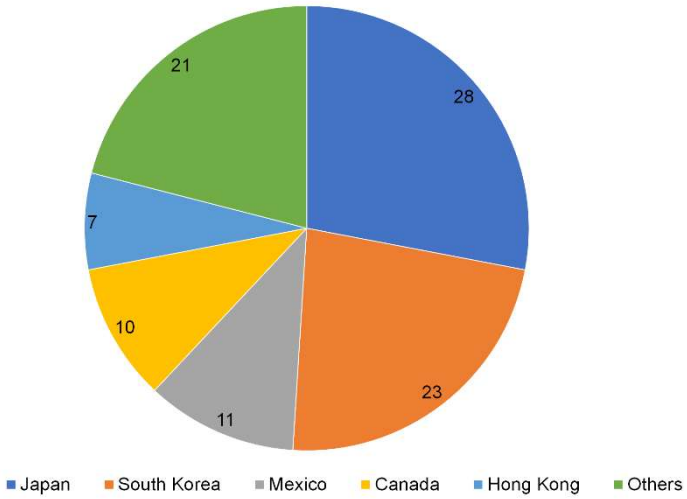
The United States imports more cattle than it exports. Canada and Mexico are the only significant cattle suppliers to the U.S. market because of their geographical proximity and because of how their cattle and beef sectors complement the United States' sector. From 2016 to 2020, Mexico provided about 64 percent of U.S. cattle imports, and nearly all of them were lighter-weight cattle intended for U.S. stocker or feeder operations. Of the cattle imports from

Canada, approximately 73 percent were designated for immediate slaughter; on average, 60 percent of these were fed steers and heifers and 40 percent were cows and bulls. Approximately 25 percent of the cattle imported from Canada went to U.S. feedlot operations, and less than 2 percent were used for breeding (Figure 5).

U.S. cattle exports to Canada and Mexico vary from year to year in both the total numbers exported and the relative percentages exported to each country. Historically, the United States has primarily exported slaughter cattle to both Canada and Mexico, in addition to some feeder cattle to Canada. However, new markets for U.S. cattle exports of dairy and beef females for breeding have emerged in recent years including Turkey, Russia, Qatar, and Vietnam.

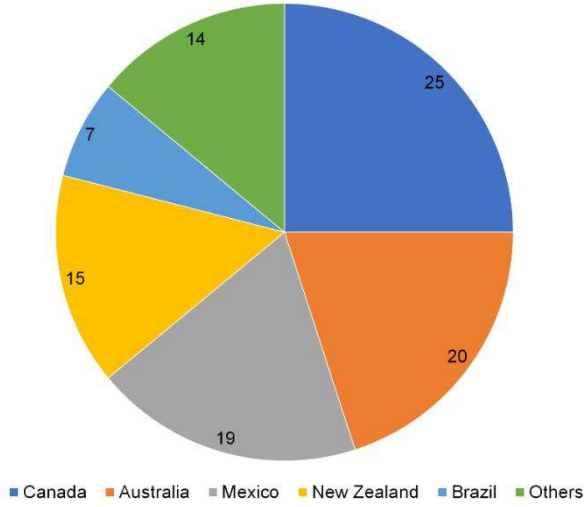
The bison industry is small but growing because of consumer-driven demand for bison meat and byproducts. In 2017, there were 1,775 bison farms with about 184,000 head.[17]

Figure 5 – U.S. Beef Export Markets, Percent of U.S. export volume in 2020



Source: USDA, ERS. 2022. Cattle & Beef Sector at a Glance. Available at: https://www.ers.usda.gov/topics/animal-products/cattle-beef/sector-at-a-glance/. Last accessed July 29, 2022.

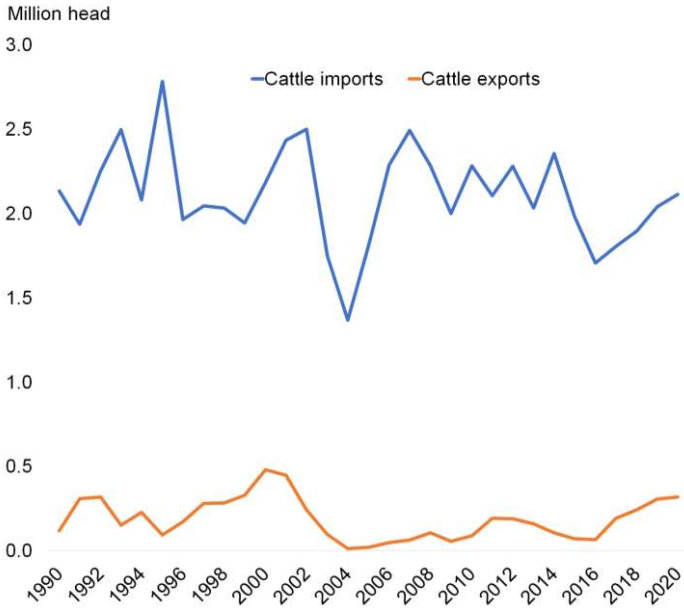
Figure 6 – U.S. Beef Import Markets, Percent of U.S. export volume in 2020



Source: USDA, ERS. 2022. Cattle & Beef Sector at a Glance. Available at: https://www.ers.usda.gov/topics/animal-products/cattle-beef/sector-at-a-glance/. Last accessed July 29, 2022.

[17] USDA, NASS. 2017. 2017 Census of Agriculture, Table 23, Miscellaneous Livestock and Animal Specialties - Inventory and Sales: 2017 and 2012. Available at: https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/. Last accessed July 29, 2022.

Figure 7 – U.S. Live Cattle Trade, 1990 - 2020



Source: USDA, ERS. 2022. Cattle & Beef Sector at a Glance. Available at: https://www.ers.usda.gov/topics/animal-products/cattle-beef/sector-at-a-glance/. Last accessed July 29, 2022.

Specific Considerations

Historically, APHIS has used visual (metal) tags for animal identification in disease programs for many decades and has approved both visual and radio frequency identification (RFID) tags for use as official eartags in cattle and bison since 2008. While APHIS focuses on interstate movements of livestock, States and Tribal Nations remain responsible for the traceability of livestock within their jurisdictions.

Electronic tags and electronic record systems provide significant advantage over visual tags by enabling rapid and accurate reading and recording of tag numbers and retrieval of traceability information. APHIS is committed to a modern disease traceability system that uses affordable technology to quickly trace sick and exposed animals to stop disease spread.

Expected Benefits and Costs of the Rule

Expected Costs

We address expected costs of the proposed rule to cattle and bison operations in the United States. For cattle producers, we provide general estimates of the costs of using EID eartags in place of or in combination with metal eartags as proposed by this rule. This analysis

does not account for the costs associated with purchasing EID readers because neither cattle nor bison operators are directly involved in the disease tracing process. We expect for the majority of entities that are involved in disease tracing (i.e. accredited veterinarians and animal health officials) to already have EID readers. This expectation is based on the facts that 1) all State, Federal, or Tribal, animal health officials have access to EID readers, and 2) that accredited veterinarians and livestock markets were eligible to receive an EID reader, free of charge, from April 2020 through March 2023. Specifically, federal funding for EID readers was provided to 47 States, two tribes, and two territories that have ADT cooperative agreements with the Federal government. Because we do not have data on the percentage of accredited veterinarians that have EID readers, we seek comment on this assumption.[18]

According to NASS, there were approximately 93.6 million head of cattle and calves on January 1, 2021[19]. Of these 93.6 million, APHIS estimates that approximately 11.17 million official visual identification devices were distributed for use in cattle and bison. Given these estimates, we assume that approximately 12% of the cattle inventory would require official EID identification tags (instead of the visual identification tags) in any given year.

Due to the cattle cycle, the number of cattle and calves fluctuate over time. To account for these fluctuations, we analyze data from the January NASS Cattle report from 2010 to 2021 (Figure 8). The average number of cattle and calves over this time period was 92.3 million. The largest inventory was in 2019 (94.8 million) and the lowest inventory was in 2014 (88.5 million). These upper and lower bounds are used to estimate the costs associated with purchasing new EID tags for 12 percent of the cattle inventory.

Using the cattle and calf inventory data from 2010 to 2021, estimates of the annual number of cattle and calves requiring EID tags range from approximately 10.6 (88,500,000*0.12) to 11.4 million (94,800,000*0.12) per year (Table 1). On average, we estimate that approximately 11 million cattle and calves will require EID eartags per year.

Data collected during the Census of Agriculture suggest that the average number of bison from 2002 to 2017 was 194 thousand (Figure 9).[20,21] The largest inventory was in 2002 (232 thousand) and the lowest inventory was in 2012 (162 thousand). These upper and lower bounds are used to calculate the average annual costs associated with purchasing new EID tags for 11 percent of the bison inventory.

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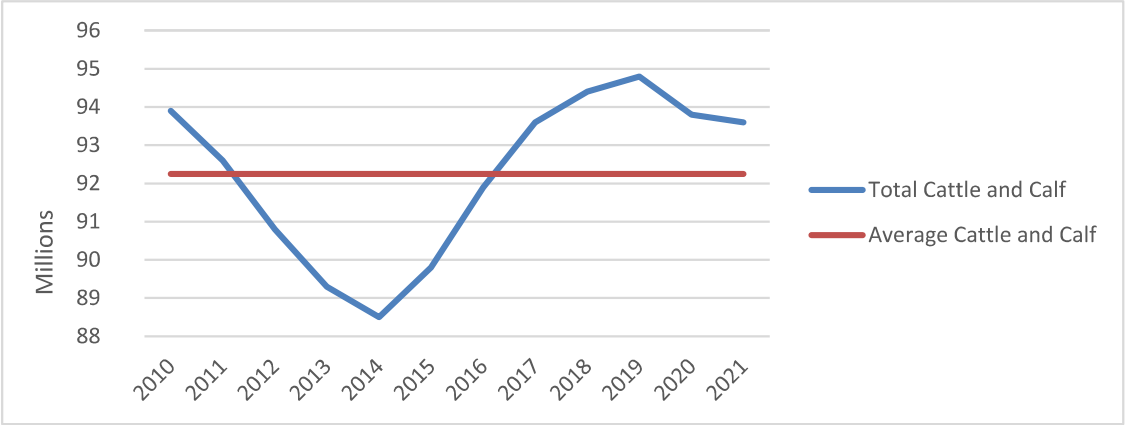
[18] The proposed rule does not mandate that accredited veterinarians who do not currently have readers purchase them. These individuals will not be adversely affected by the proposed rule, because EID eartags can be read visually.

[19] USDA, NASS. January 2010- January 2021. Cattle. Available at: https://usda.library.cornell.edu/concern/publications/h702q636h. Last accessed on July 27, 2022.

[20] USDA, NASS. 2017. 2017 Census of Agriculture, Table 23, Miscellaneous Livestock and Animal Specialties - Inventory and Sales: 2017 and 2012. Available at: https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/. Last accessed July 29, 2022.

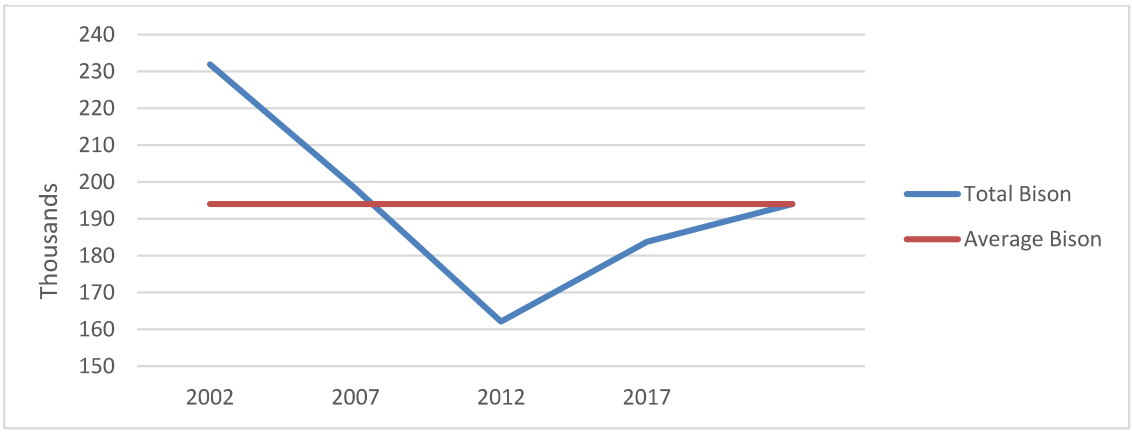
[21] USDA, NASS. 2007. 2007 Census of Agriculture, Table 31, Other Animals and Animal Products - Inventory and Number Sold: 2007 and 2002. Available at: https://agcensus.library.cornell.edu/wp-content/uploads/2007-United_States-st99_1_029_031.pdf. Last accessed July 29, 2022.

Figure 8 – U.S. Cattle and Calf Inventory: 2010 to 2021



Source: USDA, NASS. 2010 - 2021. January editions of the Cattle report from 2010 to 2021. Available at: https://usda.library.cornell.edu/concern/publications/h702q636h. Last accessed on July 27, 2022.

Figure 9 – Bison Inventory: 2002 to 2017



Source: USDA, NASS. 2017 and 2007 Census of Agriculture Data. See footnotes 20 and 21.

The Census of Agriculture data implies that the annual number of bison requiring EID tags will range from 17.8 thousand (162,000*0.11) to 25.5 thousand (232,000*0.11) per year. On average, we estimate that 21.3 thousand bison will need tags every year (Table 1).

Assuming demand for official identification tags is similar to past years and that no Federal or State funding is available in 2023, APHIS estimates that U.S. cattle producers would need to purchase between 10.6 million to 11.4 million official EID tags annually, and that bison producers would need to purchase from 17.8 thousand to 25.5 thousand official EID tags annually, at costs that range from $2.01 to $3.65 (Appendix A).

Table 1: Estimated Number of EID Eartags required in 2023 for Cattle and Bison

	Low	Average	High
Cattle Population	88.5 million	92.3 million	94.8 million
Cattle Eartags	10.6 million	11 million	11.4 million
Bison Population	162.1 thousand	194 thousand	232 thousand
Bison Eartags	17.8 thousand	21.3 thousand	25.5 thousand

Source: APHIS, using data from the NASS Cattle Report and the 2017 and 2007 Census of Agriculture.

This implies that the total average annual cost of purchasing EID tags would range from approximately $25 to $30 million, depending on the type of tag purchased and the cost distribution model (Table 2). The average annual cost of tags is approximately 29 million dollars.

Table 2. Total Annual Costs to the Cattle and Bison Industry/Operation for EID Tags

	Total Annual Cost to the Industry	Average Annual Cost Per Operation
(Cost Distribution Method 1)		
FDX Eartags	$29,960,700	$34.96
HDX Eartags	$32,838,865	$38.32
(Cost Distribution Method 2)		
FDX Eartags	$24,970,000	$29.14
HDX Eartags	$29,480,000	$34.40
Average Annual Costs	**$29,312,391.25**	**$34.21**

Source: APHIS, using data from the NASS Cattle report, the 2017 and 2007 Census of Agriculture, and retailers of EID tags (see Appendix A).

The cost of purchasing EID tags will vary from producer to producer, depending upon the size of operation and business management practices (e.g., whether cattle are shipped out of state, whether cattle are tagged for a regulatory program). Assuming that there are 856,916 cattle and bison operations the average cost per operation would range from $26.24 to $29.45 for FDX eartags, and from $31.13 to $34.73 for HDX eartags (Table 2).

The total average annual cost of purchasing NUES tags would range from approximately 3.1 million to 3.4 million dollars, depending on the cost distribution model (Table 3). The average annual cost of tags would be approximately 3.3 million dollars.

Table 3. Total Annual Costs to the Cattle and Bison Industry/Operation for NUES Tags

	Total Annual Cost to the Industry	Average Annual Cost Per Operation
(Cost Distribution Method 1)	$3,426,834.00	$4.00
(Cost Distribution Method 2)	$3,119,028.00	$3.64
Average Annual Costs	**$3,272,931.00**	**$3.82**

Source: APHIS, using data from the NASS Cattle report, the 2017 and 2007 Census of Agriculture, and retailers of EID tags (see Appendix A).

Given the estimated costs of EID and NUES tags, and assuming that the Federal government does not provide either NUES or EID tags free of charge in the future, the cost of the proposed rule is expected to be approximately 26.1 million dollars.

Expected Benefits:

EID eartags, such as RFID (FDX or HDX) eartags, may be read visually, without the use of additional equipment. In fact, the EID referred to in this proposed rule should be easier to read than most visual-only tags (see Figure 3). The EID tags proposed by APHIS will be imprinted with ¼ inch high lettering on a bright, contrasting background. Visual only, metal, NUES tags have relatively small lettering engraved into the tag itself. Unlike most visual only tags, all official EID tags must be reliably read by a person with 20/20 vision from a distance of 2.5 feet (30 inches). Though APHIS does not quantify the benefits associated with improvements in the readability of eartags in this RIA, we do expect these improvements to facilitate many herd management practices.

EID eartags can also be read using an RFID reader. This reader sends a radio signal of a specific frequency to the eartag and records the number that comes back from the eartag. Once a signal is received from the reader, the eartag transmits the identity of an animal in the form of a unique 15-digit sequence of numbers. The 15-digit sequence begins with the country code (e.g., 840 for US born animals) and is followed by 12 digits.

Official USDA-APHIS EID eartags have no batteries or active transmission of information. Depending on the type of tag and antennae (e.g., ultra-high frequency or low frequency), the reader may collect signals from distances of several inches to 20 feet or more. Reading eartags electronically does not require restraint of animals because animal identification information is captured almost instantaneously by scanning the eartag with a reader. Once the tag is scanned, the electronically collected tag number may be rapidly and accurately transmitted to a connected database. Electronic databases store data associated with an eartag number and may be quickly searched.

With visual only eartags, the animal must be restrained to allow the eartag number to be read and transcribed. Often, the eartag must also be cleaned before the number can accurately be read. Visual eartag numbers may be recorded on paper, or manually entered into a database. Errors are more likely to occur while reading, transcribing, or entering the eartag numbers manually into a database.

For the purposes of this RIA, it is assumed that the benefits associated with animal disease tracing stem from the use of EID readers by 1) accredited veterinarians during the process of completing an interstate certificate of veterinary inspection, and 2) State and Federal animal health officials during the "response phase" of a disease outbreak. This is the phase of the outbreak during which a State or Federal animal health official visits a farm to review farm records, inspect animals for clinical signs of disease, and discuss the need for quarantines and additional testing.

How EID Eartags Affect Agricultural Producers When an Outbreak Occurs

Benefits from the use of EID eartags stem from the Federal or State governments' ability to quickly trace, test, and quarantine potentially diseased animals. When this process is done quickly and effectively, it is less likely that diseases spread, and that trade restrictions are imposed. In the absence of trade restrictions, decreases in the supply of beef or cattle products (such as those stemming from depopulation or culling) can lead to short-term increases in prices that benefit cattle producers.[22] However, if trade restrictions are imposed, then domestic markets can be flooded with products intended for foreign consumers. This increase in supply tends to reduce domestic prices and lower producers' profits. The likelihood of trade restrictions depends on a number of factors, one of the most critical of which is the disease type.

For instance, a dairy cow with Bovine Spongiform Encephalopathy (BSE) was identified in Washington State in December 2003.[23] This discovery led many U.S. trading partners to restrict or ban U.S. beef products. Following reports of cattle infected with BSE on June 2005 in Texas, and on March 2006 in Alabama, imports of U.S. beef and beef products were banned by Japan, South Korea, China, and various other countries. More recently, BSE has been identified in California, Alabama, and Florida. Coffey et al. (2005) find that export restrictions stemming from the 2003 outbreak caused $3.2 billion to $4.7 billion ($4.9 to $7.1 billion in inflation adjusted terms) in losses to the U.S. beef industry.[24]

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[22] Consumer demand for U.S. beef and cattle products is inelastic. Conceptually, this means that increases in prices tend to lead to relatively small decreases in consumer demand. See The Demand for Disaggregated Food-Away-From-Home and Food-at-Home Products in the United States, Economic Research Report Number 139, by Okrent and Alston, published by the USDA's Economic Research Service in 2008, for estimates of price elasticities of beef products.

[23] United States Centers for Disease Control and Prevention. 2022. BSE Cases Identified in the United States. Available at: https://www.cdc.gov/prions/bse/case-us.html. Accessed on July 27, 2022.

[24] Coffey, B., Mintert, J., Fox, J.A., Schroeder, T.C. and Valentin, L., 2005. The economic impact of BSE on the US beef industry: product value losses, regulatory costs, and consumer reactions. Kansas State University Agricultural Experiment Station and Cooperative Extension Service, MF-2678.

Bovine Tuberculosis is another highly contagious livestock disease that illustrates the need for enhanced traceability. Bovine tuberculosis can be transmitted from livestock to any warm-blooded vertebrate, including humans. Transmission of tuberculosis from cattle to people was once common in the United States (US CDC 2012).[25] However, it currently causes approximately 2% of domestic tuberculosis cases. Because TB has the potential to adversely affect human health, the upper bound on the magnitude of impacts from an outbreak of TB is high. Herds with bovine tuberculosis were depopulated or quarantined in Hawaii, Michigan, Montana, New Mexico, South Dakota, and Texas in the fourth quarter of 2021 (from October to December).[26]

Brucellosis is another livestock disease that could affect U.S. cattle and bison populations, harm human and/or environmental health, and damage the economy. Like Bovine Tuberculosis, Brucellosis can be transferred from livestock to humans. Though the incidence of human brucellosis is relatively low in North American (0.02 - 0.09 cases per 100,000 people), the disease is considered an ongoing global health challenge by many epidemiologists (Dean et al 2012).[27] Herds with Brucellosis were identified in Idaho and Montana in the fourth quarter of 2021 (from October to December).[28]

Foot-and-Mouth Disease (FMD) is one of the most contagious and economically damaging livestock diseases. In a 2008 analysis of the economic effects of an outbreak of Foot-and-Mouth Disease, USDA's Economic Research Service found that the average total cost of a FMD outbreak to beef producers and processors, swine producers, lamb and sheep producers, poultry producers, and crop producers, would range from approximately $2.7 to $4 billion ($3.7 to $5.5 billion in inflation adjusted terms), depending on the severity of the outbreak.[29] However, these estimates may be a lower bound. Ekbor (1999) found that an FMD outbreak in California could cost between 6 and 14 billion dollars.[30] Pendell et al. (2015) found that costs associated

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[25] United States Centers for Disease Control and Prevention. 2012. Bovine TB in Humans Fact Sheet. Available at: https://www.cdc.gov/tb/publications/factsheets/general/mbovis.htm. Accessed on October 24, 2022.

[26] USDA, APHIS. 2022. National bovine Brucellosis and Tuberculosis Updates. Available online at: https://www.aphis.usda.gov/animal_health/tb_bruc/downloads/affected-herd-summary-q1-fy2022.pdf. Last accessed on August 27, 2022.

[27] Dean, A., L. Crump, H. Greter, E. Schelling, and J. Zinsstag. 2012. Global Burden of Human Brucellosis: A Systematic Review of Disease Frequency. PLoS Neglected Tropical Diseases 6(10): e1865.doi:10.1371/journal.pntd.0001865.

[28] USDA, APHIS. 2022. National bovine Brucellosis and Tuberculosis Updates. Available online at: https://www.aphis.usda.gov/animal_health/tb_bruc/downloads/affected-herd-summary-q1-fy2022.pdf. Last accessed on August 27, 2022.

[29] Paarlberg, P., A. Seitzinger, J. Lee, and K. Matthews. 2008. Economic Impacts of Foreign Animal Disease, Economic Research Report Number 57, United States Department of Agriculture, Economic Research Service.

[30] Ekboir, J.M. 1999. Potential Impact of Foot-and-Mouth Disease in California: the Role and Contribution of Animal Health Surveillance and Monitoring Services. Agricultural Issues Center. Downloadable at: https://aic.ucdavis.edu/pub/fmd.html. Accessed on July 19, 2022.

with FMD could range between 16 and 140 billion dollars.[31] Oladosu, Rose, and Lee (2013) found that costs of an outbreak could range between 37 and 228 billion dollars.[32]

Notably, Elbakidze et al. (2009) found that decreasing the time it takes to detect an FMD outbreak (from two weeks to one week) decreased the median costs associated with the outbreak by 68% to 97%.[33] Depending on the introduction scenario, Elbakidze et al. found that enhancing herd surveillance could decrease costs by 23% to 77%. These results suggest that improvements to practices intended to identify diseased cattle (such as the use of EID) can confer substantial benefits. Interviews conducted by APHIS Veterinary Services suggests that transitioning from visual to electronic identification devices can cut the time it takes to scan animals in a herd by approximately 50%.[34]

When outbreaks of FMD (or any of the aforementioned livestock diseases) occur, the use of EID eartags can help limit their size and scope, thus reducing the number of animals that are depopulated, the impact to producers and communities, and the probability that trade restrictions are imposed.

Given the large number of diseases that could affect cattle and bison populations, and uncertainty about the economic impacts of outbreaks of these diseases, it is difficult to quantify the benefits of transitioning from visual to EID eartags. However, if there was a one in a hundred chance of a $6 billion outbreak occurring each year, and if the transition from visual only to EID tags decreased the damages associated with outbreaks by 50%, the marginal benefit of the proposed rule would be approximately $30 million dollars per year.[35] We assume that the benefits associated with the rule are proportional to 1) the cost of the disease, 2) the disease incidence (i.e. the probability that a disease occurs in any given year), and 3) the percent reduction in damages associated with the shift from visual eartags to EID. This implies that doubling any of the aforementioned factors would double the benefits associated with the rule.

Alternatives to the Rule

APHIS considered a number of alternatives to this proposed rule. These alternatives include 1) not requiring the use of electronic identification devices, and 2) requiring producers to use electronic identification devices and to purchase readers.

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[31] Pendell, D.L., T.L. Marsh, K.H. Coble, J.L. Lusk, S.C. Szmania. 2015. Economic Assessment of FMDv Releases from the National Bio and Agro Defense Facility. PLoS ONE 10(6): e0129134. doi:10.1371/journal.pone.0129134

[32] Oladosu, G., A. Rose, and B. Lee. 2013. Economic Impacts of Potential Foot and Mouth Disease Agroterorism in the USA: A General Euilibrium Analysis. *Bioterorism & Biodefense* S12: 001. doi:10.4172/2157-2526.S12-001

[33] Elbakidze, L., L. Highfield, M. Ward, McCarl, B.A. and Norby, B. 2009. Economics analysis of mitigation strategies for FMD introduction in highly concentrated animal feeding regions. Applied Economic Perspectives and Policy, 31(4): 931-950.

[34] USDA, APHIS. 2022. Benefits of Electronically Readable Ear tags versus Visual Only Ear Tags (draft). Available upon request. Contact Christina Krasilinec at christina.m.krasilinec@usda.gov.

[35] The formula used to calculate the marginal benefits associated with the proposed rule is $MB = (Cost\ of\ an\ Outbreak) * (Probability\ of\ Disease) * (Percent\ Change\ in\ Damages\ Due\ to\ EID\ Use)$.

Status Quo – Not Requiring the Use of EID Eartags

One alternative to the proposed rule considered by APHIS is the status quo. Specifically, APHIS could continue to allow cattle and bison operations to use metal "brite" or brucellosis vaccination tags. Under this alternative, cattle and bison producers' costs would be approximately $23 million dollars per year lower than in the proposed rule. However, they would also forego the benefits associated with enhancements in Animal Disease Traceability.

Given that there are various diseases of consequence, each of which has a different probability of occurrence and expected cost, it is difficult to quantify the expected benefits of improvements in animal disease traceability stemming from the transition to electronic identification devices. Generally, APHIS expects the benefits of the proposed rule to exceed the costs. However, the costs may exceed the benefits if: 1) the probability of disease outbreaks are lower than anticipated, 2) the economic costs associated with disease outbreaks are lower than anticipated, or 3) if the transition from visual to EID tags decreases the costs associated with outbreaks by less than expected.

Regardless, in cases where there are low probabilities of catastrophically bad events (like outbreaks of FMD or BSE) occurring, a simple comparison of expected costs and expected pecuniary benefits may understate the benefits to stakeholders. Conceptually, this is because stakeholders may be risk averse. If so, then they may be willing to pay a premium to mitigate the impacts of natural disasters.

State, Tribal, Federal, and private entities have clearly stated to APHIS that the best assistance APHIS can offer during disease outbreaks is the ability to trace animals quickly and efficiently, thus limiting the impact to domestic cattle/bison farmers and ranchers as well as protecting our international trade markets. For these reasons, and based on our analysis of the expected costs and benefits of the proposed rule, APHIS rejected the alternative of not mandating the transition to electronic identification devices.

Requiring the use of electronic identification devices and electronic readers

One alternative to the proposed rule is to require cattle and bison operators to purchase electronic identification devices and EID readers. Recent work by Shear and Pendell (2020) suggests that an alternative like this could cost wholesale beef, feeder cattle, and slaughter cattle operations approximately 566 million dollars in the short run.[36] They find that requiring cattle operations to purchase readers and EID would increase retail and wholesale beef prices, while decreasing imports, exports, and domestic beef consumption. Government cost sharing, or increases in demand for beef attributable to better traceability, could offset these costs.

[36] Shear, H. and D. Pendell. 2020. Economic Cost of Traceability in U.S. Beef Production. Frontiers in Animal Science 1, 552386: 1-6. doi: 10.3389/fanim.2020.552386.

Initial Regulatory Flexibility Analysis

The Regulatory Flexibility Act requires agencies to evaluate the potential effects of their proposed and final rules on small businesses, small organizations, and small governmental jurisdictions. This initial regulatory flexibility analysis describes expected impacts of this proposed rule on small entities, as required by section 603 of the Act.

Reasons Action is Being Considered

APHIS is committed to a modern disease traceability system that uses affordable technology to quickly trace sick and exposed animals to stop disease spread. Based upon public input from the July 2020 notice, APHIS is proceeding with proposed rulemaking, rather than a notice-based process to ensure transparency for a national disease traceability system. APHIS has primary responsibility for controlling and eradicating communicable diseases of livestock and preventing the introduction and dissemination of any pest or disease of livestock into the United States. The regulations at 9 CFR part 86 provide the requirements for identification and documentation for certain classes of cattle and bison to move interstate.

Objectives of and Legal Basis for the Rule

Through this action, APHIS proposes amending its animal disease traceability regulations, currently codified at title 9, *Code of Federal Regulations* (9 CFR) part 86. Proposed changes are set forth below. The primary proposed change would codify a requirement that beginning 6 months after publication of any final rule following the proposed rule, APHIS would only recognize identification devices (e.g., eartags) as official identification for cattle and bison if the devices have both visual and electronic readability (EID). Other proposed changes are intended to clarify language and requirements in several sections of part 86. These changes will enhance the U.S. traceability system to better achieve goals of rapidly tracing diseased and exposed animals and containing outbreaks.

Potentially Affected Small Entities

The Small Business Administration (SBA) has established guidelines for determining which businesses are considered small. The SBA size standard for importers of livestock (livestock merchant wholesalers (North American Industry Classification System (NAICS) 424520) is no more than 100 employees. The size standard for beef cattle ranching and farming (NAICS 112111), operations with not more than $2.25 million, and for dairy cattle and milk production (NAICS 112120), operation with not more than $3.25 million and for bison and cervid farms which are included in other animal production (NAICS 112990), operations with

not more than $2.25 million in annual sales are considered small entities.[37] For cattle feedlots (NAICS 112112), operations with not more than $19.5 million in annual sales are considered small entities.[38]

Our analysis suggests that the majority of cattle operations in the United States are considered small. Approximately 98 percent of cattle/calf farms and 50 percent of dairy farms generated less than $500,000 in cash receipts. Less than one percent of beef farms and approximately 46 percent of dairy farms generated $1 million or more in 2017. In 2017, about 90 percent of cattle feedlots were considered small entities.[39]

Projected Reporting, Recordkeeping, and Other Compliance Requirements

New regulatory compliance, reporting and recordkeeping requirements associated with the information collection in this proposed rule are discussed above in the "Expected Benefits and Costs of the Rule" section. Those requirements are also discussed in the rule under the heading "Paperwork Reduction Act."

Our analysis does suggest that smaller operations pay higher unit costs for official identification than larger operations. For instance, there is a $1.45 difference in the cost of FDX tags when they are purchased in quantities of 20 (at a per unit post of 3.45), then when they are purchased in quantities of 5000 (at a unit cost of $2.00). Similarly, there is a $1.32 difference between the cost of HDX tags (when they are purchased in small, rather than large, quantities), and a $0.24 difference in the cost of NUES tags.[40] In percentage terms, this suggests that smaller operations could pay anywhere from 72% to 116% more per tag than large operations.

However, the proposed rule only affects operations that move animals interstate through non-APHIS approved out-of-state markets, and most small cattle and bison operations do not engage in interstate movement of cattle. For instance, APHIS VS found that 82% to 88% of beef

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[37] Small Business Administration. 2022. Table of Small Business Size Standards Matched to North American Industry Classification System Codes. Available at: https://www.naics.com/wp-content/uploads/2022/07/Table-of-Size-Standards_Effective-May-2-2022_Final.pdf. Last accessed on August 8, 2022.

[38] USDA, NASS. 2017. 2017 Census of Agriculture, Table 75. Summary by North American Industry Classification System: 2017. Available at: https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/usv1.pdf. Last accessed on August 8, 2022.

[39] USDA, NASS. 2017. 2017 Census of Agriculture, Table 75. Summary by North American Industry Classification System: 2017. Available at: https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/usv1.pdf. Last accessed on August 8, 2022.

[40] As discussed in Appendix A, it is explicitly assumed that official identification tags are purchased in the smallest lot size advertised. Market research suggests that the smallest advertised lot size for FDX and HDX tags was 20, the smallest advertised lot size for NUES tags is 100.

cattle were marketed through general auction markets in 2008.[41] These markets tend to be in-state auctions or out of state APHIS approved markets, for which official identification is not required. Moreover, APHIS found that small operations were most likely to use auction markets, while larger producers used auctions as well as other marketing channels.[42] Specifically, large operations were more likely than small producers to use targeted breed-influenced, age-and-source-verified, and natural marketing channels.

Because most small producers do not engage in interstate movement for marketing cattle and are not required to use official ID, we also expect any costs associated with rule familiarization, or administrative record keeping, to be small. APHIS does not expect smaller operations to be disproportionately, adversely affected by the proposed rule.

Duplication, Overlap, or Conflict with Existing Rules and Regulations

APHIS has not identified any duplication, overlap, or conflict of the proposed rule with other Federal rules.

Alternatives to Minimize Significant Economic Impacts of the Rule

One alternative to the proposed rule is to require cattle and bison operators to purchase electronic identification devices and EID readers. Recent work by Shear and Pendell (2020) suggests that an alternative like this could cost wholesale beef, feeder cattle, and slaughter cattle operations approximately 566 million dollars in the short run.[43] Government cost sharing, or increases in demand for beef attributable to better traceability, could offset these costs. Nonetheless, APHIS rejected this alternative because of concerns about its cost, especially its potential effect on small entities. Further, APHIS' requirement that official EID tags be visually readable removes the necessity for producers to have electronic reading equipment.

Another alternative considered by APHIS was to extend the compliance timeline. APHIS rejected this alternative because it was not clear 1) whether, or 2) to what extent, this alternative would lessen the impact on small cattle or bison operations, most of which do not engage in interstate movement of animals.

We appreciate that our conclusions about the extent to which small businesses engage in the interstate movement of animals is based on survey data collected in 2008 and 2017. We

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[41] USDA, APHIS. 2009. Beef 2007-08, Part III: Changes in the U.S. Beef Cow-calf Industry, 1993-2008. Available at: https://www.aphis.usda.gov/animal_health/nahms/beefcowcalf/downloads/beef0708/Beef0708_dr_PartIII_1.pdf. Last accessed on August 23, 2022.

[42] USDA, APHIS. 2020. Beef 2017, Report 1: Beef Cow-calf Management Practices in the United States, 2017. Available at: https://www.aphis.usda.gov/animal_health/nahms/beefcowcalf/downloads/beef2017/Beef2017_dr_PartI.pdf. Last accessed on August 23, 2022.

[43] Shear, H. and D. Pendell. 2020. Economic Cost of Traceability in U.S. Beef Production. Frontiers in Animal Science 1, 552386: 1-6. doi: 10.3389/fanim.2020.552386.

welcome public comment on these alternatives, other sections of the Regulatory Impact Analysis & Initial Regulatory Flexibility Analysis, and any other document associated with this rulemaking.

Appendix A: Estimating Average Costs for EID and NUES Tags

We used two different methods to calculate the estimated average cost per tag, based on different tag distribution models. Cost comparison included the visual non-EID NUES tags and the two types of low frequency EID ear tags (i.e., HDX and FDX). Ultra-High frequency (UHF) tags were not included in the analysis because there are currently no commercially available UHF official ear tags .

Tag Cost Estimate Method 1

This estimate is based on the assumption that accredited veterinarians/clinics and livestock markets are responsible for acquiring and distributing half of the ear tags applied. Generally, this assumption reflects the existing distribution pattern for identification tags.

The cost of EID official identification tags varies by tag type and quantity purchased. As illustrated in Table A1, we found that the cost per FDX tag in August 2022 ranged from $2.00 for large quantities (5,000 more) to $3.45 for smaller quantities (20 tags). We found that advertised retail price per HDX tag in August 2022 ranged from $2.32 for large quantities (5,000 or more) to $3.65 for small quantities (20 tags). The retail price for NUES tags ranged from $0.43 to $0.192. Depending on the tag type, many vendors that handle official ID tags offer volume discounts and free shipping for large orders.

Market research suggests that FDX prices range from approximately $2.00 to $3.45 per tag depending on whether an operation is large or small. Smaller operations pay a retail price of approximately $2.35 per tag (for a quantity of 20). They pay approximately 15% extra ($0.35 per unit) for shipping and approximately 32% extra ($0.75 per unit) in service charges. Large quantities can be purchased at a cost of approximately $2.00 per unit. Neither shipping nor service charges are assessed to these larger orders.

HDX prices range from approximately $2.37 to $3.65 per tag. Smaller operations pay a retail price of approximately $2.90 per tag (for a quantity of 20). They tend not to pay for shipping but pay approximately 26% extra ($0.75 per unit) in service charges. Large quantities can be purchased at a cost of approximately $2.32 per unit. Neither shipping nor service charges are assessed to these larger orders.

NUES prices range from approximately $0.19 to $0.43 per tag. Smaller operations pay a retail price of approximately $0.27 per tag (which are purchased in quantities of 100). They pay approximately 60% extra ($0.16 per unit) in shipping charges. Large quantities can be purchased at a retail cost of approximately $0.10 per unit. However, an additional $0.09 per unit (almost 90% of the retail cost) is added for shipping.

The majority of official metal identification tags currently distributed by APHIS are used by veterinarians/clinics and livestock markets as official identification for animal movements or regulatory programs such as brucellosis and tuberculosis. Veterinarians/clinics and livestock markets are high volume users and receive tags at the lowest advertised prices.

We assume that half of all eartags would be purchased in quantities of a few dozen ($3.45 per tag for FDX, $3.65 for HDX, and $0.43 for NUES tags), and that half of eartags would be purchased in larger discounted quantities of 5,000 or more tags at ($2.00 for FDX, $2.32 for HDX, and $0.192 for NUES tags). Given these assumptions, the average cost for FDX eartags is $2.72, the average cost for HDX eartags is $2.99, and the average cost of NUES tags is 0.31.

Table A1. EID tag prices based on volume (including shipping costs)

Number of Tags Purchased	Cost per FDX Tag	Cost per HDX Tag	Cost per NUES Tag
20 tags	$3.45	$3.65	-
100 tags	$2.60	$3.15	$0.430
200 tags	$2.47	$2.90	$0.331
300 tags	$2.35	$2.90	$0.294
400 tags	$2.35	$2.90	$0.283
500 tags	$2.00	$2.34	$0.240
600 tags	$2.06	$2.43	$0.236
700 tags	$2.10	$2.50	$0.234
800 tags	$2.13	$2.55	$0.232
900 tags	$2.15	$2.59	$0.206
1000 tags	$2.00	$2.34	$0.206
5000 or more tags	$2.00	$2.32	$0.192
Average or Highest and Lowest Costs	**$2.72**	**$2.99**	**$0.31**

As illustrated in Table A2, this approach implies that the total annual cost for the U.S. cattle industry to use FDX eartags ranges from $28.9 million to $31.1 million, with an average cost of $30.0 million. The total estimated cost to the bison industry ranges from $48.5 thousand to $69.5 thousand, with an average cost of $58.0 thousand.

The total estimated annual cost for the U.S. cattle industries to use HDX eartags ranges from $31.6 million to $34.0 million, with an average cost of $32.8 million. The total estimated annual cost for the bison industry is $53.1 thousand to $71.1 thousand, with an average cost of $63.6 thousand.

If the Federal and State governments did not distribute NUES tags free of charge, then the total estimated annual cost for the U.S. cattle industries to use these eartags would range from $3.3 million to $3.5 million, with an average cost of $3.4 million. The total estimated annual cost for the bison industry ranges from $5.5 thousand to $7.9 thousand, with an average cost of $6.6 thousand.

Table A2. Method 1: Range of Aggregate Annual Costs

		Cattle	Bison
Number of Eartags	Low Estimate	10,600,000	17,800
	Av. Estimate	11,000,000	21,300
	High Estimate	11,400,000	25,500
FDX Costs	Low Estimate	$28,871,220	$48,482
	Av. Estimate	$29,960,700	$58,015
	High Estimate	$31,050,180	$69,454
HDX Costs	Low Estimate	$31,642,247	$53,135
	Av. Estimate	$32,836,294	$63,583
	High Estimate	$34,030,341	$76,121
NUES Costs	Low Estimate	$3,297,660	$5,538
	Av. Estimate	$3,422,100	$6,626
	High Estimate	$3,546,540	$7,933

Tag Cost Estimate Method 2

This estimate is based on the assumption that producers purchase official identification tags from vendors rather than from accredited veterinarians/clinics or livestock markets.

As illustrated in Table A3, the 2017 NASS Census of Agriculture suggests that 51 percent of all cattle are in herds greater than 500, that 29.6 percent of cattle are in herds with 100 to 499 head, and that 19.4 percent of cattle are in herds smaller than 100 head.[44] We calculate average costs of tags for each of the herd size categories reported in the Census.

It is explicitly assumed that small growers buy the minimum advertised lot size and use the extra tags in subsequent years. For instance, a grower needing only 5 EID tags in a given year might buy 20 tags, and use the surplus 15 tags in the three subsequent years. Larger producers buy the minimum necessary lot to fulfill their needs. For instance, an operation needing 5201 tags might purchase two lots of 2600 and a lot of 20. As with smaller growers, it is assumed that surplus tags are used in subsequent years.

[44] USDA, NASS. 2017. 2017 Census of Agriculture, Table 12. Cattle and Calves - Inventory: 2017 and 2012. Available at: https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_US/usv1.pdf. Last accessed on August 12, 2022.

Table A3. EID tag costs based on herd size

Herd size	Percentage of Tags	Average Cost per FDX Tag	Average Cost per HDX Tag	Average Cost per NUES Tag
1 to 9 heads	1.2%	$3.45	$3.65	$0.430
10 to 19 heads	2.3%	$3.45	$3.65	$0.430
20 to 49 heads	7.1%	$2.69	$3.23	$0.430
50 to 99 heads	8.8%	$2.57	$3.17	$0.430
100 to 199 heads	11.7%	$2.50	$2.99	$0.377
200 to 499 heads	17.9%	$2.23	$2.66	$0.280
500 to 999 heads	12.9%	$2.08	$2.46	$0.227
1,000 to 2,499 heads	12.0%	$2.04	$2.39	$0.206
2,500 to 4999 heads	7.0%	$2.02	$2.34	$0.204
5,000 or more heads	19.1%	$2.01	$2.32	$0.192
Average Cost Per Tag	**100%**	$2.27	$2.68	$0.283

Note: It is assumed that herds are uniformly distributed (by size) within a size category.

As illustrated in Table A4, this approach implies that the total annual cost for the U.S. cattle industry to use FDX eartags ranges from approximately $24.0 million to $25.9 million, with an average cost of $25.0 million. The total estimated cost to the bison industry ranges from approximately $40.4 thousand to $57.9 thousand, with an average cost of $48.4 thousand.

Table A4. Method 2: Range of Aggregate Annual Costs

		Cattle	Bison
Eartags	Low Estimate	10,600,000	17,800
	Av. Estimate	11,000,000	21,300
	High Estimate	11,400,000	25,500
FDX Costs	Low Estimate	$24,062,000	$40,406
	Av. Estimate	$24,970,000	$48,351
	High Estimate	$25,878,000	$57,885
HDX Costs	Low Estimate	$28,408,000	$47,704
	Av. Estimate	$29,480,000	$57,084
	High Estimate	$30,552,000	$68,340
NUES Costs	Low Estimate	$2,999,800	$5,037
	Av. Estimate	$3,113,000	$6,028
	High Estimate	$3,226,200	$7,217

The total estimated annual cost for the U.S. cattle industries to use HDX eartags ranges from approximately $28.4 million to $30.6 million, with an average cost of $29.5 million. The total estimated annual cost for the bison industry ranges from approximately $47.7 thousand to $68.3 thousand, with an average cost of $57.1 thousand.

If the Federal and State governments did not distribute NUES tags free of charge, then the total estimated annual cost for the U.S. cattle industries to use these eartags would range from approximately $3.0 million to $3.2 million, with an average cost of $3.1 million. The total estimated annual cost for the bison industry would range from approximately $5.0 thousand to $7.2 thousand, with an average cost of $6.0 thousand.