

IBMP Briefing Statement

Agency: Yellowstone National Park
Issue: Yellowstone Bison Population
Date: November 5, 2008

Background

- Under the IBMP, there is insufficient guidance for adaptive management to prevent wide fluctuations in population abundance and corresponding management removals.
- Currently, agencies are prevailed upon to consider non-lethal management measures only as the population reaches 2,300-2,100 bison, and can utilize increasingly lethal brucellosis risk management when the population is greater than 3,000.
- New science should be incorporated into the IBMP as a population objective delineated by adaptive management thresholds for brucellosis risk management, ecological carrying capacity, and conservation of ecological and genetic integrity (see Figure 1).

State of Knowledge

Genetics

- New science characterizes Yellowstone bison as a single population with two genetically distinguishable breeding groups or subpopulations, and that 1,000-2,000 bison in each of the central and northern breeding herds are adequate to retain 90-95% of genetic diversity to enable bison to adapt to a changing environment through natural selection, drift, and mutation.
- Under the IBMP, new genetics science suggests that the agencies should begin to consider increasingly non-lethal bison management when the total population declines to 2,500 so as to preserve a margin of error (i.e., safety) that accounts for inaccurate estimates of population size and unexpected events (e.g., droughts, winterkill, management removals) that could adversely affect conservation.

Food-limited Carrying Capacity

- Current science indicates the food-limited carrying capacity for bison inside Yellowstone National Park is approximately 6,200 (2,400 in the northern herd and 3,800 in the central herd). Bison numbers have not yet reached this theoretical food-limited carrying capacity, and bison migrate to lower-elevation ranges in or outside the park before reaching the food-limited carrying capacity as density and winter severity interact to limit nutritional intake and foraging efficiency.

Large-scale Migrations

- Bison are migratory wildlife that historically moved at a scale larger than the park. New analyses of bison abundance and movement data during 1970-2008 suggests that limiting the total population to <4,500 (<3,300 bison in the central herd and <1,200 bison in the northern herd) would abate large-scale migrations and management removals when snow conditions are average to severe.

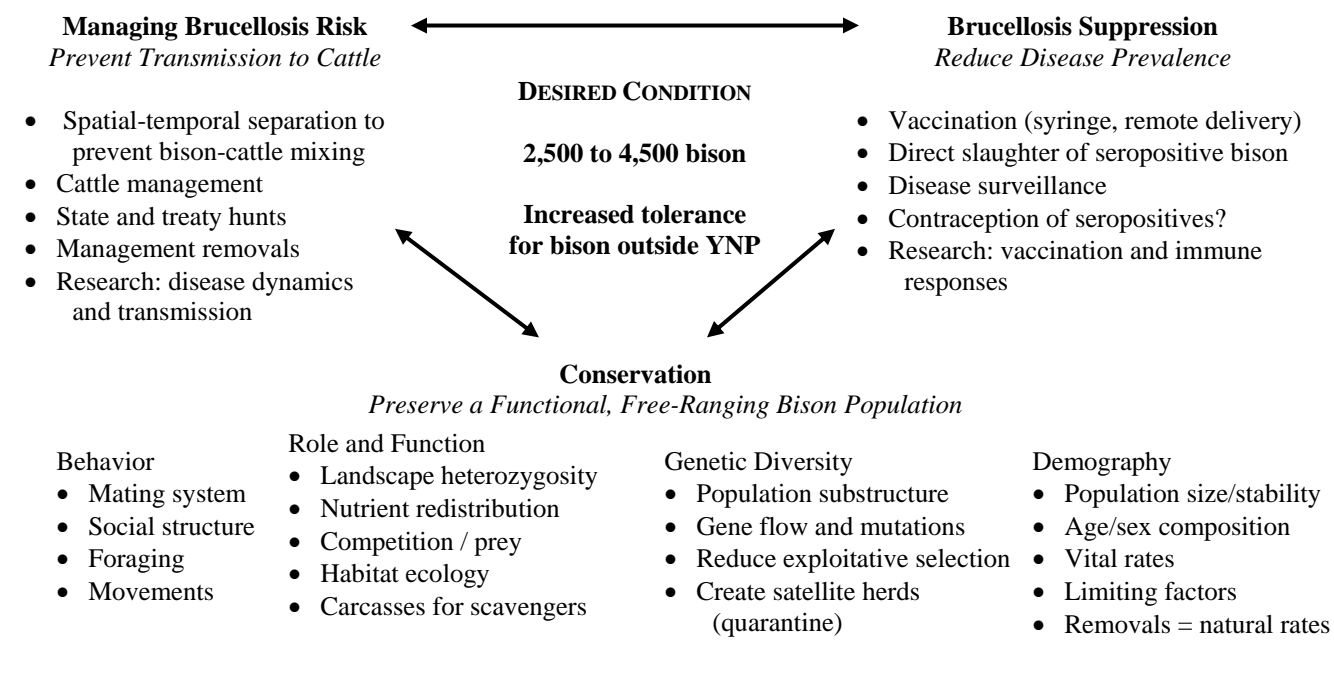
Ecological Role and Function

- While there is no precise estimate of an optimal ecological population size for Yellowstone bison, new science suggests that several thousands of bison are likely necessary to fully express their ecological role in a wild environment such as the Greater Yellowstone Area (e.g. creation of landscape heterozygosity, nutrient redistribution, competition with other ungulates, prey for carnivores, carcasses for scavengers, stimulation of vegetation primary production).

Summary

- Scientific evidence and management experience suggests a population of 2,500 to 4,500 bison will successfully address the goals of the IBMP as a balance between the park's forage base, bison movement ecology, retention of genetic diversity, and brucellosis risk management.

Figure 1. Conceptual model of conservation and disease management for Yellowstone bison.



Contacts

Suzanne Lewis, Superintendent, (307) 344-2002, suzanne_lewis@nps.gov

P.J. White, Supervisory Wildlife Biologist, (307) 344-2442, pj_white@nps.gov