Brucellosis in Yellowstone Bison

Science Review and Workshop

February 26-28, 2013 Chico Hot Springs Resort Pray, MT

Workshop Panelists

Co-chairs: Dave Hallac (Yellowstone NP) & Pat Flowers (MT Fish, Wildlife & Parks)

Panelists

***Keith Aune** – Wildlife Conservation Society*

- Chair of IUCN Bison Specialist Group for North America
- 31 year career with MT Fish Wildlife & Parks
- 10 years of research and management experience with Yellowstone Bison

***John Cox**, PhD – University of Kentucky*

- Specialty: Wildlife and Conservation Biology
- Human dimensions of wildlife management (Ex. Florida Panther and Black bear)
- Served on advisory panels for NGOs, and state and federal agencies

***Vanessa Ezenwa**, PhD – University of Georgia*

PhD in Ecology and Evolutionary Biology from Princeton University

- Specialty: Ecology of infectious diseases in wildlife populations
- Research Area: interaction between wild ungulates and their parasites (Tuberculosis in African Buffalo)

***Steve Olsen**, DVM, PhD – Agricultural Research Service*

- Board Certified in Veterinary Microbiology
- 20 years experience in brucellosis vaccination research
- More than 90 publications on brucellosis

Workshop Panelists

***Anna Jolles**, PhD – Oregon State University*

Degrees from Germany (Physics), Oxford (Biology), and Princeton (PhD in Ecology and Evolutionary Biology)

- Specialty: Disease Ecology and Epidemiology
- Research: TB in African buffalo; Factors influencing disease transmission; mathematical modeling

***Terry Kreeger**, DVM, PhD – Wyoming Game and Fish*

- State Wildlife Veterinarian for Wyoming Game and Fish Department
- 2 decades of Brucellosis research on elk and bison in GYE
- Research: disease surveillance, wildlife vaccination, contraception development

***Michael Miller**, DVM, PhD – Colorado Park and Wildlife*

- Wildlife Veterinarian and Staff Scientist for Colorado Division of Parks and Wildlife (14 years)
- Specialty: Disease Ecology, Epidemiology, and Wildlife Management
- Research: Pneumonia in Bighorn sheep, Chronic Wasting Disease

***Peter Nara**, DVM, PhD – Biological Mimetics, Inc.*

- Holds the Endowed Eugene Lloyd Chair Professorship in Vaccinology at Iowa State University
- CEO and Co-founder of Biological Mimetics, Inc. (vaccine research and development)
- 21 book chapters and 173 scientifically peer-reviewed publications

Task Assigned to the Panel

Questions to be addressed

- Is eradication feasible and appropriate as a management target?
- If not, should we target reduction of seroprevalence?
  - If so, what is a reasonable level of reduction?
  - Establish disease threshold. What is the target?
- If not eradication. If not suppression. How should we manage the risk?
- Recommendations for research and development?

Panelists Conclusions

- To date, management to maintain separation between cattle and bison appears to be effective at preventing transmission of brucellosis between these species because no documented transmission has occurred under the IBMP.
- The best available data do not support that vaccination of wild bison with currently available vaccines will be effective at suppressing brucellosis to a level that changes bison management strategies under the IBMP.
- Control of bison population size will likely include culling or removal as tools in the future, along with hunting. Past and current culling practices have not had an apparent effect on reducing the overall prevalence of brucellosis in the bison population.
- Intervention through contraception is not needed to achieve the current goals of the IBMP. Contraception could potentially be a valuable tool for brucellosis suppression, but the available data are insufficient to make a judgment at this time. Further research is needed in this area.

Comparison of Recommendations

Brucellosis Management Recommendations	Science Panel	Bison CWG	Elk CWG
Livestock Vaccination	Need effective livestock vaccine	Need effective livestock vaccine	Need effective livestock vaccine
Remote Vaccination (wildlife)	Cost ineffective tool	Should not be a priority	NA
Immunocontraception	Not needed to achieve disease management goals; further research is needed	NA	NA
Hunting	Useful tool	Useful tool	Useful tool
Spatial & temporal separation	Effective	Reduce artificial concentrations of bison and elk	Reduce problematic concentrations of wildlife
Human Dimension	Understand human values towards conservation of wildlife affected by brucellosis	Opportunities to gather and report information on brucellosis	Education regarding brucellosis management

Bison Research Priorities

High Priority

1. Cost/benefit analysis of
   a. Management options and goals (vaccination, eradication, etc.)
   b. Producing a more effective vaccine in livestock vs. a more effective vaccine in wild bison or elk
2. Better understanding of genetic effects of culling based on seroprevalence
3. Characterize and understand human values and attitudes towards conservation of wildlife affected by brucellosis to improve effective exchange of knowledge for collaborative decision making in the GYA

Medium Priority

5. Determine efficacy of remote/syringe vaccine delivery in wild bison
6. Lesser, non-invasive/disruptive delivery technologies
7. Modeling to evaluate contraception for disease control, coupled with ongoing experimental study regarding contraceptives in bison
8. Application of new molecular bacterial genomics & new vaccine science and technology
9. Characterize bison behavior and social dynamics and their relationship to brucellosis transmission