

United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS)

Review of Montana's Brucellosis Management Plan

A Review to Assess the Specific Disease Management and Disease Mitigation Activities Currently in Place within Montana's Designated Surveillance Area.

Compilation of Observations, Findings, and Recommendations from the Review Team of APHIS VS and State Animal Health Officials.

Evaluation of Montana's Brucellosis Management Plan Activities

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Dates of the Review:

- Thursday, September 13, 2012
- Friday, September 14, 2012

Locations visited during the Review:

- Montana Department of Livestock Office, Helena, Montana
- Montana Department of Fish, Wildlife and Parks Office, Bozeman, Montana
- Headwaters Livestock, Three Forks, Montana
- USDA APHIS VS Area Office, Helena, Montana

Executive Summary

Since the publication of the brucellosis interim rule in December 2010, the GYA States have been working with APHIS VS to develop a memorandum of understanding (MOU) that describes their respective brucellosis management plan (BMP). The BMP described in the MOU defines the State's designated surveillance area and further describes the surveillance and mitigation activities the State conducts to identify occurrence and prevent the spread of *Brucella abortus* (*B. abortus*) in domestic livestock and wildlife within and from the designated surveillance area.

This report reflects VS' review of Montana's current BMP activities. The focus of the review was to assess the specific disease management and disease mitigation activities currently in place within the designated surveillance area. The purpose of the review was to evaluate the State's ability to prevent brucellosis-infected animals from leaving the designated surveillance area and potentially putting the rest of the national domestic cattle and bison herd at risk.

The goal of the review was to assess the adequacy of Montana's BMP in preventing the spread of brucellosis from the designated surveillance area (DSA). The specific objectives developed for this review included:

1. Determine if the States are adhering to their BMPs.
2. Determine if the current surveillance of cattle and privately owned bison is effective.
3. Evaluate if protocols for testing used for epidemiological investigations, test and remove protocols, and quarantine release are documented and being followed.
4. Determine if adequate regulations are in place to prevent the movement of brucellosis-infected cattle or domestic bison out of the DSA; if compliance with these regulations is being adequately monitored; if animal identification requirements are in place, and are animals traceable to the DSA.
5. Determine if wildlife surveillance is sufficient to allow for rapid adjustment of the boundaries of the DSA.
6. Determine if mitigations are in place that reduce exposure to infected sources and reduce the risk of infection if exposure occurs.

Montana's BMP is comprised of pertinent State regulations detailing required actions and activities associated with their designated surveillance area. Montana's designated surveillance area was incorporated into the *Administrative Rules of Montana* (ARM 32.2.433-32.3.437) effective January 2011 and revised in July 2011.

Montana initially developed a brucellosis action plan, a short-term plan reflecting the actions and strategies aimed at regaining Brucellosis Class Free State status, in January 2009. Once the brucellosis action plan expired, Official Order 10-01-D went into effect in January 2010, establishing Montana's designated surveillance area. This Official Order outlines Montana's continued brucellosis surveillance and mitigation actions to address the risk of spread of brucellosis between livestock and brucellosis-infected wildlife. Actions implemented through this Official Order include official calfhoo vaccination requirements and individual animal identification requirements in counties in the designated surveillance area.

ARM 32.2.433-32.3.437 describes Montana's current designated surveillance area, animal identification requirements, testing, and vaccination requirements for domestic cattle and bison residing in the DSA.

Key strengths of Montana's BMP include:

- Proactive actions leading to adjustments to the boundaries of Montana's DSA.
- Cooperative efforts between Montana Department of Livestock's Animal Health Division and their Brand's Enforcement Division, including the implementation and use of an electronic brands software program at the livestock markets. Brand inspection plays a critical role in Montana's brucellosis management plan.
- Wildlife surveillance activities, most notably the multiyear elk capture and surveillance project,
- Testing and surveillance requirements for domestic cattle and bison in the DSA.
- Use of individual herd plans for herds located in the DSA.

Key recommended enhancements to Montana's BMP include:

- Increasing the number of herds within the DSA on approved herd plans. Risk assessments should be conducted on each herd prior to developing an individualized herd plan.
- Developing a template for a formal brucellosis-affected herd plan and a template for approved DSA herd plans detailing the proactive risk mitigation actions in place.
- Increasing surveillance on slaughter cattle coming out of the designated surveillance area, especially when going direct to slaughter.
- Continuing wildlife surveillance activities and studies to expand the knowledge base about brucellosis in elk, which will lead to better disease management practices and risk mitigation efforts.
- Working with APHIS to develop a State-specific (or DSA specific) slaughter cattle surveillance plan that would provide for sampling and testing "pre-slaughter."
- Continuing producer education and outreach using a variety of venues through which to deliver and disseminate information about Montana's brucellosis surveillance program.

Montana is commended for its proactive approach to addressing the brucellosis situation in DSAs and developing and implementing a BMP reflecting requirements critical to mitigating the risk of spread of disease. The Montana Department of Livestock and the Montana APHIS VS Area Office are commended for the placement of competent personnel in key positions. The forward thinking and progressive attitudes of these valuable employees will continue to help the Montana Department of Livestock and Montana VS accomplish their goals to the greater good of the cattle industry and the brucellosis eradication efforts in the GYA.

The GYA BMP Review Team thanks all the State and Federal personnel that took time out of their busy schedules to provide the plethora of information and data requested and to make sure we were in the right place at the right time. We commend them for their dedication in addressing the unique brucellosis situation in the GYA.

Background Information

In December 2010, the USDA APHIS published an interim rule amending the brucellosis regulations to allow the program to meet the circumstances and needs of today's livestock producers. The underlying premise of the interim rule was to transition the national bovine brucellosis program from one based on geopolitical boundaries to one based on boundaries determined through sound science, epidemiology, and risk assessment.

Amendments reflected in the interim rule that are germane to this review include:

1. Removing the provision for automatic reclassification of any Class Free State or area to a lower status if two or more herds are found to be infected with brucellosis within a 2-year period or if a single brucellosis-affected herd is not depopulated within 60 days.
2. Adding a requirement that any Class Free State or area with *B. abortus* in wildlife must develop and implement a BMP approved by the Administrator in order to maintain Class Free status.
3. Reducing the age at which domestic cattle and bison are included in herd blood tests.

Under the interim rule, a State may retain Class Free status if affected herds are maintained under quarantine, an individual herd plan, including a test-and-remove schedule, is developed and implemented for each affected herd to prevent the spread of brucellosis, and appropriate surveillance is conducted to detect brucellosis in other herds or species. Such States must also continue to conduct as many brucellosis ring tests per year as are necessary to ensure that all herds producing milk for sale are tested at least twice per year at approximately 6-month intervals, and all recognized slaughtering establishments in the State or area must participate in the market cattle identification (MCI) program, with blood samples being collected from at least 95 percent of all cows and bulls 2 years of age or over and subjected to an official test. The regulations continue to describe specific procedures for epidemiologic surveillance and epidemiologic investigations associated with affected herds.

The interim rule allows APHIS to utilize a risk-based approach that protects producers in an entire State from unnecessary regulation for what is, in fact, a local problem. The interim rule also provides greater flexibility in managing affected herds because a State will not be at risk for automatic downgrade of status and will not be forced to depopulate entire herds. Instead, the interim rule allows a State to create a brucellosis-affected herd management plan that includes test-and-remove options specific to the situation.

Most relevant to this review is the requirement that "any State in which the Administrator has determined wildlife are infected with *B. abortus* must develop and implement a BMP. The BMP reflected in the MOU must:

1. Define and explain the basis for the geographic area in which a disease risk exists from *B. abortus* and to which the BMP activities apply.
2. Describe epidemiologic assessment and surveillance activities to identify occurrence of *B. abortus* in domestic livestock and wildlife and potential risks for spread of disease.
3. Describe mitigation activities to prevent the spread of *B. abortus* from domestic livestock and/or wildlife, as applicable, within or from the brucellosis management area.

The GYA holds the last known reservoir of the *B. abortus* in the country. This area remains problematic because of the persistence of brucellosis in wild bison and elk and the continued threat of disease transmission between livestock and wildlife. Several recent brucellosis cases have been detected among livestock herds in the GYA, with epidemiological and genetic evidence often indicating infected elk as a source. The recent detections of brucellosis-affected domestic cattle and bison herds in Montana and the likelihood of further spread of brucellosis presents a significant challenge to livestock owners and regulators, as well as land and wildlife managers within the region.

The State of Montana has been dedicated and committed to efforts to eradicate brucellosis from the State's cattle herd, achieving brucellosis Class Free State status in June 1985. The Montana livestock industry benefited from this status for more than two decades. In May 2007, a single brucellosis-affected cattle herd was disclosed in Carbon County pursuant to a test of animals intended for interstate movement. Following Federal brucellosis regulations in place at the time, this brucellosis-affected cattle herd was depopulated with indemnity and Montana successfully completed the epidemiologic investigation, including all required testing, within the 60-day timeframe, thereby maintaining the State's Class Free classification for brucellosis. However, in June of 2008, a second brucellosis-affected cattle herd was disclosed within a 24-month period resulting in reclassification of Montana's status to brucellosis Class A in accordance with federal brucellosis regulations. This herd, located in Park County, was tested as part of Montana's efforts to test and develop brucellosis risk mitigation herd plans for herds near the GYA. The herd was depopulated with indemnity and a thorough epidemiologic investigation conducted. No additional brucellosis-affected cattle herds were disclosed. Brucellosis-infected free-ranging elk were determined to be the most likely source of infection.

Pursuant to reclassification to Class A status for brucellosis, the Montana Department of Livestock developed and implemented a Brucellosis Action Plan in May 2009. This was a short-term plan aimed at regaining Montana's Class Free State status. After completing a 12-month period without finding any additional brucellosis-affected cattle herds and meeting all requirements specified in the Federal regulations, Montana successfully regained brucellosis Class Free State status in July 2009.

Recognizing the continued risk of exposure to brucellosis from infected wildlife in the GYA, Montana continued to proactively address the threat of brucellosis by implementing Official Order 10-01-D in January 2010. This Official Order established a designated surveillance area within the State and implemented requirements for official calfhood vaccination and individual animal identification in the counties in which the designated surveillance area is located. In January 2011, Montana incorporated these regulations into the Administrative Rules of Montana (ARM 32.2.433-32.3.437). These administrative rules describe Montana's current DSA, animal identification requirements, and testing and vaccination requirements for domestic cattle and bison residing in the DSA.

One additional brucellosis-affected cattle herd and two brucellosis-affected privately owned bison herds were disclosed in Montana in 2010 and 2011, all located within Montana's DSA. Brucellosis-infected elk in the area are the most likely source of infection in each of these cases,

which were found pursuant to testing required for animals in the DSA. All three herds were quarantined and brucellosis-affected herd management plans, which included additional herd tests and movement controls, were put in place. The two brucellosis-affected privately owned bison herds remain under quarantine; periodic complete herd testing continues.

Review of Montana's Brucellosis Management Plan Activities: Observations, Findings, and Recommendations

Objective 1: Determine if the State is adhering to its BMP.

Findings and Observations:

Montana formally created a BMP in March 2012, pursuant to the publication of the Federal brucellosis interim rule. The plan outlines Montana's "efforts to address the risk of brucellosis exposure in domestic livestock." Components of Montana's BMP include:

- Administrative Rules of Montana (ARM 32.2.433-32.3.437) revised and effective in January 2011. These rules address:
 - 32.3.433 DSA
 - 32.3.434 Animal Identification within the DSA
 - 32.3.435 Testing within the DSA
 - 32.3.436 Vaccination within the Counties in which the DSA is Located
 - 32.3.437 Penalties

The requirements of Montana's BMP are categorized and summarized as follows:

Identification:

- Official identification is required on all sexually intact cattle and privately owned bison leaving the DSA.

Testing:

- Test eligible animals are defined as all sexually intact cattle and privately owned bison 12 months of age and older (≥ 6 months for epidemiologic investigations).
- Movement testing: All test eligible animals must be tested within 30 days prior to leaving the DSA unless moved to an approved livestock market or directly to a slaughter facility that will test on arrival. Tests completed July 16, or after are acceptable until February 15, of the following year.
- Change of ownership testing: All sexually intact cattle and privately owned bison must be tested within 30 days prior to change of ownership. ARM allows for a negative test July 15, or after to be accepted through February 15, of the following year.
- Whole herd testing is voluntary; only the cohort that resided in the DSA if the herd is located outside the DSA. Whole herd testing is required for epidemiologic investigations (≥ 6 months of age and sexually intact).

- All sexually intact cattle from the DSA are tested either on ranch or at the sale yard prior to going to slaughter. State and Federal inspected slaughter plants in-State continue to conduct MCI slaughter surveillance.
- Annual brucellosis ring testing (BRT) is conducted two times quarterly on all dairy herds located in the DSA and quarterly on all dairy herds located outside the DSA.

Mitigations:

- Trigger for changing the boundaries of the DSA: Based on consultation with Montana Department of Fish, Wildlife, and Parks with the goal to encompass the known extent of seropositive elk.
- Vaccination: Calfhood vaccination is required within the entirety of the four counties in which the DSA is located. Adult vaccination is encouraged (and is free of charge for designated surveillance area producers) if the animal was not officially calfhood vaccinated.
- Herd plans: Herd plans to reduce contact with elk in the DSA are voluntary and may include testing variances in low risk areas.
- Elk mitigations: Montana conducts the following mitigation actions specific to elk: 1) fencing of feed storage areas if they become an attractant to elk, 2) delay turn out of cattle into pastures where commingling is likely to occur, 3) some hazing, and 4) State, Federal, and private feeding is prohibited.

Wildlife Surveillance:

- Montana conducts surveillance on wildlife within the DSA and areas surrounding the DSA. Wildlife surveillance has focused primarily on areas just outside the DSA.
- State elk trapping: Montana is currently conducting a 5-year elk project encompassing the trapping of 100 elk each year within and around the DSA and placing radio/GPS collars on a limited number of elk to collect movement data (focused primarily on where elk are during the risk period of February through May).
- Hunter surveillance: Kits are provided to hunters with antlerless tags within the survey area (30 hunting districts).

Montana producers expressed general support for Montana's BMP and specifically noted the following:

- Expressed appreciation to the Montana Department of Livestock for their proactive and hands-on efforts to work with APHIS in support of the interim rule and are very glad that mandatory depopulation of brucellosis-affected herds has been eliminated.
- Are encouraged by the fact that brucellosis-affected herds are handled on an individual basis (e.g. testing schedules, etc.).
- Indicated support for mandatory herd plans as they are critical to making the program work and are instrumental in proactively detecting disease and doing something about it.
- Feel the program reflected by Montana's brucellosis management plan is necessary and that it is important that all other States know the extent of Montana's efforts to mitigate the risk of spread of brucellosis; feel that the State has done a great job in "standing the ground" for Montana producers.

- Are supportive of the on-going 5-year elk study and would like to see it extended.
- Producers are much more aware of the presence of elk and are aware of the need to implement mitigation actions to prevent elk interaction with their cattle.
- Wish to see further progress in traceability efforts and the use of radio frequency identification (RFID) tags; producers need to better understand that identification and traceability is key to all activities and need to share information openly.
- The brucellosis situation needs to be recognized as a “whole State” problem; loss of State status will have far-reaching impacts to producers statewide.
- Research is needed to develop better vaccines for cattle to prevent infection but are aware of the limitations of research since *B. abortus* is on the select agent list.
- From the producers’ perspective, major factors impacting the brucellosis situation in the GYA include: 1) mother nature and drought conditions causing mingling of species of animals, 2) lack of understanding on the part of some producers and the need to continue producer education and outreach, 3) lack of an effective vaccine, and 4) lack of recognitions and emphasis on elk as the problem.

Recommendations:

- Tap into the cadre of supportive producers and use them to educate and encourage their peers to develop herd plans.
- More specific observations, findings, and recommendations regarding specific activities germane to Montana’s brucellosis management plan are discussed in more detail in objectives 2 through 6.

Objective 2: Determine if the current surveillance on cattle and privately owned bison is effective.

Findings:

- Montana has identified 264 cattle herds that reside or graze in the State’s DSA. There are 150 (57 percent) of the herds in the DSA that have completed risk assessments and have approved herd plans. There are 81 herds that are headquartered outside of the DSA; 25 of these herds do not graze in the DSA until after June 15, each year based on their herd plans.
- Montana’s rules require test eligible cattle leaving the DSA to be tested. Surveillance of cattle in the DSA from August 12, 2010 through August 11, 2011 consisted of testing 29,000 of the estimated 34,500 cattle owned by 217 producers.
- Based on findings of infected elk outside of the DSA, Montana expanded the area in August 2011. The expanded area, known as the Dillon adjustment, changed the DSA boundary. This change was estimated to increase the total number of DSA producers to 234 with 46,300 cattle and bison. Montana has tested close to 32,000 animals from the DSA since the Dillon adjustment.
- Pursuant to finding additional infected elk outside of the DSA during the 2011 through 2012 winter, Montana further expanded the DSA in June 2012. This expanded DSA now includes an estimated 282 producers with 73,200 test-eligible animals. Montana estimates that they will test approximately 54,900 test-eligible animals annually.

- Montana defines test eligible animals as all sexually intact cattle and privately owned bison 12 months of age and older. These animals must be tested within 30 days prior to leaving the DSA unless they are moving to an approved livestock market or slaughter plant that will test them upon arrival. Testing that is completed on or after July 16, is acceptable until February 15, of the following year.

Observation:

- One negative test 30 days prior to movement out of the DSA allows test eligible cattle to move interstate on a certificate of veterinary inspection without restrictions.

Recommendation:

- States receiving cattle from the DSA should be provided the information necessary to feel confident that risks have been mitigated concerning latent and incubating infections.

Observation:

- All brucellosis-affected herds found since January 1, 2011, had the risk of elk mingling with the herds during the high risk exposure period.
- A review of herd risk assessments and herd plans revealed that, based on the risk assessments, the herd plans developed appropriately address the herd specific risks through recommended mitigation measures and herd testing schedules commensurate with the identified risks of exposure.

Recommendations:

- Montana should continue performing risk assessments and developing herd plans with the producers in the DSA.
- Continued educational efforts are needed to adequately mitigate the risk of disease transmission from elk.
- Montana should establish a target that 100 percent of the producers with cattle and privately owned bison in the DSA at any given time have a risk assessment and an approved herd plan that mitigates the risk of transmission of brucellosis to herds and minimizes the likelihood of exposure to unidentified brucellosis infection from sources being shipped out of the DSA.

Findings:

[Note: It is recognized that the most recent MCI slaughter data available for review may be incomplete due the transition to the Surveillance Collaboration Services database.]

- There were 3,158 test-eligible slaughter animals from Montana slaughter plants sampled and tested during fiscal year 2011.
- All eligible cattle from the DSA are tested prior to sale outside the DSA, either through on-farm tests or at the livestock market.

- All Montana slaughter plants (both State-inspected and custom) test all bovine aged 12 months and over for brucellosis.
- There were 106,046 head of Montana cattle tested from out-of-State slaughter during fiscal year 2011.
- Since the in-State slaughter plants obtain samples from all animals aged 12 months and over, review of data from calendar year 2011 and 2012 year-to-date show collection percentages above 100 percent for all but one slaughter plant. This slaughter plant is slaughtering low numbers of cattle and had an incident where some samples froze in transit and were unfit for testing by the Laboratory.

Observations:

- BRT is conducted twice quarterly on the five Montana dairy herds located in Montana's DSA and quarterly on the 71 Montana dairy herds located outside Montana's DSA. The BRT samples are collected by the Montana Milk and Egg Bureau and tested by the Montana State Veterinary Laboratory.

Recommendations:

- Montana should continue monitoring all dairy herds using BRT surveillance.
- Since cull slaughter cattle will likely not be tested via market cattle surveillance conducted at out-of-State slaughter plants, Montana should test all test-eligible slaughter cattle destined to slaughter plants out-of-State at their livestock markets or prior to any direct shipments to out-of-State slaughter plants.

Findings:

- Brucellosis testing for all species is performed at the Montana State Veterinary Laboratory in Bozeman, Montana. The laboratory performs most of the standard brucellosis serology tests.
- The Montana State Veterinary Laboratory tested a total of 44,527 samples in fiscal year 2011 and 50,841 samples in fiscal year 2012.
- *Brucella* culture is also performed at the Montana State Veterinary Laboratory. All laboratory technicians have passed the latest annual proficiency testing conducted by the National Veterinary Services Laboratories (NVSL).
- This year, the laboratory has seen an increase in the numbers of samples to test because of the expansion of the Montana's DSA. All testing has been completed by current personnel, who believe they could handle most surges in testing activity.
- Laboratory personnel consider the laboratory resources to be sufficient at this time to conduct any program testing; however since the laboratory only has a single well Fluorescence Polarization Assay (FPA) reader, additional personnel or an FPA plate reader (Synergy 2) would be needed if more samples require FPA testing.

Recommendation:

- Montana should acquire an FPA plate reader since one of the additional recommendations resulting from this review is to use the FPA to screen all blood samples from brucellosis-affected herds.
 - Followup – APHIS VS Western Region has transferred a FPA Synergy 2 instrument to the Montana State Veterinary Laboratory.

Objective 3: Evaluate if protocols for testing used for epidemiological investigations, test and remove protocols, and quarantine release are documented and being followed.

Findings and Observations:

- Montana has had three brucellosis-affected herds on test-and-remove herd plans since the publication of the brucellosis interim rule:

Ranch 1, a brucellosis-affected privately owned bison herd was disclosed in November 2010. This herd was detected as via Montana’s DSA herd management plan testing. The herd is currently under quarantine with an affected herd management plan in place. Complete herd testing is ongoing with a second complete herd test scheduled for fall 2012. All initial testing and assurance testing of adjacent herds and all testing of trace-out herds in Montana has been completed with all negative test results. Approximately 7,600 tests have been performed on adjacent herds with negative results. The brucellosis-affected herd plan includes an annual herd test, but does not specify a post-quarantine assurance test.

Ranch 2 was determined to be a brucellosis-affected herd in September 2011 when six yearling heifers in a group of 65 animals tested serologically positive on a change of ownership test for movement out of the DSA (Park County). Four of the six heifers were culture positive for *B. abortus* biovar 1. A 10-month-old bull tested serologically positive in November, however *Brucella* were not isolated on culture. A post-calving herd test has been completed and all animals tested negative. This was the second consecutive negative herd test on this herd which was subsequently released from quarantine in April 2012. The post-quarantine assurance test for this herd is scheduled for October 19 through 20, 2012. Testing of trace-out herds in Montana has been completed; all trace-out herds tested negative. The brucellosis-affected herd plan for this herd included the sentence, *“This herd plan is voluntary, is subject to review and revision, and is not intended to represent a legal contract.”* The herd plan included a provision for the quarantine to be released with the completion of the third negative whole herd test post-calving. Following the post-calving herd test, an assurance-test herd plan was put in place.

Ranch 3, a brucellosis-affected privately owned bison herd located in Madison County within Montana’s DSA, was disclosed in November 2011. A whole herd test was conducted in October 2011 because of an epidemiological link to Ranch F. This test detected a singleton 2-year-old bison bull as a reactor. *Brucella abortus* biovar 1 was isolated from a single lymph node from this bull. Testing of all adjacent herds has been completed with approximately 9,868 animals tested, all with negative test results.

All trace-ins (1) and trace-outs (6) have been located and were either determined to be destined for slaughter or have been assigned for testing. Six hundred heifers from this brucellosis-affected herd tested negative for brucellosis in early May 2012. The second complete herd test for this herd is scheduled for fall 2012. The *Brucellosis Quarantine and Surveillance Herd Management Plan* for this herd calls for annual testing to occur, but does not specify conditions for quarantine release nor does it specify a requirement for any assurance testing.

- Most adjacent and contact herds identified during brucellosis-affected herd epidemiologic investigations are identified and tested in a timely manner and assurance testing is applied based upon risk.
- A review of the MCI investigations for cattle found positive on slaughter surveillance testing during the last two years found the investigations and case closures for each case to be timely and appropriate.
- There have been no suspicious BRT investigations in the last two years.

Recommendations:

- A herd plan should be developed with the herd owner within 15 days following the disclosure and classification as an affected herd. (title 9 *Code of Federal Regulations* (9 CFR) part 78.1 (b)(3)).
- A brucellosis-affected herd plan template should be developed for brucellosis-affected and all adjacent and contact herds. These herd plans are required per 9 CFR part 78.
- The verbiage, “*This herd plan is voluntary, is subject to review and revision, and is not intended to represent a legal contract*” should not be included in any affected herd plans.
- Herd plan should include a test schedule, including the number of negative herd tests required for quarantine release, requirements for the removal of reactor animals, a requirement for a post-quarantine assurance test, vaccination recommendations both adult and calthood vaccination, requirements for herd additions, requirements for maintaining a herd inventory, requirements for movements out of the herd, and best management practices, including recommendations for cleaning and disinfection.
- Documentation needs to be maintained for any waivers to requirements specified in the 9 CFR part 78 or the *Brucellosis Uniform Methods and Rules*. This should include documentation of waivers allowing variances to the number of negative herd tests and length of quarantine or required quarantine release protocols.
- The VS Form 1-27 should be used when restricted animals are moved.
- Since the FPA test has the highest sensitivity and specificity of all of the routine brucellosis serology tests, it should be used as the screening test on all animals tested as part of all brucellosis-affected herd tests. When the FPA is used, especially when used on the quarantine release test, it will provide the best assurance (albeit not 100 percent) that there are no remaining animals incubating brucellosis.

Objective 4: Determine if adequate regulations are in place to prevent the movement of brucellosis-infected cattle or domestic bison out of the DSA; if compliance with these regulations is being adequately monitored; if animal identification requirements are in place, and are animals traceable to the DSA.

Observations regarding Movement, Inspections, and Compliance:

- Montana Department of Livestock has adequate regulations in place to prevent the movement of brucellosis-infected cattle or domestic bison out of the DSA.
- Compliance is monitored by brand inspectors and compliance enforcement officers employed by the Montana Department of Livestock.
- Routine patrol stops of livestock movements are performed to monitor compliance.
- All test-eligible cattle and domestic bison must be tested within 30 days prior to leaving the DSA unless they are moving to an approved livestock market or directly to a slaughter facility where they will be tested.
- Tests completed July 16, or after are acceptable until February 15, of the following year.

Observations regarding Livestock Markets:

Interviews were held at the Headwaters Livestock Auction with three livestock market managers and producers, the livestock market veterinarian, a livestock market association representative, and a Montana Department of Livestock brand inspector.

- Montana Department of Livestock Brand Enforcement Division demonstrated the use of the Archer handheld electronic device they are now using when performing brand inspection duties at the livestock markets located in Montana's DSA. The software package in use with this device provides for highlighting herds located in Montana's DSA in orange, thus alerting the brand inspector that the animals presented originate from the DSA. Within the software program is an animal health icon that when clicked, provides updates and requirements concerning the disposition of that particular herd from the DSA.
- The electronic Archer system was reviewed with the brand inspector and the livestock market manager. Both use the Archer handheld electronic device to record consignment information and to record test information respectively. This information, as well as additional market information, can all be married together using Certificate of Veterinary Inspection software from Fort Supply. Documentation can then be produced that displays the back tag, the color and sex of the animal, the animal's brand and the brand location, the check-in slip reference number, the blood sample test tube number, and official identification device information.
- Trip permits are required for producers to transport livestock to market without a brand inspection. The brand inspector at the livestock market is notified that a trip permit, which is valid for 36 hours, has been issued.
- Cattle consigned to the Headwaters Livestock Auction that originate from the DSA are penned off separately. The paperwork accompanying these cattle is reviewed by the brand inspector and then again by the livestock market veterinarian to confirm that the cattle do originate from the DSA. This procedure provides for review by three decision makers before the cattle are marketed. If there is any question by any one of them regarding the origin of the cattle, the cattle are tested.

- If test eligible cattle accompanied by proof of test within 30 days prior to sale are consigned, individual animal identification is not verified by the livestock market veterinarian. If the test chart presented does not represent a full herd test then a market blood test is required. The market veterinarian, market management, and the brand inspector all concur that if in doubt, blood samples would be collected.

Recommendations:

- Continue to develop the electronic process and data logger that records, stores, coordinates and retrieves all the herd and individual animal information together. This helps simplify and expedite identifying and tracing of animals through livestock markets and back to the appropriate herds of origin.
- Test eligible cattle with negative test results within the prior 30 days should have their individual identification verified for assurance that the cattle presented are the same cattle listed on the test chart.
- Consider recording official identification for test eligible cattle that move through Montana's livestock markets to assure future traceability.

In candid discussion during a meeting with livestock market managers, a livestock market association representative, and producers at Headwaters Livestock, the following comments were shared:

- Concern was expressed about seropositive elk being turned back out with collars for tracking; however, there was support to continue the elk study project.
- After being informed about changes to national slaughter surveillance sampling, support was expressed for requiring all slaughter cattle to be tested prior to shipping to slaughter.
- Counties with a split DSA status should test all test eligible cattle marketed within those counties.
- The brand inspector is the only line of defense in monitoring cattle moving from ranch to slaughter.
- More research is needed to develop a better vaccine that protects against the disease.

Observations regarding Identification, Vaccination, and Testing:

- All sexually intact cattle and privately owned bison in the DSA are required to be officially identified with an approved identification device.
- Montana uses State issued location identifiers (LIDs) and NAIS premise identification numbers for premises in the designated surveillance area. Records are maintained in the Montana Department of Livestock office. The Montana Department of Livestock Brucellosis compliance specialist produced test records and assisted with a successful mock trace.
- According to interviews, Headwaters, Ramsey and Billings (Pays) livestock markets pre-sale test all DSA test eligible cattle.
- Pre-slaughter testing is conducted but not in rule.

Recommendations:

- Because of the abbreviated national slaughter surveillance, all direct consignments of test eligible cattle originating from premises in the DSA that are destined to slaughter should have a negative brucellosis test within 30 days prior to shipping.
- There are several advantages to pre-slaughter testing, including the ease of tracing any suspect or reactor animals and the opportunity to conduct additional diagnostic testing or collect milk samples or tissue samples for culture.
- Require testing of all sexually intact cattle and domestic bison, regardless of age, intended to be used for breeding purposes.

Objective 5: Determine if wildlife surveillance is sufficient to allow for rapid adjustment of the boundaries of the DSA.

Findings and Observations regarding:

Time frames for conducting wildlife surveillance around the DSA:

Note: The Montana Fish, Wildlife & Parks defines a Brucellosis Surveillance Area comprised of hunting districts. This brucellosis surveillance area should not be confused with the Montana Department of Livestock's DSA, which encompasses a smaller area.

- Hunter test kits have been distributed in 30 hunting districts (the brucellosis surveillance area) in southwestern Montana near Yellowstone National Park and the Idaho and Wyoming borders during the fall general hunting season since 2008. General distribution of hunter test kits was discontinued in the 2011 season due to the low return rate of usable samples and funding limitations.
- Between 2008 and 2010, 829 female and 234 male elk were tested for exposure to brucellosis. A total of 562 tissue samples were collected from hunter killed elk during this period. *B. abortus* biovar 1 was isolated from 18 animals in 10 elk herd units in 10 hunting districts.
- A 5-year elk surveillance project was initiated in 2010. This project is conducted primarily with groups of 100 net gun captured female elk, which are serologically tested for brucellosis using the card test and FPA. If seropositive, the elk are pregnancy tested and a vaginal implant transmitter (VIT) is installed. The study is focused on following seropositive elk but seronegative elk are also followed. A total of 30 animals receive GPS collars annually. Animals are captured each year during January and February. Each year a different surveillance area is chosen in coordination with the Montana Department of Livestock based on several criteria; the focus is on surveillance areas on the margins of the Montana's DSA. This project includes re-capture of seropositive elk each year to monitor serological status and determine pregnancy. Expelled VITs are recovered to provide information on calving (or abortion) times and locations. If fetal material is available, it is cultured. The objective of this 5-year elk surveillance project is to gather information on brucellosis distribution in elk populations, elk migration, herd fidelity, calving locations, *B. abortus* shedding during abortions or birth events, and elk proximity to cattle.

- Discovery of a new brucellosis-affected wildlife herd could take up to 5 years or more, depending on the location and size of the outbreak. Additional factors impacting identification of new brucellosis-affected wildlife herds include altered migration patterns, herd distributions, and other factors that cause elk or bison to change their migration habits.
- During the first 2 years of the elk surveillance project, the DSA boundary line was moved as a result of detecting brucellosis exposed elk in new areas.
- Montana Fish, Wildlife, and Parks has maintained a surveillance effort adequate to detect infected elk migrating from the DSA and to allow for the rapid adjustment of its boundaries. This was evidenced by the recent expansion of the DSA on the west side when seropositive elk were detected outside of the designated surveillance boundary.
- Of some concern is the lack of adequate surveillance, due largely to landowner resistance, immediately outside the eastern extent of the DSA.

Laboratory activities, testing protocols, culture activities, etc.:

- Card and FPA tests are run in the field on captured elk. There are some inherent problems with conducting these tests in the field. Examples of such problems include false negative card test results and the need for FPA re-calibration, both precipitated by environmental conditions. These issues prolong the time required to complete the tests before the elk recovers from anesthesia. Alternatives or resolutions for these problems are being sought.
- Field-tested serum samples are re-tested at the Montana Veterinary Diagnostic Laboratory, where an expanded panel of serology tests, including the Buffered Acidified Plate Antigen, Rivanol, FPA, and SPT are run on all samples. Any samples with reactor test results to these tests are then subjected to the Complement Fixation and Card tests. The Western Blot had been run in previous years but Montana Fish, Wildlife and Parks personnel understand that the test is no longer being officially offered by Louisiana State University. Results from the western blot test in the past have been suspect.
- Preliminary bacteriologic cultures on tissues are performed at the Montana Veterinary Diagnostic Laboratory and suspect cultures are sent to NVSL for confirmation of *B. abortus*.
- Laboratory services and testing is considered adequate.

Other information:

- The elk population in Montana is estimated at 150,000 animals. The elk population inside the DSA is approximately 30,000. From 1988 until 2004, the statewide elk population generally increased. Since 1997, the northern Yellowstone herd, which migrates into Montana, has decreased.
- Elk in the Madison Valley prior to 2004 had a seroprevalence of approximately 2 percent or less. In 2004, it was approximately 6 percent, and in 2005, jumped to approximately 23 percent. Some of the seroprevalence in 2005 was attributed to *Yersinia* infection, based on a western blot test. Since then, some doubt has arisen about the accuracy of the western blot test.
- Population objectives have been met in some areas but other areas are above objective. Factors that influence populations and population management in the DSA include changing landowner values (no hunting allowed), fire, weather patterns, predators, population sizes themselves, urbanization, and regulatory and political constraints.

Concerns expressed related to wildlife surveillance activities, based on interviews with Montana Department of Fish, Wildlife and Parks personnel, Montana Department of Livestock animal health officials, and producers:

- The APHIS VS cooperative agreement funding runs out at the end of January, while the window of time pertinent to conducting testing and research project activities extends through June. Consequently, the opportunity for obtaining relevant calving and abortion location data is seriously hindered.
- Late hunts, depredation hunts, and landowner kill permits have been curtailed or are difficult for some producers to obtain. These producers are very frustrated by this policy. Reasoning for curtailing the late hunts according to Montana Fish, Wildlife, and Parks officials is that the late hunts detract from regular season hunting (i.e. hunters with late hunts generally don't hunt during the regular season) and the agency wants to encourage regular season hunting.

Recommendations:

- Continue hunter-kill elk surveillance in addition to the ongoing elk project collar studies.
- Allow late-season elk hunts in geographic areas where elk pose a risk to cattle. Late-season elk hunts will facilitate mitigating elk-cattle commingling during the season of higher risk of disease transmission. In addition, late-season hunts will provide Montana FWP greater opportunity to collect samples from hunter harvested elk for brucellosis evaluation.
- A prospective study consisting of collaring young seronegative females in high prevalence areas to determine the rate of seroconversion in each age group, immediate outcomes of infection, number of abortions following seroconversion, and other factors in the epidemiology of the disease would be extremely valuable.
- There is need for better animal-side diagnostic tests.
- The cooperative agreement funding period should be adjusted to accommodate surveillance activities.

Objective 6: Determine if mitigations are in place that reduce exposure to infected sources and reduce the risk of infection if exposure occurs.

Findings:

In addition to the risk-mitigation activities discussed in objectives two through five, the following items were identified by Montana Board of Livestock personnel and Montana's APHIS VS personnel as being most significant and integral to successfully executing Montana's BMP:

- Traceability is critical. The RFID tags provided by APHIS have been used extensively in identifying Montana cattle and domestic bison. Identification is generally applied to the animals at the time of vaccination or testing.

- Brand inspection plays a critical role in Montana’s brucellosis management plan. Montana’s Brand Enforcement Division, through local and department brand inspectors, is responsible for ensuring compliance with DSA regulations. Brand inspectors are familiar with and report animal health violations.
- Required testing (e.g. testing at the livestock markets, change of ownership testing, etc.) is supported by funds appropriated by the legislature (also reflected in the Governor’s budget) and funds received from APHIS through cooperative agreements. Receipt of these funds provides for reimbursement to private practitioners for testing costs and a “per head” stipend to producers.
- Maintaining temporal and spatial distances is an important risk mitigation strategy. This is an important consideration when identifying and prioritizing herds that should develop herd plan.
- Wildlife surveillance activities are vital to the success of Montana’s BMP.
- Strong producer participation has been garnered by the changes reflected in the brucellosis interim rule (more flexibility) and by developing and maintaining communication with producers. Producers have seen first-hand the impacts to their industry due to loss of State status and actions taken by other States. States that imposed Montana-specific regulations lifted them once Montana instituted the requirements reflected in Montana’s ARMs 32.2.433 through 32.3.437.
- Slaughter surveillance is a concern. Since many cattle from the DSA go to slaughter at several out-of-State slaughter plants, the general feeling is that there will not be adequate slaughter surveillance of Montana cattle to alleviate concerns of other States. In addition, Montana Department of Livestock officials indicated that savings from the changes to the national brucellosis slaughter surveillance plan have not been directed back to the GYA States. APHIS is reminded that current Federal brucellosis program regulations require that *“States that have B. abortus in wildlife must carry out the following surveillance testing requirements: MCI program: All recognized slaughtering establishments in the State or area must participate in the MCI program. Blood samples shall be collected from at least 95 percent of all cows and bulls 2 years of age or over at each recognized slaughtering establishment and subjected to an official test.”* When the majority of slaughter cattle go to out-of-State slaughter plants, the intended level of MCI program surveillance on cattle from such States will not be achieved.
- Producers need access to seasonal use of pastures in the DSA. This is currently accomplished by issuance of “pasture permits” and brand permits.
- CalfhooD vaccination is required in all four counties of the DSA. Vaccination data, for both calfhooD and adult vaccination, was provided and discussed. It is recognized that due to problems with the SCS database, data for 2012 is underestimated.
- Good discussion was had on the need for tattooing RB51 vaccinates, as the need to apply the vaccination tattoo can be a hindrance.
- Field personnel have developed excellent working relationships with the producers in the DSA and at the livestock markets. These efforts allow them to garner producer cooperation, especially when herds need to be tested. Field personnel indicated producers will be more cooperative when using good quality equipment such as hydraulic portable chutes which make testing herds easier, safer, and faster.

Recommendations:

- Continue the use of RFID tags. Additional discussion should be had with the APHIS Traceability Program regarding availability of program provided RFID tags and flexibility in the use of Traceability funding (i.e. allow use to purchase software).
- Continue first-point testing at livestock markets and encourage, where and when more appropriate to better mitigate risk, testing before cattle and domestic bison leave the ranch. Brucellosis-infected animals are being identified by these proactive activities.
- Require a test on female cattle of any age intended for use as breeding stock.
- As previously recommended, but worth repeating, increase the number of producers on herd plans.
- APHIS should lead efforts (perhaps a task for the Regional Brucellosis Epidemiologist) to harmonize elk testing protocols (laboratory testing protocols) between all three GYA States.
- The State and Federal Regional, Area, and Designated Brucellosis Epidemiologists are encouraged to network with appropriate State and Federal wildlife agencies to pursue ideas for projects to assess the role other wildlife species may play in maintaining (possible sentinel populations) and transmitting brucellosis to other domestic and wildlife species (i.e. cattle and elk).
- Alternative slaughter surveillance sampling strategies that will meet the intended level of MCI program surveillance for States with *B. abortus* in wildlife need to be developed specific for slaughter cattle moving out of the GYA States and more specifically out of the DSAs in the GYA States. “Pre-slaughter sampling” was proposed as an opportunity to meet the intended level of MCI program surveillance. Montana Department of Livestock personnel indicated the desire to work with APHIS to develop and implement a State-specific “pre-slaughter surveillance plan” for cattle originating from the designated surveillance areas to meet this need. Such a plan should be incorporated into and funded through the national bovine brucellosis slaughter surveillance plan.
- Strengthen seasonal grazing activities by developing a current list of producers moving into the DSA, limit issuing of permits to the District, and any producers partaking of seasonal grazing to have approved herd plans, which identifies the permits being used, animal identification, and testing requirements.
- Maintain calfhod vaccination requirement and recommend booster and adult vaccination in herds with known or suspected elk exposure. Prioritize use of Federal funds to support these activities. Also suggest monitoring vaccination data and comparing with calf crop data, especially for herds in the DSA, as a way of assessing compliance with vaccination requirements.
- APHIS should lead efforts to continue discussion regarding the need for vaccination tattoos. An evaluation of the current need for a vaccination tattoo should be explored – what is the current “function” of the vaccination tattoo?
- The Montana Department of Livestock and the Montana VS Area Office are encouraged to assess current field-testing equipment (such as chutes and gate panels) and upgrade as appropriate to assure the safety of personnel and animals when testing herds.

A final general observation and recommendation:

Observation:

The GYA States are making a good faith effort to comply with their BMPs and the regulations per 9 CFR part 78. However, some language is ambiguous enough that it might be seen as a moving or invisible target.

Recommendation:

The results of this review and the effective risk mitigating measures that the GYA States are currently taking should be incorporated into a set of GYA specific standards so that they and all other States are knowledgeable of the minimum standards to which animals moving out of the DSAs are being held.

Respectfully,

The GYA BMP Review Team