

2017 APHIS Brucellosis Review Recommendations/ WLSB Response

The Wyoming Livestock Board (WLSB) appreciates USDA APHIS recommendations made following their June 2017 review of our Brucellosis Management Plan. We will continue to work with APHIS to mitigate risks of exposure of cattle to Brucellosis infected wildlife to the best of the state's ability. We are responding to the recommendations to explain what we are doing and to clarify the Board's policies and positions.

Thank you for working with us as a cooperating partner to protect the nation's cattle industry.

Key Recommendations

1. Develop written guidelines or policy based on specific criteria for defining the boundary of Wyoming's DSA. Base the area on:
 - a. Elk range/location, changes in observed elk seroprevalence or culture positive elk, elk-livestock interface, or other risk factors.
 - The Wyoming Livestock Board does not think it is reasonable or responsible to attempt to develop an algorithm or matrix to determine the boundary(s) of the DSA as there are far too many variables to consider in an ever-changing paradigm. Therefore, the Board does not want to get locked into a strict requirement for amending the boundaries of the DSA (either expanding or shrinking). The WLSB will consider a language change in the Chapter 2 Brucellosis rules stating that "the Board will annually review the DSA boundaries and determine any changes based on recommendations from the state veterinarian and the Director of the Wyoming Game and Fish Department (WGFD)". Such a change will require the board to follow state rule promulgation requirements which will take time to transpire, but will be acted on in 2018.
 - b. Establish criteria that would trigger a change in the DSA based on these risk factors.
 - This would also require board action to make a rule change. A minimum list of criteria that the state veterinarian and the Director of the WGFD would consider prior to making annual recommendations to the board would include: elevated elk (or bison) seroprevalence rates in an area; verified high rates of elk/cattle commingling during high risk season; and verified cattle infection outside the DSA.
2. Develop a method to monitor, enforce, and report the testing of animals leaving the DSA to ensure compliance with rules and regulations, including the number tested on a herd-level basis. Reporting should be annually at a minimum.
 - WLSB brand and animal health staff are cooperating to compare cattle movement documents/brand clearances with Brucellosis test charts.
 - Through the electronic brand inspection system we have begun comparing movement documents with Brucellosis test charts to determine compliance on a monthly basis.

- Brand inspectors are already verifying if cattle being moved/changing ownership from the DSA have been tested. Only cattle moving directly to an approved market or on a state veterinarian waiver to test at destination, or with a herd plan providing a movement test waiver, may be moved without a test within the required time.
 - Reporting can be done at least quarterly once we have our system fully implemented.
3. Establish a minimum annual target for percentage of animals tested from each DSA herd, (e.g., each DSA herd tests at least 15% of its eligible animals annually, including the tests that occur when test-eligible animals leave the herd). This target can be based on expected cull and replacement rates within the herd.
- WLSB believes that its Chapter 2 Rules are sufficient to achieve adequate herd surveillance DSA-wide.
 - Compliance with the Chapter 2 Rules should achieve between 10 and 20% on an annual basis for most herds.
 - We are working to develop a list of DSA producers that will be monitored by animal health staff in comparison to Brucellosis test charts. Such monitoring will require additional personnel, and the WLSB would request additional Federal funding to complete.
4. Classify DSA herds out into high-, medium-, or low-risk categories and document where risk occurs and which herds are on herd plans based on risk level. Continue to target high-risk herds for participation in formal herd plans, and include medium- and low-risk herds when possible. Define what constitutes high-, medium-, and low-risk to create these categories. Conduct risk assessments with individual herds, which will take additional time and resources.
- Information within herd plans is confidential and by statute cannot be shared except internally with WLSB staff. Veterinary staff already do rank the risk after reviewing the risk assessment that precedes herd plan development.
 - Unless the WLSB makes risk assessments and/or herd plans mandatory, this will continue to be on a willing producer basis.
 - Herd plans and risk assessments in Wyoming are voluntary, so if a producer does not want to participate with either, they have to strictly comply with the Chapter 2 Rules which require testing prior to change of ownership or movement from the DSA.
 - WLSB veterinary staff is working with WGFD to create risk maps that will enable us to identify “higher risk herds” and solicit more in depth voluntary risk assessments. This may involve private practitioners as they have a working knowledge of not only the herd, but the area in general and associated elk behavior and potential exposure. This, too, would require additional USDA funding.
5. Continue reimbursement for pre-movement testing for all test-eligible animals moving out of the DSA as well as supporting the laboratory testing.
- Wyoming will do this as long as state and/or federal funding is sufficient.

6. Work with WGFD to maintain or increase elk surveillance, especially in the Bighorn Mountains, to enact wildlife management strategies to decrease prevalence when necessary.
 - . Currently the Wyoming Game and Fish Department (WGFD) conducts extensive surveillance for brucellosis in Wyoming with a heavy focus in the Bighorn Mountains. Over 10,000 blood collection kits are assembled and either mailed or directly handed to hunters in Wyoming. Of these, approximately 6,000 are focused in the Bighorns. This level of surveillance is currently in excess of the WGFD Wildlife Health Laboratory capacity and additional personnel must be hired to help meet this demand. With the growing need for Chronic Wasting Disease testing in cervids across the state, the WGFD is unable to increase brucellosis surveillance beyond the current level. While we will continue to make every effort to maintain current brucellosis surveillance, our Wildlife Health Laboratory must balance the diagnostic and surveillance needs for multiple wildlife diseases across the state. Other wildlife disease priorities and demands may impact brucellosis surveillance in the future.
7. Consider testing eligible animals at the change of ownership in Big Horn County. Continue voluntary testing in Sheridan County. This will require increased funding to compensate for testing, conduct herd risk assessments, and continue education in these counties. VS will stay in regular communication with the WLSB and re-assess their approach for the Bighorn Mountains in one year.
 - This would require board action. Animal Health staff intends to refine the true “ area/s of concern” based on elk movement and seasonal location data being gathered by the WGFD and then conduct location-specific, voluntary risk assessments and require testing on identified “at risk” herds. We will also be conducting educational programs for area producers and veterinarians to increase awareness.
8. Finalize the MOU between APHIS and WLSB before December 31, 2017, and review it annually.
 - At this time, the MOU is being reviewed by the Wyoming Attorney General’s office and state specific required language being added.
9. Maintain funding for Wyoming’s brucellosis management program. A decrease in funding may put any portion of the activities and effectiveness of the program at risk.
 - WLSB fully agrees with this statement. Appropriation of funding for our Brucellosis program is at the prerogative of the Wyoming legislature, but we will continue to request funding at current levels.

APHIS Objective One: Review the adequacy of Wyoming’s brucellosis rules to prevent the spread of brucellosis beyond the DSA

Recommendations:

1. Define and explain the basis for the geographic area in which a disease risk exists from *B. abortus* and to which the brucellosis management plan activities apply.
 - The DSA has historically been established on the basis of significant wildlife sero-prevalence in an area as determined by WGFD surveillance and/or by a known identified

brucellosis-affected cattle or domestic bison herd in an area. We have for years defined the boundaries of our DSA based on recommendations/advice from the state veterinarian and WGFD Director according to identified exposure risks and will continue to do so.

2. Define the criteria by which the boundary of the DSA should change, either expansion or contraction.
 - The Wyoming Livestock Board does not think it is reasonable or responsible to attempt to develop an algorithm or matrix to determine the boundary(s) of the DSA as there are far too many variables to consider in an ever changing paradigm. Therefore, the WLSB does not want to get locked into a strict requirement for amending the boundaries of the DSA (either expanding or shrinking). The WLSB will consider a language change in the Chapter 2 Brucellosis Rules stating that “the Board will annually review the DSA boundaries and determine any changes based on recommendations from the state veterinarian and the Director of the Wyoming Game and Fish Department (WGFD)”. Such a change will require the board to follow state rule promulgation requirements which will take time to transpire, but will be acted on in 2018. This will be done on a common sense and practical basis. Factors that will be considered include:
 - Expand boundaries if elk and/or bison seroprevalence increases beyond a Board-determined significant sero-prevalence rate in a given area where there is a potential for cattle / elk interaction during the transmission risk period , or if epidemiologic investigations of an affected herd presence identifies endemic risk factors.
 - Expand boundaries after a careful cost analysis is conducted, and sufficient funds can be identified and appropriated to cover the impact of increased funding needed to conduct surveillance testing both in livestock and wildlife.
 - Decrease boundaries if wildlife seroprevalence and cattle / elk exposure during the transmission risk period significantly decreases in a given area of a DSA or Area of Concern and other endemic risk factors are not present.
3. APHIS and the WLSB should finalize and sign an MOU to include a BMP as soon as reasonably possible, preferably by December 31, 2017, to come under full compliance with 9CFR Part 78. This MOU will be revisited annually.
 - At this time, the MOU is being reviewed by the Wyoming Attorney General’s office and state-specific required language being added.
4. Continue reimbursement of testing to veterinarians and lab to maintain no out-of-pocket expense to producers. This portion of the program is essential to compliance.
 - WLSB will do this as long as sufficient funds continue to be appropriated.
5. Continue supporting use of RFID or other electronic OCV tags and increase use through measurables (# of tags/year). Target herds within the DSA that retain breeding heifers to work towards an all-electronic herd.
 - RFID vaccination tags are currently purchased with APHIS grant (Cooperative Agreement) funds and are distributed statewide to veterinarians who have clients requesting them. We prioritize to provide to DSA and Brucellosis Area of Concern

veterinarians when possible. Dr. Logan also discussed the need for increased federal funding to provide more RFID vaccination tags statewide. Since Wyoming does not receive ADT grant funding, increasing the Umbrella grant/CA so adequate numbers of RFID tags can be purchased would be helpful to the program and good for traceability.

6. Work towards use of electronic capture of data at livestock markets such as creation of test charts, complete capture of all IDs (consider UHF), etc. Until then, regularly audit test records and animal movements through livestock market.
 - These efforts are ongoing.
7. If intra-herd prevalence increases in affected herds detected or in the DSA as a whole, then it would be prudent to switch strategies to area whole-herd tests.
 - WLSB agrees. Wyoming's surveillance strategies appear to be very effective in identifying infected herds prior to there being opportunity for intra-herd spread. If this does not continue to be the case, it would be prudent to consider whole herd testing as a tool to enhance surveillance.
8. Wyoming has enjoyed relatively few herds that have been affected by brucellosis in the last few years, but the WLSB should not become complacent as the risk is steadily increasing via expanding elk populations and range.
 - Wyoming is well aware, and perhaps more aware than APHIS of the dynamics and variables involved in the ever changing paradigm of Brucellosis spill over from wildlife to livestock. It has been only with persistent education, outreach, and good management that our producers have been able to combat these risks and continue production practices without more infected herds as seen in neighboring DSA states. In our minds, this is far from complacent. Rest assured, Wyoming will continue to address the Brucellosis risk with the same diligence it has in the past.

APHIS Object Two: Assess the enforcement of rules

Recommendations:

1. Create a system that reconciles the Brand Inspection data with animal testing data to easily demonstrate that proper surveillance is being conducted. Incorporate electronic brands when implemented. This will increase information for the WLSB to monitor and enforce testing as well as provide credible information for outside trading partners. Important components to consider:
 - a. Report the number of test-eligible animals leaving the DSA via brand records vs. the number of animals tested on a regular basis, at minimum, annually.
 - WLSB brand and animal health staff are cooperating to compare cattle movement documents/brand clearances with Brucellosis test charts.
 - Through the electronic brand inspection system we have begun comparing movement documents with Brucellosis test charts to determine compliance on a monthly basis

- Brand inspectors are already verifying if cattle being moved/changing ownership from the DSA have been tested. Only cattle moving directly to an approved market or on a state veterinarian waiver to test at destination, or with a herd plan providing a movement test waiver, may be moved without a test within the required time.
 - WLSB staff is already comparing brand movement data with Brucellosis test charts to determine compliance with Chapter 2 requirements. We will do this on a monthly basis and record results internally.
 - b. Include the number of herds tested and number of animals tested within each herd.
 - This will be part of our internal data.
 - c. Measure how often each individual herd within the DSA gets an individual animal test and what percentage of the herd is tested on an annual basis.
 - This will take time and extra effort to monitor, but we will try. We do not have cattle numbers in every herd in the DSA (or Area of Concern) and producers may be reluctant to share that information.
 - d. Measure how long individual herds within the DSA go without having a single movement test.
 - Probably doable, but again would take extra time and effort from an already short-handed and busy staff.
- 2. In the interim while developing the above report, conduct an audit of five to 10 ranches in the DSA to evaluate current compliance.
 - This has already been done and compliance was excellent. Animal Health staff asked veterinarians for the names of ranches moving the most cattle during the previous year. WLSB personnel then correlated brand movement documents with Brucellosis test charts and found that all producers checked were in compliance.
- 3. Consider adding sexually-intact males into test-eligible as they may be sentinels of herd-infection.
 - Public comment and board decisions when this was previously considered for the Chapter 2 Rules have been against doing this. Bulls are good sentinel animals for the disease, but the real value is in identifying infected herds with intra-herd spread. This was far more valuable in the days of eradication than under current conditions where we continue to find herds prior to intra-herd spread. Bulls won't spread the disease even if they are infected. However, we recognize that if a Brucellosis-positive bull leaves the DSA untested and is subsequently found positive at slaughter, we would have to trace back to ranch of origin and we would not have tissues for culture, which can complicate the issue.
- 4. Develop a method to better enforce testing of individual animals at risk due to grazing within the DSA. Beyond verifying that an individual herd that grazed within the DSA was tested at

20%, verify that it was the higher risk animals (opens, culls, late-breds) that are required to be tested.

- Veterinary staff may be able to do this for Wyoming in-state commuter herds by working with the veterinarian who does the testing. For out of state commuter herds, this would have to be done by the state veterinarian in the state the cattle return to.
5. Reconcile all animals presented at the market with previous test records as the animals presented for sale. Use electronic means when possible to facilitate rapid collection of animal information to facilitate commerce.
 - There is an obvious potential loophole here. However, if a producer is going to test cattle, there is no motive not to test the ones being sold or culled. We rely on the basic honesty of our producers to present cattle for sale at markets that have been tested. Tags are checked if cattle are run through the chute at the market, but they are not run through solely for the purpose of checking ID. We do correlate test chart numbers of cattle tested with numbers consigned, and in most cases those figures match.
 6. Allow VS to participate more in day-to-day brucellosis management activities. The current personnel are permanent Wyoming residents and have the skills to support Wyoming's brucellosis efforts. APHIS recognizes the unique ranching culture in Wyoming and the need to carefully establish relationships between the Federal government and private producers.
 - We do use the APHIS VMOs and epidemiologist frequently to help educate producers and veterinarians. They also participate in the Wyoming Brucellosis Coordination Team meetings as well as with testing when infection is found. Many times, Wyoming producers are very reluctant to work with federal government employees but are willing to work with state employees, so that is how we do it.

APHIS Objective Three: Assess Diagnostics, Risk Mitigations, and Education

Recommendations:

1. The WLSB should have a goal of 100% of defined high-risk herds within the DSA to have an active herd plan with the WLSB. Consider offering incentives to encourage participation or make herd plans mandatory under state rule given specified criteria, e.g. known high-risk interactions with elk.
 - Herd plans in Wyoming have always been voluntary except for affected/infected herds. Producers with no herd plan are still required to test as per the Chapter 2 Rules and that required testing is how all of our affected herds since 2006 have been identified.
 - It is very unlikely that the WLSB will make herd plans mandatory and also extremely unlikely that there will be any financial incentives forthcoming due to state budget considerations.
 - WLSB veterinary staff is working with WGFD to create risk maps that can be used to identify higher risk herds for which we can actively solicit detailed risk analysis with the input of the producer's local practitioner. USDA funds would help this initiative.

2. The WLSB should have a goal of 100% of herds with elk contact inside the Bighorns during peak period (grazing or resident) to have an active herd plan with WLSB. Consider incentives to encourage participation.
 - WLSB veterinary staff is working toward this goal. We are working with WGFD to obtain elk movement and location data during the high risk exposure season and then to work with identified producers/locations to conduct risk assessments, develop herd plans, and conduct testing where appropriate.
 - We believe it would be prudent for the board to require a risk assessment for such herds which might result in the herd owner entering into a voluntary herd plan that could include booster and/or adult vaccination at state expense.
3. WSVL should engage with GYA partners to share currently available elk serology and culture data to provide more information regarding elk brucellosis assays.
 - The Wyoming Game and Fish Wildlife Health Laboratory conducts surveillance for brucellosis in elk including serology, culture, and PCR diagnostics. Diagnostics and data management is conducted independently of the WSVL, though we collaborate closely with WSVL. The Wildlife Health Laboratory has always been both proactive and openly collaborative with any institution or individual researching brucellosis culture or serological assays (see specific publications listed below, an additional 18 coauthored brucellosis publications can be provided upon request).
 - Clarke PR, Edwards WH, Hennager SG, Block JF, Yates AM, Ebel E, Knopp DJ, Fuentes-Sanchez A, Jennings-Gaines J, Kientz RL, Simunich M. Comparison of Buffered, Acidified Plate Antigen to Standard Serologic Tests for the Detection of Serum Antibodies to *Brucella abortus* in Elk (*Cervus canadensis*). *Journal of Wildlife Diseases*. 2015 Jul;51(3):764-8.
 - See W, Edwards WH, Dauwalter S, Almendra C, Kardos MD, Lowell JL, Wallen R, Cain SL, Holben WE, Luikart G. *Yersinia enterocolitica*: An unlikely cause of positive brucellosis tests in greater Yellowstone ecosystem bison (*bison bison*). *Journal of Wildlife Diseases*. 2012 Jul;48(3):537-41.
 - Higgins J, Stuber T, Quance C, Edwards WH, Tiller RV, Linfield T, Rhyan J, Berte A, Harris B. Molecular epidemiology of *Brucella abortus* isolates from cattle, elk, and bison in the United States, 1998 to 2011. *Applied and Environmental Microbiology*. 2012 May 15;78(10):3674-84.
 - Van Houten Jr CK, Belden EL, Kreeger TJ, Williams ES, Edwards WH, Thorne ET, Cook WE, Mills KW. Validation of a *Brucella abortus* competitive enzyme-linked immunosorbent assay for use in Rocky Mountain elk (*Cervus elaphus nelsoni*). *Journal of Wildlife Diseases*. 2003 Apr;39(2): 316-22.
 - This year, the WGFD Wildlife Health Laboratory initiated collaborative research with NVSL to investigate if hemolyzed blood samples can be reliably tested. This work has shown that most hemolyzed samples can be tested for brucellosis using the FPA and CF assays and we have been able to greatly increase our sample sizes and maximize the

effectiveness of our current surveillance program. Results from this collaborative research effort will be summarized into a manuscript for publication and shared with GYA partners. In addition, laboratory staff routinely shares information and data through presentations with the Wyoming Brucellosis Coordination Team, the United States Animal Health Association, and brucellosis research meetings. We also routinely provide diagnostic data for brucellosis research at both the state and regional level.

- Although the Wildlife Health Laboratory has a demonstrated history of collaboration and research, some of the individuals/institutions that we work with may be unwilling or unable to share (for a variety of reasons) raw data or research findings. To maintain our working relationships, we respect these requirements and therefore not all data that is generated by the Wildlife Health Laboratory is available for other researchers or GYA partners.
4. Continue regular meetings and education within the DSA and expand resources beyond DSA – especially in Big Horn County.
 - This will continue through the Wyoming Brucellosis Coordination Team and WLSB/WGFD outreach efforts and those of UW Ag Extension. WLSB also hopes to hold a Brucellosis Forum with Wyoming veterinarians which would likely require some funding assistance from APHIS.
 5. Communication and outreach should be kept in front of the general public due to public health concerns and the potential impact on Wyoming should brucellosis prevalence increase in livestock. Therefore, it is important to fund ongoing education through in-person meetings and travel. APHIS cooperative agreements serve a key role for this recommendation.
 - WLSB veterinary staff continues to work closely with the Wyoming Department of Health on public education efforts. We also agree that APHIS cooperative agreement funding is very critical to conducting education/outreach programs.

APHIS Objective Four: Evaluate wildlife surveillance and risk mitigation activities

1. Maintain or increase elk surveillance, acknowledging that hunter samples are key to increasing the sample size and representativeness of the population over time. Consider offering incentives to increase hunter samples, such as added numbers to the hunt lottery or reduced tag fees for the following year if a successful sample is submitted.
 - See recommendation 6 in executive summary for comments regarding surveillance. In addition to standard surveillance practices, the WGFD is currently in the process of planning an incentive for hunters to submit blood samples for brucellosis surveillance. For the 2018 season, hunters that submit a blood sample will be entered into a raffle to win a rifle.
2. Aggressively target the Bighorn Mountains to improve confidence in the apparent seroprevalence in elk. Include practices to improve tissue sampling, such as continued personnel on site during the hunt season to facilitate sample collection.
 - In 2016, the WGFD relocated a brucellosis biologist to Powell to help oversee surveillance and management efforts in the Bighorns. This biologist has worked

diligently to improve surveillance and increase sampling efforts, including tissue collection. This position will continue to focus heavily on brucellosis efforts in the Bighorn Mountains and northeastern Wyoming. In addition, we will continue to hire seasonal support for brucellosis surveillance in the Bighorns as long as budget capacity remains.

3. Implement adaptive management strategies to prevent increases in seroprevalence across the State, with an increased emphasis in the Bighorn Mountains. Surveillance data should be used to inform these management actions.
 - Feedground management now includes low-density feeding to reduce elk-fetus contacts, and feeding is ended as early as possible at feedgrounds where there is little risk of elk-cattle commingling.
4. Continue working with Montana and Idaho to stay apprised of activities related to research. Work to coordinate more activities or sampling strategies to offer a more unified set of data and information to better characterize the risk of elk transmission and effective mitigation activities.
 - The WGFD routinely communicates with Montana and Idaho on brucellosis research and related work. We are actively sharing elk movement data on numerous research projects and provide data for regional brucellosis collaborations. WGFD personnel attend annual brucellosis research group meetings to share information and coordinate research across WY, ID, and MT.
5. Continue cooperative investing in research related to understanding the risks of elk-to-livestock transmission.
 - The WGFD remains actively engaged in multiple brucellosis research projects and employs brucellosis biologists who conduct/collaborate on research as part of their primary job duties. Global positioning system (GPS) collars and vaginal implant transmitters (VITs) deployed on elk captured on and around the feedgrounds in western Wyoming have enabled managers to identify areas of high risk for inter-specific brucellosis transmission. Maps of these zones have been shared with federal and state livestock regulatory officials. Additionally, information on the characteristics of brucellosis transmission garnered from aborted VITs has resulted in management changes on feedgrounds such as low-density feeding methods and early feeding termination efforts to reduce intra-specific brucellosis exposure.

APHIS Objective Five: Evaluate if the DSA boundary is appropriate

Recommendations:

1. Reassess the DSA boundary based on current seroprevalence in hunt units along the boundary along with other risk factors, such as wildlife and livestock herd location throughout the year. Change the boundary based on scientific and documented criteria with

relation to risk of wildlife-livestock transmission and in accordance with the criteria to be developed under Objective One.

- If valid data indicates that changing the boundary of the DSA is necessary, the Board will take appropriate action. Both the WGFD and WLSB veterinary staff monitor risk factors and will advise the Board of necessary/advised action. The WGFD provides the Wyoming Livestock Board with elk surveillance data annually and additional data is available as requested to assist the livestock board with this assessment.
6. Evaluate including Big Horn County in the DSA and, under the rules of Chapters 2 and 6, to conduct first-point testing at the change of ownership, movement out of the area, and interstate movement.
- Conversations with board members indicate that the board will not include Big Horn County in the DSA at this time. However, we have discussed conducting risk assessments on Big Horn County locations identified as having elk in the proximity during the exposure risk season and requiring testing if such risk assessment shows significant exposure risk. This would enable us to get at-risk herds into a herd plan so they can be monitored and, owner willing, do booster/adult vaccination at state expense.
7. Work with WGFD to mitigate the risks of elk-to-elk transmission within the Bighorn Mountains.
- The Board and staff will continue to work with the WGFD through the Wyoming Brucellosis Coordination Team and direct agency contacts to do this.
 - Currently the board is waiting on further information from the WGFD on the elk movement radio collar study and 2017 hunter killed elk surveillance.
 - Preliminary maps of elk locations in the Bighorn Mountains have been provided to the livestock board, but data is still limited. More movement and location data are necessary to improve confidence in occupied elk ranges and determine areas of risk before a rigorous assessment of wildlife-livestock transmission risk can be conducted. As we gather more robust data on elk locations and movement in the bighorns, maps will be revised and that information will be shared.