Wyoming Game and Fish Department
2024 Brucellosis Surveillance in Non-Feedground Elk Herds
March 28, 2025

Wyoming Game & Fish Department
Wildlife Health Laboratory

Overview:

Each year the Wyoming Game and Fish Department (WGFD) monitors the distribution and prevalence of brucellosis (*Brucella abortus*) within the state's elk populations with blood samples collected mostly by hunters and occasionally by department personnel. Between 8,000 and 9,000 blood collection kits are mailed to elk hunters successful in acquiring limited quota licenses within targeted surveillance areas and additional kits are handed out by field personnel. Annual surveillance is conducted in herds that surround the brucellosis designated surveillance area (DSA) and in herds that do not utilize state or federal feedgrounds (Figure 1). Additional surveillance occurs in a quarter of the hunt areas located outside of the DSA, annually, providing coverage of the entire brucellosis non-endemic area every 4 years. Approximately 23,792 elk blood samples have been analyzed since this programs inception in 1991.

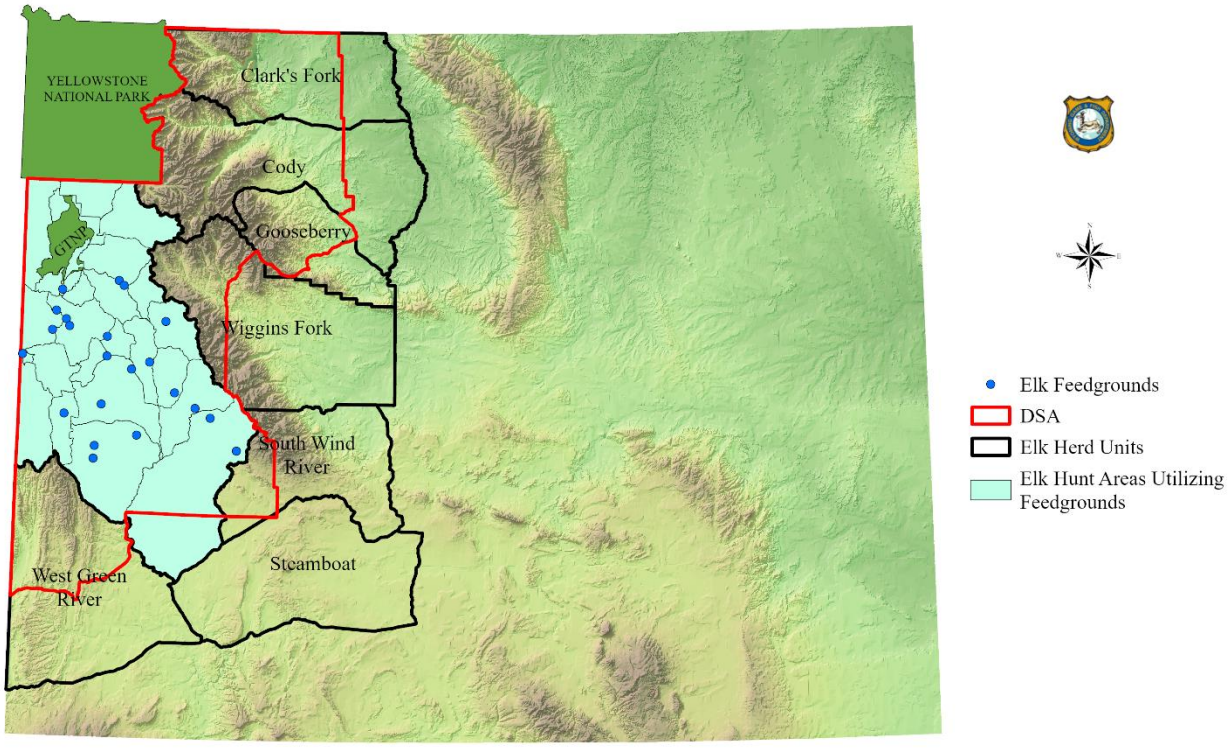


Figure 1. Locations of Wyoming feedgrounds (blue dots), elk hunt areas utilizing feedgrounds (sea foam) surrounding non-feedground elk herd units (bolded black line), and the DSA (red line).

2024 Surveillance:

Methods:
For the 2024 hunting season, over 9,000 blood collection kits were mailed or directly handed out to elk hunters. Surveillance included the western slope of the Bighorn Mountains, the eastern and southern border of the DSA and areas in southeast Wyoming (Figure 2). The blood collection kits consisted of a 15 ml sterile polypropylene conical tube, a paper towel, an instruction/data sheet, and a prepaid mailing label for return shipping. Samples were also obtained opportunistically in association with various research efforts.

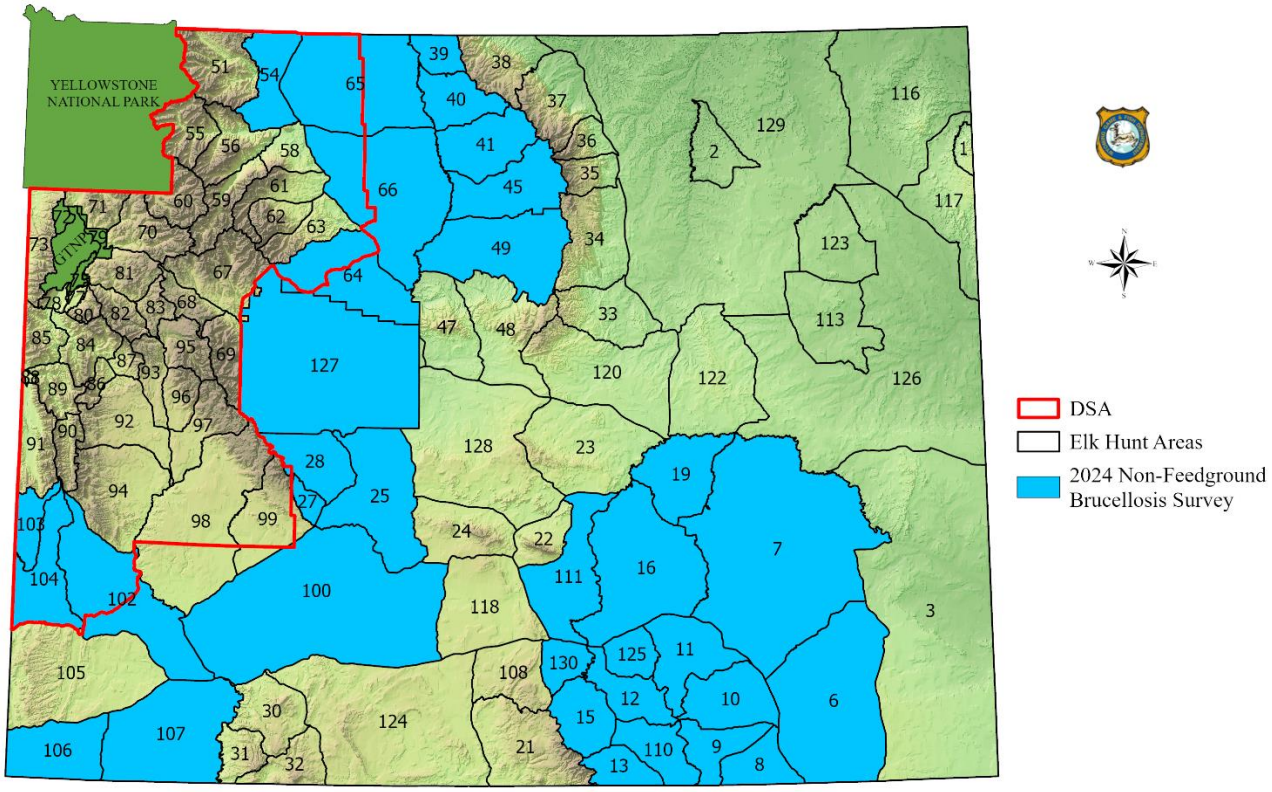


Figure 2. 2024 brucellosis surveillance in Wyoming non-feedground Elk (aqua) and the DSA (red line).

All useable samples were analyzed at the WGFD Wildlife Health Laboratory (WHL). Serologic assays for exposure to *B. abortus* were conducted and interpreted using current assay kit protocols for the fluorescence polarization assay (FPA) plate tests and National Veterinary Services Laboratories (NVSL) protocols for FPA tube tests. The FPA plate test was used to screen samples, and all positive or suspect reactions on the plate assay were confirmed with the FPA tube test. Any samples outside of the endemic or exposure region (Figure 3) testing positive were sent to NVSL for confirmation. Seroprevalence of elk within the known endemic or exposure areas are based on yearling and adult females; males and juveniles are included in surveillance data outside of the known endemic or exposure areas. Including serologic data from males and juveniles offers improved detection of brucellosis in areas where this disease is not known to occur.

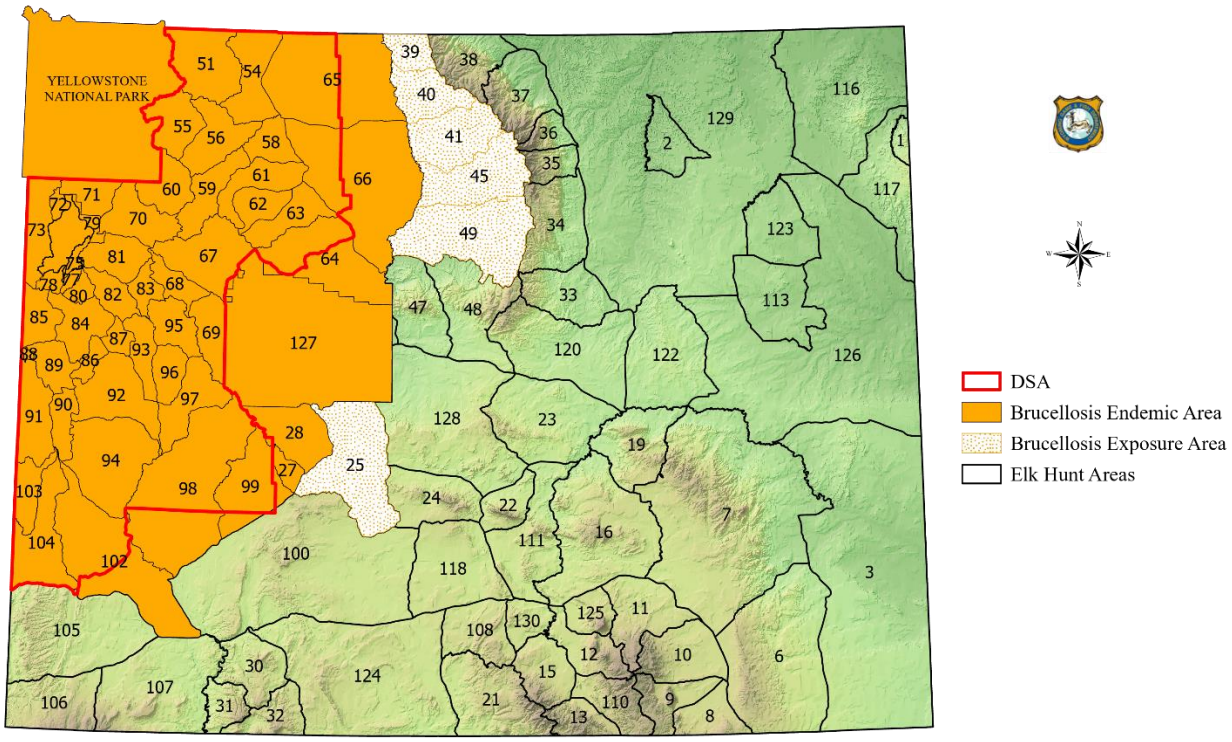


Figure 3. Wyoming elk hunt areas with brucellosis status; brucellosis endemic areas (orange), brucellosis exposure areas (white with orange dots), and DSA (red line).

Serologic tests have improved and become less subjective and most hemolyzed serum samples have become suitable for testing and can contribute to the areas sample size (Jennings-Gaines et al., 2021). Hemolyzed serum samples received from within the DSA are discarded.

The number of hunt areas surveyed and the number of blood collection kits mailed to hunters was based on the priorities of the WGFD and the Wyoming Livestock Board, while balancing the capacity of the WHL. Enhanced surveillance efforts were conducted in the Green River and Lander regions, focusing primarily on elk areas 102, 103, 104, and 25. The 2024 surveillance effort was supported by WGFD and by a cooperative agreement with USDA/APHIS.

Results and Discussion:

In 2024, 992 elk blood samples were received by the WHL; from a little over 9,000 kits mailed or handed out. Of those, 972 were suitable for testing. Testable sample numbers in 2024 were lower than average returns seen in previous years, with a four-year average testable rate of 1,070 from 2020-2023. From the 972 blood samples tested for *B. abortus* specific antibodies, 14 were seropositive; no positive elk detections were made outside of the DSA.

Bighorn Mountains Brucellosis Surveillance:

Since 2015, 4,609 samples have been tested from the Bighorn Mountains (Figure 4). The first seropositive samples were detected in 2012 from two harvested elk (bull and cow; hunt area 40). From 2013-2016, there were nine seropositive elk samples, from four hunt areas in this region (3 bulls and 6 cows; 39, 40, 41, and 49). From 2017-2021, there were no additional detections.

Due to the lack of seropositive samples, in 2021, it was decided to only focus on the western slope of the Bighorn Mountains (hunt areas 39, 40, 41, 45 and 49). In both 2022 (bull; hunt area 45) and 2023 (cow; hunt area 45) there was one seropositive sample received. There were no seropositive elk detections in the Bighorn Mountains in 2024.

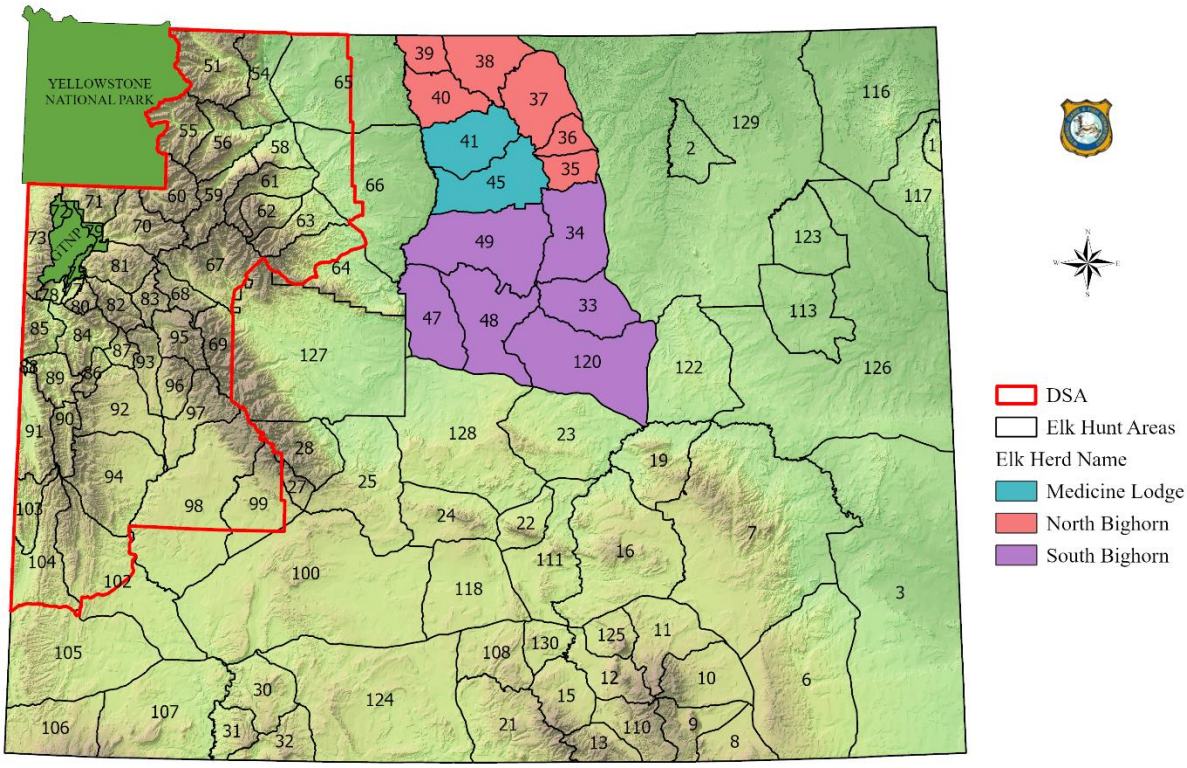


Figure 4. Herd Units and Hunt Areas within the Bighorn Mountains region of Wyoming; Medicine Lodge (teal), North Bighorn (coral), South Bighorn (purple) and the DSA (red line).

Northern DSA Surveillance:

Brucellosis surveillance in the combined northern herd units (Clark's Fork, Cody, Gooseberry, and Wiggins Fork) of the DSA reported an increase in seroprevalence over the past five years (19.3%; 95% CIs: 16.4% - 22.6%; n=652) compared to the 2015-2019 five-year average (12.3%; 95% CIs: 10.3% - 14.6%; n=908).

The five-year average seroprevalence varied between the four northern herd units (Figure 5). It is important to note that sample sizes are generally low and affect the accuracy of prevalence estimates for the individual herd units. Therefore, prevalence's are combined into five-year averages to improve sample size and allow for statistical analysis.

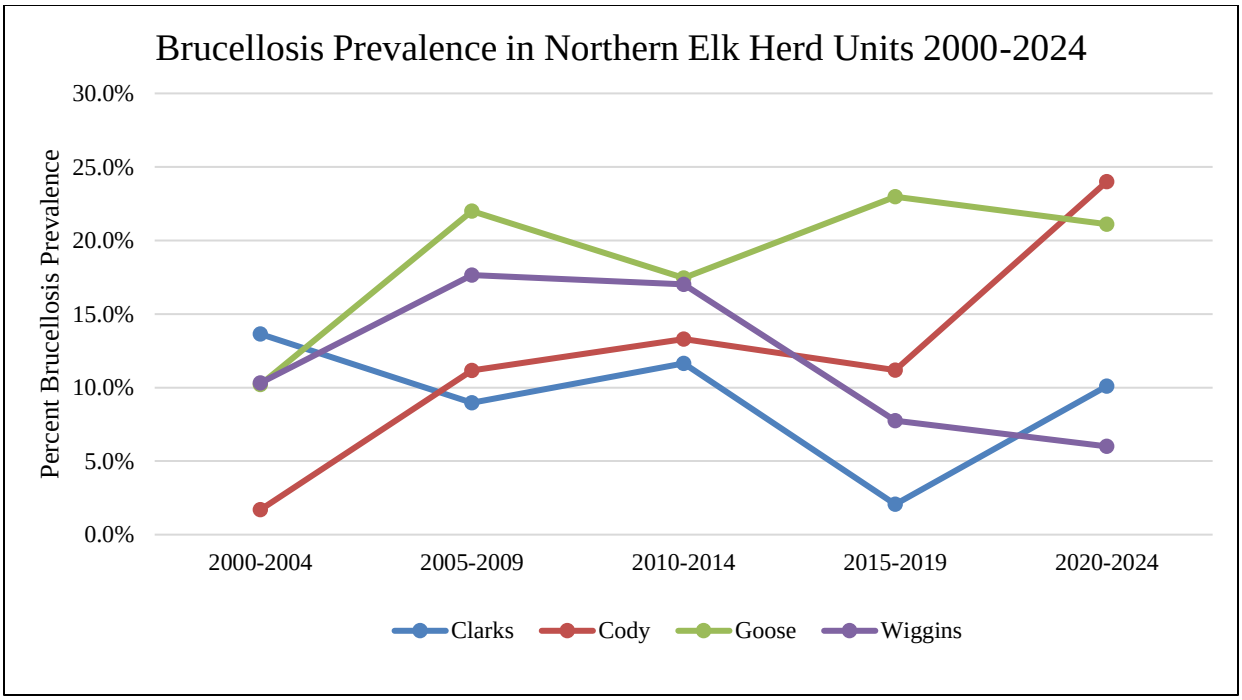


Figure 5. Seroprevalence over time in cow elk from the northern elk herd units.

Southern DSA Surveillance:
The brucellosis seroprevalence of yearling and adult cow elk of the southern DSA herd units (South Wind River and West Green River) was 0.3 % (95% CIs: 0.1% - 1.5%; n = 369) from 2020-2024; the previous five-year average (2015-2019) was 0.6%; 95% CIs: 0.0% - 3.3%; n=168).

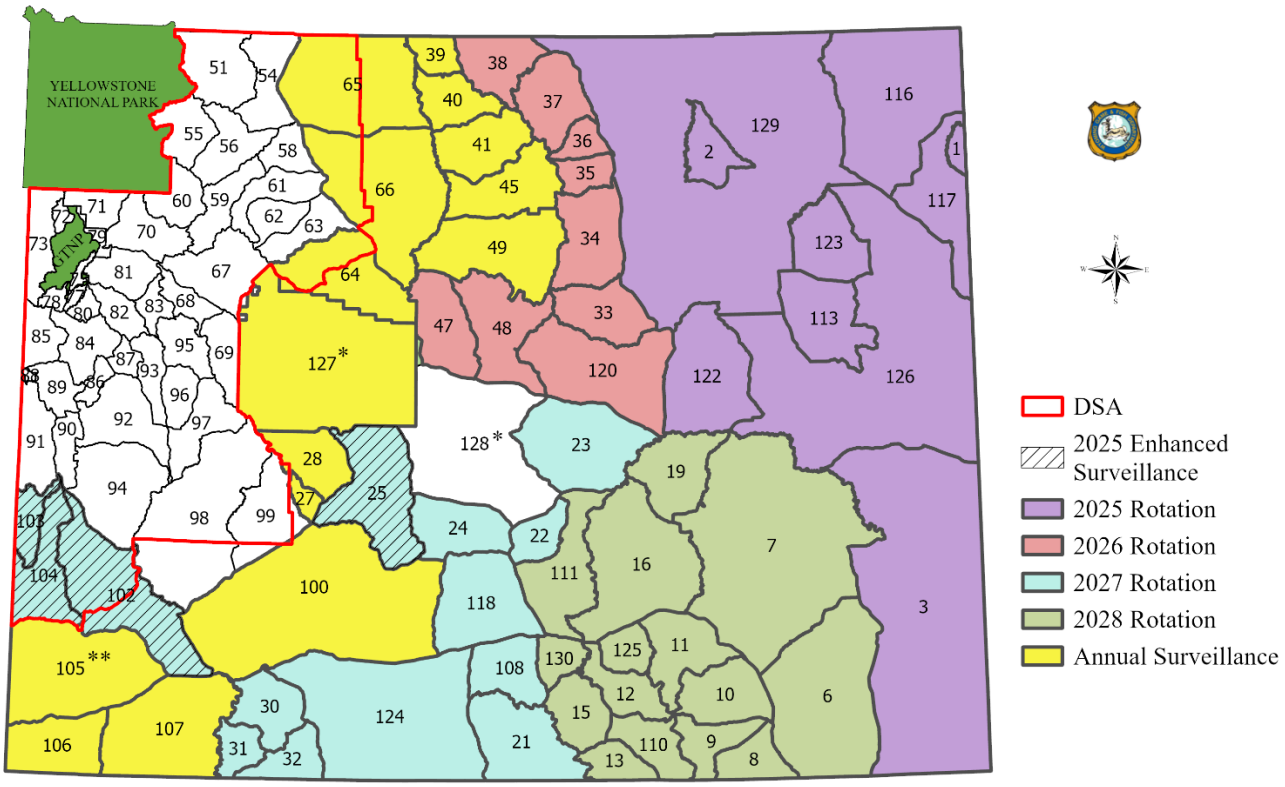
Enhanced surveillance efforts were initiated, in 2018, in the southern herd units bordering the DSA. In 2019, there were two seropositive samples (bull, cow; hunt areas 25 and 27), in both 2022 and 2023 there was one seropositive case in the southern DSA herd units (cow, bull; hunt area 28 and 25). A combined 125 samples (male and female; all ages) were tested from the South Wind River and the West Green River herd units in 2024 with no seropositive animals detected.

Rotating Statewide Surveillance:
From the statewide rotating surveillance program target non endemic areas in 2024 (6, 7, 8, 9, 10, 11, 12, 13, 15, 16, 19, 110, 111, 125 and 130), 391 useable samples were submitted. No samples from the 2024 rotating suurveillance tested positive for exposure to *B. abortus*. It is important to continue this rotating surveillance in non-endemic areas to catch detections early as this disease is difficult to manage in free-ranging populations and can have significant economic impacts statewide.

2025 Surveillance:

In 2025, the rotating surveillance area will focus on the eastern and northeastern parts of the state. This surveillance will encompass elk hunt areas 1, 2, 3, 113, 116, 117, 122, 123, 126, and 129. Enhanced surveillance will be conducted (kits mailed to hunters) in elk areas 102, 103, 104 and 25

in an effort to elicit larger sample sizes from those areas of concern. Efforts to survey around the eastern and southern border of the DSA will continue as well as the western slope of the Bighorn Mountains (Figure 6).



* Elk hunt areas with only general licenses available. Elk area 127 surveillance completed with help from the USFWS and the WRIR.
** Limited quota licenses anticipated for the 2025 hunting season

Figure 6. Statewide non-feedground brucellosis surveillance schedule; annual surveillance (yellow), 2025 rotation (purple), 2025 enhance surveillance (diagonal lines), 2026 rotation (coral), 2027 rotation (mint) and 2028 rotation (olive).

Literature cited:

Jennings-Gaines, J. E., W. H. Edwards, and T. J. Robinson. 2021. Determining antibody retention in hemolyzed, bacterially contaminated, and nobuto filter paper-derived serum utilizing two *Brucella abortus* fluorescence polarization assays. Journal of Wildlife Diseases 57(2).