

Farmed Cervid Chronic Wasting Disease Management and Response Activities 2022 Cooperative Agreements

2022 Project Executive Summaries

September 2022

Project Summaries for the Farmed Cervid Chronic Wasting Disease Management and Response Activities 2022 Cooperative Agreements

USDA APHIS VS awarded \$4.8 million through Cooperative Agreements to thirteen entities in twelve states. These projects will allow recipients to further develop and implement CWD management, response, and research activities in farmed cervids, including surveillance and testing. The Executive Summaries provided by the cooperators and the awarded amounts are below.

Farmed Cervid Management Projects
<p data-bbox="154 531 1364 598"><i>Exploring New Uses for PMCA and RT-QuIC in CWD Diagnosis: Prion Strain Discrimination and Soil Contamination</i>, Texas Parks, and Wildlife Department (Lockwood, M.) Award amount \$249,990</p> <p data-bbox="154 604 1364 1060">Chronic wasting disease (CWD) is a fatal disease affecting several cervid species. This disease is caused by unorthodox infectious agents called prions: misfolded protein aggregates devoid of nucleic acids (unlike viruses and bacteria). At present, CWD has been identified on three continents (North America, Asia, and Europe) and manifest in epidemic proportions. One of the main problems in the management of CWD is the lack of sensitive diagnostic tests able to diagnose diseased animals and the environment that contains them. While the real-time quaking induced conversion (RT-QuIC) and the protein misfolding cyclic amplification (PMCA) techniques provide us hope in this area, additional questions remain. One of them involves the strain diversity of CWD prions. CWD prion strains vary in their transmissible properties and rates of persistence in the environment, among several other relevant properties. For these reasons, it is extremely important to identify the specific CWD strains affecting cervid populations. By understanding the properties of the agent that is dealt with, better strategies for containment and eradication may be applied. Unfortunately, RT-QuIC and PMCA have not been explored for prion strain-specific diagnosis.</p> <p data-bbox="154 1102 1364 1459">Another limitation of PMCA and RT-QuIC is that they have not been optimized for the identification of infectious prions in environmental components. Although both techniques have been suggested to be used for that purpose, few reports are available and most of them involve laboratory/artificial conditions. Relevant environmental reservoirs for prions are soils as they bind and concentrate infectious prions released by infected animals. Soils inhibit PMCA and RT-QuIC reactions, and as soils vary in their compositions, protocols to refine these techniques for this specific sample type is problematic. Fortunately, our group has extensive experience modifying the PMCA technique for different purposes. In fact, we have detected CWD prions in soils and other components from a taxidermist facility using PMCA. This suggests that environmental components may be screened for prion infectivity.</p> <p data-bbox="154 1491 1364 1627">The purpose of this project is to standardize new uses for PMCA (and secondarily, RT-QuIC), namely: i) prion strain-specific diagnosis, and ii) screening of different soil types. Outcomes from this research may contribute to current efforts to diagnose CWD in deer and environmental components in a prion strain-specific manner.</p>
<p data-bbox="154 1675 1364 1743"><i>Improving Herd Management of CWD Affected Mule Deer Herd through Antemortem and Postmortem Testing</i>, South Dakota Animal Industry Board (Mendel, M.) Award amount \$120,000</p> <p data-bbox="154 1749 1364 1879">Currently ante-mortem CWD Immunohistochemistry (IHC) PrP testing of rectal biopsy samples is not validated for use in mule deer. Without a validated ante-mortem test, the current response to a CWD finding in a farmed herd is a quarantine of the affected herd, regulatory staff tracing if necessary, and depopulation if funding is available. By using this test protocol in a CWD affected herd and comparing</p>

the results of these tests to follow-up post-mortem testing of suspect animals, as well as testing mortalities occurring in the herd, conclusions can be drawn on how accurate and useful ante-mortem CWD IHC PrP testing may be for controlling the spread of CWD in captive mule deer herds. All captive mule deer producers would benefit from having a validated ante-mortem test to use for both CWD monitoring and potential pre-movement testing.

Utilization of CWD Management Strategies for CWD-affected herds and CWD-exposed cervids,
West Virginia Department of Agriculture (Alt, E.) Award amount \$9,790

CWD was first detected on a West Virginia (WV) cervid farm in August 2021. A second CWD-positive farmed cervid herd was discovered in January 2022. Both farms are located within the WV Department of Natural Resources CWD containment area. Depopulation is the preferred management strategy. However, the indemnification approval process can be prolonged due to increasing numbers of CWD-positive herd owners seeking federal indemnity. Without guarantee of indemnity funding, herd owners seek out other alternatives leaving long quarantines as the only option. Ante-mortem testing, and predictive genetics are tools that can assist herd owners in making evidence-based decisions when in long quarantines. This may include culling ante-mortem CWD-positive animals and those with undesirable predictive genetics. The overall goal of this project is to utilize CWD management strategies for CWD-affected herds and CWD-exposed cervids to control and/or prevent the spread of CWD.

The desired outcomes for this proposal include:

- 1) Assist CWD-exposed herd owners to effectively control and/or prevent the spread of CWD.
- 2) Support CWD detection via ante-mortem testing in CWD-affected herds.
- 3) Encourage selective breeding to minimize CWD susceptibility in exposed white-tailed deer herds located in high-prevalence CWD-endemic areas.

Herds remain in long quarantines when depopulation is delayed due to the indemnity process or owners decline depopulation as an option. The proposed solution to manage CWD in these herds is utilization of all available tools including the following: ante-mortem testing, genotyping, selective breeding, and culling of positive animals. This approach provides herd owners with tangible information to make evidence-based decisions for the future of their herds.

Chemical Inactivation of Soil-bound CWD Prions, Wisconsin Department of Natural Resources
(Storm, D.) Award amount \$97,608

Environmental transmission may play an important role in the long-term dynamics of cervid CWD. Infected animals shed prions in feces, urine, and saliva, and prions can be deposited in the environment via infected carcass or viscera from infected cervids left by hunters. Prion infectivity can persist in the environment for years and contribute to the maintenance of epizootics. Contamination of enclosures by residual secretions, excreta, or carcasses from prion-infected animals is sufficient to transmit prion disease to naïve animals' years after infected animals were present. Soil is a plausible reservoir of prions in the environment, and CWD prions have been detected in naturally contaminated soils. Prions are notoriously difficult to inactivate, exhibiting remarkable resistance to most methods of inactivation that are effective against conventional pathogens. Past efforts to disinfect prion-contaminated deer and elk pens have proven unsuccessful. The proposed research will test the efficacy of two potential decontamination agents in inactivating CWD prions in soil: peroxydisulfate (PMS) and hypochlorous acid (HOCl). Both have been successful in decontaminating prions in solution. We will work out conditions to maximize their efficacy in inactivating prions associated with soil under controlled conditions in experimentally contaminated

soils. We will then test the efficacy of an optimized protocol for inactivating prions in soil samples from at least one field site with a high incidence of CWD. The goal of the project will be a robust decontamination protocol for application to potentially contaminated soil in situ (e.g., captive cervid facilities, mineral licks, scrapes).

Axis Deer (Axis axis) Susceptibility to CWD, Texas Parks, and Wildlife Department (Lockwood, M.)
Award amount \$232,799

Recent prion protein research and anecdotal evidence suggests that axis deer are susceptible to CWD. However, state agencies in Texas are prohibited from placing regulatory requirements on a species until it is demonstrated that the species is naturally susceptible. Consequently, the first objective of this project is to determine if axis deer are naturally susceptible to CWD. This will be accomplished by housing eight axis deer with a CWD infected white-tailed deer (and an additional, initially uninfected, white-tailed deer which will serve as a sentinel demonstrating the infectiousness of the first). Animals will be housed in a biocontainment facility which will ensure that CWD from this project does not get out in the environment. Because we do not know the incubation period for CWD in axis deer, it may be necessary that this project extend beyond two years (under separate funding).

If axis deer are susceptible, it will be necessary to understand the disease course in the species. This is the second objective of the study. We will closely monitor axis deer for any abnormal signs, particularly those that are neurologic or might otherwise be suggestive of CWD. Documenting the signs and time-course of CWD in axis (if they are susceptible) will provide a clinical picture of the disease in this species. This will aid agency staff, cervid breeders, and the public in understanding what signs/lesions an axis at high risk of having CWD will exhibit.

More importantly, if axis deer are susceptible, we need to understand which diagnostic tests are useful for determining an individual's CWD status. This is the third objective. Every 3 months a cadre of potential antemortem tests will be conducted on the deer. This includes IHC on tonsil and RAMALT and RT-QuIC and PMCA on tonsil, RAMALT, body fluids and feces, and molecular biomarker analyses using blood samples. When an axis deer dies or is euthanized, full necropsies, gross and histologic analysis will be conducted on a variety of tissues with particular emphasis placed on lymphoid and nervous tissue. Additionally, IHC will be conducted on brain, spinal cord, tonsil, retropharyngeal lymph nodes and others, alimentary tract-associated lymphoid tissue, and select additional organs. RT-QuIC and PMCA will be conducted on lymphoid and nervous tissue as well as body fluid (to include CSF) and feces. Prion strain typing will also be conducted to explore the identity of the CWD agent in this new animal species.

Results of this study will be distributed to the scientific community and wildlife managers via peer-reviewed journal (*Journal of Wildlife Diseases*, *Prion*, etc.). Exotic animal producers will be notified via their trade magazines and public meetings. Results will help all the above develop management and regulatory programs to minimize the spread and reduce the prevalence of CWD in captive and free-range cervid populations.

<p><i>CWD Prevention & Education in New York State</i>, New York Department of Agriculture and Markets, Division of Animal Industry (Shane-Holser, B.) Award amount \$61,780</p>
<p>With CWD cases in two contiguous states, the closest case within 5 miles of a New York border, New York must engage in CWD prevention efforts, including the application and execution of the federal CWD HCP. Education of private veterinarians and veterinary students about CWD and cervid health will ensure high levels of surveillance in the state. Our captive cervid producers will benefit from NY remaining CWD free, including being one of two states who can move captive cervids to Indiana.</p>
<p><i>Enhancing Herd Management, Sample Collection, and CWD Educational Outreach for the Farmed Cervid Industry in Georgia</i>, Georgia Department of Agriculture (Weaver, D.) Award amount \$73,357</p>
<p>Georgia Department of Agriculture is the primary responding agency to issues regarding farmed cervid operations. There are multiple gaps identified within the State’s capacity to address and regulate its farmed cervid herds. Despite regulatory CWD controls, Georgia has had minimal industry involvement with surveillance and testing. The funding will provide the necessary resources to further develop Georgia’s capability to respond to the needs of the farmed cervid industry. The opportunity will also improve the industry’s knowledge of CWD, biosecurity, herd management, and bolster the State’s CWD sampling program. In addition, the programs funded by this grant will promote individual animal identification and accurate herd inventories.</p>
<p><i>CWD Information Systems Improvement Plan for Ohio’s Herd Certification Program</i>, Ohio Department of Agriculture, Division of Animal Health (Summer, D.) Award amount \$249,020</p>
<p>Ohio plans to improve the Herd Certification Program (HCP) through electronic application and licensing services, including on-line payments. This project addresses a critical need for improved data management for OH’s HCP. Implementation of Ohio’s CWD HCP is dependent on farmed cervid owners obtaining a license (required) under Ohio Revised Code (ORC) 943. Ohio uses a paper-based application process using traditional postal services. These paper applications are further processed by state staff into an electronic form by manual data entry into USAHERDS. This leads to inefficient implementation of the HCP due to increasing the follow-up time and labor hours by administrative staff needed to achieve compliance. Failure to maintain annual licensing leads to compliance issues with CWD standards and Ohio law. Paper based systems are slower and harder to manage due to voluminous paper records, leading to potentially inaccurate data due to human error (handwriting, legibility, or re-transcription into electronic form). This leads to potential gaps in traceability and investigations due to inaccurate records, lost paper records, and expired licenses. This reduces the consumer confidence in the HCP, according to verbal reports from Ohio’s cervid industry and stakeholders.</p> <p>By developing a web-based dealer licensing and payment system, OH reduces labor time and increases efficiency for program enrollment, verification, and enforcement. Reducing paper records increases industry support through improved consumer confidence and better records/data management. Increasing accuracy and data management of licenses will deliver improved traceability for CWD-affected herds. Creating an automated e-notification of license renewals will also reduce time by staff for follow-up calls, emails, letters, or site visits. This will allow Ohio administrative staff more time to work through movement records, inventories, and trace investigations, and enhancing the HCP.</p> <p>Goals achieved would be 1) improved management of CWD-affected herds; 2) improved records and</p>

data; 3) improved HCP implementation (i.e. enhanced compliance and enforcement activities); and 4) development of educational materials for producers.

Enhanced Electronic Collection of Data During Domestic Elk Movements, Utah Department of Agriculture and Food, (Price, A.) Award amount \$44,000

Utah Department of Agriculture and Food (UDAF) proposes to increase animal traceability, improve CWD surveillance, increase compliance with state and federal regulations, and reduce data entry time and costs for UDAF brand inspectors and Domestic Elk Program staff by developing modules for the mobile brand inspection application that allows rapid and seamless collection of elk movement and inventory data on domestic elk farms and parks. By significantly improving the accuracy of inventories and movement events on domestic elk facilities, UDAF will be better able to respond to any CWD outbreak within our state. Moreover, adding these two modules to our brand inspection program will save significant time as well as personnel costs.

CWD Disease Management and Assessment of the Ecology of Wildlife near the Perimeter Fence of Cervid Farms, Minnesota Board of Animal Health, (Glaser, L.) Award amount \$ 924,245

Results from our recent APHIS-funded CWD study identified risks associated with CWD-positive herd status in Midwest and Northeast cervid operations. One risk factor identified was the introduction of cervids from a cervid herd later found to have CWD positive animals. Another risk factor was proximity of the farm to the nearest CWD-positive wild deer (≤ 10 km), while other factors centered around activities related to the movement of scavengers through the perimeter fence that could introduce CWD infection (e.g., access by cats to cervid pens, on-site disposal of resident cervid carcasses above ground, use of single perimeter fencing). Overall, these factors highlight the importance of considering how transmission of CWD could occur due to indirect contact of farmed cervids with wildlife that approach or cross the fence line of cervid operations.

An important next step is to evaluate interactions between infected wild cervids and farmed cervids through wildlife activity near the perimeter fence. The objectives of this study are to

1. Identify and characterize wildlife activities associated with cervid farms in Midwest US regions with endemic CWD in wild deer populations, and
2. Update the on-farm CWD Risk Assessment tool for cervid producers and their veterinarians to assess the risk of CWD introduction to the operation.

Results from this study will provide estimates of the central tendency and variability of different wildlife interactions near the farm perimeter fence line, and relationships between these estimates and farm/environmental factors. Better understanding of the associations between cervid farms and wildlife that may serve as vectors for CWD transmission through fences will support development of improved farm biosecurity, in effect giving producers tools to protect themselves against a disease that threatens the sustainability of their operations. This project aligns with the APHIS priority area, 'Improve the management of CWD-affected farmed cervid premises,' through 'controlling or preventing the spread of CWD from ... (the) surrounding area by implementing or improving upon current guidance, ... and may include ... scavenger management or other biosecurity measures'.

CWD disease management will be improved by the removal of CWD exposed, suspect and/or positive cervids with indemnity.

Cervid Producer Online Portal for Herd Data Submission, Minnesota Board of Animal Health (Glaser, L.) Award amount \$ 226,747

Accurate and timely herd data are critical to the prevention, management, and response to CWD. The current model sees producers submitting data on paper forms through regular mail or through herd visits by regulatory officials. The specific problem this project solves is streamlining of data submission by producers by facilitating data submission through an online portal. This will greatly minimize the time it takes for the producer to perform the review and contribute towards the timeliness and accuracy of the returned census. The central plank of this project is to eliminate the need for annual census gathering as producers can submit data at the time of an event (e.g. herd addition, death) through the portal. This results in essentially real-time data being made available to regulatory officials, improving herd management, traceability, and responses to CWD detections. Data submission through the portal will result in reductions of staff time in State Animal Health Officials' offices. The target audience or beneficiaries of this project will be farmed cervid producers, State animal health officials and animal health officials with the USDA.

Landfill disposal of CWD-infected carcasses is a topic of extreme concern for state agencies, captive cervid facilities, landfill operators, and the public. Previous studies have found that prion transport through porous media was slow, and generally regard the risk associated with prion transport to be low. Nevertheless, doubt remains as to the risk associated with landfill disposal of CWD-infected carcasses. Many private and public landfill operators refuse to accept any deer carcass materials for fear of liability if prions leach from their properties. This leads to complex problems where state agencies are responsible for disposal of CWD-infected carcasses but are unable to do so for lack of a disposal site. To better articulate any risks associated with deer carcass disposal in landfills, we propose the following study. Our study aims to address knowledge gaps which exist in our understanding of prion transport using quantitative measurement of prion migration in landfill materials. New ultra-sensitive prion detection assays, such as RT-QuIC, are capable of detection of prions at far lower concentrations than older technologies and are amenable for use with a variety of sample types. Our multi-pronged approach involves optimization of RT-QuIC to detect CWD prions in landfill leachate, experimental investigation of prion transport through materials relevant for carcass burial, mathematical modeling of prion transport in the same materials, and analysis of leachate from several landfills for the presence of CWD prions. We first propose to adapt RT-QuIC for detecting CWD prions in solid waste leachate. We then plan to conduct column experiments to simulate prion movement through a variety of porous materials, including fresh and aged municipal solid waste.

Using RT-QuIC, we expect to be able to detect prion movement in these materials at far greater resolution than was previously possible. A particularly important aspect of the proposed research is the investigation of the role of preferential flow paths (macropores) on prion migration in soil and municipal solid waste. From these results, we intend to develop quantitative models which describe prion transport in each of these materials. Our experimental and modeling results will inform decisions about CWD disposal in extant landfills, and properly inform the public about any risk associated with landfill disposal of prion-infected materials. Finally, we plan to use our RT-QuIC protocol to analyze current landfill leachate for the presence of CWD prions, using leachate from three operational landfills. One of these landfills has never received CWD-infected materials; another formerly accepted deer carcasses, but no longer does so; and the third one actively receives deer carcasses. Focus on these landfills will allow a first assessment of the long- and short-term risk posed by prions in landfills. Our project represents the most thorough risk assessment of prion transport in solid porous media and leachate to date. This work will provide valuable information to the numerous stakeholders interested in effective CWD material disposal and expand the use of RT-QuIC as a tool for assessment of the environmental hazard posed by prions.

Genomic Predictions for Selective Breeding to Reduce Susceptibility to CWD in Farmed White-tailed Deer (*Odocoileus virginianus*), North Dakota Department of Agriculture, Animal Health Division, (Jacobs-Kopp, X.) Award amount \$ 52,500

It has been demonstrated that differential susceptibility to chronic wasting disease (CWD), and variation in natural disease progression, are both highly heritable polygenic traits in farmed U.S. white-tailed deer (*Odocoileus virginianus*). We propose to comprehensively define the genetic landscape of farmed white-tailed deer in North Dakota with respect to differences in CWD susceptibility using whole genome methods for the purpose of genetic improvement (i.e., reduced susceptibility) via selective breeding. The proposed project generates all the resources necessary to stimulate stakeholder changes in action, which will directly facilitate a reduction in CWD susceptibility among farmed white-tailed deer; and the potential for reducing the overall prevalence of CWD.

Genomic Predictions for Selective Breeding to Reduce Susceptibility to Chronic Wasting disease (CWD) in Farmed White-tailed Deer (*Odocoileus virginianus*), Minnesota Board of Animal Health (Glaser, L.) Award amount \$ 240,638

Dr. Seabury and his colleagues recently demonstrated that differential susceptibility to chronic wasting disease (CWD), and variation in natural disease progression, are both highly heritable polygenic traits in farmed U.S. white-tailed deer (*Odocoileus virginianus*). Moreover, using machine learning and cross validation, Dr. Seabury and his colleagues also demonstrated that genomic prediction accuracies for differential susceptibility to CWD were high, thereby providing robust evidence that the implementation of genomic selection (i.e., genome-assisted selected breeding) can be expected to reduce the prevalence of CWD in farmed U.S. white-tailed deer. To further demonstrate the utility of genomic predictions with respect to differential susceptibility to CWD, Dr. Seabury has since performed a blind validation study (2021) with USDA APHIS (VS) using more than 480 samples; the results of which clearly show that genomic predictions for selective breeding can potentially reduce the prevalence of CWD by $\geq 85\%$ in farmed white-tailed deer. Moreover, until recently, no impactful management, veterinary, or predictive interventions existed for mitigating risk of CWD in Minnesota white-tailed deer farms. Therefore, we propose to learn more about the genetics of Minnesota farmed white-tailed deer related to differences in CWD susceptibility using the same whole-genome methods recently described; for the purpose of genetic improvement (i.e., reduced susceptibility) via selective breeding. The proposed project generates all the resources necessary to stimulate stakeholder changes in action, which will directly facilitate a reduction in CWD susceptibility among farmed white-tailed deer; and the potential for reducing the overall prevalence of CWD.

CWD Disease Management and CWD Selective Breeding by performing Vasectomies in Whitetail Deer, Pennsylvania Department of Agriculture, (Proctor, B.) Award amount \$ 1,282,711

The Pennsylvania Department of Agriculture will partner with captive cervid facilities within the Commonwealth and will ensure all data collected will be shared between all participants including the USDA. All captive cervid facility participants must be active and in compliance with all CWD program standards commensurate with their enrollment level, as well as the Pennsylvania Department of Agriculture Quarantine Orders. Registered premises must also participate in Dr. Christopher Seabury's Genomics Predictions Study, all participating whitetail deer (including fawns) must have an official identification number as specified in the Pennsylvania Department of Agriculture, General Quarantine Order and born on premises within Pennsylvania. The Pennsylvania Department of Agriculture will reimburse participating facilities up to \$200.00 per whitetail with a maximum of four procedures

completed per visit, excluding anesthesia and other drugs associated with the procedure.

Dr. Dustin Davis of Laurel Highlands Animal Hospital will perform all vasectomies for all participants in the program. Dr. Davis describes the procedure as follows; vasectomies are routine procedures in certain aspects of veterinary medicine (small ruminants especially). The vasectomy is the best way to sterilize an intact male without interfering with hormonal processes. It is typically done under general anesthesia and takes about 20 mins per whitetail. An area is clipped and prepped sterilely just proximal to the testicle on the scrotum. A small stab incision is then made, and the spermatic cord is exteriorized. The vas deferens is isolated from the other structures of the cord and a large (about 4') section is removed and both ends are crushed. The skin is then closed with absorbable suture (usually #2 vicryl) after the cord is reduced back into the scrotum. This type of procedure does not produce any long-term side effects allowing the whitetail to mature and be harvested.

CWD disease management will be improved by the removal of CWD exposed, suspect and/or positive cervids with indemnity.

CWD Disease Management and Farmed Cervid remote identification and surveillance using Bluetooth® eartags and Unmanned Aircraft Systems (UAS), Kansas Department of Agriculture, Division of Animal Health, (Nelson, J.) Award amount \$ 332,486

Cervids present their own unique challenges, not only for people who choose to raise them as livestock but also for the groups who have the responsibility of oversight for such operations. Unlike other livestock species that have been domesticated over centuries, if not millennia, farmed cervids share many of the behaviors of wild cervids. For many farmed cervid species, the flight portion of the fight or flight response is just as heightened as their wild counterparts. It is incredibly difficult to evaluate health or production parameters of a farmed cervid herd let alone one specific farmed cervid when these animals instinctively avoid any potentially threatening interactions by keeping their distance, running away, and/or hiding. Even attempting to locate or identify a particular animal can be time consuming and unsuccessful.

Identification ear tags that use Bluetooth® technology for transmission of data to a reader offer producers and regulatory agencies more accurate animal and herd information. When the reader is programmed to transmit the collected information from the ear tags to a smart device, this information is collected and shared much more efficiently, requiring less time, less energy, and less animal handling. The combination of Bluetooth® ear tags and readers can collect information on animals in their enclosure and transmitting that data to a smart device for remote monitoring. The ear tags transmit a Bluetooth® signal and the reader has a read range of greater than 100 yards. Once the reader collects the data, cellular networks are then used to transmit the data from the reader to a smart device where data is housed and manipulated via a software program. This project will look at the effectiveness of Bluetooth® equipment and technology in Kansas farmed cervid operations. KDA DAH will partner with licensed farmed cervid producers to apply Bluetooth® ear tags in herds of different cervid species, varying terrains, multiple sizes, and diverse purposes.

Cervid compatibility with the ear tags will be evaluated. Reading ability and value of data collected will be compared between readers stationed at commonly frequented locations verses readers attached to an UAS. The usability of data collected from Bluetooth® ear tags that collect only identification and relative location information verses Bluetooth® ear tags that also collect accelerometer and ambient temperature information along with identification and relative location will also be determined from a producer standpoint and a regulatory agency standpoint. The

producers who volunteer for the project will be surveyed as to the ease of use of the equipment and technology, any benefit gained from the animals wearing the ear tags, and the worth of the data collected from the different versions of ear tags.

CWD disease management will be improved by removal of CWD exposed, suspect and/or positive cervids with indemnity.

Evaluating Long Range Low Energy Ear Tags for Tracking White-tailed Deer “Released” from CWD-Positive Deer Breeding Facility into a Hunting Enclosure, Texas Animal Health Commission, Schwartz, A.) Award amount \$ 250,000

Raising white-tailed deer in captivity for ultimate “release” into high-fenced enclosures or “release sites” is a practice allowed in many states, including the state of Texas. Implementing an accurate electronic identification system would strengthen the deer breeders’ accountability for reporting and allow real-time animal tracking that is extremely valuable for inventory, disease surveillance, and management of both affected and non-affected herds.

The Texas Animal Health Commission and Texas Parks and Wildlife Department (TPWD), working in conjunction with MicroTraks, will develop and test the potential for Long Range Low Energy tags as a solution for CWD traceability in a real-world pilot study. Ox Hunting Ranch, a recipient of captive cervids raised at Ox Genetics deer breeding facility currently operating under an intensive, self-funded, genetic-selection project aimed at reducing CWD susceptibility within the herd, has volunteered to be the testing site for this new technology.

Microtraks will specifically design tags with regenerative power technology that will power the tags through the duration of a hunting season to ensure 100% of the “released” white-tailed deer are recovered following natural mortality, escape from the “release site” enclosure, or harvest.

Specifically, MicroTraks will:

- Monitor and notify the ranch manager/owner and TPWD of any deer that is not moving within 8-hours, helping to eliminate samples missed due to carcass deterioration.
- Monitor and alert all parties if a deer jumps, or escapes, the enclosed parcel of land, facilitating recapture and reducing opportunities for disease spread.
- Provide a 100% accurate manifest of all deer that have been harvested over the hunting season and which deer still remain on the parcel of land, providing information critical to management of the herd and regulatory oversight.
- Provide accurate reporting until all deer have been harvested and identified and confirmed by TPWD, thereby proving compliance with the genetic management herd plan.
- Once the pilot has concluded, it will yield tools and resources to monitor farmed cervid herd movements, greatly reducing man hours and valuable state and federal resources. Lastly, this pilot will prove the first surveillance of farmed cervid movements to decrease the spread of CWD, which can serve as a model to other states to control the spread of CWD.

The primary audience or population that will directly benefit from this project are the deer breeders of Texas. However, the project will also benefit state and or federal regulators tasked with reducing the prevalence of CWD in farmed cervids.

CWD Genetic Improvement Plan and Continued Support of Ohio's Herd Certification Program,
Ohio Department of Agriculture, Division of Animal Health, (Summers, D.) Award amount \$340,997

Ohio Department of Agriculture (ODA) regulates Ohio's captive cervid industry and protects and promotes the health of farmed cervids. To maintain a healthy captive cervid population, it is critical that ODA has a strong HCP and continuously works to reduce the risk and spread of CWD. ODNR detected a total of eleven CWD-positive wild white-tailed deer from 2020-2022 hunting seasons and culling efforts. With a history of CWD positive captive premises in previous years, recent CWD detections in wild white-tailed deer and spreading geographic distribution in the U.S., it is important for ODA to have a veterinary epidemiologist to provide support to the HCP. It is also critical to use selective genetics to reduce CWD susceptibility in captive white-tailed deer.

ODA proposes to maintain a veterinary epidemiologist on staff to provide critical support and subject matter expertise to Ohio's cervid industry and to continue to build upon the HCP improvements made with VS FY2021 Farmed Cervid Funding through increased compliance, monitoring, and enforcement. The epidemiologist will continue to expand outreach activities, in-field sample collection trainings, writing standard operating procedures and developing informational documents for ODA's CWD webpage. By enhancing the HCP further, the epidemiologist will increase disease surveillance and increase consumer confidence and industry support for the HCP.

Dr. Seabury et al. demonstrated that CWD susceptibility and natural variation in disease progression are moderately to highly heritable and that genomic predictions for selective breeding can reduce the prevalence of CWD. Ohio proposes to implement a voluntary genetic improvement plan for whitetail deer herds enrolled in the HCP. Participants will be able to have genetic testing completed through North American Deer Registry at a subsidized rate. Genetic improvements will be made by culling and selective breeding which will reduce CWD susceptibility of Ohio's captive deer.

ODA's proposal for epidemiological support for the HCP and to implement a voluntary, novel genetic improvement plan will overall strengthen Ohio's captive cervid population, prevent the incidence of CWD in captive cervids and increase consumer and industry support for the HCP and CWD management.

Total	\$4,788,668
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