

**Appendix A**

**Elk Monitoring Plan**  
**for the**  
**Fortification Creek Area**

Elk Monitoring Plan  
for the  
Fortification Creek Area

U.S. Department of the Interior  
Bureau of Land Management  
Buffalo Field Office  
Buffalo, Wyoming

May 2008

**Background**

Coal Bed Natural Gas (CBNG) development in the Powder River Basin under the Powder River EIS began in 2003. Industry has submitted CBNG plans of development in the 123,000 acre Fortification Creek Area (FCA) that have been delayed due to resource concerns.

The BFO identified special resource values in the FCA when it delineated the area in the Buffalo Resource Area Oil and Gas EA (BOG 1980). The Fortification Creek Oil and Gas Surface Protection Plan (FOG) was completed in 1982. The 1985 BFO Resource Management Plan (RMP) incorporated decisions about FCA from both of those documents. Important resources in the FCA include habitat for an isolated elk herd, high visual quality, steep slopes with erosive soils, and significant cultural, historic, and paleontological values.

The objective of this monitoring plan is to identify the specific monitoring tasks necessary to ensure a viable elk herd is conserved through environmentally responsible CBNG development. The monitoring plan will identify items to be monitored, the techniques and units of measure for data gathering, and thresholds for which impacts should not exceed. Exceeding a threshold value or a trend towards exceeding indicates management action is necessary.

**Methods****Population –**

The Wyoming Game and Fish Department (WGFD) will conduct four surveys annually:

1. post parturition for an indication of calf production,
2. pre-hunt to estimate summer calf survival,
3. post hunt to estimate pre-winter population, especially cow:calf ratio,
4. and early spring to estimate over winter calf survival.

The post hunt and early spring surveys will be by helicopter, while the post parturition and pre-hunt surveys will be by fixed-wing aircraft. Helicopter surveys will help locate animals seeking cover beneath junipers. Results of the surveys are entered into a population simulation model (POP II) to estimate the elk population. WGFD population estimates shall be used to monitor the Fortification Creek elk population.

**Habitat Use –**

Thirty-nine adult cow elk were captured during late March 2008 and fitted with global positioning system (GPS) technology radio collars. GPS collars allow for real-time data collection, location data transmitted via satellite. The collar selected was the North Star Science and Technology's DD-cell collar, programmed to collect four data points per day, with a four year collar life expectancy. Collars were programmed to collect data points every five hours as five is not a factor of 24, to eliminate any potential timing

related bias. For example if the collars were programmed at six or eight hour intervals, data points would be collected at the same times every day. Data collection is also divided equally between daytime and nighttime.

The 2007 pre-hunt population estimate was 250; therefore a minimum of 26 collared elk were desired for an adequate sample size for statistical inferences as the sample size represents greater than 10% of the population. To ensure the sample size remained 26 or greater for the life expectancy of the collars, accounting for hunting loss and to prevent the cost of additional capture efforts, 38 elk were targeted. Two collared elk were harvested during the 2005 and 2006 hunting seasons; three collared elk were harvested during the 2007 season. A four-year collar life expectancy combined with a three elk per year collar loss equals an additional twelve collars to account for hunting loss. Annual cost estimates are provided in Table 1. North Star provided a 39<sup>th</sup> collar as a demonstration collar. Two collars failed within three weeks of deployment leaving 37 functioning collars as of May 1.

Table 1. Annual Fortification Creek Elk Monitoring Cost Estimations (by calendar year).

<i>Units</i>	<i>Item</i>	<i>Unit Price</i>	<i>Total Price</i>
2008			\$213,422.00
38	North Star DD GPS collar w VHF and drop off sensor	\$3,300.00	\$125,400.00
38	Elk capture	\$1,000.00	\$38,000.00
38	Data Acquisition (9 months)	\$1,558.00 (\$41.00/month)	\$14,022.00
9	Monitor Flights	\$4,000.00	\$36,000.00
2009			\$66,696.00
38	Data Acquisition (12 months)	\$1,558.00	\$18,696.00
12	Monitor Flights	\$4,000.00	\$48,000.00
2010			\$66,696.00
38	Data Acquisition (12 months)	\$1,558.00	\$18,696.00
12	Monitor Flights	\$4,000.00	\$48,000.00
2011			\$66,696.00
38	Data Acquisition (12 months)	\$1,558.00	\$18,696.00
12	Monitor Flights	\$4,000.00	\$48,000.00
2012			\$16,674.00
38	Data Acquisition (3 months)	\$1,558.00	\$4,674.00
3	Monitor Flights	\$4,000.00	\$12,000.00
<b>Total</b>			<b>\$430,184.00</b>

Prior to the elk capture, the GPS collars were positioned at known locations. Data points collected from collars at known locations enable telemetry accuracy estimation.

A qualified contractor captured the elk using helicopter net-gunning. The entire Fortification Creek elk range (FCA) was scouted the day prior to the capture operations to locate elk groups and the FCA was flown during capture operations to ensure cow elk were captured from as many elk groups and geographic locations within the entire FCA as possible. Thirty-two elk were captured north of Fortification Creek and seven south of Fortification Creek. Spreading capture locations amongst herd groups and geographic locations should minimize capture related bias. The capture operation lasted two days. The capture operation took place prior to elk calving to reduce the risk of premature birth.

Once captured, the cow elk were quickly assessed for body condition, pregnancy status, fitted with a global positioning system (GPS) radio collar, and a blood sample drawn for disease surveillance. Elk were processed and released at the capture location. Blood sampling and body condition assessment followed WGFD's established protocols. Blood samples were collected from 36 elk, 33 (92%) of which tested positive for pregnancy. A WGFD employee was present during the capture operation to assist with processing and in case of accidental injury or death of an elk. There were no elk injuries or mortalities.

GPS data collection began immediately at the rate of four points per day for a period of four years. Periodic aerial surveys will be conducted by fixed wing aircraft. The aerial surveys provide a means to assess GPS accuracy, verify habitat selection, identify herd group size and composition, and verify collar status (in case mortality sensor is activated). BLM shall provide quarterly progress reports in the form of written reports and/or cooperator meetings. North Star provides a web site upon which project partners can view GPS point locations overlaying aerial photographs or other geographic data.

### **Monitoring Thresholds**

#### Population –

BLM identified an overall 20% population reduction, as measured from the herd management objective (150 head), as that level of impact that would be considered biologically significant. This metric was selected after discussions with WGFD biologists responsible for the management of this elk herd. Several different activities occurring on the land may contribute to a population reduction, and CBNG may be only one of those activities. It must be noted, that while this percentage (i.e., 20%) is used herein as a "threshold" for the evaluation, there are a number of parameters – including non-biological ones – that factor into the acceptable level of impact that an animal population can endure before a level of concern is reached – for example: size of the herd affected; inherent productivity of the herd affected; nature of other mortality factors; hunter access and success, etc. A summary of monitoring tasks is provided in Table 2.

When monitoring the impacts of development on the elk population, the threshold would be reached if:

1. the population trend or cow:calf ratio decline 15-20% per year or greater,
2. the overall total herd population estimation drops below 120 (20% below the herd management objective).

3. the rate of seasonal elk ventures outside the FCA increases 20% above the current level (15% of the herd), and/or ...
4. the longevity of elk ventures outside the Fortification Creek shifts from seasonal to permanent . Elk presently venture outside the FCA primarily during summer and autumn, and return to the FCA for winter and calving. The threshold would be reached, if 20% of the elk were to not use the crucial ranges during their crucial periods, or to not return to the FCA crucial ranges at all.

Monitoring shall be accomplished through the collared elk and annual WGFD population surveys. Radio collars on over 10% of the current population would elk provide a reliable representative sample.

#### Habitat Use –

Animal numbers are only one side of the impact equation. From the BLM standpoint, habitat condition and availability for wildlife is a major management consideration. Population numbers and habitat condition/availability are tightly interrelated, though not necessarily in a directly linear fashion. One acre (or even 100 acres) does not equal one elk – the relationship is more complicated than that. The type and amount of vegetation and forage, water sources, security cover, human activity and disturbance levels, etc., all factor into the value of a particular parcel of habitat to elk. The 150 elk population management objective for Fortification Creek was first proposed in the 1981 WGFD Big Game Job Completion Report, at which time the population estimate was 140, and was projected to rise to 170 by 1982 (Jahnke 2006).

For this analysis, a 20% actual loss (i.e., habitat quantity [destruction]) of elk crucial habitat (i.e., crucial winter range or parturition areas), or a 20% loss of habitat quality (effectiveness, as affected by habitat fragmentation, simplification, or degradation) within the boundary of delineated elk crucial habitat or yearlong habitat will be considered biologically significant. These habitat impact thresholds are roughly equivalent to the animal loss thresholds. Typically indirect effects (function of the habitat) associated with energy development are greater than the direct effects (actual loss).

When monitoring the impacts of development on elk habitat, the threshold would be reached if:

1. direct habitat loss exceeded 20% from current levels, or
2. habitat effectiveness (indirect habitat loss) decreased more than 20% from current levels.

Table 2. Summary of Fortification Creek Area Elk Monitoring Tasks.

Item	Technique	Measurement Unit	Frequency	Threshold	Budget
Population trend	WGFD post-hunt estimate	Individuals	Annually	Annual population decline > 15%	None
Population level	WGFD post-hunt estimate	Individuals	Annually	Post hunt population estimate < 120	None
Winter Calf Survival	Helicopter Survey	Cow:calf ratio	Annually	Significant decrease in ratio	\$5,000
Productivity	Fixed-wing Survey	Cow:calf ratio	Annually	Significant decrease in ratio	\$2,500
Summer Calf Survival	Fixed-wing Survey	Cow:calf ratio	Annually	Significant decrease in ratio	\$2,500
Seasonal population movements	Radio-collar locations	Individuals	4 GPS locations/day summarized in a quarterly report	35% of collared elk temporarily leave the FCA.	\$430,184
Population movement longevity	Radio-collar locations	Individuals	4 GPS locations/day summarized in a quarterly report	20% of collared elk are not present within the FCA during the crucial winter and calving periods.	Included in seasonal population movements
Direct habitat loss	POD Surface Use Plans, Field inspections, Remote imagery	Acres	Summarized in a quarterly report	20% of a seasonal range	None
Habitat effectiveness	POD Surface Use Plans, Radio-collar locations	Acres	Locations monitored > twice per month, summarized in a quarterly report	20% decrease in effectiveness from current levels in any seasonal range.	Included in seasonal population movements