MAFWA Update for Nebraska April 2020

With the current pandemic, Nebraska is following the CDC and state agency guidelines for both human safety and wildlife research/surveillance. We are currently developing guidelines that would help researchers, biologists, rehabbers, pest control issues, etc. during this extended period. We are only submitting research related and high priority cases for wildlife disease testing at this time. Other restrictions now in place include the Governor and agency approved closing of turkey hunting to all non-residents for the 2020 spring turkey season, and closing all public areas to overnight camping until further notice. At this point, there is a lot of uncertainty as to what lies ahead this summer and fall for wildlife related work but we will make adjustments as new information and research provides.

North Dakota Game and Fish Wildlife Health Lab Summary

MAFWA Wildlife Health Committee Meeting

April 2020

Prepared by Charlie Bahnson, Wildlife Veterinarian, NDGF

Chronic Wasting Disease

2019 CWD SURVEILLANCE SUMMARY: Approximately 3640 animals were tested for CWD in 2019. Results indicated a slight increase in prevalence among adult, hunter-harvest mule deer in previously positive units 3F2 and 3A1 (3.1 and 1.9%, respectively). Single positive detections were also found in new hunting units 3B1 and 4B, approximately 50 and 80 miles further south than detections in 3A1.

Chronic wasting disease was not detected in the eastern third of North Dakota where rotating surveillance was conducted.

Figure 1: North Dakota deer hunting units and 2019 CWD surveillance areas.

Table 1: Number of free-ranging cervids tested for CWD in 2019 in North Dakota.

Species	Hunter Harvested	Targeted Surveillance
White-tailed Deer	2122 (3)[a]	325 (0)
Mule Deer	960 (9)	48 (0)
Elk	53 (0)	4 (0)
Moose	107 (0)	21 (0)
Total	3242 (12)	398(0)

[a] Number of animals tested (Number of positive detections)

2019 CWD MANAGEMENT HIGHLIGHTS:

- Issued an increase in licenses for units 3A1 (40%), 3B1 (58%), and 3F2 (16%).
- Amended regulations to allow hunters to harvest more than one deer with rifle in unit 3F2.
- Added carcass transportation restrictions to units 3A1 and 3B1.
- Added baiting restrictions to units 3A1, 3B1, 3A3, and 3A2.
- Ran pilot project where carcass disposal sites were provided in remote areas with carcass transportation restrictions.

General Mortality Investigations

Necropsies and/or general morbidity-mortality investigations were performed on approximately 425 animals at the NDGF Wildlife Health Lab. Species included American marten, badger, big brown bat, bighorn sheep, black bear, bobcat, Eurasian collared dove, fisher, fox squirrel, great blue heron, mallard, moose, mountain lion, mule deer, pronghorn, racoon, ring neck pheasant, river otter, rock dove, sage grouse, striped skunk, white-tailed deer, and wolf.

Rabies

NDGF continued to assist the ND Department of Public Health with rabies surveillance in wildlife through submission of samples from diagnostic cases, road-killed animals, and trapper-harvested animals.

Figure 3: Locations of rabies detections by county.

Table 1: 2019 Rabies activity in North Dakota by species

Species	Number Confirmed
Bat	1
Bovine	1
Cat	0
Dog	0
Skunk	2

Viral Hemorrhagic Septicemia

In 2019, 60 walleyes from Lake Sakakawea and 60 northern pike from Lake Oahe were sampled for VHS to comply with transportation requirements. All samples were negative for VHS.

Hemorrhagic Disease

In September 2019, NDGF received approximately 10 reports of acute mortalities in white-tailed deer in Williams, McKenzie, and Dunn counties. Epizootic hemorrhagic disease, serotype 2 (EHDV-2) was isolated from a white-tailed deer from Williams County, and EHD was detected by PCR in tissues from a white-tailed deer in McKenzie County. As these reports began to come in, a mortality event due to anthrax was documented in a cattle herd in the vicinity of these cases. The handful of additional reports of dead deer were recorded as suspect hemorrhagic disease cases but further diagnostics were not pursued.

Pigeon Paramyxovirus

In December 2019, NDGF began receiving reports of multiple Eurasian collared doves found dead. Pigeon paramyxovirus-1 was determined as the cause of death. Following a press release soliciting information from the public, NDGF received over 50 reports of approximately 275 dead EUCDs found dead from December through February from Morton and Burleigh Counties, North Dakota.

Sage Grouse Translocations

The translocation efforts from Rawlins, WY to Bowman County, ND continued in 2019. In April, 20 adult males were translocated to ND. An additional 19 hens, and 40 chicks were translocated in late June/early July. All birds were screened for influenza A virus, avian tuberculosis, fowl typhoid, and *Mycoplasma* sp. The 20 birds translocated in April tested negative to all diseases. Two hens translocated in June tested PCR positive to *Mycobacterium avium.* Permission was granted to retest the adults and chicks. One adult died of unknown cause prior to recapture. The remaining adult and all chicks tested negative by PCR.

Bighorn Sheep Translocations

In January 2020, North Dakota Game and Fish assisted with the translocation of 35 bighorn sheep from Rocky Boys Indian Reservation in Montana to the Fort Berthold Reservation in central North Dakota. Sheep were screened for *Mycoplasma ovipneumonia*, and *Brucella* spp. All sheep tested negative.

Elk Capture

In January 2019, 90 elk were radio collared for a research project. No antibodies to *Brucella* sp. or blue tongue virus were not detected in 34 serum samples tested. Eleven of 34 samples were positive for antibodies to epizootic hemorrhagic disease virus by AGID.

Mallard Implantations

As part of an ongoing study examining habitat use and movement patterns of locally hatched mallards, NDGF Wildlife Health Laboratory Personnel surgically implanted intracelomic GPS/GSM transmitters into 18 young-of-year Mallards. All birds were successfully released following recovery from the procedure.

Bovine Tuberculosis

In December 2018, the North Dakota Department of Agriculture confirmed the detection of bovine TB in a beef herd in Sargent County in Southeastern North Dakota. Approximately 12 animals were confirmed positive by NVSL and depopulation of the approximately 100 remaining animals was completed in March 2019.

In collaboration with USDA Wildlife Services, NDGF sampled 82 coyotes collected from the surrounding area. Culture results were negative, and no suspect lesions were identified on histopathology. Wildlife Services trapped and removed 5 raccoons and 2 feral cats from the premise. All cultured negative and no suspect histologic lesions were identified.

Ontario Ministry of Natural Resources & Forestry – 2019 Report

Midwest Fish and Wildlife Health Committee

Ontario

Chronic Wasting Disease

In 2019, Ontario's chronic wasting disease (CWD) surveillance program occurred in two areas of the province; an area in northwestern Ontario that was identified as a high priority and an area in eastern Ontario in response to cases detected on a farm in western Quebec, near the Ontario border in 2018.

The Ontario CWD surveillance program uses a dynamic risk-based model to predict highest risk areas of the province on an annual basis. Risk inputs used in the current model are (in order of importance): estimated cervid farm density, proximity of neighbouring CWD outbreaks, estimated wild deer density, years since last surveillance, presence of unstudied elk/red deer populations and deer wintering concentrations. Each year, new data are input to determine the areas with the highest risk, which informs the choice of the surveillance area.

Accordingly, CWD surveillance was conducted in northwestern Ontario (Figure 1), which included Wildlife Management Units (WMUs) 8, 9a, 9b, 10, and 13 (Figure 2a). Freezer depots were established at ten locations throughout the sampling area where hunters could drop off their deer heads for testing. Depots were open from September until the first week of December so hunters could drop off their deer heads. As well, during November, roving crews of MNRF wildlife research technicians sampled deer directly from hunters within the zone. Most of the samples (83%) were collected by MNRF roving crews. The remaining samples (17%) were collected from the depots. In total, 174 wild deer were sampled and screened for CWD, which was not detected in any of the samples.

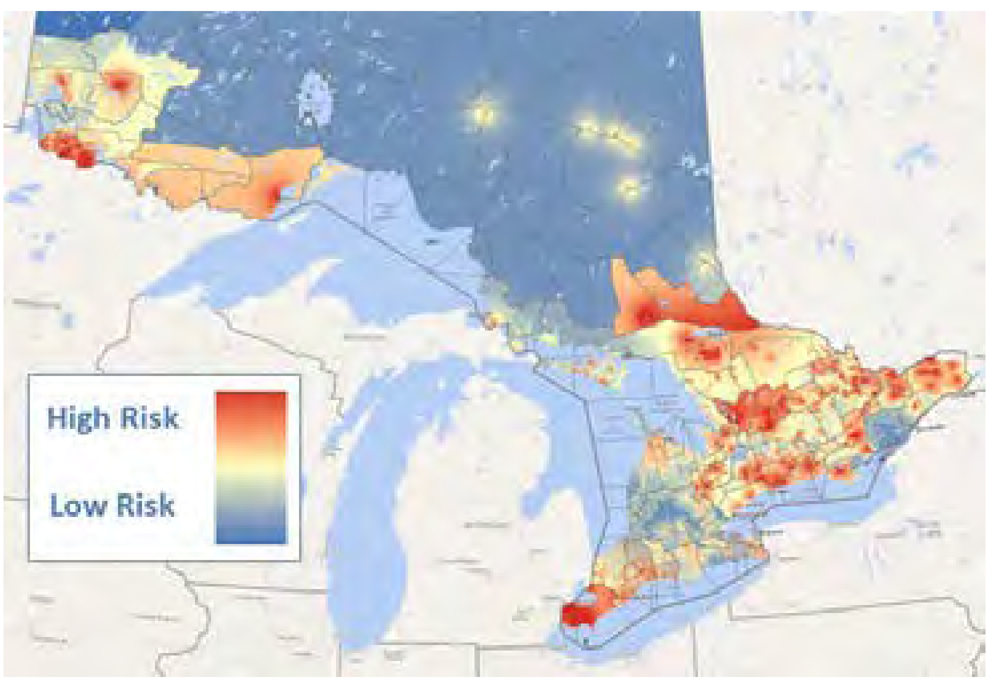

Figure 1. Modeled risk of chronic wasting disease for 2019.

On September 10th, 2018, the first case of CWD in Quebec was detected on a game farm approximately 15 km from the Ontario-Quebec border near Hawkesbury, Ontario (Figure 2b). For the second year in a row, MNRF established a second surveillance zone in eastern Ontario (WMU 65 and 64b) adjacent to Quebec (Figure 2b). MNRF established eight freezer depots within the eastern surveillance zone. Depots were open from early October until January 5, so hunters could drop off their deer heads for sampling. Most of the samples (57%) were collected through depots and participating butchers. The remaining samples (43%) were collected from MNRF roving crews. In total, 275 wild cervids were sampled and screened for CWD in eastern Ontario. CWD was not detected in any of the samples. The province of Quebec has tested a significant number of wild deer surrounding the positive game farm in 2018 and 2019, no positive cases have been identified in Quebec wild deer yet.

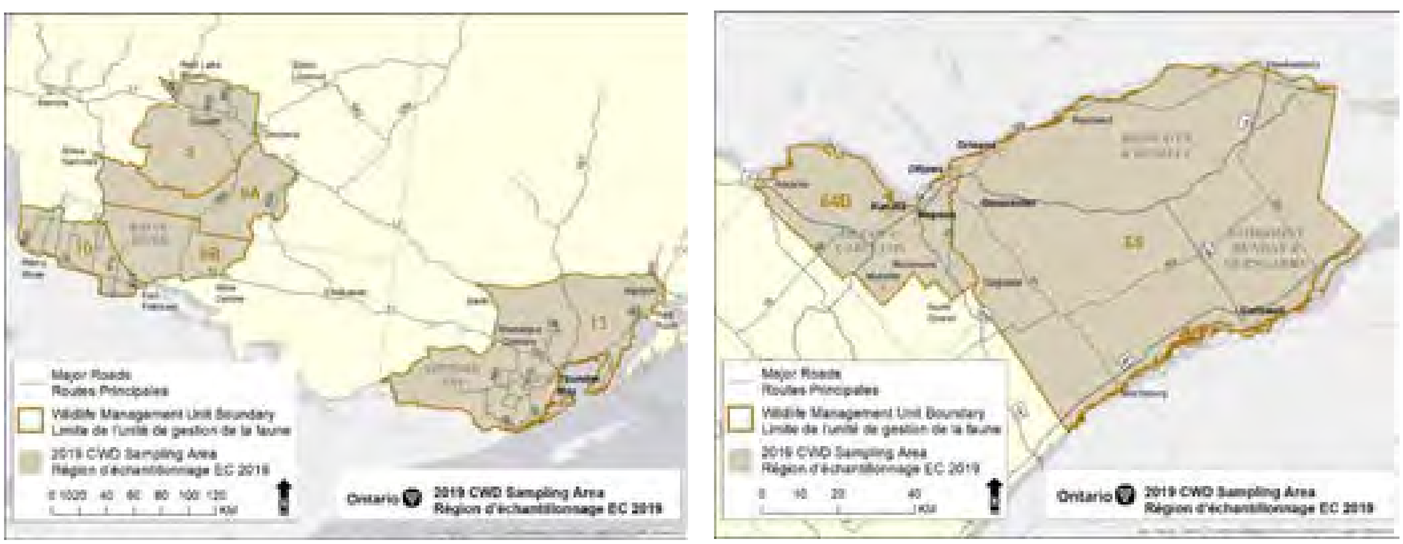

Figure 2. 2019 CWD surveillance zones in northwestern Ontario (a) and in eastern

In addition to MNRF's annual systematic surveillance, the ministry also opportunistically tests samples from cervids that display CWD-like symptoms, as reported by the public or MNRF offices, throughout the year and across the province. In 2019, 14 white-tailed deer were opportunistically collected and tested from across the province. Reported symptoms included abnormal appearance or behaviour, emaciation and disorientation. Five moose, 4 red deer, 2 elk, and 1 fallow deer were also sent in for testing. Post-mortems on these animals were performed by the Canadian Wildlife Health Cooperative (CWHC) in Guelph, Ontario. All animals tested negative for CWD. Since 2009, 103 cervids displaying abnormal, CWD-like behaviour have been necropsied and tested for CWD (Figure 4); CWD was not detected in any of the samples.

In 2019, MNRF staff collaborated with Dr. Samantha Allen from the University of Guelph to collect blood samples from deer harvested within the CWD surveillance zone. The aim of the project is to look at the distribution of certain arboviruses in wild white-tailed deer, specifically the distribution of antibodies for eastern equine encephalitis.

In 2019 MNRF's CWD program supported a project led by Dr. Joseph Northrup (MNRF) and Dr. Aaron Schafer (Trent University) that characterized the spatial pattern of genetic susceptibility to CWD in Ontario's white-tailed deer. Genetic variation in the prion protein (PRNP) gene has been shown to impact how quickly deer display symptoms of CWD and how long they shed prions to the environment. These factors could influence the rate of CWD spread and therefore inform future surveillance and monitoring. The team sequenced the PRNP gene and quantified variation of four known positions (referred to as SNPs) that link to reduced expression of CWD symptoms. They found no variation in these genes across the province, which is consistent with populations that have no or recent detections of CWD. They developed a bioinformatic pipeline that streamlined the analysis and will be making it publicly available to facilitate future assessments. Based on these findings they recommend continued sampling of tissue for CWD detection and continued genotyping of the PRNP gene in high-risk areas. This project was funded by the Ontario Animal Health Network (OAHN).

This was the 17th operational year of the Ontario CWD surveillance program. All areas of the province with significant deer populations have been surveyed at least once, and many of the highest priority areas have been surveyed two or three times. To date, 12,925 wild cervids (12,898 white-tailed deer, 15 elk, 6 moose, 5 red deer, and 1 fallow deer) have been tested for CWD during regular surveillance, and no cases of CWD have ever been detected in wild deer populations in Ontario. All neighbouring U.S. states have had positive CWD cases.

Ontario's CWD response plan was updated in 2019 to ensure it continues to reflect current scientific knowledge about CWD, the evolving roles of government agencies (including the Canadian Food Inspection Agency; CFIA), and that appropriate mechanisms and responses are in place to minimize the risk of CWD entering or spreading within Ontario.

Rabies

The Ontario Ministry of Natural Resources and Forestry continued its efforts to control and contain the rabies virus in southern Ontario. As of December 2019, there were a total 471 raccoon strain and 21 fox strain cases detected in the province since the outbreaks began December 2015 (Figure 4). In 2019 a total of 65 rabies cases were detected in Ontario (22 terrestrial rabies, all raccoon and no fox strain, and 43 bat strain), continuing ≥50% downward trends of annual terrestrial cases, since peaking in 2016.

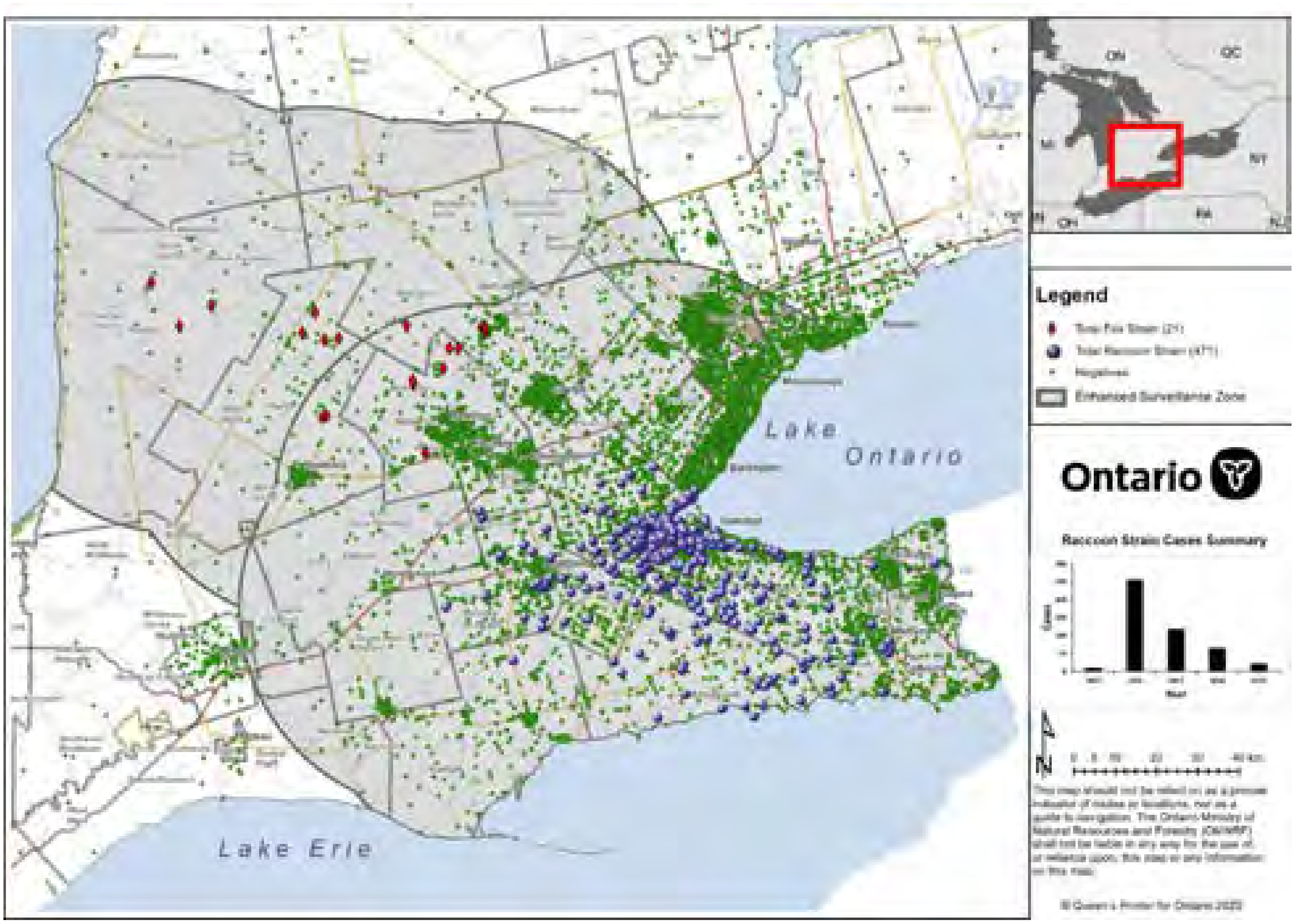

Figure 4. Positive (blue/red) and negative (green) samples tested since December 15, 2015. Grey shaded area indicates the rabies control areas.

All terrestrial rabies cases in 2019 were found within the ministry's enhanced surveillance zone. The MNRF's enhanced surveillance program has been a key element in receiving and testing animals that are acting strange, ill or have been found dead. In 2019 MNRF tested over 4425 specimens, which provided insight on the size and spread of the rabies outbreak and helped target management and control decisions.

In 2019, close to 1.2 million rabies vaccine baits were distributed in southern Ontario by hand and air. Annual bait distribution occurred within the ministry's surveillance and control zone and through individual spot treatments for cases at the periphery of the enhanced surveillance and control areas (Figure 4). Proactive vaccine baiting was also conducted along the New York and Ontario border in the Niagara Peninsula and near Kingston and Cornwall in eastern Ontario. This proactive baiting maintains a buffer of immunized animals in high risk areas where there is potential for infected animals to enter from the US. In eastern Ontario, baits were distributed in the City of Cornwall, on Wolfe Island, and on the adjacent mainland east of Kingston. MNRF partnered with the Mohawks of Akwesasne First Nation to provide baits for distribution on Cornwall Island (Akwesasne).

Planned activities for the 2020 season include:

- large scale aerial baiting in rural areas to prevent further spread of fox and raccoon strain rabies
- hand-baiting in urban areas within the control zone
- enhanced surveillance within 50 km of known rabies cases
- trap-vaccinate-release (TVR) in strategic urban areas in Hamilton, Burlington and around outlying new cases as needed
- proactive baiting in areas where the risk of rabies re-incursion is high (along the New York and Ontario border)
- evaluation of baiting operations effectiveness by live trapping and testing antibody levels in skunks and raccoon in baited areas

The MNRF is continuing to work with Quebec and the United States Department of Agriculture through the North-East Raccoon Rabies Control Program to reduce the potential that Ontario will experience any further outbreaks of raccoon rabies originating from those jurisdictions, and to collaboratively research and develop improved rabies knowledge, control strategies, and technologies.

Bat white-nose syndrome

MNRF researchers led a collaborative study comparing the response of three species of bat to white-nose syndrome (WNS) in partnership with scientists from the University of Winnipeg, University of Veterinary and Pharmaceutical Sciences Brno (Czech Republic), and the Academy of Sciences of the Czech Republic. The study compared transcriptomic responses (gene expression) of a European species (the greater mouse-eared bat) that co-evolved with the fungus that causes WNS, with that of two Canadian species (little brown bats and big brown bats) to whom exposure to the WNS fungus is novel (Figure 5). These three species have displayed different disease outcomes to WNS exposure.

Figure 5. A big brown bat emerging from hibernation

The results showed that both the little brown bats and greater mouse-eared bats up-regulated their overall immune responses in response to WNS exposure despite showing a different susceptibility to the disease. While those two species mounted systemic responses to infection, big brown bats mounted a localized response observed by a strong immune response in lesions on the wings where the fungus had invaded the skin, but not in intact wing tissue on the same wings. In addition, they found that while the fungus up-regulated the same molecular responses to growth in all three species, they each displayed different growth rates.

Ophidiomycosis (Snake Fungal Disease)

Figure 6. An eastern foxsnake basking in a wetland.

Researchers tracked the prevalence of the fungal pathogen ophidiomycosis (*Ophidiomyces ophiodiicola*, also called snake fungal disease) in wild snakes at a site in south-western Ontario, in collaboration with the Canadian Wildlife Health Cooperative (CWHC). The pathogen was monitored by qPCR testing of swabs collected from the body or any observed lesions consistent with ophidiomycosis. Based on two years of sample collection, the pathogen was detected most frequently on snakes in the spring, with detection decreasing through the active season. The same pattern was observed for clinical signs of ophidiomycosis. However, the pathogen was detected on snakes with and without clinical signs indicating that the prevalence of the pathogen in snakes is independent of clinical signs. Ophidiomycosis was most commonly detected in eastern foxsnakes (Figure 6) and occasionally detected in other snake species. Based on the data collected using radio-telemetry on a subset of eastern foxsnakes, ophidiomycosis was not associated with changes in body condition, home range sizes and distances travelled. Snakes with ophidiomycosis had comparable survival to snakes without the disease. To further the understanding of *ophiodiicola* transmission the team conducted an experimental test of contact transmission using cornsnakes, in collaboration with CWHC. This test showed that contact transmission can occur during over-wintering but is infrequent. Finally, the pathology of ophidiomycosis in wild Ontario snakes was found to be consistent with that reported in captive experiments.

Mycoplasma and Eimeria in Ontario wild turkeys

Following extirpation from Ontario, Canada, in the early 1900s, Eastern Wild Turkeys (EWTs; Meleagris gallopavo silvestris) were successfully reintroduced to the province in 1984. In 2018 new research was published related to viruses in EWTs. Mycoplasma and Eimeria spp. are potential pathogens in Galliformes, and scientists set out to determine their prevalence and distribution in Ontario wild turkeys. During the 2015 spring hunting season (April and May), oropharyngeal swabs from 147 hunter-harvested and five opportunistically collected turkeys from southern Ontario were cultured for Mycoplasma spp. The intestinal or cloacal contents of 107 of these birds and an additional 24 opportunistically and biologist-collected turkeys (Figure 7) were analyzed for Eimeria spp. using PCR or fecal flotation. At least one Mycoplasma spp. was isolated from 98.7% of EWTs, with six species identified.

Figure 7. MNRF researchers releasing a captured turkey.

Mycoplasma gallopavonis was identified most commonly in 96.7% of samples collected, followed by Mycoplasma gallinaceum in 23.7%. Potential poultry pathogens (Mycoplasma meleagridis, Mycoplasma iowae, and Mycoplasma synoviae) were isolated from swabs in 3.3% of EWTs sampled. Coinfections with up to three Mycoplasma spp. were detected in 36.8% of EWTs. Most wild turkeys tested positive for Eimeria spp. oocysts (75.6%; 99/131). A subset of positive samples (n=16) were characterized by PCR, which detected the following species: Eimeria meleagrimitis (93.8%), Eimeria adenoeides (93.8%), Eimeria gallopavonis (56.3%), and Eimeria meleagridis (12.5%). The majority (93.8%) of these samples were positive for more than one Eimeria spp. This research showed that numerous, mostly non-pathogenic Mycoplasma and Eimeria spp. circulate in eastern wild turkeys across southern Ontario, and this helped to establish baseline information for comparison with future surveillance and monitoring.

Lymphoproliferative disease virus

The successful reintroduction of wild turkeys to Ontario, Canada, has led to established populations in southern portions of the province. These populations geographically overlap domestic turkey farms, an important sector of the provincial agri-food industry. Potential pathogen transmission between wild and domestic turkeys is a concern, because they are susceptible to infection with many of the same pathogens and have direct and indirect contact in outdoor or open farm settings and contaminated environmental substrates. Researchers assessed the prevalence and geographic distribution of geographically relevant viruses in Ontario wild turkeys. Oropharyngeal and cloacal swabs were tested for avian influenza viruses (AIV) by real-time reverse transcriptase (RT)-PCR (n=207), pooled tissues for lymphoproliferative disease virus (LPDV; n=183) and reticuloendotheliosis virus (REV; n=119) by PCR, and gross skin lesions by real-time RT-PCR for avian poxvirus (n=8). Researchers sequenced a fragment of the gag polyprotein (p31) gene of LPDV on a subset (n=10) of LPDV-positive samples for phylogenetic analysis and tested additional upland game bird species (n=39) and domestic fowl (n=17).

This research identified the first LPDV in wild turkeys in Canada, with a prevalence of 65%. Phylogenetic analysis revealed that LPDV sequences from Ontario were genetically similar to other North American strains and did not group into separate clades. Reticuloendotheliosis virus was detected in 4% of LPDV-positive wild turkeys. Grossly evident skin lesions from five wild turkeys tested positive for poxvirus, and all turkeys tested negative for AIV. This study provides evidence of LPDV circulation in Canada and provides a baseline for comparison with future wild turkey pathogen surveillance and monitoring in Ontario.

Additional monitoring

- Avian Botulism
- Avian Influenza Surveillance
- Canine distemper
- Echinococcus multilocularis in canids
- Epizootic Hemorrhagic Disease (EHD)
- Ranavirus
- Turtle herpesvirus
- Wild Turkey Pox

Saskatchewan Ministry of Environment-2020 Report

Midwest Fish and Wildlife Health Committee Meeting

Chronic Wasting Disease:

Submissions to the Ministry of Environment's Chronic Wasting Disease (CWD) hunter surveillance program increased during the 2019-2020 hunting season. More than 3,300 animals were submitted for testing, up from 2,000 the previous year. Five hundred and twenty-eight positive cases were detected through the hunter surveillance program and another 36 clinical cases were reported to conservation officers. Of the hunter surveillance animals that were tested there were 414 positive mule deer, 107 white-tailed deer, six elk and one moose. The number of positives increased from the 2018-2019 hunting season when a total of 349 positive cases were detected. In male mule deer, the prevalence among tested animals from 2019-2020 hunting season was just over 40%. Nearly 250 heads were collected at self-serve kiosks across the province.

The disease was detected in seven new zones for a total 55 of 83 WMZs in Saskatchewan and is considered endemic across most of the southern part of the province. CWD has not yet been detected in the boreal forest, but its spread to threatened boreal caribou is a potential concern.

The Ministry of Environment in conjunction with the Ministry of Agriculture is working on a CWD Management Strategy to help limit transmission of the disease in affected areas and reduce the risk of spread to new species and areas.

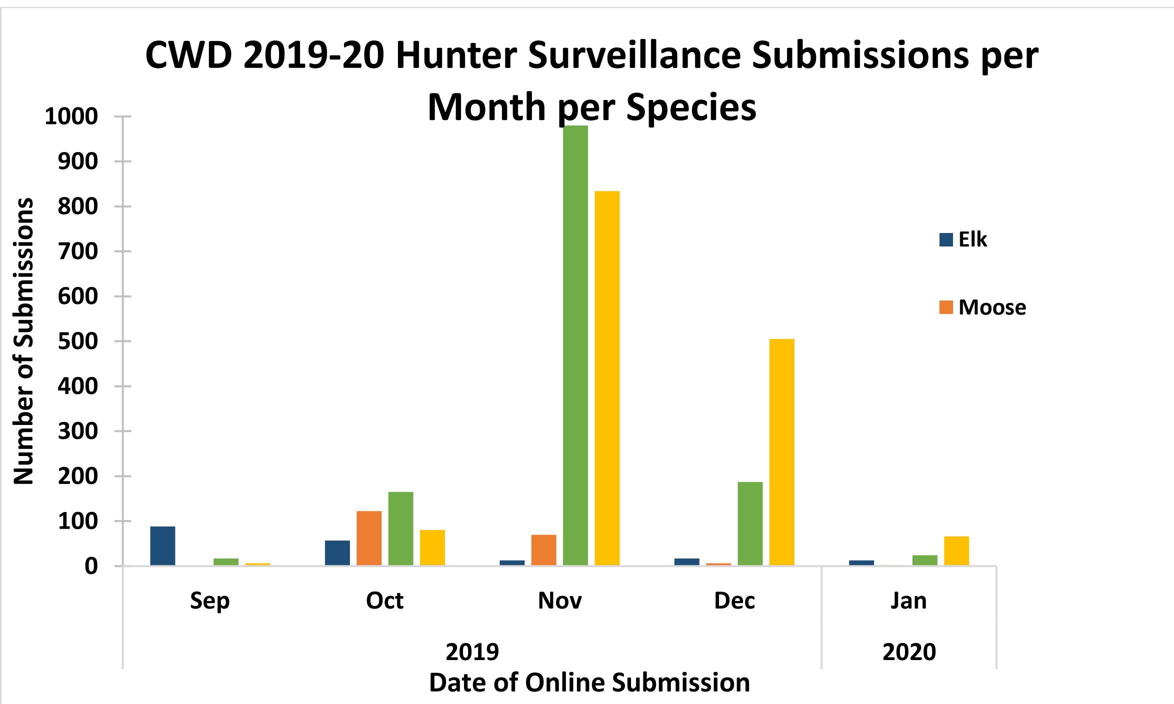

Figure 1: The number of submissions made to the CWD Surveillance Program per species each month from September 1st, 2019 to January 21st, 2020. Submissions made prior to September 1st, 2019 were omitted from graph (total of 3) along with submissions with no associated date (total of 43). Overall, November and December were peak submission periods with white-tail and mule deer accounting for the majority of submissions.

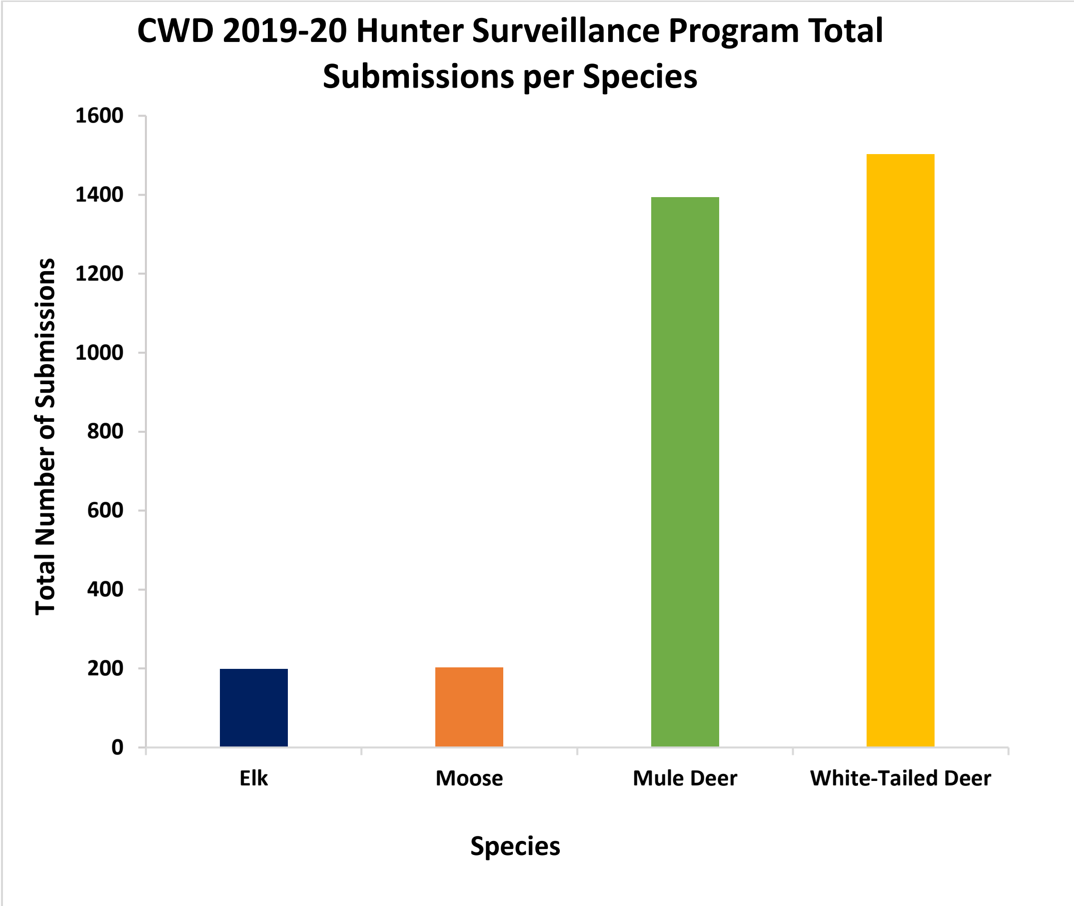

Figure 2: Total number of submissions made per species to the 2019-20 CWD Hunter Surveillance Program. White-tailed deer accounted for the highest number of submissions made per species with a total of 1503, followed closely by mule deer with 1394. Moose and elk had noticeably lower total submissions of 202 and 199, respectively.

Table 1: CWD 2019-20 Hunter Surveillance Data Summary as of March 13, 2020

Species	Negative	Positive	Unsuitable*	Untestable**	Total Samples	% Positive
Elk	162	6		31	199	3%
Moose	183	1		18	202	0%
Mule Deer	835	414	1	144	1394	30%
Unknown	1				1	0%
White-Tailed Deer	1327	107		69	1503	7%
Total	**2508**	**528**	**1**	**262**	**3299**	**16%**

*Tissue sample unusable for diagnostics or inconclusive

** Animal shot in head, tissues destroyed or rotten, animal too young to test, no tracking number, etc.

Chronic Wasting Disease 2019 Positive Test Results

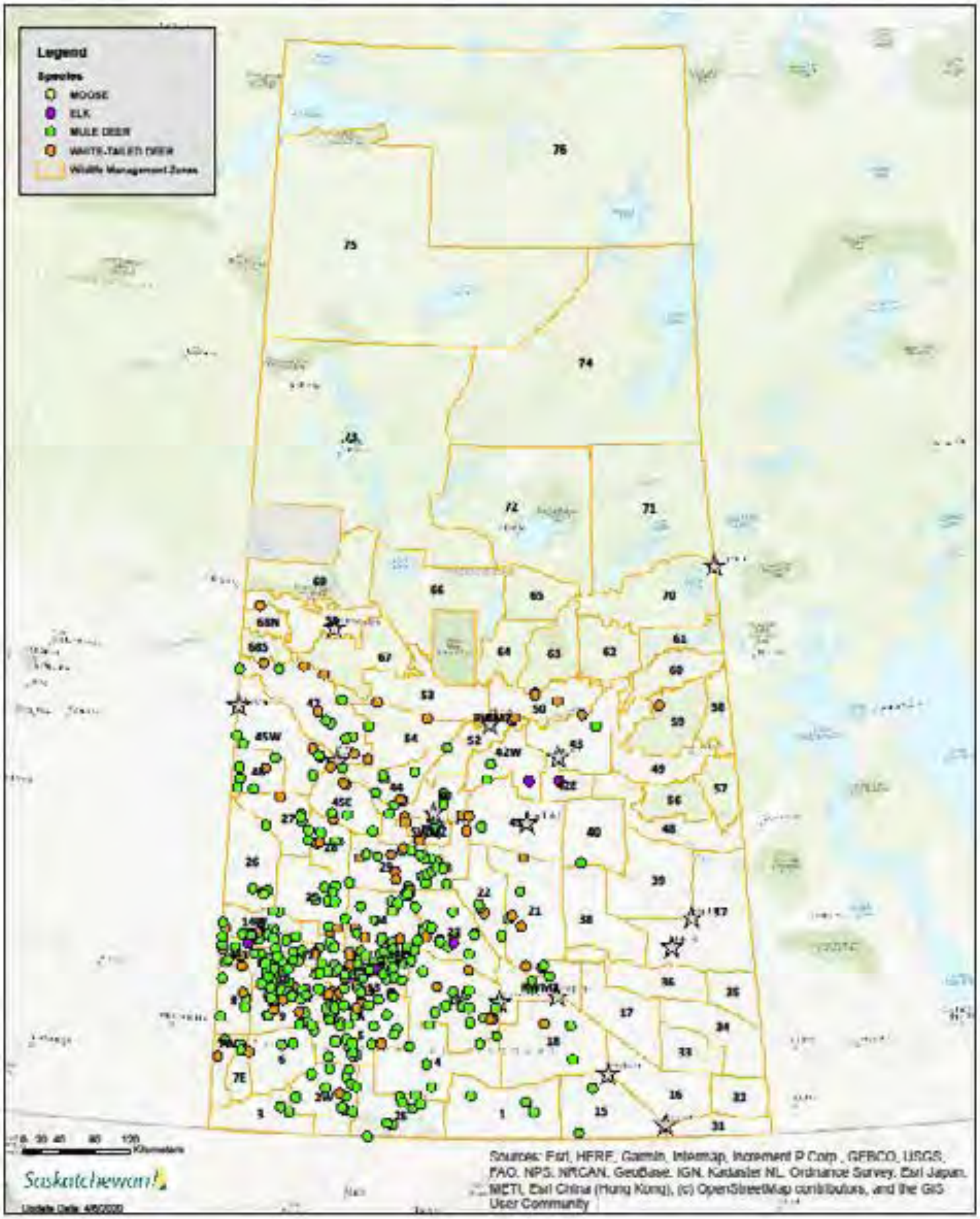

Figure 3. Locations of all CWD positive animals by species shot by hunters in 2019.

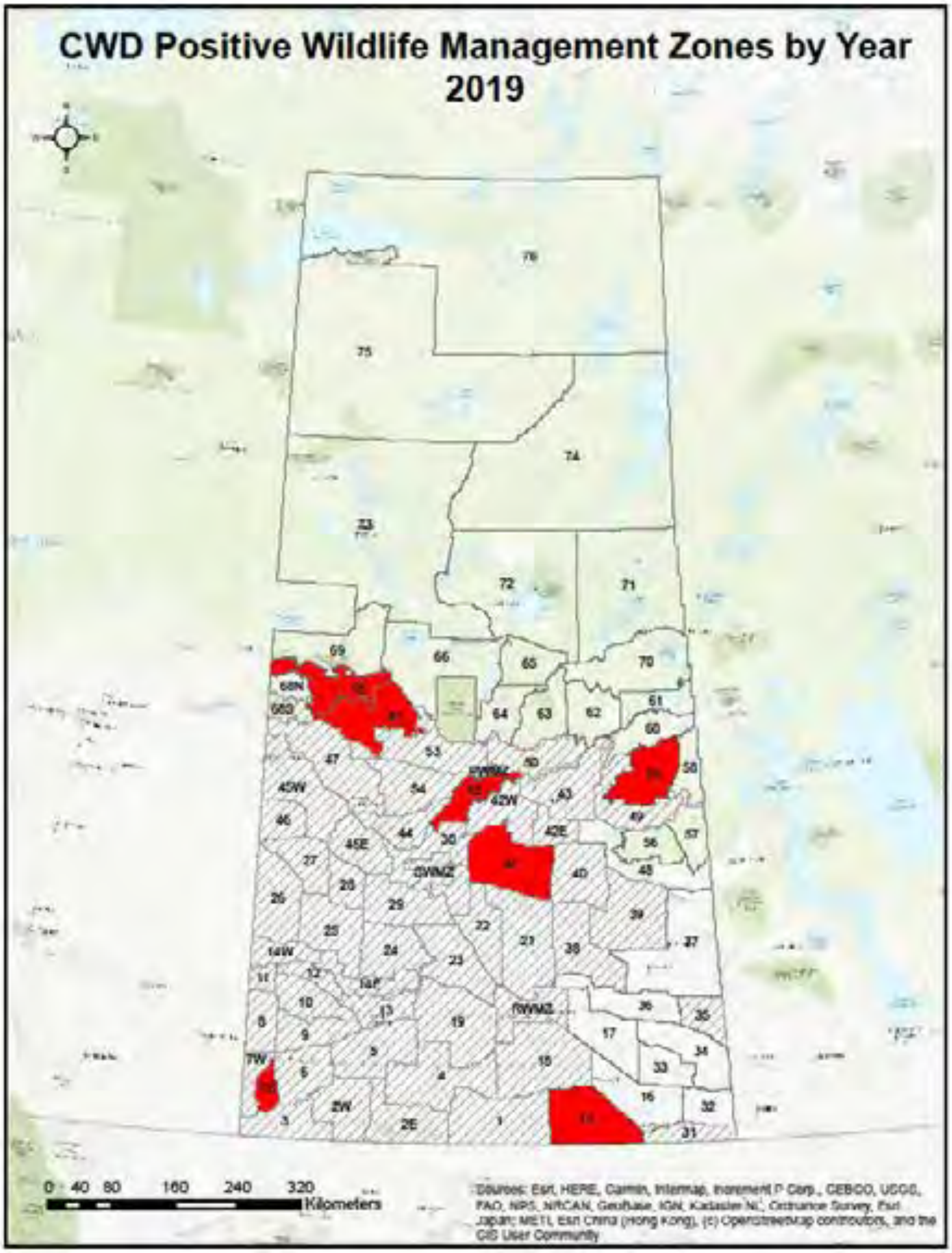

Figure 4. CWD positive wildlife management zones. Hatched zones indicate positive in a previous year and red zones are new for 2019.

SOUTH DAKOTA DEPARTMENT OF
GAME, FISH AND PARKS
4130 ADVENTURE TRAIL | RAPID CITY, SD 57702

South Dakota Wildlife Disease Summary for 2019

Report to the Midwest Fish and Wildlife Health Committee
Steve Griffin-Wildlife Biologist
April 28-29, 2020

Chronic Wasting Disease in South Dakota:

Surveillance for chronic wasting disease (CWD) in South Dakota was expanded in 2019 to include counties that fell within 25 miles of a known CWD positive cervid within South Dakota, or from another surrounding state (Figure 1). North Dakota and Nebraska had known CWD positive cervids that were within 25 miles and thus added high surveillance areas within South Dakota. Methods for collection of CWD samples during fall of 2019 included GFP designated collection stations, taxidermist, game processors, volunteer hunter self-sampling, and vehicle killed deer. Hunters in new surveillance areas were sent letters requesting samples and taxidermist or game processors in designated areas were asked and or contracted to participate in sample collection. Additionally, vehicle killed deer were collected by contractors who submitted heads from desired high surveillance locations. Sampling of hunter harvested cervids from previously known endemic areas continued if requested by hunters and/or samples were delivered to a GFP Regional Office.

During the period of July 1, 2019 through April 1, 2020 CWD surveillance resulted in the testing of 176 elk, 363 mule deer, 1,416 white-tailed deer, and 1 moose, for a total of 1,956 samples. Most of the elk sampling involved collection of heads at drop off locations from hunter killed elk in the Black Hills. Most deer samples were collected from hunter harvested or vehicle killed animals. Additionally, 427 white-tailed deer and 24 mule deer samples were collected through statewide city deer reduction programs. South Dakota collected and sampled 91 sick/surveillance cervids from across the state. Overall, most deer samples were obtained from within high surveillance areas through hunter harvested cervids in South Dakota (Figure 1).

Test results received on 1,956 samples indicate 57 white-tailed deer, 14 mule deer, and 18 elk were CWD positive. Eight new counties were added to the endemic area in South Dakota (Figure 2). Hunter harvest accounted for 42 of the CWD positive cervids (2 elk, 40 deer), and sick surveillance accounted for 23 of the CWD positive cervids (8 elk, 15 deer). Four elk were found positive for CWD during Wind Cave National Park sharp shooting operations within the Park (Jan-Feb 2020). Fifteen deer were found to be positive from city removal programs in the Black Hills area. The total number of CWD positive animals discovered in SD since the first free ranging white-tailed deer was found in the fall of 2001 is now 540, including 232 elk, 105 mule deer and 203 white-tailed deer (Figure 3). Wind Cave National Park has reported 12 deer and 152 elk as positive for CWD since 2002 and Custer State Park has reported 12 deer and 32 elk as part of these totals.

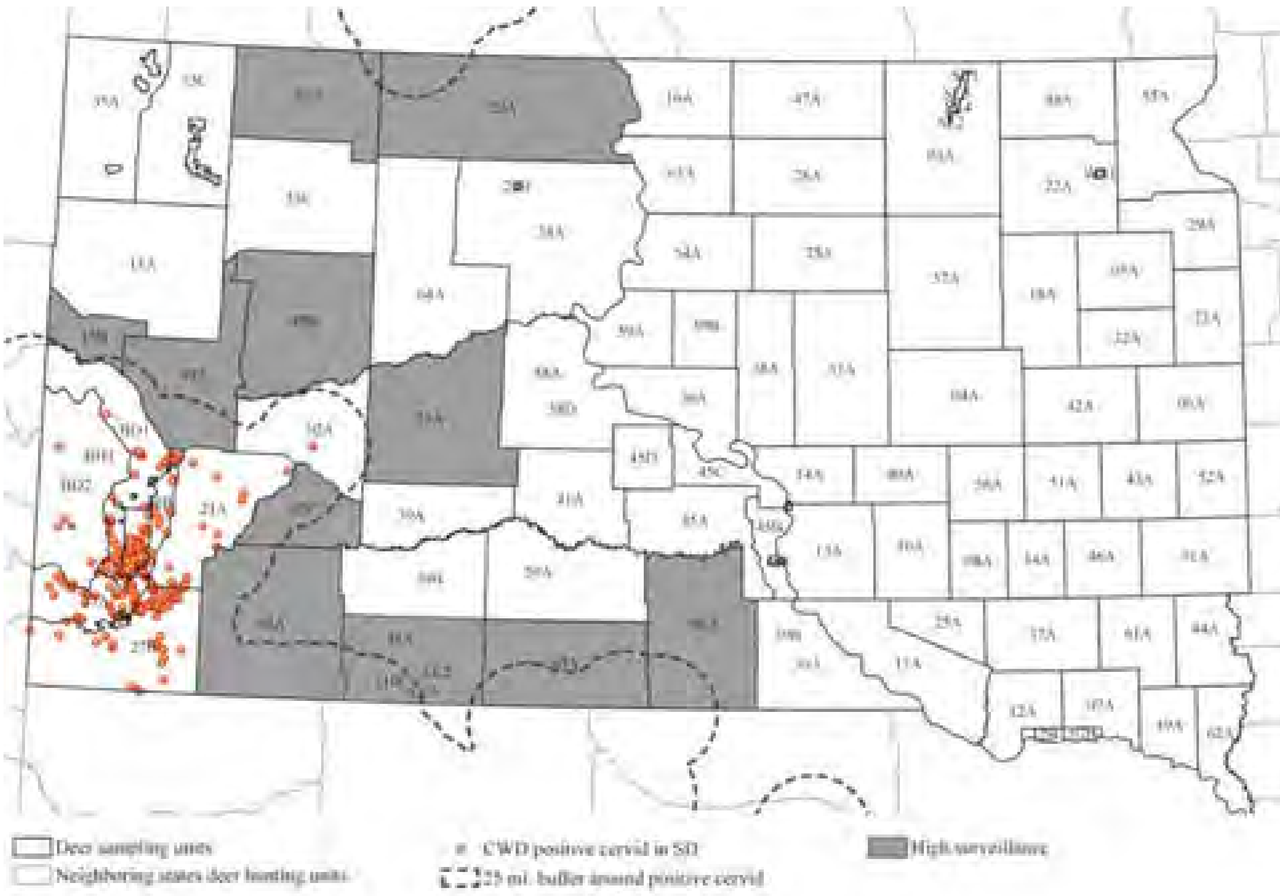

Figure 1. Known CWD positive wild cervids and 25-mile buffer around positive locations used to determine high surveillance areas (shaded in gray) in South Dakota, 2019.

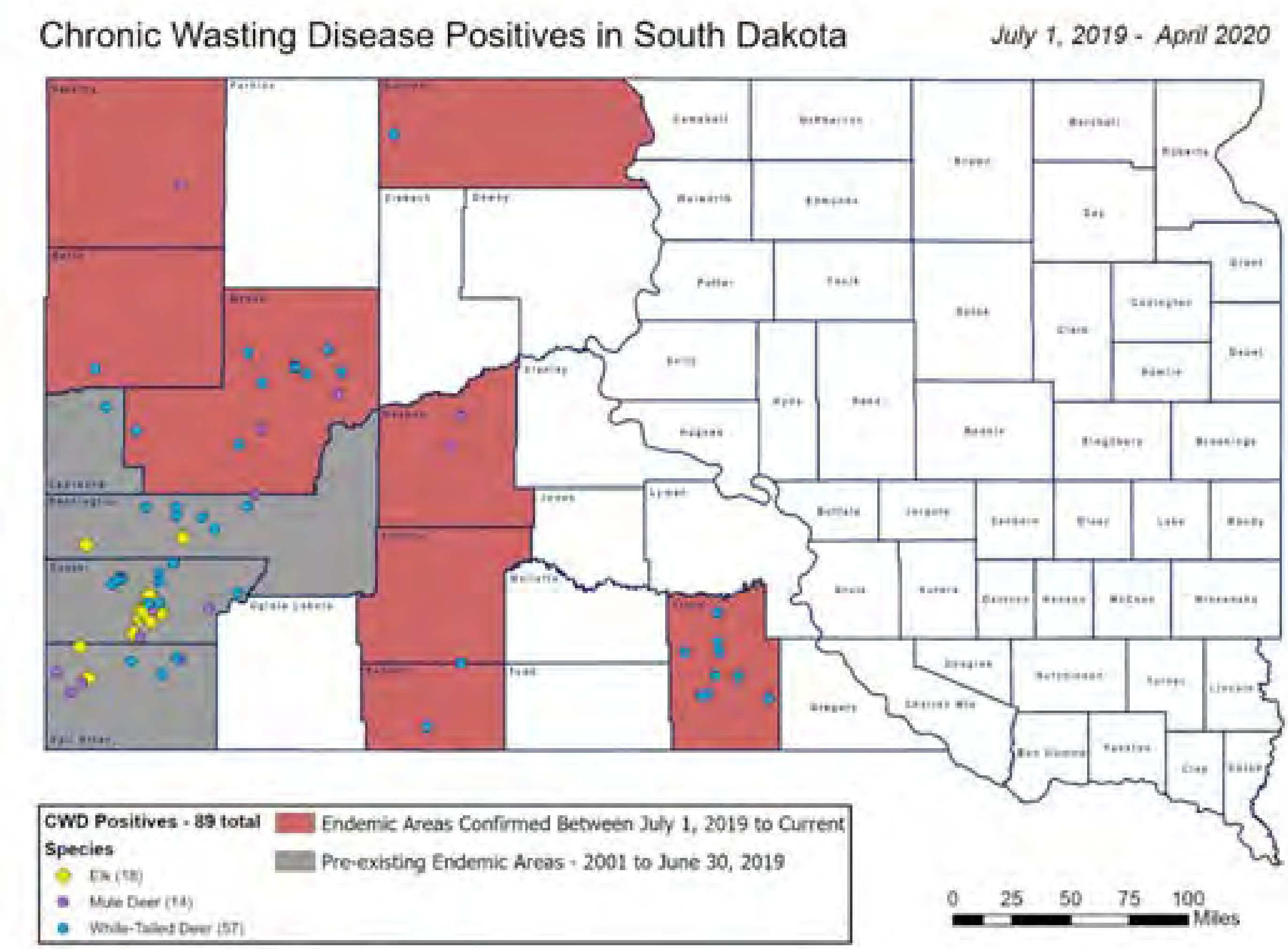

Figure 2. CWD Positive Cervids in South Dakota July 2019 - April 2020.

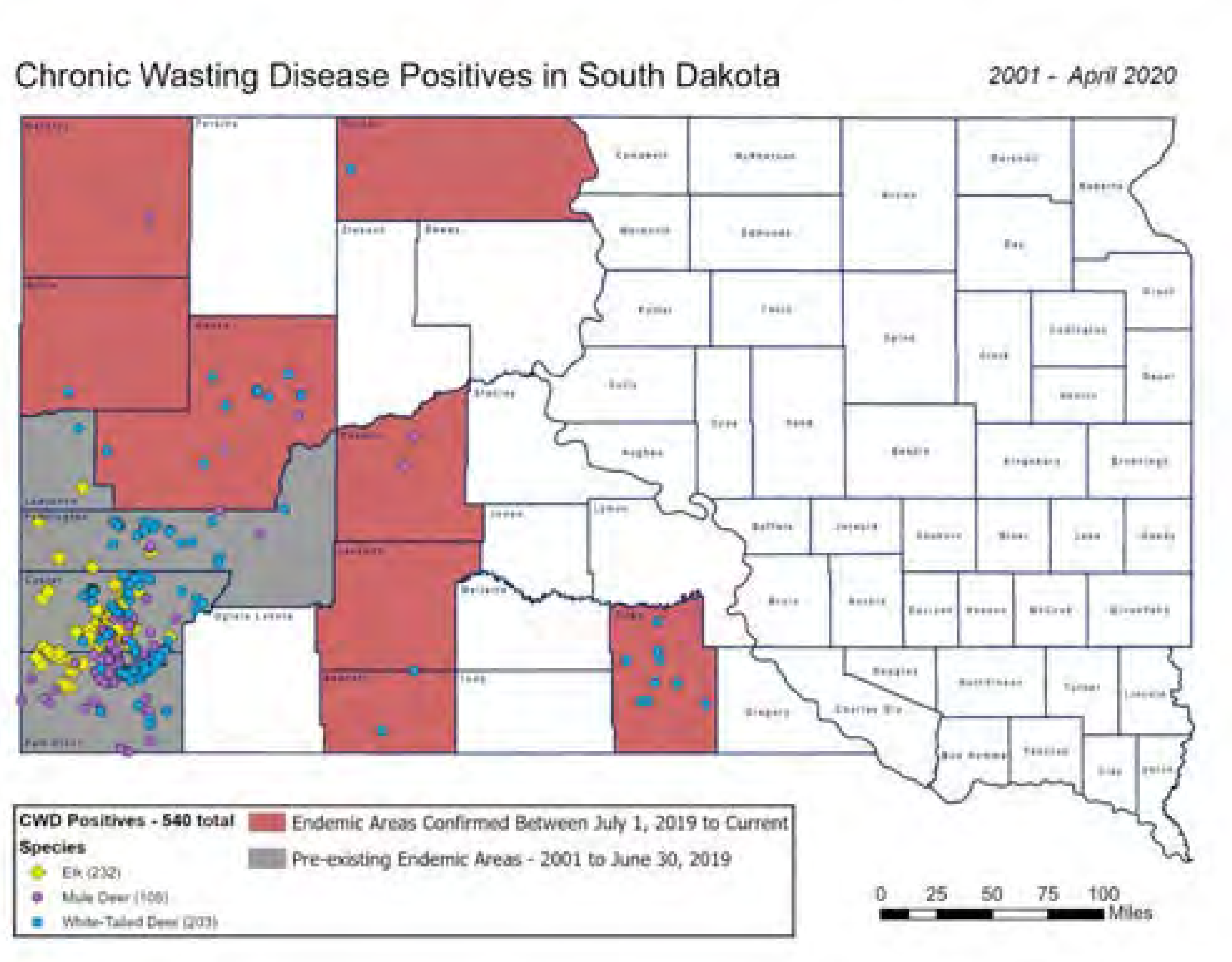

Figure 3. CWD Positive Cervids in South Dakota 2001 - April 2020.

In March of 2019, chronic wasting disease was identified in a captive elk in Clark county, South Dakota (Figure 4). The 21-month-old female elk was found showing illness and samples were submitted for CWD testing at the SDSU Diagnostic Lab in Brookings, SD. The United States Department of Agriculture's National Veterinary Services Laboratory in Ames, IA, later confirmed positive test results for CWD. Traceback showed that the elk had come from a captive facility in Meade county, SD (Figure 4).

In November of 2019, twenty-one elk were depopulated from the Clark county facility with no additional positives found. The Meade county facility had 2 elk die and test positive for CWD in September of 2019. An additional five elk were depopulated in October 2019 with no additional CWD positive elk found. Both facilities currently have no elk on the premises.

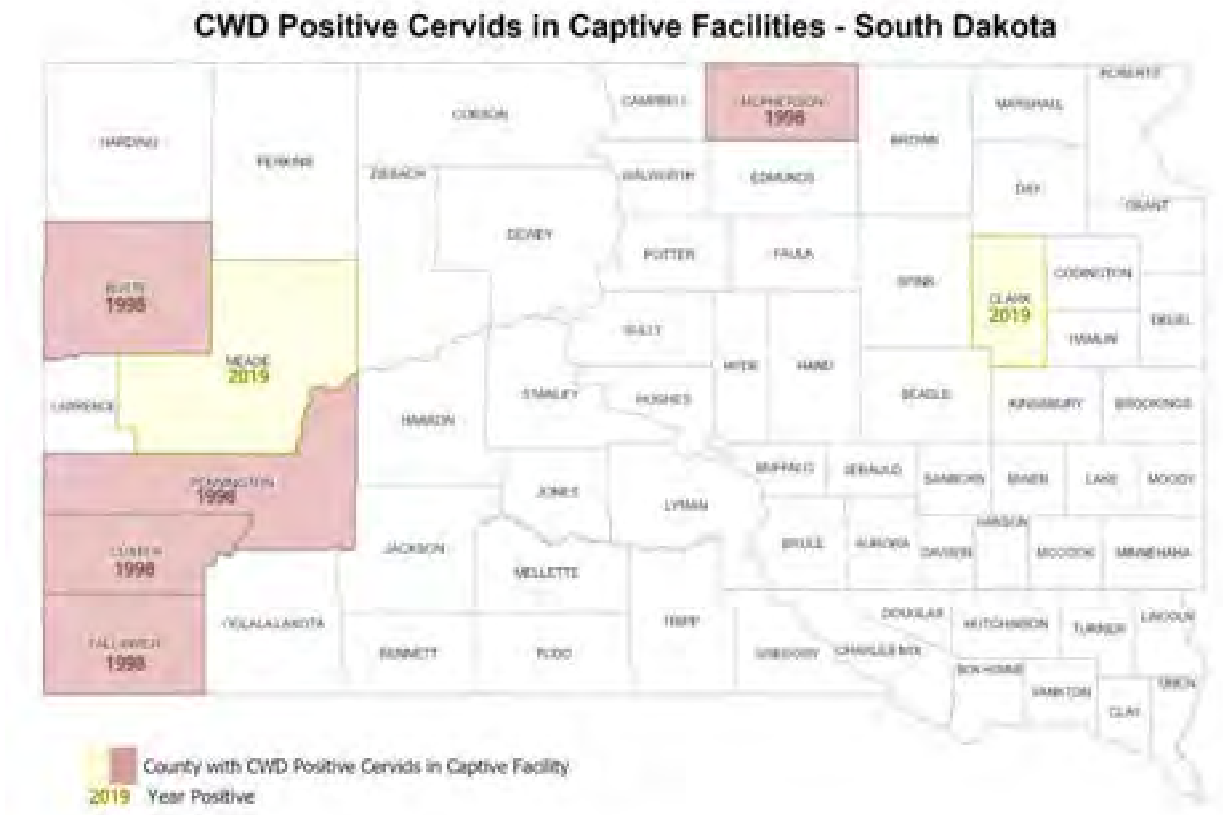

Figure 4. South Dakota Counties with documented CWD positive captive elk. Year of confirmation included.

The South Dakota Animal Industry Board permits the possession of captive non-domestic mammals, including cervidae, within the state. The Board required mandatory CWD testing of all permitted cervids mortalities from 1997 until 2012, at which time testing became voluntary under the state's USDA approved voluntary CWD herd certification program.

South Dakota Department of Game, Fish, and Parks will continue to review and adapt our surveillance program. Figure 5 shows potential high surveillance areas for the 2020 hunting seasons based on known CWD endemic areas and know positive cervids.

The South Dakota Chronic Wasting Disease Action Plan was approved by the GFP Commission in June of 2019. This is a working Action Plan with the key points including: investigating regulations regarding interstate and intrastate movement of carcasses, baiting and feeding of wildlife, use of urine based lures, translocation of cervids, game processors, taxidermist, donation of venison, and expansion of surveillance areas to determine current presence of CWD surrounding known endemic areas. The GFP Commission has created regulations for the transportation and disposal of deer and elk carcasses from other states and from hunting units within South Dakota's known CWD endemic areas. The new regulations will go into effect during the 2020 hunting seasons: https://gfp.sd.gov/2020-cwd-regulations/ Communication with all stakeholders within South Dakota is key to a successful CWD Action Plan. South Dakota CWD Action Plan can be found at: https://gfp.sd.gov/userdocs/docs/Final_SD_CWD_Action_Plan_071819.pdf

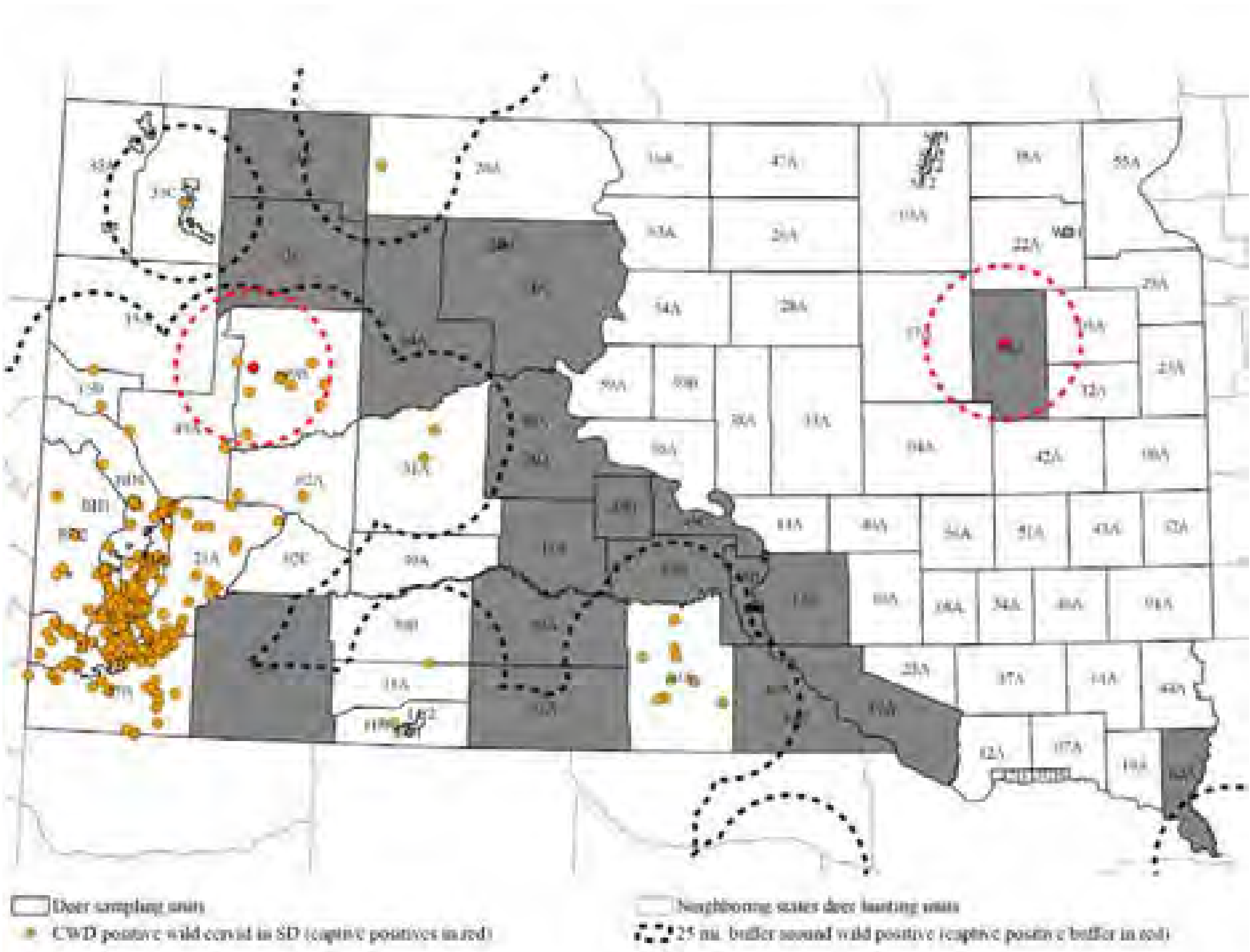

Figure 5. Known CWD positive wild cervids and 25-mile buffer around positive locations used to determine high surveillance areas (shaded in gray) in South Dakota, 2020.

Epizootic Hemorrhagic Disease and Bluetongue in South Dakota:

The State of South Dakota experienced a very minor mortality event of mainly white-tailed deer during late August-early October 2019 due to Epizootic Hemorrhagic Disease (EHDV) and/or Blue Tongue (BTV). The South Dakota Department of Game, Fish, and Parks (SDGFP) received minimal reports of sick and deceased white-tailed deer, mule deer or pronghorn during the fall of 2019. As in previous years with mortality in the summer months, EHDV was suspected and efforts were made to document the virus through the Diagnostic Lab at South Dakota State University. Through laboratory testing, confirmation was received that the EHDV virus was present in 5 white-tailed deer (Table 1). The SDGFP investigated very few sick and dead ungulates that would be associated with EHDV/BTV.

Fourteen counties from across South Dakota had suspected, reported or confirmed EHDV or BTV virus in white-tailed deer, mule deer, or pronghorn (Figure 1). Statewide, a total of 27 dead or sick animals were recorded in 2019, which included 26 deer and 1 pronghorn (Figure 2). Most cases were found east of the Missouri River with 24 reports of dead or sick deer and/or pronghorn being recorded.

Table 1. Confirmed epizootic hemorrhagic disease or blue tongue in South Dakota, 2019.

Species	Sex	County	EHDV	EHDV Serotype	BTV	BTV Serotype	LAT	LONG
WTD	F	Aurora	POS by PCR	EHDV-2			43.6595	-98.5566
WTD	M	Lincoln	POS by PCR	EHDV-2			43.24973	-96.58554
WTD	M	Turner	POS by PCR	EHDV-2			43.40726	-96.95914
WTD	F	Minnehaha	POS by PCR	EHDV-2			43.5768	-96.6164
WTD	F	Stanley	POS by PCR	EHDV-2			44.38912	-100.38612

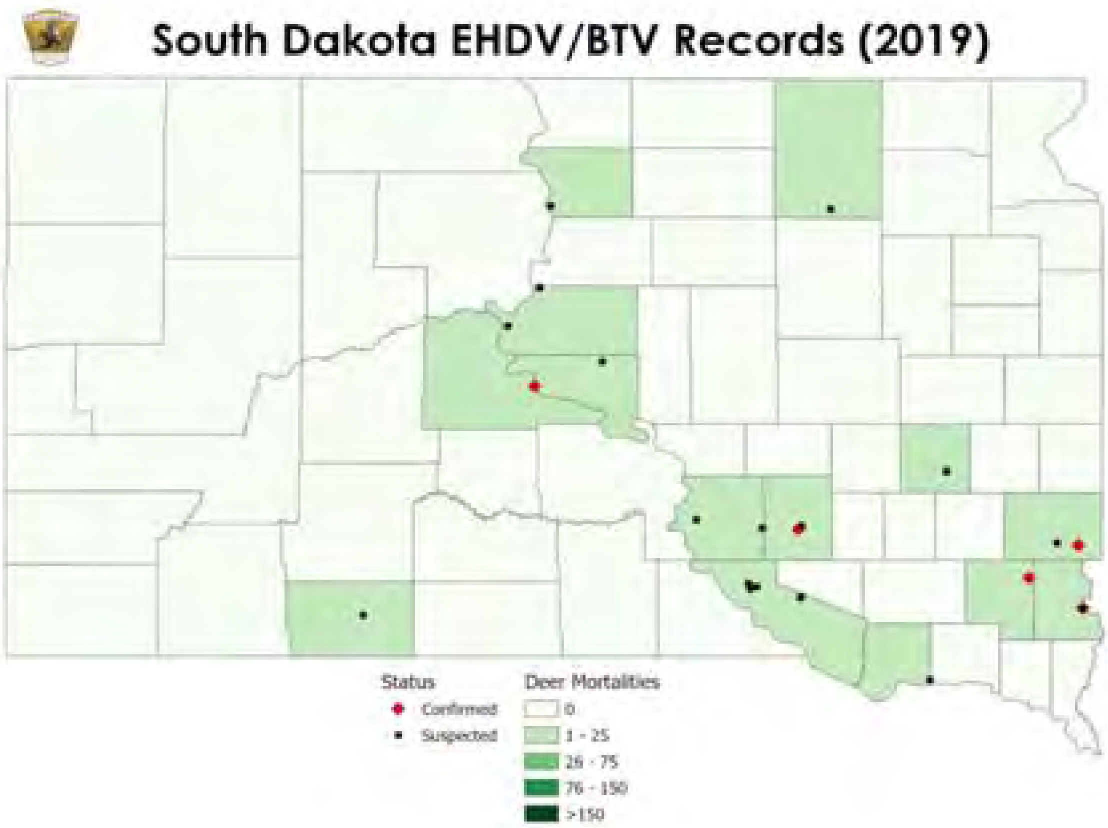

Figure 1. Locations of reported dead deer and pronghorn during 2019 in South Dakota. Red locations indicate positive results from laboratory testing.

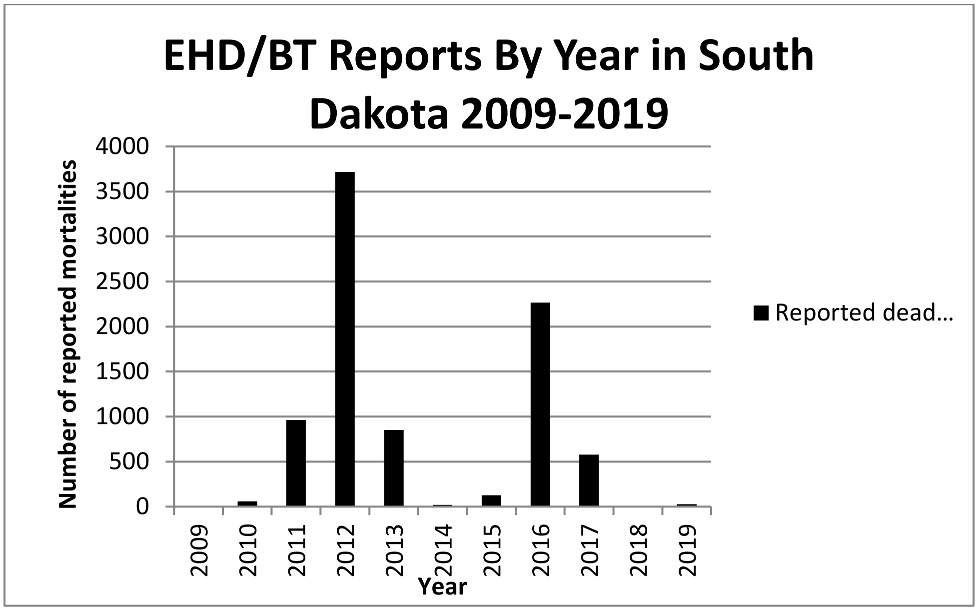

Figure 2. Annual reported loss of deer, elk, pronghorn, and bighorn sheep in South Dakota, 2009-2019.

Pneumonia in Bighorn Sheep:

Pneumonia has been the cause of many bighorn sheep die-offs across western North America. The pathogen is thought to be spread through domestic sheep and goats and can result in up to 98% herd mortality. Understanding the disease and potential preventatives have been a key focus of research. It is theorized that select individuals that survive pneumonia die-offs continue to spread the pathogen, resulting in poor lamb survival due to naïve immunity. The identification and removal of these chronic pathogen carrying individuals has proven to be successful at eliminating pneumonia from the Custer State Park herd in South Dakota. Currently the Custer State Park herd is thriving with no known pneumonia and a growing population. This removal method is currently being used on the Rapid City bighorn sheep herd in conjunction with South Dakota State University. The objectives of this project are to assess the efficacy of collecting samples to classify the individuals that chronically carry the pathogen, determine if removal of these individuals improves survival of bighorn sheep lambs, and identify any local domestic sheep and goat threats.

There are two sub-herds that make up the Rapid City bighorn herd, spring creek and rapid creek. Six individuals, between both sub-herds, have been identified as carriers of the pathogen and removed, since January 2018. Preliminary results yielded 40% lamb survival in the rapid creek sub-herd and 100% lamb survival in the spring creek sub-herd for the 2019 lambing season, with no known pneumonia deaths. All individuals in the Rapid City herd were tested for the pathogen spring 2020 and no additional pathogen carriers were identified. 2020 lamb survival monitoring will begin in the late spring and will continue through the summer. This will conclude the study and results will be analyzed.

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Rabies in South Dakota:

Rabies is an enzootic fatal, but preventable, viral disease and a public health concern in South Dakota. In 2019, 500 animals were tested for rabies, and 16 animals tested positive for the disease. This is a slight increase from the 15 positive animals in 2018. The 16 rabid animals included 15 wild animals (2 skunks, 13 bats) and 1 domestic dog. There were 484 animals that tested negative for rabies in 2019. The majority of these included 178 bats, 138 cats, 65 dogs, 41 cows, 26 raccoon, 8 skunk, 2 horses, and 23 others. No human rabies was reported. Skunks (*Mephitis mephitis*) are the primary rabies reservoir in South Dakota.

Bovine Tuberculosis in South Dakota:

No new Bovine Tuberculosis activity to report in South Dakota in the last year.

Feral Hogs in South Dakota:

No reports of feral hogs in South Dakota during 2019.

White-Nose Syndrome in South Dakota:

We received reports of dead bats near Jewel Cave during spring 2019 emergence. Five carcasses were collected from the historic entrance of Jewel Cave in March and May 2019; one little brown bat was WNS-positive. U of Wyoming sampled at Badlands, Wind Cave, Jewel Cave and Mount Rushmore in spring 2019. Positives were at Jewel Cave (1 fringed myotis, 3 long-legged myotis and 1 long-eared myotis were positive for the fungus; 1 long-legged myotis was WNS positive).

Nation-wide-New this season 2019-2020 is the incorporation of a designed surveillance approach based on a model that identifies high risk areas where *Pseudogymnoascus destructans* (*Pd*) is predicted to spread this year in western and southern states. SD is not a priority sampling area as the fungus and disease is confirmed. However, SDGFP in cooperation with USFS will collect environmental samples at 4-5 underground sites after emergence in spring of this year.

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Midwest Association of Fish & Wildlife Agencies
Fish & Wildlife Health Committee State Report---Wisconsin
2019 Report

Chronic Wasting Disease

The Wisconsin Department of Natural Resources (WDNR) began monitoring the state's wild white-tailed deer for chronic wasting disease (CWD) in 1999. Three positive deer were identified from Dane County through random testing of hunter harvested deer in November 2001. To date, more than 246,000 deer have been tested in Wisconsin for CWD, with over 6,500 testing positive as of April 2020. CWD was detected in wild deer in Dunn, Sheboygan and Marathon counties for the first time during the 2019-20 deer season along with additional wild positive detections in southern Wisconsin and already CWD-affected counties in central, west central and northern Wisconsin.

Wisconsin CWD Surveillance in 2019-2020

DNR Zone	# Sampled	# Analyzed	Positive for CWD
Central Farmland Zone	6298	6290	21
Central Forest Zone	623	621	6
Northern Forest Zone	3084	3083	2
Southern Farmland Zone	9347	9323	1304
Unknown Zone	34	30	1
Totals:	19386	19347	1334

There are currently 56 CWD-affected counties, 38 of which have at least one wild and/or captive positive within the county.

2019 Surveillance

In 2019, statewide CWD surveillance was focused on annual areas of interest, disease assessment around recent CWD positive detections, disease detection, and continued hunter testing for adult deer anywhere in the state. The department continued to sample deer within the Southern Farmland Zone as well as around CWD positive wild deer locations in Adams, Juneau, Portage, Marquette, Eau Claire, Lincoln, & Oneida counties. The department sampled wild deer around CWD positive captive deer facilities in Marathon, Burnett, Eau Claire, Oneida, Shawano, Waupaca, Marinette/Forest/Florence, & Oconto counties. New in 2019 was surveillance in northern Wisconsin, where surveillance has not been conducted across all 18 counties in the district for many years. This is part of a multi-year rotation conducting surveillance in west central, northern and northeast Wisconsin.

Adopt-a-Kiosk and Adopt-a-Dumpster

During the 2019 season, the department continued to increase the number of samples collected using self-serve kiosks along with enhanced communication and outreach efforts including emailing CWD sample result notifications, GameReg messaging, and a CWD brochure available at service centers and Orange Friday events. The main goal of kiosks is to offer a 24/7 option for hunters to help enhance sampling numbers, ease and options for hunters. Overall feedback from hunters show they appreciate the option of a kiosk.

Photo:WDNR

Beginning in 2018 and expanded in 2019, individuals or organizations could volunteer to sponsor a kiosk throughout the deer season at a mutually agreed upon location with the WDNR. Adopt-a-Kiosk (AAK) participants could choose to monitor a kiosk at the entry level, intermediate level, or advanced level, and participants could volunteer to Construct-a-Kiosk to donate to the WDNR. AAK participants were responsible for all costs and guidelines associated with their level of involvement, but WDNR provided all kiosk supplies and participants received WDNR recognition and a certificate of appreciation at the end of the season. The main goal of the AAK program is to work with volunteers to enhance CWD sample numbers, ease and options for hunters. In 2018, there were two AAK participants, in 2019 the program expanded to 23. Fourteen were at the entry level (monitor kiosk and inform DNR staff of low supplies and samples to be picked up), 4 intermediate level (entry level requirements plus correct datasheet errors/missing info), and 10 construct a kiosk (build kiosk and donate to DNR; some of these were also adopted).

Also beginning in 2018 and expanded in 2019, individuals or organizations could volunteer to sponsor a dumpster throughout the deer season at a mutually agreed upon location with the WDNR. Adopt-a-Dumpster (AAD) participants were responsible for guidelines associated with the dumpster but received WDNR recognition and a certificate of appreciation at the end of the season. The main goal of the AAD program is to provide hunters an option for appropriate deer carcass waste disposal, especially in areas where carcass waste disposal options are limited or not already available. In 2018, there were 16 volunteer-sponsored dumpsters. In 2019, a cost share option was added and the program expanded to 61 adopted dumpsters (38 cost share with the WDNR. For cost-shared dumpsters, the WDNR contributed 50% of the dumpster cost, up to $500, for up to two dumpsters in select counties. Counties of preference are CWD affected counties or CWD watch counties with no disposal option. The DNR also hosted 32 dumpsters statewide in these preference counties.

<u>Self-Sample Kits</u>

The 2019 season was the fourth year that self-sample kits were available. 300 kits were distributed primarily to select WDNR service centers. Kits were advertised to the public as first come, first serve. Overall, 72 self-sampling kits were submitted for CWD testing. Kits were also provided to a couple interested groups and individuals. There was no charge for the kits.

<u>Surveillance Permits</u>

Surveillance permits were utilized in select surveillance areas in the state for use on private and public land.

- Total Surveillance Permits Issued: 298 (private landowner permittees or public land properties)

- Total Surveillance Permit Authorizations Issued: 1,255 (1-5 for private land permittees, more for public lands)
- Total Deer Registered: 172 (public & private lands)

Research

Southwest CWD, Deer, and Predator Study


Photo:WDNR

In fall of 2016, the largest deer research project undertaken in Wisconsin began in the southwestern part of the state. The goal of this project is to comprehensively examine factors that could impact deer survival and deer population growth in southern Wisconsin. Those include Chronic Wasting Disease, predation, habitat suitability and hunter harvest. Additionally, a component of this study involves directly estimating the abundance and distribution of deer predators (bobcats and coyotes) and examining their possible impact on deer survival and behavior. Collaring bobcat and coyotes began in the fall of 2016 and was completed winter 2020, with 69 coyotes and 57 bobcats collared. Collaring adult deer began in January 2017 and ended March 2020, with a total of 766 deer >8 months of age having been fit with GPS collars. Fawns were collared during May-June of 2017-2019 with a total of 323 neonate deer being collared. The WDNR is planning one final fawn-collaring effort for May-June 2020, but due to the Covid-19 restrictions, it is unknown if this effort will occur. The department will continue to monitor collared deer for the next few years, while analyzing data on survival, population change, deer and predator movements, habitat use, and interactions. The study is accessible subscribing to the newsletter at https://dnr.wi.gov/topic/research/articles/april2020.html. The WDNR releases a newsletter roughly every 2 months to give project updates and dig deeper into various aspects of the study, CWD, and deer ecology and management.

Deactivation of Chronic Wasting Disease Prions Using Composting

This study is testing the ability of composting to degrade and deactivate CWD prions in deer carcasses. CWD-infected deer carcasses will undergo a controlled and monitored composting process. The composted material will be contained. Both the composted material and leachate resulting from the composting process will be collected and tested for CWD prions. This research is being conducted at the Almond Farm, a WDNR owned facility that was previously a commercial cervid farm that was depopulated in 2006. At that time, it was discovered that 80% of the farm's deer were CWD positive. The Almond Farm is double-fenced, preventing deer from entering the facility and ensuring that this work does not pose a risk to wild deer. This is a collaborative project with Wisconsin DNR, the University of Wisconsin Stevens Point, and the University of Wisconsin-Madison.

CWD Prion Persistence in Soil

The objective of this study is to identify the persistence of CWD prions in soils, which are a likely source of environmental transmission. To determine the potential for prion persistence in soil, researchers will test soil samples taken from the Almond Farm, a WDNR owned facility that was previously a commercial cervid farm that was depopulated in 2006. Eighty percent of the farm's deer were CWD positive at testing. At the time of this depopulation, soil samples were collected and archived. Following depopulation, the facility underwent state required soil removal and mandatory exclusion of cervids. The facility has maintained cervid exclusion since depopulation. To analyze soil presence pre-treatment, and if there is persistence post treatment in this facility, assays will be conducted on those archived samples as well as current samples collected from the same locations as those archived. An important first step in this project is to optimize next-generation prion detection methods (RT-QuIC) for the detection of CWD prions in soil samples. This is a collaborative project with Wisconsin DNR and the University of Wisconsin-Madison.

Bovine Tuberculosis Surveillance

In late October 2018, one cow from a Waunakee-area dairy tested positive for bovine tuberculosis (bovine TB). Wisconsin has been certified as bovine TB-free since 1980. Bovine TB can spread to deer and other wildlife that come into close contact with infected cattle. To date, bovine TB has not been identified in wild, free-ranging animals in Wisconsin.

In response to this detection, surveillance efforts to assess the possibility of wildlife exposure were implemented. Required testing of harvested white-tailed deer went into effect during the November 2018 gun deer season in nine townships of Dane and Columbia counties. Bovine tuberculosis was not isolated from the 232 white-tailed deer that were submitted for testing in 2018. During the 2019 gun deer season, 153 samples were collected and submitted in pooled samples for culture at the National Veterinary Services Laboratory. Bovine tuberculosis was not isolated from the 153 samples submitted. Results are still pending on additional samples that were delayed due to the Covid-19 pandemic. Surveillance will extend into the 2020 deer season.

Mortality Investigations

Staff investigate wildlife mortality events where there are five or more sick or dead birds or three or more sick or dead mammals reported in one area over a short timeframe. Mortality of selected individual species is also investigated. During 2019, 122 wild animals were submitted for necropsy to determine the cause of death. Twenty-five mortality events involving multiple animals were also investigated.

Epizootic Hemorrhagic Disease
In 2019, epizootic hemorrhagic disease virus serotype 2 (EHDV-2) was detected in white-tailed deer in seven counties in southwestern Wisconsin from August through October. Significant deer mortality from EHDV has been rare in Wisconsin.

The 2019 the EHDV outbreak was centered in Crawford County with approximately 226 deer reported to the WDNR that were suspected or confirmed to have died from the virus. Other counties in the affected area included Vernon (42 reported), Grant (23 reported), Richland (10 reported), Sauk (17 reported), La Crosse (10 reported) and Iowa (1 reported). Department staff continue to monitor the deer herd for indications of EHDV.

Avian Cholera
Avian cholera (*Pasteurella multocida*) motality events have been documented infrequently in Wisconsin with the most recent mortality event occurring in 1979-80.

In fall 2019, avian cholera was detected in double-crested cormorants submitted for necropsy from the Cat Island causeway and surrounding area in Green Bay. The Cat Island causeway is an annual staging area for double-crested cormorants before migration south. The estimated mortality included approximately 3,800 double-crested cormorants and a small number of white pelicans and gulls. In September, the local wildlife biologist observed an estimated 30,000 live cormorants in addition to an unusually high number of sick or dead cormorants present on the causeway. Several carcasses were collected and submitted to the National Wildlife Health Center (NWHC) in Madison for necropsy and avian cholera was determined to be the cause of the mortalities. A joint effort by WDNR, USFWS, and USDA-WS occurred to collect and dispose of carcasses twice a week until the mortality event ended in October. This effort likely assisted in reducing the number of waterfowl affected.

Ranavirus
Ranaviruses are found worldwide and can affect species of amphibians, reptiles, and fish. In June, a WDNR Bureau of Natural Heritage conservation biologist was contacted by locals in Dane County that reported finding dozens of dead frogs and few tadpoles in a pond despite seeing hundreds a few weeks earlier. Four partially metamorphic tadpoles were collected and submitted to the National Wildlife Health Center in Madison. Testing confirmed that the cause of death was from a ranavirus (species not identified). Citizen scientists assisted in monitoring the pond throughout the summer and reported back to the department. It is estimated that 80-90 amphibians were affected.

West Nile Virus
Wisconsin DNR continued the second year of a multi-year regional effort to gather baseline data on WNV exposure in ruffed grouse. This regional effort is being conducted in collaboration with Minnesota and Michigan Departments of Natural Resources and the Ruffed Grouse Society, with the Wisconsin Conservation Congress assisting within Wisconsin. This effort involves

distributing self-sampling kits to grouse hunters to collect blood and tissue samples for lab analyses. As in the first year, 500 self-sampling kits were distributed to grouse hunters statewide. The WDNR received 188 samples from hunters throughout the course of the 2019 ruffed grouse season. These samples will be analyzed by the Southeastern Cooperative Wildlife Disease Study in Athens, Georgia. Results from the first samples collected in 2018, indicated that 68 (29%) of the Wisconsin submitted samples had antibodies to WNV either confirmed (44 or 19%) or likely (24 or 10%). Results showed that two (0.9%) of the 235 grouse had evidence of the virus present in their hearts, but as both of these birds had also developed antibodies to the virus (from the accompanying blood test), the results do not directly indicate that these two birds were sick at the time of harvest

Rabies

Testing of wildlife for rabies is conducted when there is a risk that either a human or a domestic animal has been exposed or when mortality investigations identify signs consistent with rabies infection. In situations of human and domestic animal exposure, samples are submitted directly to the Wisconsin State Lab of Hygiene (WSLH) for rabies testing. In 2019, the only positive rabies cases were in wild bats. Since 2009, approximately 800-1000 bats are tested annually by the WSLH, of which about 3-4% test positive for rabies each year.

Wild mammals that are submitted to the WDNR Wildlife Health Program for necropsy are also tested for rabies based on species, if neurologic signs are observed, and other clinical history. In 2019, 26 wild mammals were tested for rabies at necropsy, all tests were negative.

Elk Translocation

The fourth and final year of a multi-year translocation effort to reintroduce elk into Jackson County and supplement the herd by Clam Lake with elk from Kentucky was completed in 2019. As part of this effort, Wildlife Health staff supported the greater WDNR elk team and partners in planning for the elk trapping and their caretaking in Kentucky through monitoring the elk after release in the Flambeau River Forest.

In February 2019, WDNR and the Kentucky Department of Fish and Wildlife staff captured and began the quarantine process to relocate elk to Wisconsin. Wildlife Health staff provided oversight of husbandry and animal health, drawing upon the previous three years of experience as well as those of other states. Following initial testing for diseases of concern, 48 elk were approved for transport from Kentucky to Wisconsin in April. All 48 elk completed quarantine in Wisconsin and with the addition of calves, 60 elk were released in August.

Publications of interest:
Echolocator March 2020 Up-to-date information on bat program including WNS surveillance and research, including an in-depth article on wild bat vaccine trials
Wildlife Health Matters Annual Highlights from the WDNR Wildlife Health Program

Fish Health

Viral Hemorrhagic Septicemia (VHS) Surveillance
Three WDNR hatcheries (Art Oehmcke State Fish Hatchery, Governor Tommy G. Thompson State Fish Hatchery, and Lake Mills State Fish Hatchery) are surface water fed from four lake locations (Clear Lake and Madeline Lake, Yellow River Flowage, and Rock Lake, respectively). From these lakes, VHS susceptible species (150 fish/lake) are collected annually for viral disease screening. VHS was not detected this year at any of the 4 locations.

Forage Fish
Virology testing of forage fish purchased from vendors for the department muskellunge and walleye stocking program has continued. Over the course of 2019, eight lots of forage fish were tested of which seven were fathead minnows and one was golden shiners. Golden shiner virus was detected this year in three lots; one lot each delivered to the C.D Besadny Anadromous Fish Facility, Governor Thompson State Fish Hatchery, and Art Oehmcke State Fish Hatchery. Additionally, one lot from C.D Besadny Anadromous Fish Facility tested positive for an unknown replicating agent.

Wild Fish Transfers
Four wild fish transfers were undertaken in 2019. These included: spring and fall transfers of lake sturgeon from the Wolf River over the Shawano Dam as well as transfers of bluegill and largemouth bass from Lake Wingra and Mud Lake, respectively, to Indian Lake. Transfer of lake

sturgeon and bluegill required only visual inspection. However, skin samples were taken from lake sturgeon at the Wolf River for testing of a herpes virus under current investigation (See below). Although largemouth bass are listed as VHS susceptible, time constraints and logistical issues required a waiver allowing exemption from testing to be requested from the Department of Agriculture, Trade and Consumer Protection (DATCP). This request was granted and fish were transferred without need for testing. All fish permitted for transfer showed no gross or clinical signs of contagious or infectious disease.

Mortality Events

In 2019, approximately 3 cases of wild unusual morbidity/mortality were investigated. These were only cases of one to several moribund fish or fish with masses. No major fish die-offs were reported to fish health for investigation this year. Some larger fish kills did occur, but fish health was not made aware until well after they occurred. We have done further fish kill response training with WDNR staff this year and hope that communication about these events will improve.

Three black crappies were submitted from Little Butternut Lake in Polk County with clinical signs consistent with what has been tentatively termed "Black Crappie Sarcoma". Samples were collected and will be part of our ongoing research on the etiology of "Black Crappie Sarcoma." The current state of this research will be discussed later in this document.

One adult walleye was submitted from Lake Lucerne in Forest County with a firm, white, round to oval, undulating, semi-pedunculated 2-inch diameter mass on the medial aspect of the right operculum. This fish was submitted by an angler. The final morphological diagnosis via histopathology was a spindle cell tumor of undetermined histogenic origin, but consistent with a sarcoma. The differential diagnoses include fibrosarcoma, myxosarcoma, liposarcoma, tumors of muscle, and undifferentiated sarcoma. Further immunohistochemical studies and electron microscopy were not elected. This is not considered to be a population disease concern.

Lastly, a single small mouth bass from Lake Mendota in Dane County was submitted by a WDNR biologist concerned that it could have VHS. External examination of the gills revealed excessive mucous accumulation and pallor. The inside of the oral cavity showed bilateral areas of congestion near the back of the upper palate. Bilateral exopthalmia was severe. On internal examination the liver showed a mottled pattern of congestion, injected vasculature, and petechial hemorrhaging. Smear of ocular fluid showed no significant findings. Samples were submitted for virology and came back negative for any pathogens of concern.

Ongoing Cases

Acipenserid Herpesvirus 1

Over the last 10 years, skin lesions have been noted on lake sturgeon in the Wolf River being transferred above the Shawano Dam**.** In the spring of 2017**,** quantitative polymerase chain reaction (qPCR) confirmed Acipenserid Herpesvirus 1 (AciHV1) in lesioned Wolf River fish, a pathogen previously only recorded in white sturgeon. In 2018 and 2019, sampling kits were distributed to WDNR hatchery managers and field biologists throughout Wisconsin, to better understand the prevalence of test-positive lake sturgeon. In spring 2018, lake sturgeon from the Wolf River (n=9) and Menominee River (n=1) tested positive for AciHV1. Testing was conducted at the University of Florida. Images of the virus were subsequently able to be captured in these tissues through transmission electron microscopy (TEM). This was significant as it positively linked the virus particles with PCR positive tissue and histology results. In 2019, more sites were able to be sampled. Results are shown in Table 1.

Sampling locations with corresponding virology and PCR results for 2019

Location	# of Fish	Virology	Results	PCR	Results
Wolf River, Shawano WI	10	Yes	Negative	Yes	POSITIVE
Menominee River, Marinette	1	No	/	Yes	Negative (+ in 2018)
Wisconsin River @ Nekoosa Dam	1	Yes	Negative	Yes	Negative
Chippewa River, Eau Claire	7	Yes	Negative	Yes	POSITIVE
Yellow River, Spooner	1	No	/	Yes	POSITIVE
St Louis River, Superior	5	No	/	Yes	POSITIVE
Wisconsin River@ Hydro Dam	1	No	/	Yes	Negative

While sampling on the Wolf River during 2019, it was anecdotally noted that more lesions were being detected on female fish as opposed to males. Comparison of data sheets from the transfers on April 15 and April 18, 2019 confirmed a possible sex link (Table 2). This is currently under investigation.

Comparison of female and male lake sturgeon that were not passed upstream due to suspect lesions for 2019

FEMALES	# of Females Captured	# of Females Not Passed Upstream	% Not Passed Upstream
04/15/2019	25	8	32.0%
04/18/2019	33	14	42.4%
Total	58	22	37.9%
MALES	# of Males Captured	# of Males Not Passed Upstream	% Not Passed Upstream
04/15/2019	19	2	10.5%
04/18/2019	31	3	9.7%
Total	50	5	10.0%

Upcoming efforts will focus on collecting suspect lake sturgeon AciHerpV1 lesions in waterbodies with limited data, to gain a more comprehensive view of prevalence within the state. Efforts will also focus on testing reproductive fluids in previously test-positive bodies of water to assess the potential for vertical transfer of the virus.

Black Crappie Sarcoma

Black Crappies in multiple locations continue to be affected with what has been termed 'Black Crappie Sarcoma'; a condition characterized by red focal proliferative lesions, ulcerating into the underlying cutaneous layers. A definitive cause has yet to be been determined but efforts continue. Future efforts will focus on PCR, TEM, and In-situ hybridization (ISH) testing.

APPENDIX IV

RESOLUTION TO JOIN THE NORTH AMERICAN NON-LEAD PARTNERSHIP

WHEREAS, the North American Non-Lead Partnership (‘Partnership’) was established to conserve wildlife and hunting heritage; and

WHEREAS, part of the stated mission of the Partnership is to provide a *‘mechanism to minimize unintentional impacts on wildlife health while protecting the public image of hunting and the associated benefits to the conservation of wildlife and habitat’*; and

WHEREAS, the stated mission of the Midwest Association of Fish and Wildlife Agencies (MAFWA) includes initiating *‘action to benefit the management and conservation of fish and wildlife resources’*; and

WHEREAS, sound research has unequivocally determined lead from hunting ammunition and fishing tackle poses a health hazard to wildlife and has shown the increased use of non-lead ammunition reduces inadvertent impacts of lead on wildlife; and

WHEREAS, the Partnership seeks to expand the coalition of hunters, anglers and other conservationists dedicated to improving ecosystem and wildlife health by voluntarily choosing non-lead options; and

WHEREAS, efforts to improve the health of our native fish and wildlife species are most successful when employed across multiple landscapes and jurisdictions; and

WHEREAS, the Directors of several state wildlife agencies, namely Arizona, Oregon and Utah have already joined the Partnership; and

WHEREAS, the Northeast Association of Fish & Wildlife Agencies recently joined the Partnership and encourages its members to consider joining the Partnership at a level they deem appropriate;

NOW, THEREFORE, BE IT RESOLVED, the support of the North American Non-Lead Partnership is an appropriate and justifiable action to increase the use of non-lead ammunition to improve ecosystem health; and

BE IT FURTHER RESOLVED, the Midwest Fish and Wildlife Health Committee encourages the Midwest Association of Fish and Wildlife Agencies directors to join the North American Non-Lead Partnership at the “Supporting Partner” level, thereby endorsing the efforts of the Partnership and providing either direct funding or in-kind support; and

BE IT FURTHER RESOLVED, the Midwest Fish and Wildlife Health Committee encourages individual member states/provinces to consider joining the North American Non-Lead Partnership at a level appropriate to their program; and

BE IT FURTHER RESOLVED, the Midwest Fish and Wildlife Health Committee encourages the Midwest Association of Fish and Wildlife Agencies directors to adopt this resolution at their annual meeting in 2020.