



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ft. Niobrara-Valentine National Wildlife Refuge Complex

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BISON MANAGEMENT ON FORT NIOBRARA NWR (Prepared by K.McPeak on 5/03/07)

Fort Niobrara National Wildlife Refuge:

Fort Niobrara NWR is 19,131 acres in size and located along the Niobrara River in north-central Nebraska. The refuge was established in 1912 as a “preserve and breeding ground for native birds”. Its purpose was expanded later that same year to include the preservation of bison and elk herds representative of those that once roamed the Great Plains. The refuge consists of ~14,323 acres of grasslands, ~4,318 acres of woodlands, ~375 acres of wetlands, and 115 acres administrative sites.

Fort Niobrara (FTN) Bison Herd:

Background - Bison were reintroduced to Fort Niobrara in 1913 with the donation of six bison (sex unknown) from J.W. Gilbert of Friend, Nebraska and the transfer of two bulls from Yellowstone National Park. Additional introductions were made in 1935 (4 bulls, Custer State Park), 1937 (4 bulls, Custer State Park), and 1952 (5 bulls, National Bison Range). Management policy/philosophy implemented over the years has been to maintain a representative herd under reasonably natural conditions in numbers sufficient to ensure their continued existence. More specific management goals have been to (1) conserve a genetically viable population, (2) provide appropriate viewing opportunities for public enjoyment and education, (3) support that level of scientific study feasible within the management of a representative herd, and (4) be used for habitat management.

Grazing Program - The FTN bison herd has been managed under a controlled grazing program since 1913, however, the intensity has varied from a two-unit rotation on 5,000 acres in the early years to a 15-unit rotation on 14,000 acres in recent years. From the late 1980s through 2006, FTN bison wintered (late September through March) in the 3,938 acre Fort Niobrara Wilderness Area and then moved two times through 14 native prairie habitat units every 5-7 days depending on the size of the unit. Beginning in 2007, the number of acres and habitat units available to the FTN bison herd will be reduced to enable management of the Sullys Hill (SUH) bison herd. Bison have access to salt and mineral, however, the herd is not fed supplemental forage.

Population Characteristics - Herd size has varied over time based on habitat availability, carrying capacity of available habitat, needs of other wildlife species, and genetics. Winter population levels numbered less than 200 during the period 1940 - 1964, approximately 200-300 bison from 1965-1985, and 300-400 bison in recent years with the herd numbering ~315 bison in December 2006. The age composition of the FTN herd going into the winter at the end of 2006 was ~ 17% calves, 10% yearlings, 63% 2-14 years old, and 10% 15 - 23 years old; and the sex ratio (M:F) was 1:1.2 (see attached herd structure). The age composition of the herd varied somewhat from its current status during the period 1970s to mid 1990s in that adult bison were not allowed to reach “old” age.

Breeding occurs under natural conditions with no manipulation of bulls or cows. Peak rut activity is generally observed late July-early August with first breeding documented in early July and limited breeding taking place into the fall and early winter. Calving usually begins the second week of April with this year’s first calf observed on April 13. Most calves are born by the end of May. The average calving rate during the past 20+ years for 3-years old and older females is 83%,

however, it has exceeded 90% three times since 1996. A total of 107 calves were born in 2006 for a calving rate of ~81%. Mortality has been minimal in recent years with an average of 5-7 fatalities (adult - rut injury, old age; calf - heat stress, unknown) documented each year.

Roundup/Culling Strategies- Bison have been rounded-up by refuge staff on horseback annually in the fall since the early 1930s to remove surplus, complete various health tests, vaccinate, and/or mark animals. Due to extreme drought conditions in recent years, the bison herd was also reduced in the spring of 2004 and 2005. A total of 105 bison were surplused in 2006 which was based upon the winter herd size objective, calf production, and grassland carrying capacity. In most years, calf and yearling age classes are each reduced by ~50% and 2-year olds by ~20% in a systematic/random manner to the extent possible, however, factors such as age (i.e. red calf) or health (injury) may be considered in the decision to retain or surplus an animal. Approximately 15-20 adult bison are culled each year with culling decisions based on health/condition, age, and breeding status with efforts made to random cull where possible across the herd (not in one cut or a specific age class). These culling strategies have been utilized since 2000, however, some "randomness" was incorporated into the culling process in the late 1990s. Culling strategies 1970s through early 1990s were more selective and emphasized size and conformation. Information is limited for culling strategies prior to the 1970s.

Animal Identification - Bison were branded with a single digit signifying year of birth beginning in the 1930s, and in the 1980s, the brand was changed to a 4-digit number representing year of birth and individual (i.e. 9803). The brand is seldom noticed by public visitors due to its relatively small size and location (behind the left hip bone parallel to the backbone), however, a trained observer can read it in the field using binoculars. Marking of individual animals has facilitated research and enabled monitoring/management of the herd to the individual level as necessary. During the 2006 roundup, a total of 209 keeper bison (yearling and older) were implanted with a microchip behind the left ear. Adult keeper bison not worked through the chute, ~47 males and 4 females, will receive a microchip in 2007 along with keeper bison born in 2006. After the initial chipping process is completed this year, plans are to microchip FTN keeper bison at the yearling age class. As in previous years, keeper yearling bison will also be branded with an individual 4-digit number. The need to continue branding as in past, or with a modified brand, or stop branding all together will be evaluated after potential chip loss is determined.

In 2006, as part of the National Animal Identification System, Fort Niobrara NWR registered with the Nebraska Department of Agriculture and was assigned a national premises identification number.

Herd Health /Disease - FTN bison are in good health with disease not a significant problem. Periodic testing of surplus bison for various diseases including brucellosis, tuberculosis, leptospirosis, anaplasmosis, and/or blue tongue has been accomplished since 1940. Leptospirosis was diagnosed in approximately 12% of the bison tested in 1962 which resulted in a 2-year vaccination program for this disease. The entire bison herd tested negative for brucellosis in 1965 and was declared brucellosis-free in 1974 by the State of Nebraska. Annual testing of surplus bison during the past 30+ years have shown the herd to be negative for the various program diseases. Beginning in 2003, a subsample of keeper bison have been tested annually for Johne's, BVD I&II, IBR, PI3, and BRSV. Test results for these diseases have been negative with the exception of PI3 and BRSV (low positive titers detected in most animals).

Bison calves are vaccinated in the fall for hemorrhagic septicemia, blackleg, and malignant edema as part of standard accepted health management practices for fenced bovines, however, age eligible heifer calves are no longer vaccinated for brucellosis. A brucellosis vaccination program on the refuge was conducted 1941-1970 and 1983 - 1998. Parasites are not a significant problem and treatment has not been done in recent years.

Research - The research project titled Fitness Consequences of Sexually Selected Acoustical Signaling in American Bison being conducted by Dr. Mike Mooring and others will be completed next year. One of the major findings to date that could be relevant to bison population models is the objective -- "genetic paternity versus behavioral measures of reproductive success." Paternity analysis results for 300 calves born 2004-2006 revealed that behavioral observations were unreliable measures of reproductive success (calf production) in 42% of the cases for which observational data were available.

Genetic samples for all SUH bison and 2 sets of "trios" (sire, dam, offspring) from the FTN bison herd were provided to

Drs. Robert Schnabel and Jerry Taylor at the University of Missouri- Columbia for use in development/refinement of a research proposal examining introgressive hybridization at the genomic level. The original NSF proposal titled North American Bison as a Model for Studying Hybridization at the Genomic Level was declined in December 2006, but will be modified and resubmitted in January 2008 using data collected this summer from their 50,000 SNP chip. They plan to genotype some bison from the Custer, FTN, and SUH herds but haven't yet finalized the actual number.

Sullys Hill (SUH) Bison Herd:

Background - The Sullys Hill (SUH) bison herd was founded in October 1918 with receipt of six bison from the Portland City Park in Portland, Oregon. The original herd included the "herd matriarch" and her offspring (two males, three females). Based on historical records, it is believed that the herd matriarch was obtained by the Portland City Park from Ravilli, Montana around 1906 through a trader name B.H. Denison. In 1932, a bull from Wind Cave National Park was introduced to the herd. Nine other introductions are recorded between 1941 and 1997, including bison from the National Bison Range, Fort Niobrara NWR, and Theodore Roosevelt National Park. Since 1980, herd size averaged around 30 animals, with the highest number being 40 in 2006. Prior to receipt of genetic test results in 2006, approximately 8 surplus animals were dispatched annually. Because the SUH herd has the potential to be a non-hybridized herd, it was transferred to Fort Niobrara NWR on December 7, 2006. The SUH herd is being managed separate of the FTN bison herd and will be allowed to grow in order to reduce additional genetic loss.

Grazing Program - The SUH herd will be managed under a controlled grazing program separate of the FTN herd. The initial program will consist of a 6-unit rotation on ~4,400 acres. The herd will winter (October-March) in a 2,400 acre unit south of the Niobrara River and then move through a 5-unit system every ~2 weeks during the April-September time period. As the SUH bison herd grows, habitat units from the FTN bison grazing program will shift to the SUH herd. This past winter, SUH bison wintered in the exhibition pasture surrounding the refuge headquarters area and was fed supplemental hay.

Population Characteristics - The SUH bison herd currently consists of 41 animals which includes three calves born to date (refer to attached herd structure). The first calf was born on April 26. One fatality has occurred since the SUH bison herd transferred to Fort Niobrara and it was a 13-year old bull in late January 2007. The sex ratio (M:F) is currently 1:1.5. In 2006, a total of 8 calves were born by a potential 13 calving-age cows for a 61% calving rate. Parentage assignments done by U.C. Davis indicate three bulls sired the calves born in 2006 and one bull sired the bison born in 2005.

Animal Identification - All SUH bison were implanted with a microchip behind the left ear when they arrived on Fort Niobrara. Each animal was also branded with a lazy "S" and a 1 or 2 digit number unique to each individual. The brand is relatively small and located behind the right hip bone parallel to the backbone (opposite side of FTN bison) which will enable rapid visual identification of SUH bison in the field and be a "back-up" in case of chip loss.

Herd Health /Disease - Upon their arrival at Fort Niobrara, the SUH bison herd was tested for a various parasites and diseases including brucellosis, tuberculosis, Johne's, IBR, BVD I & II, PI3, and BRSV. Test results for the diseases were negative with the exception of BVD I & II (one animal seropositive, low titer), IBR (two animals seropositive, low titer), PI3 (39 animals seropositive), and BRSV (27 animals seropositive). Parasitology results were as follows: lung worms (not detected); coccidia (14 positive, mostly low counts except one animal that is probably near clinical); and intestinal parasites (37 positive, mostly low counts except for three animals with higher counts suggesting possible moderate infection). No recommendations have been received yet regarding possible management response to these results.

FTN and SUH Bison Herd Structures
 Fort Niobrara National Wildlife Refuge
 May 1, 2007

FTN Bison Herd:

<u>Age</u>	<u>Male</u>	<u>Female</u>
Calf		
1	27	27
2	16	15
3	10	10
4	6	8
5	10	9
6	7	8
7	7	9
8	8	10
9	7	10
10	9	8
11	5	9
12	9	5
13	5	7
14	3	6
15	5	9
16	4	6
17	3	6
18	3	5
19		2
20		1
21		1
22		1?
23		
24		1?
Totals	144	171

Total # of FTN Bison: ~315 +35 calves

SUH Bison Herd:

<u>Age</u>	<u>Male</u>	<u>Female</u>
Calf		
1	4	4
2	3	3
3	4	3
4	1	
5	1	
Adult	2	13
Totals	15	23

Total # of SUH Bison: 38 +3 calves