Washington Department of Fish and Wildlife's Chronic Wasting Disease Surveillance Program Annual Report

July 2021 – June 2022

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Acknowledgements

Kristin Mansfield provided expert disease knowledge and assisted with the development and implementation of the surveillance program. Paul Whelan developed and maintained the CWD data collection application and database. Staci Lehman conducted extensive outreach about the CWD surveillance program. Ilai Keren aided with data analysis and report development. Many WDFW field staff, seasonal technicians, tribal biologists, taxidermists, meat processors, and volunteers collected samples throughout the year. Marie Neumiller with the Inland Northwest Wildlife Council provided additional support for hunters to submit samples. The Washington Department of Transportation collected carcasses for sampling. Funding was provided by the Washington State Legislature.

Executive Summary

Chronic wasting disease (CWD) is a fatal neurologic illness of cervids (members of the deer family *Cervidae*) caused by a prion protein. Free-ranging moose, elk, mule deer, white-tailed deer, and reindeer are all known to be naturally infected and currently 29 states, 2 Canadian provinces, Norway, Finland, and Sweden have documented CWD in their wild cervid populations. In Washington, the Washington Department of Fish and Wildlife (hereafter "the Department") used federal funds to test 6,133 cervids statewide from 2001-2011. After federal funding was no longer available, the Department tested only animals suspected of CWD based on non-specific clinical signs from 2012-2020. Currently, CWD has not been detected in Washington.

With CWD detections closer to Washington each year, the Washington State Legislature prioritized CWD surveillance by providing the Department budget proviso funds in 2021 to expand efforts and begin systematic surveillance. At that time, the closest detection to Washington was in Libby, Montana, thus the Department prioritized the four most northeastern CWD Surveillance Units (CSUs) described in the CWD Management Plan. This report describes the CWD surveillance program conducted in northeast Washington during Surveillance Year (SY) 2021.

During SY21, the Department focused efforts to collect samples from adult (≥1 year old) white-tailed deer in four CSUs in northeast Washington. These four CSUs encompassed seven Game Management Units (GMUs) that were combined to achieve sampling units of approximately 15,000 deer per CSU. This estimate of deer per CSU is based on harvest within administrative units and is not an estimate of biological population size. Our goal was to sample 300 deer in each CSU to achieve 95% confidence of detecting CWD at 1% prevalence (i.e., the percentage of the population that was affected by CWD during the time samples were collected).

The Department collected 425 samples during SY21 and 423 were suitable for testing. Two samples were the incorrect tissue type, likely salivary gland, and could not be tested for CWD. Chronic wasting disease was not detected in any of the 423 testable samples. Of the testable samples, two were female mule deer, and the remaining 421 samples were white-tailed deer (148 females ranging in age from 0 – 15 years old; 269 males ranging in age from 0 – 19 years old; four unknown sex). Four males and two females were aged in the field as either a yearling or adult but based on cementum annuli analysis were determined to be fawns. The median age of the 184 deer for which cementum annuli analysis results were available at the time of report writing was 3 years old.

While CWD was not detected in any of the testable samples, sample sizes limited the Departments ability to conclude with 95% confidence that CWD was not present at 1% prevalence in any of the CSUs in northeast Washington. However, it is expected that as the surveillance program continues and outreach expands, participation and thus sample collection will increase as more hunters and roadkill salvagers are made aware of CWD and the importance of submitting samples. Also, all samples were submitted voluntarily, and mandatory sample submission may become necessary to achieve sample size goals in the future.

Introduction

Chronic wasting disease (CWD) is a fatal neurologic illness of cervids (members of the deer family *Cervidae*) caused by a prion protein. Free-ranging moose, elk, mule deer, white-tailed deer, and reindeer are all known to be naturally infected and currently 29 states, 2 Canadian provinces, Norway, Finland, and Sweden have documented CWD in their wild cervid populations.

The first documentation of CWD was in captive deer at a Colorado research facility in the late 1960s. It was later found in wild deer in Colorado and Wyoming in the early 1980s. During the 1990s, CWD was detected at several captive facilities in Canada, South Dakota, Oklahoma, and Nebraska. Since the 2000s, CWD has spread throughout the continental United States, affecting free-ranging and captive cervids in the Midwest, Southwest, and some states along the East Coast. Parts of the Northeast, Southeast, and West Coast have not detected CWD to date; however, a lack of detection does not equate to freedom from disease.

Surveillance for CWD is conducted at the state or provincial level usually by the local wildlife management agency. Therefore, resources to conduct CWD surveillance are dependent on the local jurisdiction and their priorities for wildlife management, which can vary dramatically. In the 2000s, federal funds were available to states to conduct CWD surveillance, but funding ceased by 2011. Many states reverted to testing only those animals that showed clinical signs of CWD, such as weight loss, ataxia, abnormal behavior, excessive salivation, and excessive drinking and urination. Unfortunately, waiting to observe and detect clinical signs in wild animals allows CWD transmission to occur undetected for potentially months to years. Implementing a surveillance program to test apparently healthy wild cervids increases the chances of early detection and will help wildlife managers respond quickly to an outbreak of CWD.

In Washington, the Washington Department of Fish and Wildlife (hereafter "the Department") used federal funds to test 6,133 cervids statewide from 2001-2011. After federal funding was no longer available, the Department tested only animals suspected of CWD based on those non-specific clinical signs previously described from 2012-2020. Chronic wasting disease was not detected in any animals tested to date.

With CWD detections closer to Washington each year, the Washington State Legislature prioritized CWD surveillance by providing the Department budget proviso funds in 2021 to expand efforts and begin systematic surveillance. At that time, the closest detection to Washington was in Libby, Montana, thus the Department prioritized the four most northeastern CWD Surveillance Units (CSUs) described in the CWD Management Plan. This report describes the CWD surveillance program conducted in northeast Washington during Surveillance Year (SY) 2021.

Surveillance Area and Sample Size

During SY21, the Department focused efforts to collect samples from adult (≥1 year old) white-tailed deer in four CSUs in northeast Washington (Fig. 1). These four CSUs encompassed seven Game Management Units (GMUs) that were combined to achieve sampling units of approximately 15,000 deer per CSU. This estimate of deer per CSU is based on harvest within administrative units and is not an estimate of biological population size. Harvest in this area is primarily antlered deer with very few antlerless opportunities. Research has shown that adult male deer tend to have higher occurrence of CWD compared to females and fawns in the same population. While the

sampling strategy was not weighted using population demographics, hunting regulations opportunistically provided samples that increased the probability of detecting CWD. Our goal was to sample 300 deer in each CSU to achieve 95% confidence of detecting CWD at 1% prevalence (i.e., the percentage of the population that was affected by CWD during the time samples were collected). Until better estimates of deer populations are available, these methods for allocating sampling efforts and determining disease status within Washington will be used with these limitations in mind when interpreting results.

Fig. 1. Chronic wasting disease surveillance units (CSUs W581, W3, W7, W47) that were made up of a combination of seven Game Management Units (GMUs 105, 108, 111, 113, 117, 124, 127) located in northeast Washington were the focus of sampling efforts for the CWD surveillance program during Surveillance Year 2021.

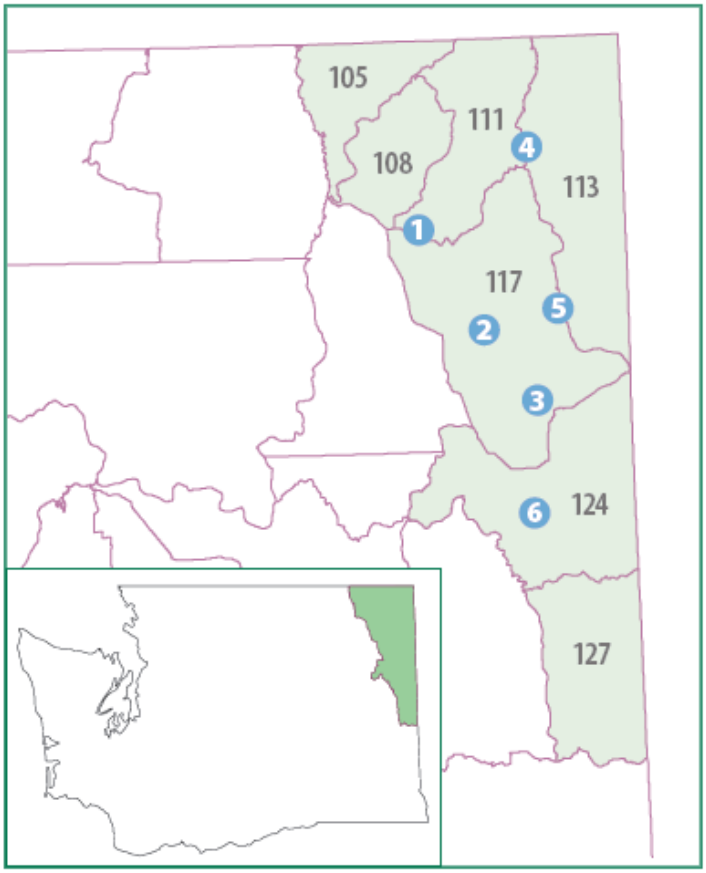
Methods

Medial retropharyngeal lymph nodes (RPLNs) were collected from dead deer and submitted to the Washington Animal Disease Diagnostic Laboratory at Washington State University in Pullman, WA where they were tested using an enzyme-linked immunosorbent assay for detecting CWD prions. Incisor teeth were collected to be aged using cementum annuli analysis by Matson's Laboratory in Manhattan, Montana. Other data collected included date of sample collection, sex of the animal, cause of death, mortality location at either a specific location using latitude and longitude or a grid cell that covered an area of 4.3 square miles (11.1 square kilometers), and hunter or roadkill salvager's contact information when applicable.

Department staff sampled deer opportunistically and from harvested animals primarily during the general modern firearm hunting season. Collection from harvested deer was conducted at six

hunter check stations placed strategically within CSUs operated by Department staff and volunteers during the early and late general deer seasons in October and November (Fig. 2). Hunters were also given the option of making an appointment for sample collection either by Department staff or with the Inland Northwest Wildlife Council (INWC). Road-killed deer were picked up either by Department staff or by the Washington Department of Transportation (WSDOT). When WSDOT picked up road-killed deer within a CSU, their staff tagged the carcasses with the location and date of collection so that Department staff could sample those animals at one of WSDOT's carcass collection sites. All harvested and salvaged deer were submitted voluntarily by the hunter or salvage permittee.

Outreach was conducted to increase awareness of the CWD surveillance program and to inform the public how to submit samples for testing. An email about the surveillance program and operation times and locations of check stations was sent to hunters that had reported hunting deer in the last five years in northeast Washington. A letter was sent to licensed taxidermists and game meat processors statewide outlining the current transportation restrictions on cervid carcasses and information about the surveillance program. The Department also requested samples from taxidermists and game meat processors, with hunter consent, and offered $7 per sample collected. Those that salvaged road-killed deer within a CSU, were notified via an online notification when submitting their salvage application that the Department was interested in testing their salvaged deer for CWD testing. Outreach about the CWD surveillance program was also conducted on Department social media accounts, local newspaper and radio outlets, and presentations given to local sportsperson groups.



1	Colville WDFW District Office - 755 S Main Street, Colville, WA 99114
2	Chewelah Intersection of Sand Canyon Road and HWY 395, DOT Gravel Lot
3	Deer Park Weigh Station - 65 N Arlington Rd, Deer Park, WA 99006
4	Ione, Tiger Store/Museum, 390372 State Rte 20, Cusick, WA 99119
5	Usk, Crossroads Restaurant - 421341 State Rte 20, Usk, WA 99180
6	HWY 2 Weigh Station - Across highway from Spokane Regional Solid Waste

Fig. 2. Six hunter check stations were operated throughout northeast Washington during the general modern firearm deer seasons during Surveillance Year 2021.

Results

The Department collected 425 samples during SY21 and 423 were suitable for testing. Two samples were the incorrect tissue type, likely salivary gland, and could not be tested for CWD. Chronic wasting disease was not detected in any of the 423 testable samples. Of the testable samples, two were female mule deer, and the remaining 421 samples were white-tailed deer (148 females ranging in age from 0 – 15 years old; 269 males ranging in age from 0 – 19 years old; four unknown sex). Four males and two females were aged in the field as either a yearling or adult but based on

cementum annuli analysis were determined to be fawns. The median age of the 184 deer for which cementum annuli analysis results were available at the time of report writing was 3 years old.

The first sample was collected on August 28, 2021, and the last sample was collected on June 20, 2022 (Fig. 3). The bulk of sampling coincided with the general modern firearm deer seasons during October and November. Most samples were collected from harvested deer (n=226) at check stations (n=194) (Fig. 4a). Some harvested deer were sampled by Department staff or INWC by appointment (n=19), at a hunter camp (n=5), taxidermist (n=7), and game meat processor (n=1; Fig. 4a). Secondary sources for samples were from deer that died from other diseases (n=94) primarily during an epizootic hemorrhagic disease (EHD) and bluetongue (BT) outbreak, and roadkill (n=69). Road-killed deer were picked up by Department staff opportunistically (n=50), at WSDOT carcass collection sites (n=18), and from a salvage permittee (n=1; Fig. 4b). Other miscellaneous samples came from deer that died of various causes including illegal harvest (n=4), euthanized deer that had clinical signs consistent with CWD (n=3), fence entanglement (n=2), wounding loss (n=1), and predation (n=1). Cause of death was not recorded for 24 deer.

Distribution of samples was uneven throughout the surveillance area and several samples (n=18) were collected outside of the four target CSUs in adjacent units for various reasons, including two deer suspected of CWD, convenience sampling, and accidental sample collection outside of the surveillance area (Fig. 5). Samples tended to cluster along roadways due to the nature of opportunistically sampling from road-kills. Harvested animals were also likely killed closer to roads because of easier access for hunters. Samples also clustered around residential areas during the EHD/BT outbreak as people were more likely to observe and call the Department about a dead deer on their property. Over 75% of the sample locations were recorded with a specific location (latitude and longitude) rather than within a grid cell that covered an area of 4.3 square miles (11.1 square kilometers). Generally, roadkill sample locations were recorded with a specific location and nearly 55% of harvest locations were recorded at specific locations with a hunter-reported error of less than or equal to 1 mile.

Two CSUs (W47 and W7) achieved sample sizes (n=151 and n=145, respectively) that allowed the Department to conclude with 95% confidence that CWD would have been detected at 2% prevalence within those surveillance units (Fig. 6). An additional CSU (W581; n=85) achieved 95% confidence in detecting CWD if it were present at 4% prevalence within the surveillance unit (Fig. 6). Sample size in one CSU (W3; n=21) only achieved 65% confidence that CWD would have been detected if it were present at 5% prevalence within that surveillance unit (Fig. 6). None of the CSUs reached the target sample size of 300 samples per CSU and a power of detection of 95% to detect CWD if present at 1% prevalence (Fig. 6). Based on harvest estimates, sampling 300 deer in W3 was not feasible (Table 1).

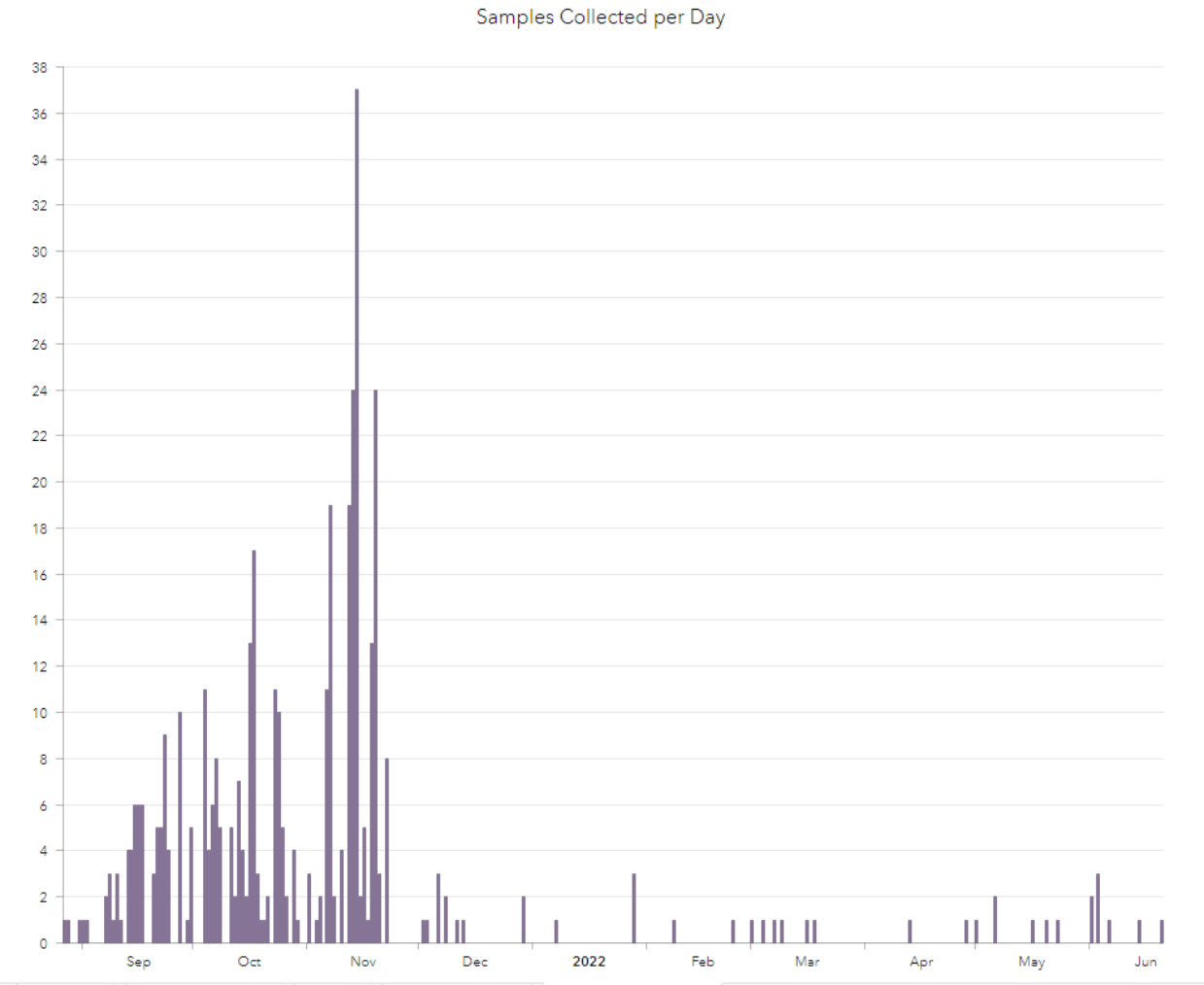


Fig. 3. The distribution of the number of chronic wasting disease samples collected per day during Surveillance Year 2021 in northeast Washington with the first sample collected on August 28, 2021, and the last sample collected on June 20, 2022, and most samples collected during the general deer modern firearm seasons during October and November.

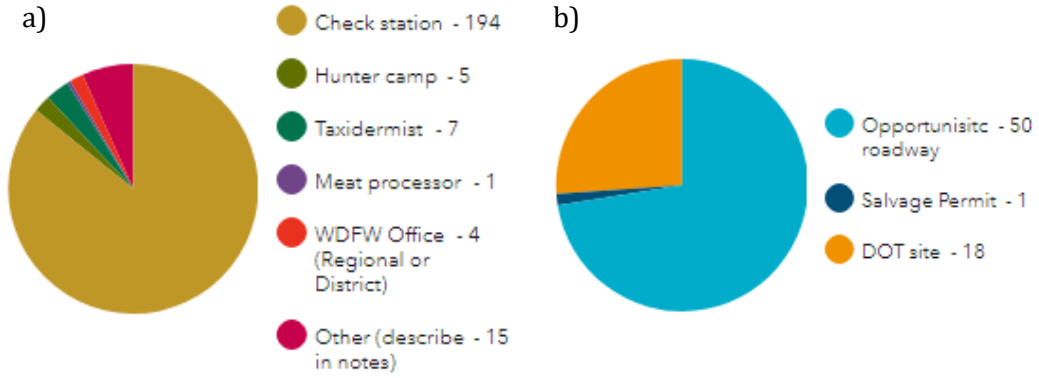


Fig. 4. The number of chronic wasting disease samples collected by collection location type for (a) hunter harvested and (b) road-killed deer during Surveillance Year 2021.

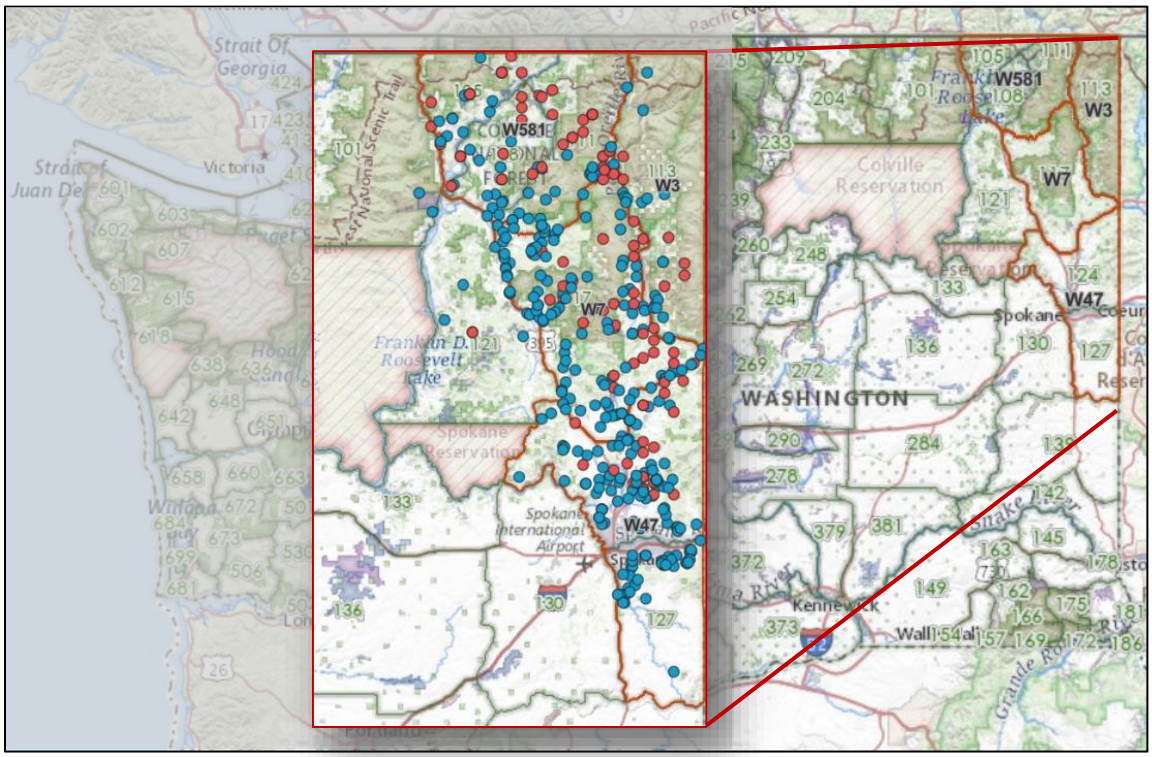


Fig. 5. The majority of samples were collected from four CWD surveillance units (CSUs W581, W3, W7, W47) that were made up of a combination of seven Game Management Units (GMUs 105, 108, 111, 113, 117, 124, 127) during Surveillance Year 2021. Blue dots indicate the specific mortality location with a reported error of <1 mile; red dots indicate an estimated mortality location within a 4.3 sq. mile area.

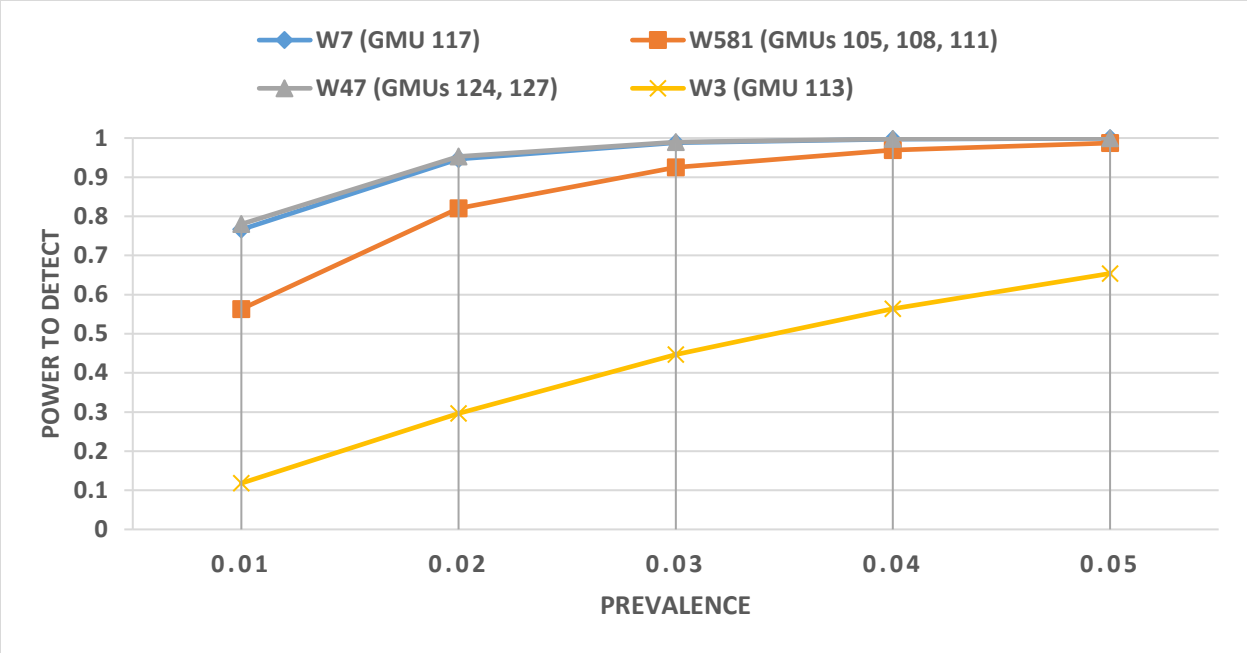


Fig. 6. The power to detect chronic wasting disease (CWD) at a prevalence ranging from 1% - 5% within each CWD surveillance unit based on the number of samples collected during Surveillance Year 2021.

Table 1. Number of hunters, white-tailed deer harvest and success rate (harvest/hunters) in each of the four CSUs estimated from harvest reporting. Note, some hunters may hunt multiple CSUs. Standard error around harvest estimates is approximately 8%.

CSU	Hunters	Harvest	Success
W3	1,865	271	14%
W7	3,740	579	15%
W581	3,082	727	24%
W47	5,104	1,194	23%

Discussion

While CWD was not detected in any of the testable samples, sample sizes limited the Departments ability to conclude with 95% confidence that CWD was not present at 1% prevalence in any of the CSUs in northeast Washington. However, it is expected that as the surveillance program continues and outreach expands, participation and thus sample collection will increase as more hunters and roadkill salvagers are made aware of CWD and the importance of submitting samples. Also, all samples were submitted voluntarily, and mandatory sample submission may become necessary to achieve sample size goals in the future.

Check stations were the best sampling source in northeast Washington and should continue to be utilized during the general deer seasons to sample hunter-harvested animals. The check stations in Ione and Usk were less productive and likely saw overlap of hunters traveling south to Spokane who would have otherwise stopped at either the Deer Park or Highway 2 check stations. The same redundancies in hunters that stop at check stations were seen from Colville to Chewelah and south through Deer Park. To maximize staffing and sampling efficiencies, the Department will consider removing the Ione, Usk, and Chewelah check stations if the Colville, Deer Park, and Highway 2 check stations are in operation. While this may increase CWD sampling efficiencies, a potential consequence of removing these check stations is a decrease in outreach to local hunters. Depending on the Department's objectives, check station location decisions will need to consider both CWD sampling and hunter outreach needs.

Surveillance unit W3 comprised only of GMU 113, in Pend Oreille County and geographically the closest area to known positive cases in western Montana, had the lowest number of samples collected (n=21). Harvest reports suggest that the assumption of 15,000 deer within this CSU likely over estimated deer numbers. While hunter success in each unit is influenced by more than deer densities, achieving a sample size of 300 in W3 is not feasible regardless. Moreover, nearly half of the reported harvest was by Pend Oreille County residents and unfortunately, there is no single convenient location for collecting samples from hunter-harvested deer in GMU 113, making identification of a productive check station location difficult. Other surveillance strategies will need to be explored to increase sample sizes from this GMU.

There were no quantitative evaluations of how successful the Department was with different types of outreach materials to inform hunters about the CWD surveillance program. However, several hunters informed Department staff that they knew about the check stations, locations, and times of operation from the email that was sent to hunters prior to the general deer seasons. The Department will continue to conduct outreach as described previously and explore additional methods to reach underrepresented groups such as First Nation hunters that participate in harvest on Reservation Lands. Additionally, the content of the outreach will improve as the Department learns what is already known and what isn't known about CWD. For example, location of the tissue samples was generally not known by hunters and hunters were unaware they needed to save the head to preserve the RPLNs. As a result, outreach materials were updated to include this detail and instructed hunters to save the heads of their harvested deer with a few inches of neck attached. Another example that will improve future outreach is educating hunters on the disease management need for specific locations of their harvested animal. While most hunters could provide a specific location, many were only able to identify the GMU the animal was harvested in. As technology and mapping tools improve, many hunters have the capability to record the harvest location, but most do not.

A request for taxidermists and meat processors to collect samples from harvested deer was made prior to hunting seasons, but very few were able to collect samples. Primary obstacles to obtaining samples were hunters typically leave the head in the field or at home, meat processors do not have the space to store heads for long periods of time, several meat processors request hunters to bring only bone-out meat, or hunters simply did not choose to submit samples to the Department. With these obstacles, even offering a financial incentive is unlikely to increase the number of samples from these businesses. In fact, the one taxidermist and meat processor that did collect samples declined the incentive payment. Several taxidermist and meat processors in northeast Washington

were willing to help the Department collect samples even without the incentive, and the Department will continue to explore ways to overcome these challenges to obtain samples from these businesses.

In addition to collection from hunters, roadkill salvage permittees were targeted for CWD samples via the Department salvage permit website and the permit itself. Despite this effort, only one salvage permittee contacted the Department to have their deer tested for CWD, even though nearly 200 deer were reported salvaged from northeast Washington. To better understand why salvage permittees were not submitting samples, the Department sent a survey to those who had applied for a salvage permit within Stevens, Pend Oreille, or Spokane Counties after September 1, 2021. Based on survey results, over half of the 224 respondents indicated a willingness to submit a sample, but a third didn't know how to do so. To increase sample submissions by salvagers, the Department may consider updating outreach materials with specific instructions on the tissues needed for testing, how to preserve those tissues, and where salvage permittees can go to have their animal tested for CWD.

During the 2021 hunting season, Idaho Department of Fish and Game detected CWD near Riggins along the Salmon River, less than 50 miles from Washington's southeast border. This new detection increased the risk of natural transmission to those deer populations in southeast Washington. In response, the Department is expanding surveillance efforts to include all GMUs along the eastern border, south to Oregon's border in SY22. Prior to this new detection in Idaho, expansion of the surveillance area was expected with greater Legislative funds for SY22 but now with greater emphasis in the Blue Mountains region rather than expansion west as described in the CWD Management Plan. As new detections outside of Washington occur, surveillance priorities will need to be reevaluated annually to determine the most effective methods for detecting CWD.