

Bison Literature Review

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Executive Summary –

Bison (*Bison bison*) have had a recent surge in interest related primarily to a growing commercial bison industry and potential re-introduction as a component of natural ecosystems. In both cases, questions of similarity with cattle arise and must be considered for proper management. Usually, questions from the bison industry relate to the applicability of cattle husbandry practices and the large scale production industry. Questions concerning re-introduction relate to the ecological effects and management implications.

The main consideration in discussions of bison is the degree of domestication. Domestication should be considered a continuum that ranges from complete domestication to wild or free-ranging. It is essential to determine the degree of domestication for the bison under consideration and the information that is utilized. Highly desirable traits for highly domesticated animals are related to husbandry (e.g. ease of handling, docility and conformation) and economics (e.g. meat quality, calf production, feed-to-meat conversion). While most of the traits related to “wild” bison are related to local adaptations and ecological efficiency. For most characteristics, as the bison becomes more domesticated the degree of difference between cattle and bison decreases.

Cattle and bison have large overlap in similarities but are not completely analogous herbivores. Comparisons that cattle are nothing more than domestic bison or the corollary, that bison are nothing more than wild cattle, are drastically overstated and fail under scrutiny. Related to the taxonomic level of subfamily, *Bovinae*, gross similarities in appearance and traits would be expected. Both species are generalist foragers with large dietary overlaps and foraging patterns, mainly graminoides. There are notable differences in dietary, physiological and behavior attributes which result in different utilization of vegetation and resulting vegetative structure. Bison generally exhibit stronger social organizations which can result in unique behavior and habitat utilization. Bison also exhibit stronger environmental tolerances particularly for cold.

In addition to biology and ecology there are several managerial considerations that need to be addressed to determine the appropriateness of utilizing bison in landscape management programs. First, the managerial context must be clearly defined. This should at a minimum include the scale or size of the area, available facilities, economics, objectives and overall management constraints and opportunities. The second suite of issues relate to the public, including: safety, neighboring lands (depredation, disease, escape), and perceptions. The final consideration, as mentioned before, is the degree of domestication. Any issue related to bison should include an explicit discussion of the degree of domestication and clear understanding of the associated assumptions. These considerations should be weighed along with the basic biological and ecological comparisons between cattle and bison.

Summary of Bison and Cattle Characteristics

	BISON	CATTLE
BIOLOGY		
Diet Composition	high adaptation to low quality forage	lower adaptation
Forage Quality	consume greater quantities of low protein and poor quality forage	
Grass	shift between warm and cool seasons grasses, consume more C4 and digest better	less seasonal variation
Forb and Browse	less than 10%	greater than 10%
Disease		
Anthrax	Susceptible	Susceptible
Bovine Tuberculosis	Susceptible	Susceptible
Bovine Brucellosis	Susceptible	Susceptible
ECOLOGY		
Dietary Decisions	based on energy maximizations	consistent gain
Landscape	prefer open grassland areas,	utilize opportunistically, selectively graze in high moisture areas
Mountainous Areas	Use steeper slopes, higher elevation and travel farther from water	Prefer gentle slopes, lower elevations and proximity to water
Grazing Patch	less selective, prefer patches with low diversity and forage quality	more selective for high quality, intake rate higher
Bite Pattern	utilize lips for closer grazing	utilize tongue, taller remaining stubble
Grazing Behavior	Scale dependent	scale dependent
Fire	more heterogeneous fuel load	homogeneous fuel load
Area Requirement	larger area requirements superior adaptations, including thermoregulation in habitat selection and metabolic rate	smaller area requirements
Winter Survival		inferior adaptations
Social structure	strong, matriarchal influences	weak
Sex Ratio	important consideration for bull dominance	lower consideration
Non-feeding Activities	greater, include wallowing and horning	lower, more time spent on grazing
MANAGEMENT		
Economics	Require strong economic base	lower requirements
Facilities	Require good	higher tolerance for poor conditions
Management Strategy	simple	complex
Size	Require larger areas	higher tolerance for smaller areas