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Economic Analysis Prepared for the Environmental Impact Statement on Black-Tailed Prairie Dog Conservation and Management on the Nebraska National Forest and Associated Units

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ECONOMIC ANALYSIS PREPARED FOR THE ENVIRONMENTAL IMPACT STATEMENT ON BLACK-TAILED PRAIRIE DOG CONSERVATION AND MANAGEMENT ON THE NEBRASKA NATIONAL FOREST AND ASSOCIATED UNITS

by

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Abstract

This limited analysis resulted from a request by the Nebraska National Forest to provide some economic estimates to the value of changes in forage availability that would result from three proposed levels of rodenticide use in the management of black-tailed prairie dogs (BTPD) on the Nebraska National Forest (NNF) and associated units managed by NNF (i.e. Buffalo Gap National Grasslands, Ft. Pierre National Grasslands in South Dakota, and the Oglala National Grasslands in Nebraska.)

The values of changes in forage availability were determined based on three alternatives of rodenticide use. These alternatives include: (1) limit use of rodenticides to only protect public health & safety and maintain facilities; (2) maintain a 1 mile buffer zone to prevent encroachment of BTPDs onto adjacent private or tribal agricultural land; and (3) provide a 1 mile buffer zone in the Conata Basin area (under specific conditions), ¼ mile buffer on the Ft. Pierre National Grasslands, and ½ mile buffer everywhere else. Two levels of estimates were provided by the NNF estimating the change in available forage from BTPD expansion given: (1) normal to above normal precipitation, and (2) below normal precipitation; over a 10 year period. Forage change estimates where provided by the NNF in pounds and in terms of Animal Unit Months (AUMs) of grazing. A 3 year average of hay prices ($70.00/ton) and AUM rates ($16.63/AUM) from the SD Agricultural Statistic Service were used to value the change in forage availability.

The results of this analysis showed that under Alternative 1, the value of the change in forage availability in pounds range from loss of $79,870 to $212,065 from the low to high projected expansion of BTPD colonies. In terms of AUM value this loss ranged from $48,686 to $129,208. Under Alternative 2, the value of the change in forage availability in pounds range from a gain of $59,185 to $62,860 from the low to high projected decrease in BTPD colonies. In terms of AUM value this gain ranged from $36,029 to $38,274. With respect to Alternative 3, there was an overall gain in value from the reduction of BTPD colonies. In terms of pounds of available forage this value ranged from $9,065 to $23,835 and in AUM value from $5,506 to $14,521. Only the Ft. Pierre National Grassland had a loss of value under the low BTPD expansion estimate of $2,065 in the value per ton and $1,264 in the AUM value under Alternative 3.

Economic analysis prepared for the Environmental Impact Statement on black-tailed prairie dog conservation and management on the Nebraska National Forest and associated units.

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Purpose

This analysis limits its scope to the valuation of the resulting change in forage availability (as estimated by the Nebraska National Forest), given three proposed levels of rodenticide use in the management of black-tailed prairie dogs (BTPD) on the Nebraska National Forest (NNF) and associated units managed by NNF (i.e. Buffalo Gap National Grasslands, Ft. Pierre National Grasslands in South Dakota, and the Oglala National Grasslands in Nebraska.) This analysis was requested by the NNF as part of the process to prepare an Environmental Impact Statement (EIS) for black-tailed prairie dog conservation and management on the NNF and associated units. The resulting analysis will be tiered to the Final EIS for the 2002 Revised Nebraska National Forest Land and Resource Management Plan (LRMP).

Alternatives

The three proposed levels of rodenticide use are basically:

1. To limit use to only protect public health & safety and maintain facilities (same as present management).
2. To maintain a 1 mile buffer zone to prevent encroachment of BTPDs onto adjacent private or tribal agricultural land. This plan mimics the proposed plan which will be presented to the SD Legislature early in 2005.
3. To provide a 1 mile buffer zone in the Conata Basin area (under specific conditions), ¼ mile buffer on the Ft. Pierre National Grasslands, and ½ mile buffer everywhere else. This third alternative is an attempt by the NNF to offer a balance between the desires of adjacent land owners and those who are concerned with wildlife species and black-footed ferret habitat.

Methodology & Assumptions

Given the short time frame permitted for this analysis, it was assumed that economic analysis would be limited to the valuation of the changes in forage availability. Estimates of the value of the change in forage availability were computed using two methods: First, by estimating

the resulting tonnage of the change in forage availability and using a three year average of South Dakota hay prices per ton to value the change. The second method is to utilize the estimates of forage change in terms of AUMs and to use a three year average of South Dakota AUM grazing rates to value the change.

The difference between the two methods from a livestock producer viewpoint would be based upon how the resulting change in forage availability would be compensated for or utilized; depending upon if the change resulted in a decrease or an increase in forage available for grazing. For example, given a decrease in forage availability and assuming no reduction in AUs grazing, the additional forage needed to feed the livestock would either come as additional grazing purchased during the grazing season (utilizing the AUM based value) or as additional hay purchased during winter months (utilizing the hay price value).

The above does not imply that the NNF would change permitted Animal Units (AUs) in the affected grazing allotments as a result of any change in forage availability. It is assumed for this analysis that the changes in available forage from one year to the next would be held in a type of "grass bank", where additional forage available one year might not be grazed and kept in reserve for any potential decrease in forage availability the next due to drought conditions, thus allowing a more constant level of AUs permitted over time.

Three years (2001-2003) of hay prices and AUM rates as reported by the South Dakota Agricultural Statistics Service were averaged for use in this study. The hay price used was $70.00 per ton. The AUM rate used was $16.63/AUM.

Change in Forage Availability

The Nebraska National Forest provided estimates of the resulting changes in forage availability from the use of rodenticides to manage BTPDs in pounds and in Animal Unit Month (AUM) equivalents. These estimates are given in Table 1 and Table 2 respectively. The low end of the range represents BTPD colony growth if normal to above normal precipitation and plant production occur over the next ten years. High end represents growth if drier than normal (drought) conditions occur. Drought conditions favor the expansion of prairie dog towns. With this expansion, increased reductions in the amount of forage available occur. The figures also do not include the effects of 6,398 acres of rodenticide use on the Buffalo Gap National Grasslands in 2004. One of the greatest determinates in the estimates below rests in the expected amounts of rodenticide that are expected to be used under normal & above to below normal (drought) precipitation conditions. The proposed amounts of rodenticide use are not discussed in this analysis.

Table 1. Nebraska National Forest estimates of the change in forage availability in pounds from the use of rodenticides to control black-tailed prairie dogs.

	Alternative 1		Alternative 2	Alternative 3	
	Low[a]	High[a]	Low	High	Low High
	1000 lbs.		1000 lbs.		1000 lbs.
Buffalo Gap National Grasslands	(1,976) to (5,138)[b]		1,186 to 1,291		237 to 553
Ft. Pierre National Grasslands	(127) to (331)		229		(59) to 8
Oglala National Grasslands	(179) to (590)		276		81 to 120
Nebraska National Forest	0		0		0

[a] Low range indicated change under normal to above normal precipitation, High range indicates below normal (drought) precipitation. Estimates are for a 10 year period.

[b] Parentheses indicate negative numbers.

Table 2. Nebraska National Forest estimates of the change in forage availability in animal unit months (AUMs) from the use of rodenticides to control black-tailed prairie dogs.

	Alternative 1		Alternative 2	Alternative 3	
	Low[a]	High[a]	Low	High	Low High
	AUMs		AUMs		AUMs
Buffalo Gap National Grasslands	(2,534) to (6,588)[b]		1,520 to 1,655		304 to 709
Ft. Pierre National Grasslands	(163) to (424)		293		(76) to 11
Oglala National Grasslands	(230) to (756)		353		103 to 153
Nebraska National Forest	0		0		0

[a] Low range indicated change under normal to above normal precipitation, High range indicates below normal (drought) precipitation. Estimates are for a 10 year period.

[b] Parentheses indicate negative numbers.

Results

Alternative 1

Under alternative 1, no additional rodenticide would be used other than that required to maintain public health and safety and to prevent facilities from damage. This alternative resulted in an increase of BTPD colonies on the Buffalo Gap, Ft. Pierre, and Oglala National Grasslands. The economic valuation of the resulting decrease in forage availability is shown in Table 3. Since there was no change in estimated forage availability for the Nebraska National Forest in Tables 1 & 2, no corresponding estimates were made in the tables below.

Table 3. Valuation of the change in forage availability by national grassland as a result of proposed alternative 1 to the Nebraska National Forest black-tailed prairie dog management plan.

	Estimated Value based on Hay Prices ($)		Estimated Value based on AUM rates ($)	
	Low[a]	High[a]	Low	High
Buffalo Gap National Grasslands	(69,160)[b]	(179,830)	(42,149)	(109,580)
Ft. Pierre National Grasslands	(4,445)	(11,585)	(2,711)	(7,053)
Oglala National Grasslands	(6,265)	(20,650)	(3,826)	(12,575)
Total	($79,870)	($212,065)	($48,686)	($129,208)

[a] Low range indicated change under normal to above normal precipitation, High range indicates below normal (drought) precipitation. Estimates are for a 10 year period.

[b] Parentheses indicate negative numbers.

The range of values from low to high prairie dog expansion, based on hay price were a reduction of $79,870 to $212,065 of forage value respectively for all three national grasslands. The Buffalo Gap National Grasslands had the largest reduction in value from $69,160 to $179,830, primarily given the fact of more numerous colonies of BTPDs.

The range of values based on AUM grazing rates for all three national grasslands ranged from the low end prairie dog expansion estimate (given normal to above normal precipitation) of a loss of $48,686 of forage value to the high expansion estimate (given drought conditions) of a loss of $129,208.

Alternative 2

Alternative 2 maintains, through the use of rodenticide, a 1 mile buffer zone to prevent encroachment of BTPDs onto adjacent private or tribal agricultural land and more closely follows the expected SD State plan that is yet to be acted upon by the legislature. Given the reduction of expected prairie dog acreage under this alternative, all three national grasslands are expected to see an increase in the amount of available forage. The economic valuation of the resulting increase in forage availability is shown in Table 4.

Table 4. Valuation of the change in forage availability by national grassland as a result of proposed alternative 2 to the Nebraska National Forest black-tailed prairie dog management plan.

	Estimated Value based on Hay Prices ($)		Estimated Value based on AUM rates ($)	
	Low[a]	High[a]	Low	High
Buffalo Gap National Grasslands	41,510	45,185	25,283	27,528
Ft. Pierre National Grasslands	8,015	8,015	4,874	4,874
Oglala National Grasslands	9,660	9,660	5,872	5 872
Total	$59,185	$62,860	$36,029	$38,274

[a] Low range indicated change under normal to above normal precipitation, High range indicates below normal (drought) precipitation. Estimates are for a 10 year period.

The range of values from low to high prairie dog expansion, based on hay price, were an increase of $59,185 to $62,860 in forage value respectively for all three national grasslands. The Buffalo Gap National Grasslands had the largest valuations from $41,510 to $45,185, given more numerous colonies of BTPDs on that grassland.

The range of values based on AUM grazing rates for all three national grasslands ranged from the low end prairie dog expansion estimate (given normal to above normal precipitation) of an increase of $36,029 in forage value to the high expansion estimate (given drought conditions) of an increase of $38,274 in forage value.

Alternative 3

Alternative 3 provides a 1 mile buffer zone in the Conata Basin area (under specific conditions), ¼ mile buffer on the Ft. Pierre National Grasslands, and ½ mile buffer everywhere else. This alternative allows for prairie dog colony expansion in some areas and reductions through the use of rodenticides in others. The expected prairie dog acreage under this alternative was expected to increase on the Ft. Pierre National Grasslands and decrease on the Buffalo Gap and Oglala National Grasslands. The economic valuation of the resulting change in forage availability is shown in Table 5.

Table 5. Valuation of the change in forage availability by national grassland as a result of proposed alternative 3 to the Nebraska National Forest black-tailed prairie dog management plan.

	Estimated Value based on Hay Prices ($)		Estimated Value based on AUM rates ($)	
	Low[a]	High[a]	Low	High
Buffalo Gap National Grasslands	8,295	19,355	5,057	11,793
Ft. Pierre National Grasslands	(2,065)[b]	280	(1,264)	184
Oglala National Grasslands	2,835	4,200	1,713	2,54
Total	$9,065	$23,835	$5,506	$14,521

[a] Low range indicated change under normal to above normal precipitation, High range indicates below normal (drought) precipitation. Estimates are for a 10 year period.

[b] Parentheses indicate negative numbers.

The overall total in the range of values from low to high prairie dog expansion, based on hay price, were an increase of $9,065 to $23,835 in forage value. Estimated change in forage value for the Buffalo Gap National Grasslands is an overall increase from $8,295 to $19,355 as the total number of prairie dog acres are expected to decrease. On the Ft. Pierre National Grasslands, under low prairie dog expansion, prairie dog acres are expected to increase (given the amount of rodenticide to be used) resulting in a decrease in the value of available forage by $2,065. Under the high prairie dog expansion which assumes more drought-like conditions, there is little change in the amount of available forage resulting in a small increase of $280. The Oglala National Grasslands are expected to see an increase in the value of available forage ranging from $2,835 to $4,200.

The range of values based on AUM grazing rates for all three national grasslands ranged from the low end prairie dog expansion estimate (given normal to above normal precipitation) of an increase of $5,506 in forage value to the high expansion estimate (given drought conditions) of an increase of $14,521 in forage value. Only the Ft. Pierre National Grasslands under low prairie dog expansion is expected to see a decrease in the value of available forage of $1,264.

Summary of Alternatives

A summary of the change in forage evaluations by alternative is given in Table 6.

Table 6. Summary of the valuation of the change in forage availability as a result of the three proposed alternatives to the Nebraska National Forest black-tailed prairie dog management plan.

	Estimated Value based on Hay Prices ($)		Estimated Value based on AUM rates ($)	
	Low[a]	High[a]	Low	High
Alternative 1	(79,870)[b]	(212,065)	(48,686)	(129,208)
Alternative 2	59,185	62,860	36,029	38,274
Alternative 3	9,065	23,835	5,506	14,521

[a] Low range indicated change under normal to above normal precipitation, High range indicates below normal (drought) precipitation. Estimates are for a 10 year period.

[b] Parentheses indicate negative numbers.

Other Considerations

There are many other considerations that could be taken into account in an analysis such as this. Given time and funding constraints, they were not examined here. Such considerations include the effects of prairie dog expansion onto private and public lands with respect to:

- Type and productivity of the land being encroached upon (i.e. rangeland, hay land, cropland, tribal lands, etc.).
    - Effects on productive capacity and value of product produced.
    - Appraisal of land and land values.
- Impacts to livestock production (lbs. of beef produced, change in animal units grazed, affects on viability of private ranch operations dependant upon or adjacent to public land leases, etc.).
- Effects on other sectors of the economy as a result of changes in economic activity from the increase or decrease of prairie dog acreages (recreation, tourism, ranch supply businesses, local merchants, etc.).
- Impacts on other wildlife species and any economic activity related to them.
- Any economic gains or losses from the variation of the availability of forage over time or the value of a forage supply that is more or less stable through wet and dry climatic conditions.

Many of these considerations are very difficult to quantify. To examine any or all of these considerations would take considerable more time and resources that what was available at the time of this analysis.