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Brucellosis in the Greater Yellowstone Area

Abstract

A management plan was adopted in 2000 in order to reduce the risk of brucellosis transmission between ungulates (Bidwell 2009). It has been controversial due to the hazing and culling of wild bison that cross the Yellowstone National Park's boundary with Montana (Bidwell 2009). Some migration is allowed on winter ranges in Montana (White et al. 2011). The plan has failed to reduce brucellosis in the bison population itself, and some management strategies are recommended to improve the conservation of plains bison (White et al. 2011).

1. Introduction

Brucella abortus is a zoonotic disease that causes abortions in elk, bison, and cattle (Rhyan et al.). It can be transmitted to humans by ingesting unpasteurized milk, or under cooked meat from infected animals, causing influenza-like symptoms (Rhyan et al. 2013). The transmission of brucellosis between wildlife and livestock threatens the populations that are isolated in protected areas (White et al. 2011). Bison in Yellowstone National Park are in close quarters with one another; increasing the

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spread of disease between them (White et al. 2011). Good conservation practices can be learned by examining previous managements and their results (White et al. 2011). Bison and elk are the last known hosts of infection in the greater Yellowstone area (GYA) (White et al. 2011). The Interagency Bison Management Plan (IBMP) was adopted in 2000; which preserves the bison population as a natural component of the ecosystem, and allows some bison to occupy winter ranges on public lands in Montana (White et al. 2011). There was an effort by federal and state agencies to predict the ecological impacts of risk as well as the management of brucellosis transmission to cattle (White et al. 2011). This study evaluated whether or not the expectations met reality so that adaptive management adjustments can be developed to protect bison and cattle from brucellosis (White et al. 2011).

2. Methods and Materials

Several different management strategies were implemented throughout the years. Some things that were implemented in the IBMP was the intentional separation of bison and cattle, the prevention of bison leaving the park, and to test the ones that escaped. Bison that tested positive were slaughtered and bison that tested negative were vaccinated (White et al. 2011). 3,100 bison were culled during 1985-2000 in

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response to the bison migrating out of the park during severe winters (White et al. 2011). It was also implemented to conduct research on the disease and the vaccinations. It was encouraged for ranchers to voluntarily vaccinate their cattle, and if that failed, it would become mandatory. The agencies planned on providing a quarantine facility for testing bison. In 2005, it was permitted to hunt bison outside of the park. Also, bull bison posed no threat to cattle (White et al. 2011). The IBMP complies with mandates from its partnering agencies; including three Tribal entities, and has been adjusted several times since 2000 due to new knowledge and continued efforts. For example, the boundary was adjusted to encompass the Gardiner Basin on both sides of the Yellowstone River.

3. Results

The IBMP was mostly successful, but not all of the strategies worked according to the predictions. It was found that in order for bison to transmit brucellosis to cattle, they must leave the park, and enter an area where cattle graze; shedding birth tissues that the cattle come in contact with (White et al. 2011). The IBMP has almost completely prevented brucellosis transmission from bison to cattle, and all recent cases of brucellosis in cattle are due to elk (White et al. 2011). Brucellosis has been

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successfully controlled in the GYA with only 17 transmissions occurring in 2002-2012 (Rhyan et al. 2013). However, in 2010, 60% of females in the bison population tested positive for brucellosis, proving the prediction of a 50-33% decrease to be incorrect (White et al. 2011). It is debated whether ranching or wildlife is the greater asset for moral interest. Unmanageable weather and ecological conditions govern bison migration; causing conflict between the cattle market and the National Park Service (Bidwell 2009).

4. Discussion

There has been a great deal of effort towards the management of brucellosis transmission in the GYA, but there is room for improvement. With the future in mind, genetic diversity in bison can be maintained by preventing disease. And, in turn, protect grassland biodiversity (White et al. 2011). Allowing bison into Montana can cause alarm for landowners with crops and livestock (White et al. 2011). A lack of funding for bison management and vaccination also restrains progress (White et al. 2011). When dealing with migratory ungulates, disease transmission poses a serious risk, and need to be restricted to areas that may not be ideal for survival year-round (White et al. 2011). If brucellosis increases in elk, the area in which brucellosis

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resides could expand (Rhyan et al. 2013). In order to manage brucellosis, learning more about the environmental changes in the GYA is crucial (Rhyan et al. 2013).

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