

# APPENDIX D

## MULTIPLE-USE TRADEOFFS

Coal planning regulation 43 CFR 3420.1-4e(3) states that "multiple land use decisions shall be made which may eliminate additional coal deposits from further consideration for leasing, to protect resource values of a locally important or unique nature not included in the unsuitability criteria."

Surface resource values, oil and gas values, municipal utilities, coal values, and industry's interest and prior commitments were considered in the screening process to obtain a balance between resource conflicts.

### Factors in Analysis

Eight resource categories and factors were defined that could be significantly affected by mining. These were:

1) Buffer zones around incorporated cities and towns, unincorporated towns, residential subdivisions, power generation facilities, industrial concentrations, MINUTEMAN missile silos (2.5 mile radius), and an agricultural experiment station were identified as unacceptable for further consideration for coal leasing. Buffer zones around cities and towns were determined by population levels: less than 500 persons one-fourth mile, greater than 500 persons — one-half mile.

2) Utility and transportation routes including: MINUTEMAN missile communication cables (200 foot corridor), MINUTEMAN missile silos (2.5 mile radius), electric transmission lines 230 KV and larger, pipelines 12 inches in diameter and larger, and all operating railroads (100 foot corridor) were considered to be unacceptable for further consideration for coal leasing.

3) The eligible KRF Quarry National Register District contains 3,761 acres of Federal coal. Due to the significance of these resources, all federal coal within the District boundaries has been dropped from further consideration for coal leasing.

Forty acres of Federal coal surrounding Writing Rock Historic Site and 160 acres surrounding the A.C. Townley farmstead were dropped from further consideration for coal leasing because of historic significance.

4) Tracts with known high wildlife values that did not qualify under criteria 14 and 15 were identified as unacceptable, or acceptable with stipulations for further consideration for coal leasing. Each CSA has an individual thresh-

hold percentage for leasing that was determined from the particular values of the CSA (Table D-1). Once the threshold percentage is reached, no further leasing can occur without a joint review of the situation in the CSA by BLM, NDGFD, and USFWS. The intent of the threshold approach is to protect a portion of the remaining higher value habitats without having to arbitrarily specify precise geographic areas.

5) Steep, rough topography has high aesthetic value, high potential to erode if disturbed, and is difficult to reclaim. Steep slopes greater than 30 percent) were dropped from further consideration for leasing under Alternatives A and C. Under Alternative B no acres were dropped because industry has successfully reclaimed small areas of extreme slope. In Alternative D slopes greater than 15 percent were dropped.

6) Major oil and gas fields defined by the North Dakota Industrial Commission were dropped. Field boundaries are established by the State of North Dakota. Major fields were identified based on total production, likelihood of future production and expected life.

7) A total of 38,536 acres were excluded to protect the City of Dickinson's municipal watershed. This watershed is located along the Heart River, Dickinson's only source of municipal water.

8) Buried-valley aquifers are protected under Alternative D because they contain high quality water, have relatively high flows, and are at a shallow depth. Buried-valley aquifers may be used for domestic and/or irrigation purposes.

### Methods

Transparent overlays for each of the eight multiple-use tradeoffs were delineated on 1:100,000 scale base maps for each of the 24 CSAs. The presence of any one multiple-use conflict was sufficient to drop an area from further coal leasing. These overlays are available for review in the Dickinson District BLM office.

### Results

Areas deleted due to multiple-use conflicts are summarized in Tables D-1 through D-5 by CSA and alternative.

**TABLE D-1  
WILDLIFE THRESHOLD ACREAGES BY ALTERNATIVE**

Coal Study Area	ALTERNATIVE B				ALTERNATIVE C			ALTERNATIVE D		
	Original Threshold Acres	Gross Acres	Portion Excluded	Threshold Acres Excluded	Gross Acres	Portion Excluded	Threshold Acres Excluded	Gross Acres	Portion Excluded	Threshold Acres Excluded
ANTELOPE	3,685	3,386	0.4	1,354	2,164	0.5	1,082	510	0.3	153
ARNEGARD	7,409	4,294	0.2	859	4,294	0.5	2,147	5,602	0.9	5,042
BEULAH-ZAP	5,582	4,949	0.3	1,485	3,253	0.5	1,627	169	0.0	0
BOWMAN-GASCOYNE	1,929	2,169	0.4	868	2,169	0.6	1,301	2,002	0.8	1,602
CENTER-STRANTON	2,811	2,635	0.4	1,054	2,193	0.6	1,316	592	0.5	296
DICKINSON	3,046	1,987	0.1	199	1,450	0.2	290	741	0.5	371
DIVIDE	0	0	0.0	0	0	0.0	0	0	0.0	0
DUNN CENTER	5,195	3,193	0.2	639	1,911	0.2	382	982	0.5	491
ELGIN-NEW LEIPZIG	1,278	924	0.1	92	731	0.3	219	628	0.6	377
ELKHORN	7,326	6,280	0.4	2,512	4,883	0.5	2,442	2,461	0.7	1,723
FORTUNA	998	562	0.1	56	562	0.3	169	560	0.6	336
GARRISON	1,150	0	0.0	0	0	0.0	0	0	0.0	0
GOLDEN VALLEY	191	181	0.0	0	181	0.0	0	181	0.0	0
HANKS	12,762	9,506	0.2	1,901	7,894	0.5	3,947	4,787	0.7	3,351
KEENE	12,059	10,494	0.3	3,148	9,363	0.6	5,618	2,244	0.5	1,122
MOTT	3,418	2,786	0.1	279	2,599	0.5	1,300	1,719	0.6	1,031
NEW ENGLAND	3,964	1,624	0.1	162	979	0.2	196	919	0.1	92
NIOBE	0	0	0.0	0	0	0.0	0	0	0.0	0
SAND CREEK	10,515	6,164	0.1	616	5,820	0.4	2,328	4,752	0.8	3,802
TOBACCO GARDEN	1,919	197	0.0	0	197	0.0	0	224	0.0	0
UNDERWOOD	0	0	0.0	0	0	0.0	0	0	0.0	0
VELVA	261	122	0.0	0	54	0.0	0	0	0.0	0
WASHBURN	478	429	0.2	86	325	0.4	130	40	0.0	0
WILLISTON	4,268	2,167	0.1	217	2,028	0.4	811	740	0.0	0
TOTALS	90,244	64,049	0.2	15,527	53,050	0.5	25,305	29,853	0.7	19,789
PORTION OF ORIGINAL THRESHOLD			0.17			0.28			0.22	

**TABLE D-2**  
**ALTERNATIVE A**  
**ACRES EXCLUDED FROM FURTHER CONSIDERATION DUE TO MULTIPLE-USE TRADEOFFS**

CSA	Slopes 30%	Wildlife Refuge Watershed	Buried- Valley Aquifer	Intensive Use Buffer	Oil & Gas Fields	Wetlands	Municipal Watershed	Land Use Plan Consist.	Lake Buffer Zone	Gross Total	Net Total
ANTELOPE	0	0	0	0	0	0	0	0	0	0	0
ARNEGARD	0	0	0	0	0	0	0	0	0	0	0
BEULAH-ZAP	0	0	0	0	0	0	0	0	0	0	0
BOWMAN-GASCOYNE	0	1440	0	0	0	0	0	0	0	1440	1440
CENTER-STANTON	0	0	0	0	0	0	0	0	0	0	0
DICKINSON	0	0	0	0	0	0	54492	0	0	54492	28986
DIVIDE											
DUNN CENTER	0	0	0	0	0	0	0	0	800	800	0
ELGIN-NEW LEIPZIG	100	0	0	0	0	0	0	0	0	100	100
ELKHORN											
FORTUNA											
GARRISON	0	0	0	0	0	0	0	0	0	0	0
GOLDEN VALLEY	0	0	0	0	0	80	0	0	0	80	80
HANKS	1920	1760	1200	0	0	0	0	0	0	4880	4605
MOTT	240	1000	0	0	0	0	0	0	0	1240	1031
NEW ENGLAND	620	0	0	0	0	0	0	0	0	620	620
NIOBE											
SAND CREEK	1050	240	520	440	0	0	0	320	0	2570	2410
TOBACCO GARDEN	5860	0	6440	0	0	0	0	0	12230	24530	2507
UNDERWOOD	0	0	0	0	0	0	0	0	0	0	0
VELVA											
WASHBURN	0	0	0	0	0	0	0	0	0	0	0
WILLISTON	31390	0	2360	0	10168	0	0	0	23357	67275	3493
TOTAL	41180	4440	10520	440	10168	80	54492	320	36387	158027	45272

**TABLE D-3**  
**ALTERNATIVE B**  
**ACRES EXCLUDED FROM FURTHER CONSIDERATION DUE TO MULTIPLE-USE TRADEOFFS**

CSA	Wildlife Threshold	Municipal Watershed	Intensive Use Buffer	Oil & Gas Fields	Cultural Resources	High Use, Utility, Trans.	Gross Total	Net Total
ANTELOPE	1354	0	0	0	0	718	2072	2014
ARNEGARD	859	0	0	920	0	75	1854	1774
BEULAH-ZAP	1485	0	0	0	0	1970	3455	1556
BOWMAN-GASCOYNE	868	0	0	0	0	559	1427	1395
CENTER-STANTON	1054	0	0	0	0	921	1975	1640
DICKINSON	199	38536	0	9400	0	1548	49683	40263
DIVIDE	0	0	0	0	0	3	3	0
DUNN CENTER	639	0	0	1520	3761	1294	7214	5286
ELGIN-NEW LEIPZIG	92	0	0	0	0	0	92	92
ELKHORN	2512	0	0	0	0	63	2575	2512
FORTUNA	56	0	0	2400	40	522	3018	1875
GARRISON	0	0	0	0	0	8602	8602	5623
GOLDEN VALLEY	0	0	0	480	160	212	852	1021
HANKS	1901	0	0	0	0	399	2300	2188
KEENE	3148	0	0	46280	0	261	49689	45496
MOTT	279	0	0	0	0	0	279	279
NEW ENGLAND	162	0	0	0	0	280	442	277
NIOBE	0	0	0	0	0	0	0	0
SAND CREEK	616	0	440	3840	0	1920	6816	5742
TOBACCO GARDEN	0	0	0	0	0	0	0	0
UNDERWOOD	0	0	0	0	0	15	15	0
VELVA	0	0	0	0	0	4261	4261	1525
WASHBURN	86	0	0	0	0	12	98	86
WILLISTON	217	0	0	13200	0	693	14110	8189
<b>TOTAL</b>	<b>15527</b>	<b>38536</b>	<b>440</b>	<b>78040</b>	<b>3961</b>	<b>24328</b>	<b>160832</b>	<b>128833</b>

**TABLE D-4**  
**ALTERNATIVE C**  
**ACRES EXCLUDED FROM FURTHER CONSIDERATION DUE TO MULTIPLE-USE TRADEOFFS**

CSA	Wildlife Threshold	Municipal Watershed	Intensive Use Buffer	Oil & Gas Fields	Cultural Resources	Slopes 30%	High Use, Utility, Trans.	Gross Total	Net Total
ANTELOPE	1082	0	0	0	0	2264	718	4064	3436
ARNEGARD	2147	0	0	920	0	46	75	3188	3108
BEULAH-ZAP	1627	0	0	0	0	3952	1970	7549	4013
BOWMAN-GASCOYNE	1301	0	0	0	0	0	559	1860	1828
CENTER-STANTON	1316	0	0	0	0	374	921	2611	2457
DICKINSON	290	38536	0	9400	0	894	1548	50668	42877
DIVIDE	0	0	0	0	0	0	3	3	0
DUNN CENTER	382	0	0	1520	3761	1995	1294	8952	6859
ELGIN-NEW LEIPZIG	219	0	0	0	0	220	0	439	399
ELKHORN	2442	0	0	0	0	1802	63	4307	4185
FORTUNA	169	0	0	2400	40	0	522	3131	2028
GARRISON	0	0	0	0	0	0	8602	8602	5623
GOLDEN VALLEY	0	0	0	480	160	0	212	852	852
HANKS	3947	0	0	0	0	2597	399	6943	6663
KEENE	5618	0	0	46280	0	3866	261	56025	49462
MOTT	1300	0	0	0	0	433	0	1733	1591
NEW ENGLAND	196	0	0	0	0	981	280	1457	1266
NIOBE	0	0	0	0	0	0	0	0	0
SAND CREEK	2328	0	440	3840	0	1379	1920	9907	8406
TOBACCO GARDEN	0	0	0	0	0	22597	0	22597	283
UNDERWOOD	0	0	0	0	0	0	15	15	0
VELVA	0	0	0	0	0	100	4261	4361	1596
WASHBURN	130	0	0	0	0	227	12	369	273
WILLISTON	811	0	0	13200	0	35751	693	50455	9030
<b>TOTAL</b>	<b>25305</b>	<b>38536</b>	<b>440</b>	<b>78040</b>	<b>3961</b>	<b>79478</b>	<b>24328</b>	<b>250088</b>	<b>156235</b>

**TABLE D-5**  
**ALTERNATIVE D**  
**ACRES EXCLUDED FROM FURTHER CONSIDERATION DUE TO MULTIPLE-USE TRADEOFFS**

CSA	Wildlife Thres- hold	Municipal Water- shed	Intensive Use Buffer	Oil & Gas Fields	Cultural Resources	Slopes 15%	High Use, Utility, Trans.	Buried- Valley Aquifers	Gross Total	Net Total
ANTELOPE	153	0	0	0	0	9806	718	917	11594	7065
ARNEGARD	5042	0	0	920	0	1499	75	1107	8643	8320
BEULAH-ZAP	0	0	0	0	0	24362	1970	1825	28157	18523
BOWMAN-GASCOYNE	1602	0	0	0	0	846	559	0	3007	2890
CENTER-STANTON	296	0	0	0	0	4667	921	1004	6888	3854
DICKINSON	371	38536	0	9400	0	7862	1548	0	57717	47614
DIVIDE	0	0	0	0	0	0	3	49	52	29
DUNN CENTER	491	0	0	1520	3761	8410	1294	2635	18111	15537
ELGIN-NEW LEIPZIG	377	0	0	0	0	717	0	200	1294	887
ELKHORN	1723	0	0	0	0	8574	63	64	10424	10232
FORTUNA	336	0	0	2400	40	1091	522	5903	10292	4371
GARRISON	0	0	0	0	0	2703	8602	50	11355	5837
GOLDEN VALLEY	0	0	0	480	160	136	212	0	988	1100
HANKS	3351	0	0	0	0	9137	399	562	13449	12911
KEENE	1122	0	0	46280	0	39097	261	7495	94255	72358
MOTT	1031	0	0	0	0	4808	0	0	5839	5274
NEW ENGLAND	92	0	0	0	0	2281	280	0	2653	2463
NIOBE	0	0	0	0	0	0	0	0	0	0
SAND CREEK	3802	0	440	3840	0	8577	1920	878	19457	15991
TOBACCO GARDEN	0	0	0	0	0	38095	0	4659	42754	2665
UNDERWOOD	0	0	0	0	0	497	15	114	626	189
VELVA	0	0	0	0	0	4162	4261	1037	9460	1992
WASHBURN	0	0	0	0	0	709	12	0	721	588
WILLISTON	0	0	0	13200	0	66951	693	3774	84618	17089
<b>TOTAL</b>	<b>19789</b>	<b>38536</b>	<b>440</b>	<b>78040</b>	<b>3961</b>	<b>244987</b>	<b>24328</b>	<b>32273</b>	<b>442354</b>	<b>257779</b>