## List of Appendices

# Appendix 1

## Methods to Calculate Trend and Other Vital Rates Using Known Fate Analysis

The survival rates, reproductive rates, and population trend of a wildlife population can be calculated using data collected from radio-collared females. This technique is termed "known-fate" monitoring because the fate (alive or dead) of each individual in generally known with certainty for each monitoring period (e.g. month, year). Known-fate monitoring has been employed as a monitoring tool for grizzly bears in the NCDE since 2004. The technique is generally described by Mace et al. (2005) and more recently in a publication of population trend by Mace et al. (2012).

Grizzly bears were captured using leg-hold snares and culvert traps, by helicopter darting, and in some instances, were darted and immobilized bears over baits. We chose specific capture sites within each capture zone while avoiding certain private properties. These properties were known to regularly attract grizzly bears seeking anthropogenic foods, and we suspected that survival rates of these bears would not be representative of the female population at large. All female bears were radio-collared, and each bear was tagged subcutaneously with passive transponder tags and pulled a pre-molar tooth for age determination. The sample of radio-collared females was distributed based on relative grizzly bear density across the NCDE, using the distribution of bears detected at DNA hair traps in 2004 (Kendall et al. 2009). A goal was established of monitoring a minimum of 25 females/year as possible. Female bears were categorized as either "research" bears or members of the "conflict-subsample." Generally, population trend was calculated using only research bears. However, conflict bears could enter the dataset under certain circumstances (Schwartz et al. (2006).

Survival analyses were conducted on cubs and yearling of both sexes and for subadult and adult females. Survival of cubs and yearlings was determined form visual observations while monitoring their radioed mothers. Survival of independent subadult and adult females was estimated monthly using the staggered-entry Kaplan-Meier method within Program MARK using the logit scale. The reproductive status of each adult female was documented visually during telemetry sessions. Spring observation flights were conducted to ascertain which females had dependent offspring and the number of offspring per litter.

Population trend was estimated by computing the asymptotic rate of population growth (λ) using a standard, dynamic life table, solved iteratively for *r* (i.e., the intrinsic rate of growth). Approximate confidence intervals on λ were calculated by iterating life tables created using the empirical distribution of each rate in a Monte Carlo approach.

# Appendix 2

Background Information for Demographic Standards 2-4.

Sections:



## Section A: Methods to calculate sex and age class structure of the grizzly bear population in the NCDE.

The demographic standards in this Strategy require an estimate of the proportion of the male and female populations that are $\geq$ 2 years old (independent bears). Standards 3 and 4 fix a maximum mortality limit of 10% for independent females, and 20% for independent males. In the case of grizzly bears in the NCDE, the proportion of individuals of each age and sex cannot be ascertained directly from field data such as physical captures or from examination of genetics data from hair-traps or rub-trees. In the case of physical capture, as is used for population trend monitoring in the NCDE, age and sex classes are not captured in the same proportion as they exist in the population (Fig. 1). Cubs and yearlings are under-represented in the capture sample, and sub adults are over-represented relative to the stable state estimates. For genetic tagging data using hair samples collected at rub-trees or hair-trap (Kendall et al. (2009), it is not possible to determine the age of individuals.

There is a method to estimate the age structure of the population from vital population rates and population trend; the calculation of stable state population structure (Lotka and Sharpe 1911). A closed population that has experienced constant age-specific birth and death rates over a long period can be shown to also have a constant proportion of individuals in each age/sex class, thus a stable state (Seber 1982).

The stable age structure of grizzly bears in the NCDE was estimated in program RISKMAN (Taylor et al. 2001) using the vital reproductive rates, and cub and yearling female survival rates from Mace et al. (2012). Program RISKMAN uses a life-table approach to modeling structure. Specific input variables used in RISKMAN are given in Table 1. Independent male survival was set at 0.850 (Mace and Roberts 2012). The survival rates of independent sub-adult (2-4 years old) and adult (5+ years old) females were pooled at 0.936 for these analyses. For the entire male and female population, age-specific proportions are given in Table 2, and for each sex separately in Table 3. From these analyses, we estimated that 58.2% of the male population was independent bears, and 68.6% of the female population was

independent-aged in the entire NCDE population (Table 3). These estimates of independent bears were used to calculate sustainable mortality levels of males and females.

**Figure. 1. Comparison of female grizzly bear age structure from stable age distribution using program RISKMAN and from research female captures (2004-2012) in the NCDE whose age was known.**

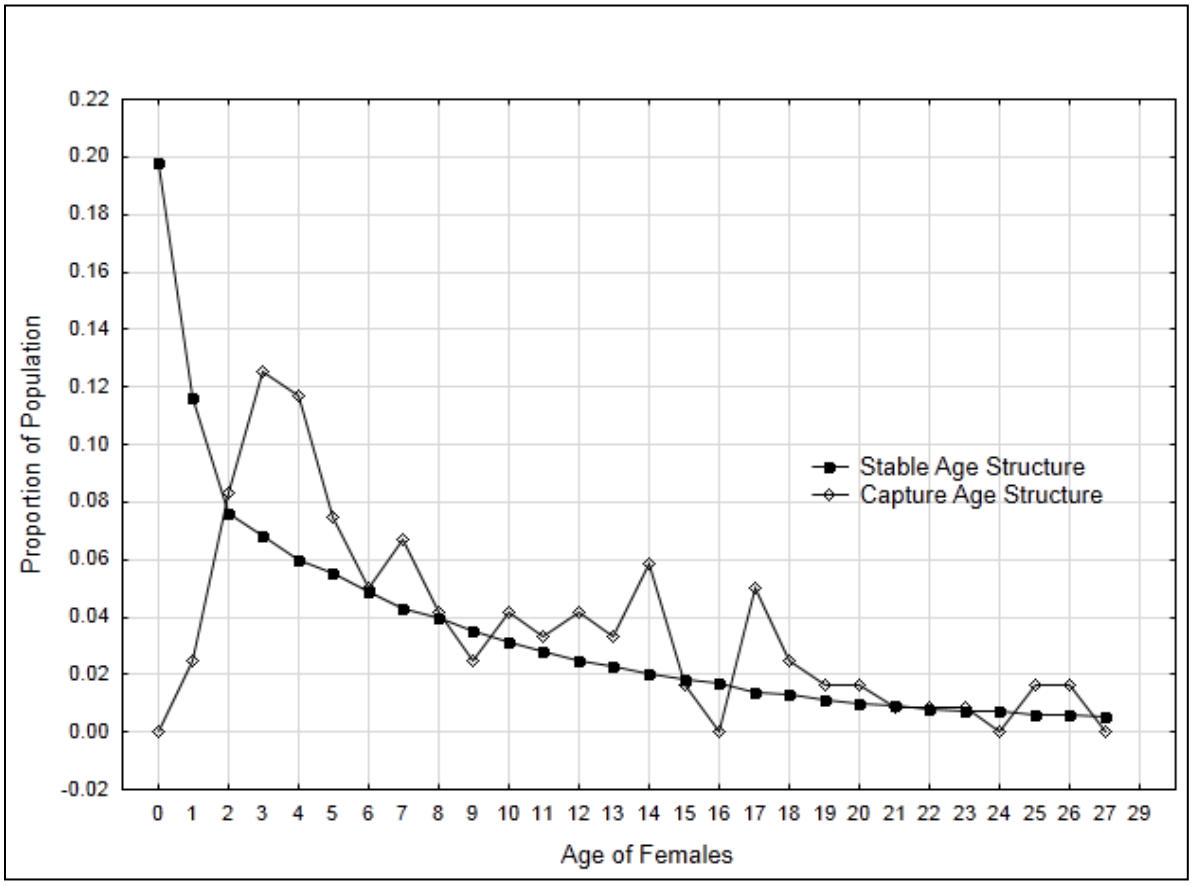

**Table 1. Program RISKMAN input variables to estimate grizzly bear stable state population for the NCDE.**

| Program RISKMAN input variables | Value used to estimate stable state grizzly population |
|---|---|
| Preferences: | -Research/stochastic, trails = 1000<br>-no parameter/environmental uncertainty<br>-normalize male and female structure |
| Species definition: | -annual<br>-no hunting season<br>-covariance of recruitment and survival rates<br>-maximum age = 27<br>-age of 1st adulthood = 5<br>-maximum litter size = 3<br>-minimum age of 1st reproduction = 4<br>-maximum age of reproduction = 27 |
| Individual survival rates; males | -age 0 = 0.612, se= 0.108 (Mace et al. 2012)<br>-age 1 = 0.682, se= 0.132 (Mace et al. 2012)<br>-age 2-27 = 0.850, se= 0.055 (Mace and Roberts 2012) |
| Individual survival rates; females | -age 0 = 0.612, se= 0.108 (Mace et al. 2012)<br>-age 1 = 0.682, se= 0.132 (Mace et al. 2012)<br>-age 2-27 = 0.936, se= 0.079 (Mace and Roberts 2012) |
| Recruitment: | -probability of 1 cub = 0.103[a]<br>-probability of 2 cub = 0.524[a]<br>-probability of 3 cub = 0.373[a]<br>-mean litter size = 2.27, se = 0.18 (Mace et al. 2012)<br>-proportion with litters = 0.322, se = 0.051 (Mace et al. 2012)<br>-assume 50:50 M:F sex ratio for cubs at birth |

[a] Proportions of 1, 2, and 3 cub litters varied somewhat from Mace et al. (2012) to achieve a mortality-adjusted cub litter size of 2.27.

**Table 2. Stable state proportions of the grizzly bear population. Stable state proportions were based on a population of 1000 individuals using program RISKMAN.**

| Age | Age-specific proportion of entire population | |
|---|---|---|
| | Male | Female |
| 0 (cub) | 0.115 | 0.115 |
| 1 | 0.068 | 0.068 |
| 2 | 0.044 | 0.044 |
| 3 | 0.036 | 0.039 |
| 4 | 0.029 | 0.035 |
| 5 | 0.024 | 0.032 |
| 6 | 0.019 | 0.028 |
| 7 | 0.016 | 0.025 |
| 8 | 0.013 | 0.023 |
| 9 | 0.010 | 0.020 |
| 10 | 0.008 | 0.018 |
| 11 | 0.007 | 0.016 |
| 12 | 0.006 | 0.015 |
| 13 | 0.005 | 0.013 |
| 14 | 0.004 | 0.012 |
| 15 | 0.003 | 0.011 |
| 16 | 0.002 | 0.009 |
| 17 | 0.002 | 0.008 |
| 18 | 0.002 | 0.008 |
| 19 | 0.001 | 0.007 |
| 20 | 0.001 | 0.006 |
| 21 | 0.001 | 0.005 |
| 22 | 0.001 | 0.005 |
| 23 | 0.001 | 0.004 |
| 24 | 0.000 | 0.004 |
| 25 | 0.000 | 0.004 |
| 26 | 0.000 | 0.003 |
| 27 | 0.000 | 0.003 |

**Table 3. Summary of grizzly bear stable population states for each sex separately as derived from program RISKMAN.**

| Age | Age-specific proportion of male population | Age-specific proportion of female population |
|---|---|---|
| 0 (Cub) | 0.276 | 0.198 |
| 1 | 0.162 | 0.116 |
| 2 | 0.105 | 0.076 |
| 3 | 0.086 | 0.068 |
| 4 | 0.07 | 0.06 |
| 5 | 0.057 | 0.055 |
| 6 | 0.046 | 0.049 |
| 7 | 0.038 | 0.043 |
| 8 | 0.031 | 0.04 |
| 9 | 0.025 | 0.035 |
| 10 | 0.02 | 0.031 |
| 11 | 0.016 | 0.028 |
| 12 | 0.013 | 0.025 |
| 13 | 0.011 | 0.023 |
| 14 | 0.009 | 0.02 |
| 15 | 0.007 | 0.018 |
| 16 | 0.006 | 0.017 |
| 17 | 0.005 | 0.014 |
| 18 | 0.004 | 0.013 |
| 19 | 0.003 | 0.011 |
| 20 | 0.003 | 0.01 |
| 21 | 0.002 | 0.009 |
| 22 | 0.002 | 0.008 |
| 23 | 0.001 | 0.007 |
| 24 | 0.001 | 0.007 |
| 25 | 0.001 | 0.006 |
| 26 | 0.001 | 0.006 |
| 27 | 0.001 | 0.005 |

**Table 4. Comparison of grizzly bear population structure from three data sources.**

| Sex and age class of population | Data Source | | |
|---|---|---|---|
| | **Stable state structure from program RISKMAN[a]** | **Kendall et al. 2009** | **Mace et al. 2012** |
| % females in population | 58.2% | 61.2% | na |
| % males in population | 41.8% | 38.8% | na |
| % of males 2+ years old (independent) | 56.4% | na | na |
| % of females 2+ years old (independent) | 68.6% | na | 69%[b] |

[a] Tabulated from Table 3.

[b] From Leslie-matrix projections to stable state projections using Microsoft Excel (Microsoft, Redmond Washington, USA) and the add-in PopTools (PopTools version 3.1, www.poptools.org, accessed 02 Feb 2010).

## Section B: Sustainable Mortality Levels

Sustainable Rates For the entire grizzly bear population. Grizzly bear populations can sustain a certain level of mortality before populations decline (Bunnell and Tait 1980, Schwartz et al. 2003). Like other wildlife species, grizzly bears are subject to both natural and man-caused sources of mortality. Natural mortality rates vary by age and sex class. For adult males and females, natural mortality rates have been reported to be between 4 and 7 percent (McLoughlin 2003). Using estimates of mortality rates from radioed bears and their dependent offspring in the NCDE, it is estimated that on average, approximately 16% of the entire population, and 2.3% of the independent-aged bears die from natural causes each year (Table 5).

**Table 5. Estimates of natural mortality levels in 2004 given an estimated population of 765 individuals and a stable age distribution.**

| Age | % of total stable age population[a] | # of bears out of 765[b] | Natural annual mortality rate[c] (n individuals) | # mortalities per year |
|---|---|---|---|---|
| Cubs | 0.230 | 176 | 0.15 (n =73) | 26 |
| Yearlings | 0.136 | 104 | 0.14 (n=48) | 15 |
| Independent-aged bears | | | | |
| female | 0.398 | 304 | 0.03 (n=102) | 9 |
| male | 0.235 | 180 | 0.05 (n =52) | 9 |
| Total natural mortalities | | | | 59 |
| % natural mortality of total population | | | | 59/765 = 7.7% |
| % of total population that | | | | 18/765 = 2.3% |

| | | | | |
|---|---|---|---|---|
| are independent-aged | | | | |

[a] From stable state proportions.
[b] From estimate of total population size from Kendall et al. 2009.
[c] Natural rates of annual mortality from evaluation of survival rates of radio-collared research females and their dependent young; 2004-2011.

In addition to natural mortality, brown bears can sustain an additional man-caused mortality level for both sexes of between 2 and 5-6% (Miller 1989, McLoughlin 2003).

Sustainable Rate for independent male grizzly bears The fate of radio-collared male grizzly bears captured and instrumented during field efforts to capture females for population trend monitoring provided information on the current survival rate of independent males in the NCDE.

During the period 2004-2011 51 research males were monitored at population trend monitoring sites outside of Glacier National Park. Annual survival for independent males averaged either 0.844 (assuming 1 unresolved bear died) or 0.862 (assuming the 1 bear lived) (Table 6).

These survival data suggest a mean annual mortality rate for independent males of between 0.138 and 0.156 during a period when no legal hunting occurred. These independent male mortality rates were established during the same period that the population of grizzly bears in the NCDE was growing at a mean lambda of 1.0306, and where 71% of Monte Carlo simulations produced estimates of $\lambda > 1.0$ (Mace et al. (2012). Population trend is most influenced by female survival, not male survival (Hovey and McLellan 1986, Mace and Waller 1996, Harris et al. 2006.) An additional 5% man-caused mortality, above the 14-15% mortality currently observed, will not additionally influence population trend. The Interagency Grizzly Bear Study Team (2007) has stated that there are no quantitative tools to estimate the "sustainable" male mortality rate for grizzly bears unless the presence of males in some way influences female reproduction or survival, or if there are too few males to mate with available females. Rather the mortality rate for males affects the ratio of males to females in the population and at high levels could influence population viability.

**Table 6. Survival rates of research male grizzly bears in the NCDE; 2004-2011.**

| **Independent male sample** | **Survival parameter** | | | |
|---|---|---|---|---|
| | Estimate | SE | -95 CI | +95 CI |
| Natural Survival | 0.946 | 0.037 | 0.809 | 0.986 |
| Natural plus man-caused: | | | | |
| 1 individual whose fate was unresolved assumed to have lived | 0.862 | 0.055 | 0.720 | 0.944 |
| 1 individual whose fate was unresolved assumed to have died | 0.844 | 0.058 | 0.694 | 0.928 |

Sustainable mortality rate for independent female grizzly bears. Mace et al. (2012) calculated separate survival estimates for sub-adult (ages 2-4) and adult (ages 5+) females. Our estimates of sub-adult and adult female survival were 0.852 (95% CI = 0.628–0.951) and 0.952 (95% CI =

0.892–0.980) (Table 7). Coupled with other vital rates, Mace et al. (2012) estimated a mean lambda of 1.0306.

As an alternative to separate age classes, a survival rate was estimated for these categories combined ("independent female bears"). Analyses in program MARK found that this model (using this single, 2+ age-category) was within 0.3359 AIC units of the model than recognized both sub-adult and adult age-classes, suggesting that either model was similarly supported by available data. Results indicated an estimated survival rate of 0.936 (SE = 0.0216, and a 95% CI 0.878–0.968) for the period 2004-2009. This survival rate suggests a mean mortality rate of 0.064. Simulations (Section C) provided a similar but higher mean estimate of lambda of between 1.038 and 1.047 (Table 8).

A maximum 10% annual mortality (90% survival) threshold has been established as a population monitoring standard for independent females. Based on simulations by Harris (Section C), a 90% independent female survival rate would result in a mean lambda of 1.009 (Table 8). This population trajectory corresponds to an essentially stable population size. For a mean survival rate of 90%, 61% of the population simulations returned a value of lambda greater than 1.0 (stable) (Table 8). Twenty-eight percent of simulations at this benchmark rate indicated a population decline of $\geq$ 2%.

In the event that, for whatever reason, the survival of independent females should decline below 90% into the future, population management Standard #2 is in place to halt further declines until a management review is completed documenting and correcting, if possible, the reason behind the decline. The timing of the management review is based on the impact of female survival on population trend. If, through known-fate monitoring of radioed females, survival is determined to be between 0.89 and 0.90 for the most recent 12 year period, a review will take place. This equates to a mean population trend of between 1.002-1.009 (Table 8). Second, if survival is determined to be between 0.885 and 0.89 for the most recent 10 year period, a review will take place. This corresponds to a mean population trend of between >0.992 and 1.002 or a net change in the number of bears of -6 to +3 /bears year (Table 8). Third, if survival is determined to be between 0.875 and 0.885 for the most recent 8 year period, a review will take place. This corresponds to a mean population trend of >0.983 and $\leq$ 0.992 or a net change in the number of bears of -6 to -10/bears year (Table 8). And fourth, if survival is determined to be between $\leq$ 0.875 for the most recent 5 year period, a review will take place. This corresponds to a mean population trend of $\leq$ 0.982, or a net change of -13 bears/year (Table 8).

**Table 7. Independent female survival rates from radio-collared bears in the NCDE.**

| Survival type | Estimate | SE | -95% CI | +95% CI |
|---|---|---|---|---|
| Natural survival ( n = 2 deaths)[a] | 0.989 | 0.008 | 0.956 | 0.997 |
| Natural survival ( n = 7 deaths)[b] | 0.961 | 0.014 | 0.921 | 0.981 |
| Natural and man-caused: | | | | |
| 1 unresolved assumed alive | 0.940 | 0.018 | 0.895 | 0.966 |
| 1 unresolved assumed dead | 0.934 | 0.018 | 0.888 | 0.962 |

[a] assumes bears with undetermined causes of death were not natural.

[b] assumes bears with undetermined causes of death were natural.

**Table 8. Mean, SD, 95 confidence limits, and proportion of simulated λ values < 1.0, given reproductive and survival rates as estimated for the NCDE grizzly bear population 2004-09, and trial values of independent (age 2+) female survival. For all rates, distributions were generated using the desired mean, and variances that approximated the 95 confidence interval surrounding their empirical estimates.**

| Independent Female Survival | Mean λ | SD λ | Lower 95% λ | Upper 95% λ | Proportion λ < 1.0 (declining) | Proportion λ > 1.0 (increasing) | Proportion λ ≤ 0.98 (≥ 2% decline) |
|---|---|---|---|---|---|---|---|
| 0.87 | 0.983 | 0.0347 | 0.9145 | 1.0489 | 68.6 | 31.4 | 46.3 |
| 0.88 | 0.992 | 0.0349 | 0.9213 | 1.0574 | 58.3 | 41.7 | 36.7 |
| 0.89 | 1.002 | 0.0349 | 0.9303 | 1.0673 | 47.1 | 52.9 | 22.5 |
| 0.90 | 1.009 | 0.0348 | 0.9399 | 1.0750 | 39.0 | 61.0 | 28.0 |
| 0.91 | 1.019 | 0.0349 | 0.9476 | 1.0848 | 27.8 | 72.2 | 16.4 |
| 0.92 | 1.028 | 0.0356 | 0.9562 | 1.0949 | 20.9 | 79.1 | 8.7 |
| 0.93 | 1.038 | 0.0363 | 0.9626 | 1.1046 | 15.5 | 84.5 | 2.4 |
| 0.94 | 1.047 | 0.0353 | 0.9754 | 1.1129 | 10.1 | 89.9 | 3.4 |
| 0.95 | 1.056 | 0.0359 | 0.9808 | 1.1212 | 6.8 | 93.2 | 2.3 |

## Section C: Distributions of growth rates of grizzly bears in the Northern Continental Divide Ecosystem under various possible estimates of annual survival of independent bears.

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### I. Problem statement

Managers desire guidance on understanding the effects of various levels of mortalities on the grizzly bear population inhabiting the Northern Continental Divide Ecosystem (NCDE). Ideally, one would like to know how the number of mortalities that puts the population into a negative trajectory, so as to attempt to avoid having this many die. Calculating such a number with confidence is fraught with difficulty, for 2 reasons: 1) Although a precise estimate of total population size has been published, there is, at present, no protocol in place for updating this estimate; consequently, yearly population size of NCDE grizzly bears remains unknown; and 2) Considerably uncertainty surrounds both estimates of the number of bears dying, and the vital rates of the standing population.

Analyses conducted by Mace et al. (2012) suggest that the single best estimate of population growth (λ) during 2004-09 was1.0306 (i.e., roughly 3% increase yearly). However, largely because sample sizes were limited and the time period of this investigation spanned only 6 years, the 95% confidence limits around this estimate was 0.928–1.102. Thus, although the authors deem it highly likely that the population was increasing, available data do not allow this to be asserted with the conventional level of statistical certainty.

A possible option that managers may wish to consider in developing guidance regarding number of mortalities is to use what is known about the demographics of this population to

explore how λ would vary if survival rates increased or decreased from the estimated value during 2004-09.

**II. Objectives**

The objectives of this exercise were to apply the level of uncertainty surrounding current estimates of vital rates for female grizzly bears to alternative future point estimates of the survival rate for independent female bears (defined here as age 2+), and from these, generate distributions of rates of growth (λ) that follow from these combinations. The results of this exercise are useful to someone asking the following question: "Given that reproduction and juvenile survival rates (as well as their uncertainty) are as best estimated during 2004-09, and given that uncertainty surrounding survival of independent female bears is similar to that estimated by Mace et al. (2012), what levels of annual female survival are consistent with a grizzly bear population that is unchanging in size?"

**III. Methods**

I projected λ from a series of life-tables of grizzly bear populations using PopTools (G. M. Hood, 2009; PopTools version 3.11). Each life table was produced from a sampling from the distributions of $m_x$ (the mean number of female cubs/adult female/yr), for $s_0$ (female cub survival), and $s_1$ (female yearling survival) from the NCDE population, 2004-09 (Mace et al. 2012). I then used Monte Carlo methods (in PopTools) to sample from these distributions, each time recalculating λ. I then calculated means, standard deviations, and non-parametric 95% confidence limits of these simulated distributions (the latter by excluding the upper and lower 2.5% of simulated results). In all cases, n = 5,000 iterations.

To parameterize these life tables, I used the following means and standard errors from Mace et al. (2012): $m_x$: $\bar{x}$= 0.36685, SE = 0.0453; $s_0$: $\bar{x}$ = 0.6119, SE = 0.1077; $s_1$: $\bar{x}$ = 0.6820, SE = 0.1322. Note that this reproductive rate (0.36685) was an adjusted rate that accounted for cubs that were likely born but died prior to that year's first observation of her mother but still within the time period that the cub survival rate applied. Mace et al. (in press) calculated separate survival estimates for sub-adult (ages 2-4) and adult (ages 5+) females. To simplify calculations, I used a survival rate estimated for these categories combined ("independent female bears"), by Mark Haroldson (using the same data set): $\hat{S}_{F2+} = 0.936$, with a standard error, SE = 0.0216, and a 95% CI 0.878–0.968. Analyses in program MARK found that this model (using this single, 2+ age-category) was within 0.3359 AIC units of the model than recognized both subadult and adult age-classes, suggesting that either model was similarly supported by available data. I generated beta distributions that replicated the mean and 95% confidence interval of this survival rate. I then varied the desired mean survival in 0.01 increments (0.87-0.95), maintaining the same variance term in each case. Rates were modeled as independent of one another (i.e., no temporal correlation among rates).

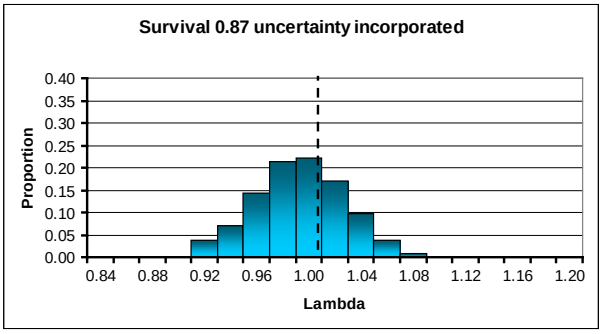
**III. Results**

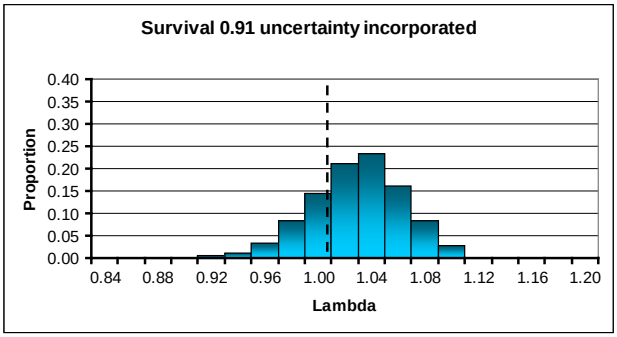
For each trial value of $S_{2+,}$ I report means, standard deviations, and upper and lower 95% confidence limits of λ in Table 1. Histograms of these distributions are shown in Figure 1. Mean values of λ and proportion of simulations < 1.0 are shown in Table 9.

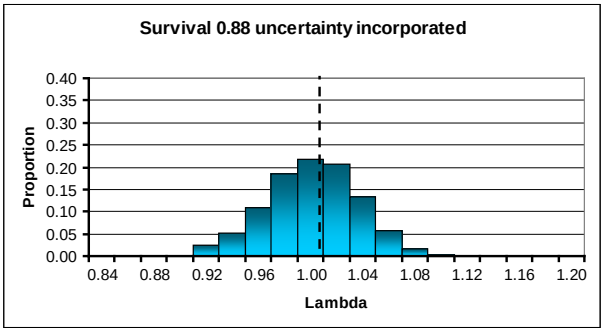
**Table 9. Mean, SD, 95% confidence limits, and proportion of simulated λ values < 1.0, given reproductive and survival rates as estimated for the NCDE grizzly bear population 2004-09, and trial values of independent (age 2+) female survival. For all rates, distributions were generated using the desired mean, and variances that approximated the 95% confidence interval surrounding their empirical estimates.**

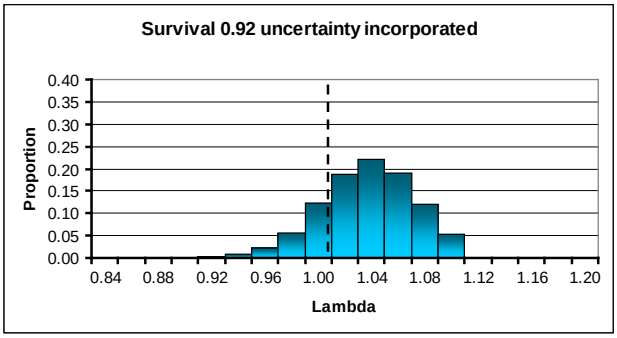
| Independent Female Survival | Mean λ | SD λ | Lower 95% λ | Upper 95% λ | Proportion λ < 1.0 (declining) | Proportion λ > 1.0 (increasing) | Proportion λ ≤ 0.98 (≥ 2% decline) |
|---|---|---|---|---|---|---|---|
| 0.87 | 0.983 | 0.0347 | 0.9145 | 1.0489 | 68.6 | 31.4 | 46.3 |
| 0.88 | 0.992 | 0.0349 | 0.9213 | 1.0574 | 58.3 | 41.7 | 36.7 |
| 0.89 | 1.002 | 0.0349 | 0.9303 | 1.0673 | 47.1 | 52.9 | 22.5 |
| 0.90 | 1.009 | 0.0348 | 0.9399 | 1.0750 | 39.0 | 61.0 | 28.0 |
| 0.91 | 1.019 | 0.0349 | 0.9476 | 1.0848 | 27.8 | 72.2 | 16.4 |
| 0.92 | 1.028 | 0.0356 | 0.9562 | 1.0949 | 20.9 | 79.1 | 8.7 |
| 0.93 | 1.038 | 0.0363 | 0.9626 | 1.1046 | 15.5 | 84.5 | 2.4 |
| 0.94 | 1.047 | 0.0353 | 0.9754 | 1.1129 | 10.1 | 89.9 | 3.4 |
| 0.95 | 1.056 | 0.0359 | 0.9808 | 1.1212 | 6.8 | 93.2 | 2.3 |

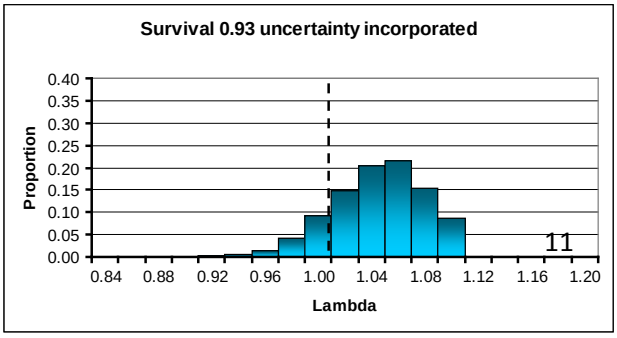
**Fig. 2. Histograms of simulated λ given mean reproductive and juvenile female survival rates as estimated for the NCDE grizzly bear population 2004-09, and trial values of independent (age 2+) female survival. For cub survival ($s_0$), yearling survival ($s_1$), and independent female survival ($s_{2+}$), beta distributions were generated using the mean, and variances from their empirical estimates. For reproductive rate ($m_x$), a normal distribution was generated using the mean and variance from its empirical estimate (Mace et al. 2012).**

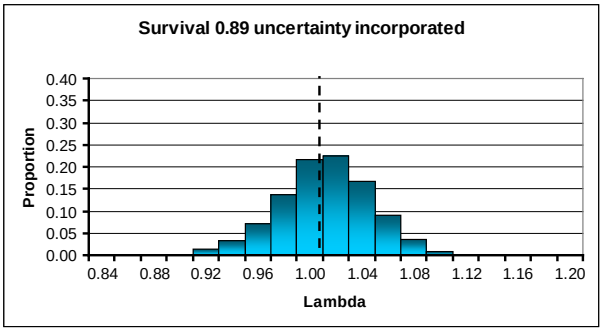


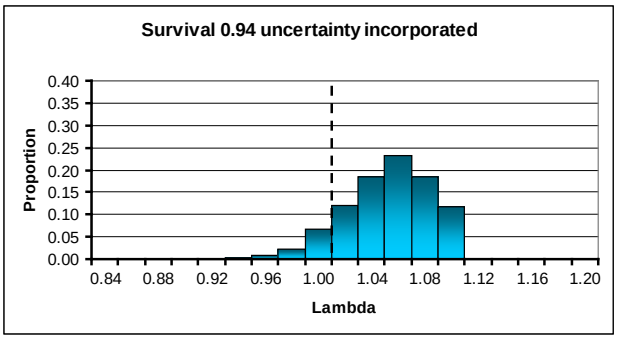



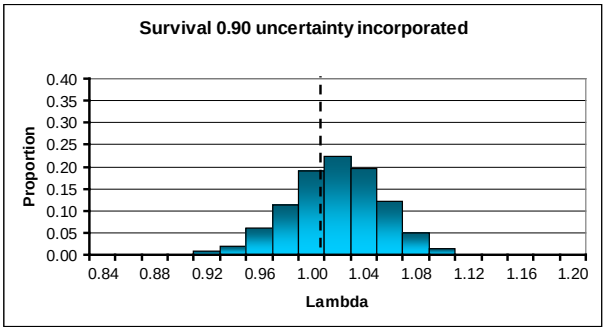



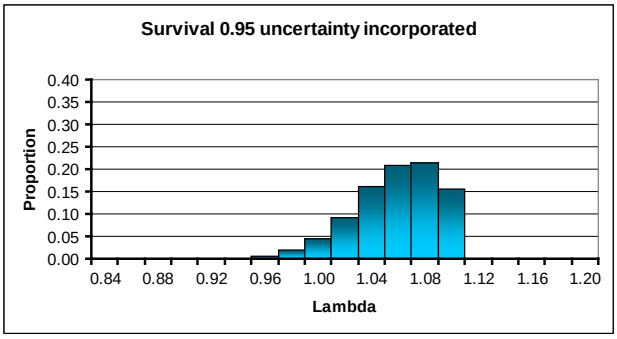





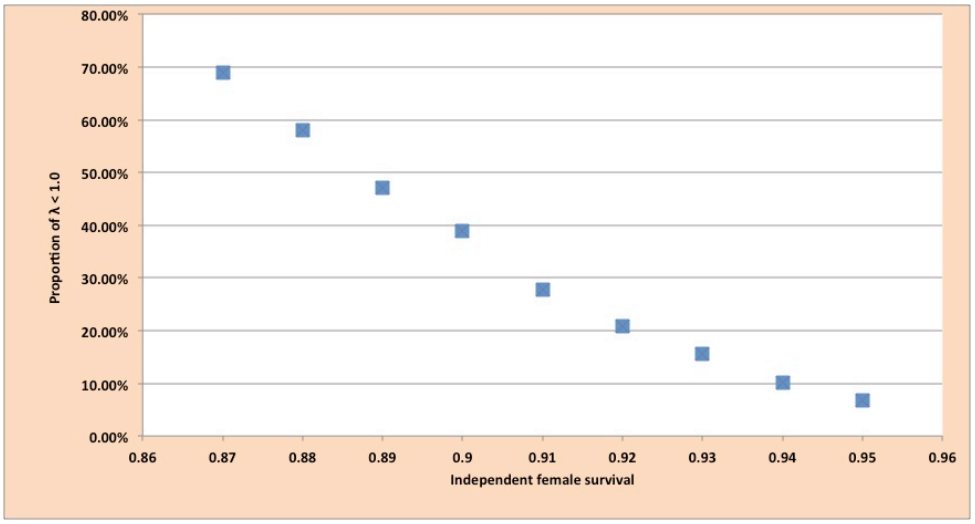




**Discussion**

Table 9 and Fig. 2 should be interpreted with the following information in mind. The magnitudes of variability surrounding each estimate of λ account for uncertainty of estimates for reproductive and survival rates but not for any possible covariance among these rates (although this is likely to be relatively unimportant). Projections of λ produced in this way also implicitly assume that mean reproductive and juvenile survival rates would remain unchanged under hypothetical survival rates of independent females, as well as with associated changes in density and distribution of grizzly bears.

To make an informed decision on the appropriate management goal for population management in the NCDE, managers need to consider Figure 3. Independent female survival is the vital rate that can be managed and carefully monitored to measure adherence to the management goal. Pervious sections of this report have detailed the methods available to measure independent female survival. The closer the management goal is to threshold management, the more uncertainty about the trajectory of the population increases.

**Figure 3. The proportion of the 95% confidence interval around independent female survival in the NCDE that lies below λ = 1.0 for survival rates between 86% and 95%. λ = 1.0 is a stable population with no increase in size. The probability that the population is decreasing is represented by the Y axis (the proportion of the calculated $\square < 1.0$). Note that decreases. For example, at survival = 0.91, 29% of the 95% confidence interval is below λ = 1.0. The larger the proportion of the 95% confidence interval below λ = 1.0, the greater the uncertainty that the population is stable to increasing.**




## Section D: Supporting Information for Demographic Standards 2-4

Standard 2. Maintain a point estimate of independent female (2+ years' old) survival of > 0.90 averaged over the most recent 6-year period in the PCA and Zone 1.

Two estimates of independent female survival will be calculated and reported by the NCDE Monitoring Team each year: 1) independent female survival over the entire PCA and Zone 1, and 2) "All independent females excluding those whose annual home range is entirely within GNP" (See Section F).

The sample of radioed-females to use in survival analyses must meet the protocol of Mace et al. (2012) and Schwartz et al. (2006) as being "research females." For survival analysis #1 (above), all independent radioed-females throughout the PCA and Zone 1 in the sample will be used in the analysis including radioed female bears in Glacier National Park. For survival analysis #2 (above), all radioed females except those whose annual home range is entirely within the Park boundary will be used.

Independent female survival will be estimated annually using the staggered-entry Kaplan-Meier (known fate) method as in Mace et al. (2012) or other appropriate method. Survival will be calculated and averaged over the most recent 6-year period to ensure adequate sample sizes. Each year, females whose telemetry points are entirely within Glacier National Park will be excluded from survival analyses for the second estimate. The known fate method of calculating survival is described in Appendix 2-1.

Standard 3: Independent female mortality will not exceed 10% of the estimated number of independent females in the following two areas, whichever is reached first : 1) all independent females inside the PCA or Zone 1; and 2) all independent females excluding those whose annual home range is entirely within Glacier National Park. (See Appendix 2, Section F). The average number of independent female mortalities from all causes in the areas described above, including grizzly bears dying from known and probable human-caused, natural, calculated unknown and unreported, and undetermined causes, will not exceed 10% of the projected population size of independent females estimated in either of the two areas described above, whichever is reached first, as averaged over the most recent 6-year period (e.g., 2006-2011, 2007-2012, and so on). Annual mortality reports will be used by population managers to determine maximum annual discretionary mortality.

Standard 4: Independent male mortality will not exceed 20% of the estimated number of independent males outside of Glacier National Park but inside the PCA or Zone 1 (see Appendix 2, Section D, Table 13). The average number of independent male mortalities from all causes outside of GNP but inside the PCA and Zone 1, including grizzly bears dying from known and probable human-caused, natural, calculated unknown and unreported, and undetermined causes, will not exceed 20% of the projected population size of independent males outside GNP as averaged over the most recent 6-year period (e.g., 2006-2011, 2007-2012, and so on). Annual mortality reports will be used by population managers to determine maximum annual discretionary mortality.

Mortalities of independent females and males will be tallied and reported for the PCA and Zone 1, including Glacier National Park each year, and reported for the two areas described above. Annual mortality reports of all bears will include all mortalities from all causes including grizzly bears dying from known and probable human-caused, natural, calculated unknown and unreported, and undetermined causes. Levels of unreported mortality will be estimated and updated using the methods of Cherry et al. (2002) and as described in Section E. Few independent female mortalities occur within Glacier National Park (Table 10). Mortality records will be collected and maintained by the NCDE Monitoring Team led by MFWP.

Mortality limits will be used by State and Tribal population managers to determine allowable discretionary mortality that will ensure the standards for survival and mortality are met. To calculate annual allowable independent male and female mortality, managers will use estimates of the population size as extrapolated from population trend ($\lambda$). Two estimates of lambda will be calculated and reported by the NCDE Monitoring Team each year: 1) lambda over the entire PCA and Zone 1, and 2) lambda for that portion of the population (See Section F) that use habitats either entirely outside of Glacier National Park plus that portion of the population that straddles the Park boundary.

The 2 estimates of population trend will be calculated each year using the most recent 6 years of vital reproductive and survival rate data obtained from the sample of radio-collared independent females. All vital population rates and associated standard errors will be estimated using the method of Mace et al. (2012) or other appropriate methods. Population trend will be estimated using program RISKMAN or other appropriate model, including

measures of uncertainty. Sub-adult and adult female survival rates will be pooled for analyses unless significant differences exist. Trends in all vital rates will be investigated annually.

Each year, a total mortality limit of 10% of independent females will be calculated for the both: a) the entire population in the PCA and Zone 1 and separately for: b) all females except those living entirely within Glacier National Park. These calculations are given in Table 11. Second, the number of known and probable non-hunting independent female mortalities outside GNP will be averaged over the most recent a 6-year period. This average non-hunting mortality number will then be subtracted from the total limit of 10% to ascertain the number of discretionary mortalities available per year. Between 1999 and 2011, an average of 11 independent females were known to die from non-hunting causes each year outside of Glacier National Park but within the PCA and Zone 1 but this number does not include the estimated unknown/unreported kills during that period (Table 12).

Each year, a total mortality limit of 20% of independent males will be calculated for the both: a) the entire population in the PCA and Zone 1 and b) separately for those independent males expected to be using habitats outside the Park and straddling the Park boundary. These calculations are given in Table 13. Second, the number of known and probable non-hunting independent male mortalities outside GNP will be averaged over the most recent a 6-year period. This average non-hunting mortality number will then be subtracted from the total limit of 20% to ascertain the number of discretionary mortalities available per year. Between 1999 and 2011, an average of 14 independent males were known to die from non-hunting causes each year outside of Glacier National Park but within the PCA and Zone 1 but this number does not include the estimated unknown/unreported kills during that period (Table 14).

**Table 10. Annual known and probable grizzly bear mortalities in the PCA and Zone 1 that showing mortalities within and outside Glacier National Park. Data do not include an estimate of unreported mortality; 1999-2011.**

| Year | Percent of all known or probable grizzly mortalities inside GNP | Percent of independent female mortalities in the NCDE that occurred within GNP |
|---|---|---|
| 1999 | 0.0 | 0.0 |
| 2000 | 0.0 | 0.0 |
| 2001 | 4.2 | 0.0 |
| 2002 | 7.1 | 0.0 |
| 2003 | 6.7 | 0.0 |
| 2004 | 0.0 | 0.0 |
| 2005 | 0.0 | 0.0 |
| 2006 | 21.4 | 20.0 |
| 2007 | 0.0 | 0.0 |
| 2008 | 7.1 | 0.0 |
| 2009 | 19.0 | 20.0 |

| | | |
|---|---|---|
| 2010 | 0.0 | 0.0 |
| 2011 | 3.1 | 0.0 |
| Mean | 4.3% | 3.1% |

**Table 11. Method to calculate annual sustainable mortality for independent females.**

| Area | Estimate of total number of females in given year ($T_{Fpop}$)[a] | Proportion of independent females (2+ years old)[b] | Proportion of independent females using habitats outside GNP[c] | Independent female mortality limit (10%) |
|---|---|---|---|---|
| a)PCA and Zone 1 | = (471)$\lambda^z$ | 0.69 | na | $T_{Fpop)*0.69*0.10}$ |
| b)Proportion of population using habitats outside GNP | = (471)$\lambda^z$ | 0.69 | 0.71 | $T_{Fpop)*0.69*0.71*0.10}$ |
| 2015 example | | | | |
| a) PCA and Zone 1 | $(471)1.03^{11}$ = 652 | 652*0.69=450 | na | 450*0.10 = 45 |
| b)Proportion of population using habitats outside GNP | $(471)1.03^{11}$ = 652 | 652*0.69=450 | 450*0.71=320 | 320*0.10 = 32 |

[a] estimate of 471 females in 2004 (Kendall et al. 2009), ), and trend of 1.03 from Mace et al. (2012). "Z" is the number of year's post-2004.
[b] see Section A for estimation of proportion of independent females from stable age distribution.
[c] see Section F for estimated proportion of the population of grizzly bears that use habitats outside and straddling the boundary of Glacier National Park.

**Table 12. Female mortality records for that portion of NCDE outside of Glacier Park.**

| | | Mortality Cause | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Est. independent female population outside of GNP[a] | Mgmt Removals | Public Discovery | Unreported Estimate | Telemetry Discovery | Total | % Mortality[b] |
| 1999 | 209 | 0 | 4 | 5 | 0 | 9 | 3.2 |
| 2000 | 215 | 2 | 6 | 8 | 1 | 17 | 5.9 |
| 2001 | 221 | 2 | 5 | 7 | 0 | 14 | 4.7 |
| 2002 | 227 | 1 | 4 | 5 | 0 | 10 | 3.3 |
| 2003 | 234 | 1 | 1 | 1 | 0 | 3 | 1.0 |
| 2004 | 242 | 3 | 3 | 4 | 4 | 14 | 4.3 |
| 2005 | 248 | 5 | 1 | 1 | 1 | 8 | 2.4 |
| 2006 | 256 | 1 | 0 | 1 | 2 | 4 | 1.2 |
| 2007 | 263 | 0 | 6 | 8 | 1 | 15 | 4.2 |
| 2008 | 272 | 3 | 2 | 2 | 0 | 7 | 1.9 |
| 2009 | 280 | 0 | 5 | 7 | 2 | 14 | 4.0 |
| 2010 | 288 | 2 | 0 | 1 | 2 | 5 | 1.6 |
| 2011 | 296 | 2 | 7 | 9 | 0 | 18 | 4.5 |
| Mean | | 1.77 | 3.38 | 4.54 | 1.08 | 10.77 | 3.2% |

[a] Estimated number of females derived from Kendall et al.'s (2009) estimate of 471 total females in 2004. Seventy-five percent of the population is estimated to use habitats outside of Glacier National Park. Population grew at a lambda of 1.03 (Mace et al. 2012).
[b] Total mortality/population size.

**Table 13. Method to calculate annual sustainable mortality for independent males.**

| Area | Estimate of total number of males in given year ($T_{Fpop}$)[a] | Proportion of independent males (2+ years old)[b] | Proportion of independent males using habitats outside GNP[c] | Independent male mortality limit (20%) |
|---|---|---|---|---|
| a)PCA and MZ1 | = (295)$\lambda^z$ | 0.56 | na | $T_{Fpop)*0.56*0.20}$ |
| b)Proportion of population using habitats outside GNP | = (295)$\lambda^z$ | 0.56 | 0.79 | $T_{Fpop)*0.56*0.79*0.20}$ |
| 2015 example | | | | |

| | | | | |
|---|---|---|---|---|
| a) PCA and MZ1 | $(295)1.03^{11} = 408$ | 408*0.56=228 | na | 237*0.20 = 47 |
| b)Proportion of population using habitats outside GNP | $(295)1.03^{11} = 408$ | 408*0.56=228 | 228*0.79=180 | 180*0.20 = 36 |

[a] estimate of 295 males in 2004 (Kendall et al. 2009), and trend of 1.03 from Mace et al. (2012). "Z" is the number of year's post-2004.
[b] see Section A for estimation of proportion of independent males from stable age distribution.
[c] see Section F for estimated proportion of the population of grizzly bears that use habitats outside of Glacier National Park.

**Table 14. Male mortality records for that portion of the PCA and Zone 1 outside of Glacier Park.**

| | | Mortality Cause | | | | | |
|---|---|---|---|---|---|---|---|
| **Year** | **Est. independent male population outside of GNP[a]** | **Mgmt Removals** | **Public Discovery** | **Unreported Estimate** | **Telemetry Discovery** | **Total** | **% Mortality[b]** |
| 1999 | 116 | 5 | 2 | 2 | 2 | 11 | 9.5 |
| 2000 | 120 | 3 | 1 | 1 | 0 | 5 | 4.2 |
| 2001 | 123 | 5 | 5 | 7 | 2 | 19 | 15.4 |
| 2002 | 127 | 3 | 4 | 5 | 0 | 12 | 9.4 |
| 2003 | 131 | 3 | 1 | 1 | 0 | 5 | 3.8 |
| 2004 | 135 | 1 | 6 | 8 | 0 | 15 | 11.1 |
| 2005 | 139 | 2 | 8 | 11 | 1 | 22 | 15.8 |
| 2006 | 143 | 2 | 1 | 1 | 1 | 5 | 3.5 |
| 2007 | 147 | 2 | 10 | 14 | 0 | 26 | 17.7 |
| 2008 | 152 | 1 | 4 | 5 | 0 | 10 | 6.6 |
| 2009 | 156 | 1 | 6 | 8 | 0 | 15 | 9.6 |
| 2010 | 161 | 7 | 3 | 4 | 0 | 14 | 8.7 |
| 2011 | 166 | 7 | 6 | 9 | 1 | 23 | 13.9 |
| Mean | | 3.2 | 2.3 | 4.0 | 5.4 | 14 | 9.9% |

[a] Estimated number of males derived from Kendall et al.'s (2009) estimate of 294 total males in 2004. Population grew at a lambda of 1.03 (Mace et al. 2012). Independent males are assumed to be 58% of total using stable state probabilities from program RISKMAN. Seventy-nine percent of the population is estimated to use habitats outside of Glacier National Park.
[b] Total mortality/population size.

## Section E. Estimating the Level of Unreported Mortality for Grizzly Bears in the NCDE

**Mace, R. and L. Roberts. 2011. Northern Continental Divide Ecosystem Grizzly Bear Monitoring Team Annual Report, 2009-2010. Montana Fish, Wildlife & Parks, 490 N. Meridian Road, Kalispell, MT 59901. Unpublished data.**

### Introduction

Grizzly bear mortalities in the NCDE are recorded annually. The number grizzly bear of deaths involving agency removals, and those that die while wearing functional radio collars are know with certainty. However, managers acknowledge that not all dead bears discovered by the public are reported to authorities. To more accurately estimate the total number of bear mortalities occurring each year requires an estimate of the level of these unreported mortalities. Although such estimates are available for the Greater Yellowstone Ecosystem, and are incorporated into annual total mortality tabulations no such estimates have been made for the NCDE. To more accurately estimate annual total mortality in the NCDE, we employed the methods of Cherry et al. (2002) using a sample of radio-instrumented bears.

## Methods

Cherry et al. (2002) provided a method wherein radio-collared bears that died were used to estimate additional grizzly bear deaths that go undetected. Each death of an independent aged (2 + years old) radioed-instrumented bear, monitored between 1999 and 2010, was classified as being either reported by the public or unreported by the public. We defined a reported death as one where either a radioed or non-radioed bear that was reported to wildlife management authorities by the public without the aid of radio-telemetry. We defined an unreported death as the death of a radioed bear discovered by telemetry. Bears reported by employees of other state, federal, or tribal agencies were considered publicly reported deaths. Likewise, bear/train collisions reported by Burlington Northwestern personnel were considered to be public reportings.

We used a sample of independent-aged (2+ years old) grizzly bears radioed-monitored at time of death, 1999-2010. We considered deaths where bears were wearing a functional radio collar at time of death, and were radio-monitored within 2 months of death. Additionally, the death had to be either a known death (a carcass or other evidence) or a probable death (Strong evidence of death, but no carcass) (Cherry et al. 2002). We excluded radioed bears that were removed from the ecosystem due to conflicts with humans (management removals).

The number of reported and unreported deaths of radio bears was then used in the Bayesian method of Cherry et al. (2002), to estimate the number of grizzly bear deaths that go unreported each year. As per the Interagency Grizzly Bear Study Team document (2005), we used the median of the creditable interval for the estimated reported and unreported loss.

## Results

We used data from 32 radio-collared bears to estimate the ratio of unreported to reported mortalities in the NCDE. We drew inference from 13 and 19 instrumented males and females, respectively. For males, 53.8% of the deaths were reported, while 31.5% of the female deaths were reported (Table 15). When sexes were combined, 40.6% of the deaths were reported, and 51.43% were unreported. The ratio of unreported to reported deaths for both sexes suggest that for every 1 reported death there are 1.43 deaths were not reported to management authorities.

The estimated total reported and unreported deaths per year is provided in Table 16 given the unreported rate of 1.43. To calculate total mortality of independent aged bears of each sex annually, sanctioned management removals, and removals of radio-collared bears must be add to this total.

**Table 15. Cause of death for 32 radio-collared grizzly bears in the NCDE that were used to judge the level of unreported mortality; 1999-2010.**

| Cause of death | Reporting of Mortality by Sex | | | | Total |
|---|---|---|---|---|---|
| | Male | | Female | | |
| | Reported by Public | Unreported by Public (due to telemetry) | Reported by Public | Unreported by Public (due to telemetry) | |
| Train collision | 2 | 0 | 3 | 0 | 5 |
| Automobile collision | 2 | 0 | 0 | 0 | 2 |
| Defense-of-life | 0 | 0 | 1 | 0 | 1 |
| Illegal | 3 | 4 | 2 | 3 | 12 |

| | | | | | |
|---|---|---|---|---|---|
| Undetermined | 0 | 1 | 0 | 8 | 9 |
| Natural | 0 | 1 | 0 | 2 | 3 |
| Total | 7 | 6 | 6 | 13 | 32 |

**Table 16. Estimated number of reported and unreported deaths of grizzly bears each year based on the ratio of unreported to reported deaths (1.43) of a test sample of radioed bears. These numbers should be used separately for male and female deaths.**

| Number of Publicly Reported Deaths per year[a] | Estimated Number of Unreported Deaths per year | Total Reported and Unreported Deaths per year[b] |
|---|---|---|
| *0* | *1* | *1* |
| *1* | *1* | *2* |
| *2* | *2* | *4* |
| *3* | *4* | *7* |
| *4* | *5* | *9* |
| *5* | *7* | *12* |
| *6* | *8* | *14* |
| *7* | *9* | *16* |
| *8* | *11* | *19* |
| *9* | *12* | *21* |
| *10* | *14* | *24* |

[a] *the number of deaths in the official mortality records reported by the public.*
[b] *the median of the credible interval for reported and unreported mortalities (Cherry et al. 2002).*

## Section F. Proportion of grizzly bear population using habitats outside of Glacier National Park: Where do the mortality standards apply

Prepared by: Richard Mace, John Waller, Dan Carney, Chris Servheen

### Introduction

This chapter contains a description of management zones, and outlines proposed population management strategies. Management of independent male and female mortality limits is a central part of the Chapter. Within the PCA and Management Zone 1, there are 2 standards (3 and 4) which pertain to allowable mortality limits for independent males and females. It is necessary to determine where within the PCA, and what portion of the male and female population are subject to the mortality standards of 10% for independent females and 20% of independent males.

The PCA can be divided into 2 main areas regarding mortality standards; Glacier National Park where the use of discretionary mortality is very limited, and the remainder of the PCA where there is most discretionary mortality management would be applied. It is therefore

necessary to determine the proportion of the total population of independent males and females that occupy habitats either wholly or partly outside of Glacier National Park.

**Methods**

To address this issue, we used home ranges from radio-instrumented female grizzly bears, and DNA detections at rub-trees for the period 2009-2011 (Kendall, USGS unpublished data; email to C. Servheen dated 5 July, 2012). Location data on these radioed females were obtained as a part of the NCDE Grizzly Bear Trend Monitoring Program (Mace et al. 2012).

For the radioed sample of females, we examined the home ranges of those individuals that lived within and directly adjacent to Glacier National Park. We did not include bears captured and radioed during human conflict situations. For each individual and year, we used the telemetry coordinates and calculated the standard radius (km) of each bears annual home range (Harrison 1958, Single and Roseberry 1989). The standard radius was calculated as $D_i = \sqrt{((x_2-x_1)^2+(y_2-y_1)^2)}$. Using GIS, we then buffered the boundary of Glacier Park using this radius. Each female was categorized as having a home range that was 1) 100% within Glacier Park, 2) 100% outside of the park but within the buffer, or 3) bears whose home range straddled the Park. For these females, we determined the percentage of telemetry points within and outside Glacier Park. The percentage was assumed to be closely correlated with the amount of time bears spend in and out of the park.

We then evaluated the individual male and female grizzly bears that were detected at through DNA at rub-trees to ascertain the proportion of individuals in 3 geographic zones. These zones were: 1) a buffer zone that was the average home range radius extending outside the Park boundary plus a home range radius that extended inside the Park boundary, 2) the internal portion of GNP not within the buffer zone, and 3), the area of the NCDE outside the buffer surrounding the Park (Fig. 4). The proportions of males and females detected in each zone were then determined.

**Results**

**Home Range Location Relative to GNP**

We evaluated 76 home ranges of 34 females that lived in or adjacent to Glacier Park. Home ranges were developed for the period 2004-2011, and individual females had between 1 and 6 annual home ranges within the sample. Most home ranges (59%) straddled the Park boundary (Table 17). Home range diameters were, on average, smallest for bear that lived 100% within the Park, and largest (mean = 6.07 km) for females that straddled the Park boundary. For the pooled sample, the average home range radius was approximately 5 km. For the bears that straddled the Park, an average of 57.02% of their locations were within the Park (Table 18), while 42.98% were outside the Park. A sample of multi-annual female home ranges that straddle the GNP boundary is shown in Fig. 5.

**DNA Rub-tree Detections**

Comments by K. Kendall (USGS) regarding the results of the distribution grizzly bear detections at rub-trees are as follows. “The proportion of bears detected in each zone was similar for hair traps and bear rubs in 2004. The proportion of bears outside of GNP and the

buffer was consistently higher 2009-2011 than in 2004. This is consistent with preliminary analysis of trend data from bear rub monitoring suggesting that the population inside GNP increased slightly or was stable 2004-2010 and the population outside GNP increased at a higher rate. We sampled all of habitat in the NCDE thought to be occupied by grizzlies in 2004, which extended beyond the Recovery Zone boundary. The proportions in the table do not include 21 individuals detected in 2004 and 16 individuals detected in 2009-2011 whose average locations were outside the Recovery Zone boundary. Obviously, if these bears were included, the proportion of the population occurring outside the park would be higher. We did not sample in Canada so we had no detections in the buffer north of the border."

For females, 75% of the individuals were detected in either the 12 km buffer around the Park or in the remainder of the NCDE (Table 18). This is the assumed proportion of the independent female population in the NCDE that either do not use the Park or move between the Park and non-park habitats.

For males, 79% of the individuals were detected in either the 12 km buffer around the Park or in the remainder of the NCDE (Table 18). This is the assumed proportion of the independent male population in the NCDE that either do not use the Park or move between the Park and non-park habitats.

**Table 17. Home range radius size for bears living 100% outside GNP, 100% inside of GNP, and for those bears whose ranges straddled the Park boundary.**

| Female Home Range Relationship Relative to Glacier Park | Radius of Home Range (km) | | | | |
|---|---|---|---|---|---|
| | **Mean** | **-95% CI** | **+95% CI** | ***n*** | **SE** |
| 100% In GNP | 2.799 | 2.289 | 3.308 | 21 | 0.244 |
| 100% Out Of GNP | 4.645 | 3.515 | 5.775 | 10 | 0.499 |
| Straddle Park Boundary | 6.070 | 5.044 | 7.096 | 45 | 0.509 |
| All Groups | 4.979 | 4.273 | 5.684 | 76 | 0.354 |

**Table 18. Proportion of males and females detected by DNA at rub-trees in different zones within the NCDE (Kendall, USGS, unpublished data).**

| Area of the NCDE | % of population detected at rub-trees in each zone |
|---|---|
| **FEMALES** | |
| GNP Core | 24% |
| 12 km buffer around GNP[a] | 16% |
| Remainder of NCDE[b] | 59% |
| a +b | 75% |
| **MALES** | |
| GNP Core | 22% |
| 12 km buffer around GNP[a] | 18% |
| Remainder of NCDE[b] | 61% |

| | |
|---|---|
| a +b | 79% |

**Figure 4. Location of 3 geographic zones used to judge the proportion of the male and female grizzly bear population that use non-park habitats; Core GNP, a 12 km wide buffer (6 km internal to park boundary, and 6 km outside the boundary), and the remainder of the NCDE.**

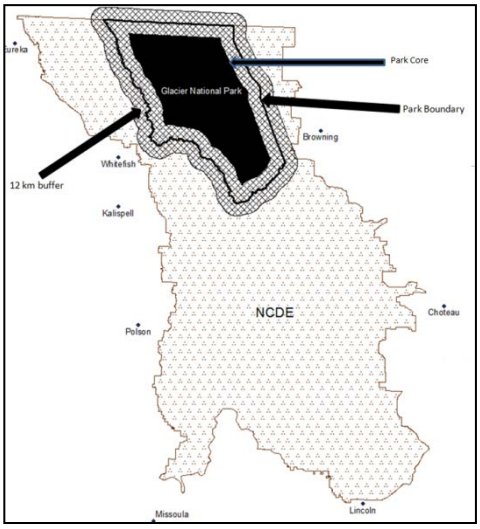
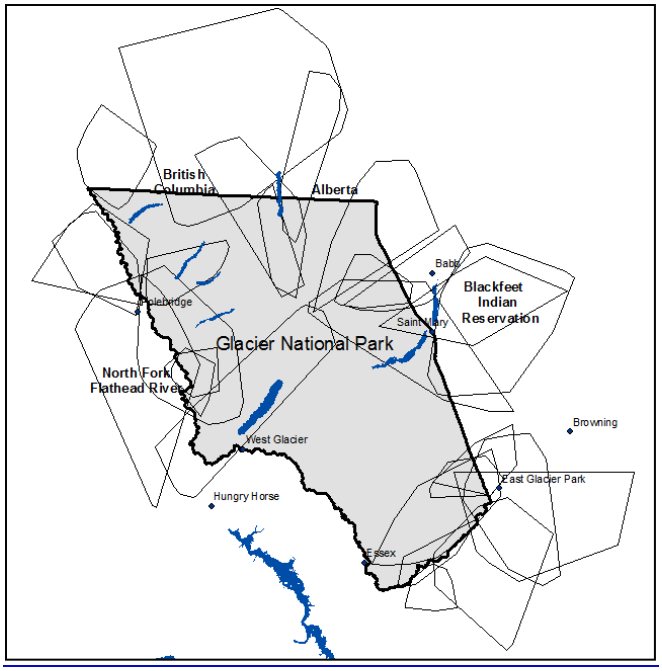



**Figure 5. Female grizzly bear convex polygon home ranges (multi-annual) relative to Glacier National Park, for those females who used both Park and non-park habitats; 2004-2011.**

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# Appendix 3

Habitat Baseline 2011 – Motorized Access in Each Bear Management Subunit

| BMU | Subunit Name | Principal Agency | OMRD | TMRD | CORE |
|---|---|---|---|---|---|
| BATM | Badger | LCNF-Rocky Mtn Front RD | 0 | 0 | 94 |
| BATM | Heart Butte | LCNF-Rocky Mtn Front RD | 1 | 0 | 81 |
| BATM | Two Medicine | LCNF-Rocky Mtn Front RD | 2 | 1 | 87 |
| BGSM | Albino Pendant | FNF-Spotted Bear RD | 0 | 0 | 100 |
| BGSM | Big Salmon Holbrook | FNF-Spotted Bear RD | 0 | 0 | 100 |
| BGSM | Black Bear Mud | FNF-Spotted Bear RD | 0 | 0 | 100 |
| BGSM | Brushy Park | FNF-Spotted Bear RD | 0 | 0 | 100 |
| BGSM | Buck Holland | FNF-Swan Lake RD | 24 | 41 | 49 |
| BGSM | Burnt Bartlett | FNF-Spotted Bear RD | 0 | 0 | 100 |
| BGSM | Hungry Creek | FNF-Spotted Bear RD | 0 | 0 | 100 |
| BGSM | Little Salmon Creek | FNF-Spotted Bear RD | 0 | 0 | 100 |
| BGSM | Meadow Smith | FNF-Swan Lake RD | 21 | 53 | 41 |
| BGSM | White River | FNF, Spotted Bear RD | 0 | 0 | 100 |
| BITE | Birch | LCNF-Rocky Mtn Front RD | 0 | 0 | 93 |
| BITE | Teton | LCNF-Rocky Mtn Front RD | 12 | 4 | 75 |
| BNKR | Big Bill Shelf | FNF-Spotted Bear RD | 11 | 2 | 87 |
| BNKR | Bunker Creek | FNF-Spotted Bear RD | 5 | 3 | 92 |
| BNKR | Goat Creek | FNF-SLRD & MT DNRC | 23 | 59 | 42 |
| BNKR | Gorge Creek | FNF-Spotted Bear RD | 0 | 0 | 100 |
| BNKR | Harrison Mid | FNF, - Spotted Bear RD | 1 | 0 | 99 |
| BNKR | Jungle Addition | FNF-Spotted Bear RD | 19 | 17 | 68 |
| BNKR | Lion Creek | FNF-SLRD & MT DNRC | 19 | 47 | 51 |
| BNKR | South Fork Lost Soup | FNF-SLRD & MT DNRC | 25 | 48 | 40 |
| BNKR | Spotted Bear Mtn | FNF-Spotted Bear RD | 20 | 18 | 68 |
| CODV | Pentagon | FNF-Spotted Bear RD | 0 | 0 | 100 |
| CODV | Silvertip Wall | FNF-Spotted Bear RD | 0 | 0 | 100 |
| CODV | Strawberry Creek | FNF-Spotted Bear RD | 0 | 0 | 100 |
| CODV | Trilobite Peak | FNF-Spotted Bear RD | 0 | 0 | 100 |
| DELK | Falls Creek | LCNF-Rocky Mtn Front RD | 0 | 0 | 85 |
| DELK | Scapegoat | LCNF-Rocky Mtn Front RD | 2 | 0 | 83 |
| HGHS | Coram Lake Five | FNF-Hungry Horse RD | 30 | 46 | 18 |
| HGHS | Doris Lost Johnny | FNF-Hungry Horse RD | 57 | 19 | 36 |
| HGHS | Emery Firefighter | FNF-Hungry Horse RD | 19 | 20 | 53 |
| HGHS | Peters Ridge | FNF-HHRD & SLRD | 52 | 25 | 34 |
| HGHS | Riverside Paint | FNF-Hungry Horse RD | 19 | 16 | 73 |
| HGHS | Wounded Buck Clayton | FNF-Hungry Horse RD | 28 | 28 | 65 |
| LMFF | Dickey Java | FNF-Hungry Horse RD | 9 | 0 | 85 |
| LMFF | Lincoln Harrison | Glacier NP | 0 | 0 | 98 |
| LMFF | Moccasin Crystal | FNF-Hungry Horse RD | 8 | 1 | 81 |
| LMFF | Muir Park | Glacier NP | 0 | 0 | 98 |

| BMU | Subunit Name | Principal Agency | OMRD | TMRD | CORE |
|---|---|---|---|---|---|
| LMFF | Nyack Creek | Glacier NP | 0 | 0 | 100 |
| LMFF | Ole Bear | Glacier NP | 0 | 0 | 94 |
| LMFF | Pinchot Coal | Glacier NP | 0 | 0 | 99 |
| LMFF | Stanton Paola | FNF-Hungry Horse RD | 8 | 3 | 83 |
| LNFF | Anaconda Creek | Glacier NP | 5 | 0 | 94 |
| LNFF | Apgar Mountains | Glacier NP | 15 | 4 | 81 |
| LNFF | Canyon McGinnis | FNF-GVRD & FNF-TLRD | 18 | 30 | 56 |
| LNFF | Cedar Teakettle | FNF-Glacier View RD | 35 | 32 | 24 |
| LNFF | Dutch Camas | Glacier NP | 6 | 0 | 93 |
| LNFF | Lake McDonald | Glacier NP | 13 | 5 | 85 |
| LNFF | Lower Big Creek | FNF-Glacier View RD | 18 | 20 | 66 |
| LNFF | Upper McDonald Creek | Glacier NP | 9 | 2 | 90 |
| LNFF | Werner Creek | FNF-Glacier View RD | 19 | 21 | 42 |
| MSRG | Beaver Creek | FNF-Swan Lake RD | 6 | 26 | 66 |
| MSRG | Cold Jim | FNF-Swan Lake RD | 18 | 56 | 43 |
| MSRG | Crane Mtn | FNF-Swan Lake RD | 28 | 56 | 38 |
| MSRG | Crow | Flathead IR | 6 | 3 | 92 |
| MSRG | Glacier Loon | FNF-Swan Lake RD | 22 | 43 | 45 |
| MSRG | Hemlock Elk | FNF-Swan Lake RD | 6 | 30 | 64 |
| MSRG | Piper Creek | FNF-SLRD & MT DNRC | 19 | 43 | 52 |
| MSRG | Porcupine Woodward | FNF-SLRD & MT DNRC | 28 | 72 | 15 |
| MSRG | Post Creek | Flathead IR | 10 | 5 | 87 |
| MSRG | Saint Marys | Flathead IR | 4 | 2 | 94 |
| MLFK | Alice Creek | HNF-Lincoln RD | 9 | 17 | 71 |
| MLFK | Arrastra Mountain | HNF-Lincoln RD | 15 | 19 | 75 |
| MLFK | Monture | LNF-Seeley Lake RD | 1 | 0 | 99 |
| MLFK | Mor-Dun | LNF-Seeley Lake RD | 17 | 17 | 78 |
| MLFK | N-Scapegt | LNF-Seeley Lake RD | 0 | 0 | 100 |
| MLFK | Red Mountain | HNF-Lincoln RD | 22 | 20 | 62 |
| MLFK | S-Scapegt | LNF-Seeley Lake RD | 10 | 14 | 79 |
| MULK | Krinklehorn | KNF-Fortine RD | 22 | 14 | 75 |
| MULK | Therriault | KNF-Fortine RD | 25 | 9 | 72 |
| NFSR | Lick Rock | LCNF-Rocky Mtn Front RD | 0 | 0 | 100 |
| NFSR | Roule Biggs | LCNF-Rocky Mtn Front RD | 0 | 0 | 100 |
| NEGL | Belly River | Glacier NP | 0 | 0 | 99 |
| NEGL | Boulder Creek | Glacier NP & Blackfeet IR | 18 | 13 | 76 |
| NEGL | Chief Mtn | Glacier NP & Blackfeet IR | 28 | 10 | 53 |
| NEGL | Poia Duck | Glacier NP & Blackfeet IR | 23 | 8 | 68 |
| NEGL | Upper Saint Mary | Glacier NP | 11 | 1 | 89 |
| NEGL | Waterton | Glacier NP | 0 | 0 | 100 |
| RTSN | Mission | LNF-Seeley Lk RD & MFWP | 23 | 57 | 33 |
| RTSN | Rattlesnake | LNF-Missoula RD | 3 | 13 | 86 |
| RTSN | South Fork Jocko | Flathead IR | 38 | 14 | 59 |
| SUBW | South Fork Willow | LCNF-Rocky Mtn Front RD | 8 | 2 | 88 |

| BMU | Subunit Name | Principal Agency | OMRD | TMRD | CORE |
|---|---|---|---|---|---|
| SUBW | West Fork Beaver | LCNF-Rocky Mtn Front RD | 12 | 4 | 84 |
| SEGL | Divide Mtn | Glacier NP & Blackfeet IR | 32 | 25 | 67 |
| SEGL | Midvale | Glacier NP & Blackfeet IR | 7 | 4 | 87 |
| SEGL | Spot Mtn | Glacier NP & Blackfeet IR | 10 | 3 | 79 |
| STRV | Lazy Creek | MT DNRC | 68 | 62 | 10 |
| STRV | Stryker | MT DNRC | 37 | 33 | 50 |
| STRV | Upper Whitefish | MT DNRC | 34 | 57 | 54 |
| SLVN | Ball Branch | FNF-Spotted Bear RD | 8 | 4 | 84 |
| SLVN | Jewel Basin Graves | FNF-Hungry Horse RD | 19 | 19 | 72 |
| SLVN | Kah Soldier | FNF-Spotted Bear RD | 19 | 18 | 69 |
| SLVN | Logan Dry Park | FNF-HHRD & FNF-SBRD | 30 | 33 | 54 |
| SLVN | Lower Twin | FNF-Spotted Bear RD | 9 | 2 | 91 |
| SLVN | Noisy Red Owl | FNF-Swan Lake RD | 22 | 14 | 59 |
| SLVN | Swan Lake | FNF-Swan Lake RD | 40 | 23 | 46 |
| SLVN | Twin Creek | FNF-Spotted Bear RD | 0 | 0 | 100 |
| SLVN | Wheeler Quintonkon | FNF-HHRD & FNF-SBRD | 25 | 17 | 66 |
| TESR | Deep Creek | LCNF-Rocky Mtn Front RD | 4 | 2 | 73 |
| TESR | Pine Butte | LCNF-Rocky Mtn Front RD | 6 | 2 | 71 |
| UMFF | Flotilla Capitol | FNF-HHRD & FNF-SBRD | 0 | 0 | 100 |
| UMFF | Long Dirtyface | FNF-Hungry Horse RD | 0 | 0 | 100 |
| UMFF | Plume Mtn Lodgepole | FNF-HHRD & SBRD | 0 | 0 | 100 |
| UMFF | Skyland Challenge | FNF-Hungry Horse RD | 20 | 17 | 63 |
| UMFF | Tranquil Geifer | FNF-Hungry Horse RD | 0 | 2 | 90 |
| UNFF | Bowman Creek | Glacier NP | 6 | 0 | 93 |
| UNFF | Coal & South Coal | FNF-Glacier View RD | 15 | 21 | 72 |
| UNFF | Ford Akokala | Glacier NP | 7 | 1 | 93 |
| UNFF | Frozen Lake | FNF-Glacier View RD | 10 | 4 | 86 |
| UNFF | Hay Creek | FNF-Glacier View RD | 24 | 13 | 55 |
| UNFF | Ketchikan | FNF-Glacier View RD | 16 | 3 | 72 |
| UNFF | Kintla Creek | Glacier NP | 3 | 0 | 96 |
| UNFF | Logging Creek | Glacier NP | 4 | 0 | 94 |
| UNFF | Lower Whale | FNF-Glacier View RD | 36 | 17 | 50 |
| UNFF | Quartz Creek | Glacier NP | 4 | 0 | 93 |
| UNFF | Red Meadow Moose | FNF-Glacier View RD | 25 | 17 | 55 |
| UNFF | State Coal Cyclone | FNF-GVRD & MT DNRC | 31 | 24 | 59 |
| UNFF | Upper Trail | FNF-Glacier View RD | 14 | 4 | 88 |
| UNFF | Upper Whale Shorty | FNF-Glacier View RD | 12 | 10 | 86 |
| USFF | Basin Trident | FNF-Spotted Bear RD | 0 | 0 | 100 |
| USFF | Gordon Creek | FNF-Spotted Bear RD | 0 | 0 | 100 |
| USFF | Jumbo Foolhen | FNF-Spotted Bear RD | 0 | 0 | 100 |
| USFF | Swan | LNF-Seeley Lake RD | 32 | 16 | 55 |
| USFF | Youngs Creek | FNF-Spotted Bear RD | 0 | 0 | 100 |

| | |
|---|---|
| | Indicates subunit is ≥50% federal or tribal wilderness of all lands within subunit. |

# Appendix 4

## Habitat Baseline 2011 – Developed sites in Each Bear Management Unit

| BMU Name | Residences | Overnight Sites | | Campgrounds | Day-Use | Trailheads | Admin. |
|---|---|---|---|---|---|---|---|
| | | # sites | type of capacity | | | | |
| Badger Two Medicine | - | - | - | 1 (17) | 1 | 7 | 2 |
| Big Salmon | 32 | 2 | 7 cabins; 9 rooms | 4 (50) | 5 | 8 | 12 |
| Birch Teton | 7 | 1 | 6 cabins; 1 room | 3 (23) | 3 | 8 | 1 |
| Bunker | - | 3 | 17 cabins; 2 rooms; 4 bunkhouses | 7 (54) | 6 | 26 | 5 |
| Continental Divide | - | - | - | - | - | - | 5 |
| Dearborn Elk | 1 | - | - | - | 1 | 3 | 2 |
| Hungry Horse | - | - | - | 11 (139) | 20 | 39 | 6 |
| Lower Middle Fork Flathead | 10 | - | - | 12 (32) | 7 | 16 | 12 |
| Lower North Fork Flathead | 82 | 9 | 54 cabins; 185 rooms; 2 bunkhouses; 362 emp. beds | 19 (726) | 35 | 60 | 24 |
| Mission Range | 1 | 1 | 1 cabin | 1 (22) | 5 | 17 | - |
| Monture Landers Fork | - | 1 | 1 cabin | 4 (42) | 11 | 28 | 8 |
| Murphy Lake | - | 5 | 5 cabins | 8 (29) | 12 | 41 | 1 |
| Northeast Glacier | - | 4 | 27 cabins; 350 rooms; 294 emp. beds | 27 (429) | 16 | 28 | 14 |
| North Fork Sun River | - | - | - | - | - | - | 5 |
| Rattlesnake | - | 1 | 1 cabin | 1 (3) | - | 6 | - |
| Southeast Glacier | - | - | - | 11 (143) | 9 | 14 | 8 |
| Sullivan | 20 | 2 | 9 cabins; 1 room; 1 bunkhouse | 8 (89) | 9 | 30 | 6 |
| Stillwater River | - | - | - | 2 (3) | - | 2 | 1 |
| South Fork Sun Beaver Willow | 74 | 4 | 19 cabins; 2 rooms; 3 bunkhouses; 3 RV | 6 (65) | 2 | 15 | 8 |
| Teton Sun River | 17 | 1 | 2 bunkhouses | 2 (32) | 2 | 10 | 4 |
| Upper Middle Fork Flathead | - | 2 | 2 cabins | 2 (21) | 3 | 12 | 4 |
| Upper North Fork Flathead | 7 | 7 | 7 cabins | 24 (153) | 6 | 36 | 21 |
| Upper South Fork Flathead | - | 1 | 1 cabin | - | 3 | 5 | 6 |

Residences. These are full-time or seasonal recreational residences. We have no authority to limit increases in capacity at these sites so it is not reported for these essentially private residences. However, there will be no new residences allowed.

Overnight Sites. Cabin rentals, guest lodges with or without rooms and/or cabins, camps, etc. Capacity is the number of cabins, rooms, bunkhouses, employee beds (Glacier NP) and RV sites.

Campgrounds. List # of campgrounds with # of campsites in parentheses, i.e. "2 (32)" is two separate campgrounds with a total number of 32 sites. Campground development ranges from fully developed with all amenities to very minimal development. There are group sites included; however, the number accommodated at one group site is variable.

Day-Use. Site includes businesses, restaurants, river/lake access, picnic areas, points of interests, etc.

Trailheads. Trailheads range from fully developed to a turn-out at a road closure.

Admin. Administrative sites include ranger stations, work centers, guard stations, active fire lookouts, etc. While these sites are not subject to the Developed Site standards, increases in the number of administrative sites on Federal lands will be minimized so they are reported here to provide transparency and accountability.

# Appendix 5

Protocol Paper for Motorized Access Analyses Application Rule

## EXECUTIVE SUMMARY

This Protocol Paper contains a descriptive explanation of the application rule for motorized access density and secure core analyses as well as key points for the components, input GIS layers, and actual processes. The paper is intended to provide the reader with both a general background for moving window route density and secure core analyses as well as specific information and requirements for the Northern Continental Divide Ecosystem (NCDE) Conservation Strategy (2012).

A moving window type of motorized access density analysis requires several components: 1) a road layer; 2) a trail layer; 3) analysis area(s); and 4) a good vector and raster-based GIS software package. The secure core area analysis involves buffering roads and trails a given distance, using GIS software. Either raster or vector GIS software will work for the secure core analysis, but vector is more commonly used.

There are five sections within the Protocol Paper:

1. BACKGROUND gives some history and rationale for methods of calculating road densities, and a general description of the moving window and security analyses.
2. ANALYSIS COMPONENTS describes the GIS software and individual GIS layers needed for the analyses.
3. GIS PROCESSES outlines and describes the procedures for the analyses, as non-technical as possible.
4. NCDE CONSERVATION STRATEGY ANALYSES gives the specifics for running the moving window and secure core procedures for grizzly bear analysis for programmatic and project level work within the NCDE.
5. LITERATURE CITED.

## BACKGROUND

Until 1993, road density was calculated by dividing the total miles of roads by the square miles for a analysis area resulting in a linear average density. GIS technology has allowed the user to place buffers around roads or trails, create density contour maps, and calculate density. Traditionally, the analysis area has been about 5,000 to 15,000 acres (7.81 to 23.44 square miles). Currently, BMU Subunits are used for the analysis area, approximating the 50 square miles of a female grizzly bear home range.

For a moving window density, each pixel (square unit of land, 30 meters by 30 meters in size for the NCDE) is assigned an access route density value based upon the roads and trails within the specified surrounding window, where the window size is commonly 1 square mile or 1 square kilometer. The square mile or kilometer is the "window" surrounding a pixel. The "moving window" refers to the actual process that the GIS software program utilizes. Starting in the upper left corner, the first pixel is

assigned an access route density value based upon its surrounding window; the program moves over 1 pixel and assigns this next pixel a density value based upon its surrounding window; move over 1 pixel and that pixel is assigned a density; etcetera until the entire file has been analyzed pixel by pixel. This can then be summarized as the proportion of the analysis area in various density classes.

As described in the Interagency Grizzly Bear Committee (IGBC) Motorized Access Management report (1994, 1998) and referenced in the NCDE Conservation Strategy (2012), the moving window analysis should be used for calculating the open road and motorized trail, and total motorized access route densities for a given analysis area. Moving window processes are used to create two access route density maps: 1) open motorized access (open roads and open motorized trails); and 2) total motorized access (motorized roads and motorized trails). The output for the analysis area is provided in percentages of one mile route density increment classes. Traditionally in linear average density, we might have stated that analysis area 'B' has 1.00 miles of total roads per square mile. The main benefit from the moving window density analysis is the spatial display of the access route density by one mile classes. The user can see where the density is high within the analysis area, rather than just the average density over the entire area. Instead of knowing the analysis area 'B' had 1.0 mile/sq mile, we would know that 33% of the area had greater than 3.0 mile/sq mile and 67% had 0.0 mile/sq mile density, and more importantly, where that high density occurs within the analysis area relative to secure habitat.

Secure habitat is defined as areas that do not have human access. Referred to as Core Areas in the IGBC Motorized Access Management report (1994, 1998), these areas are defined as being >0.3 miles (500 meters) from any open road, motorized road or trail, and high use road or trail. Per IGBC direction, core areas are to include seasonal habitats represented in proportion to that of the analysis area. And once established, core areas are to remain in place for at least ten years. The South Fork Grizzly Bear Study defined secure habitat as polygons greater than 2000 acres, farther than a mile from any road or trail. The NCDE Conservation Strategy defines Secure Core as areas more than 500m (0.3 miles) from open or gated wheeled motorized access routes, at least 2,500 acres in size, and in place for 10 years.

For the purposes of this protocol paper, the standards, prodecures, and analyses will follow those outlined in the NCDE Conservation Strategy for open route density (OMRD), total route density (TMRD), and Secure Habitat.

## ANALYSIS COMPONENTS

### GIS software

Raster GIS software packages generally have some sort of moving window program. This program systematically moves throughout the whole file, analyzing each pixel based upon the surrounding pixels (=window). For instance, a 3x3 window would analyze 3 rows by 3 columns of pixels, or 9 pixels. The center pixel would be the analysis pixel and would be assigned a new value based upon the class values of the 9 window pixels. The road density analysis utilizes a sum, or count, analysis of the window. As of August 2001, four GIS software packages have been used to run a moving window analysis: ERDAS, ARC/Info GRID, ArcGIS, or EPPL7. For the NCDE, Arc/Info GRID and ArcGIS are currently used. The problem does not seem to be the mechanics of the moving window, most raster-based GIS software packages have some sort of filtering routine. However, some software packages do not have the

program set with a large enough window size to allow a one square mile moving window. At 50 meter pixels, it is 32 by 32 pixels for one square mile; at 30 meters, it is 54 by 54 pixels.

Due to differences between vector to raster algorithms and in actual moving window calculations, it is strongly recommended that the same software package, utlized to develop the standards, is utilized for all analyses. If this is not feasible, then extra steps in the analysis may be needed so that, using the same GIS coverages, the processes and software used to analyze will provide the same results as the processes and software used to develop the standards.

**Analysis area layer**

This refers to the area(s) for which the road density classes are evaluated. For grizzly bear analyses, the IGBC Motorized Access Management report recommends analysis areas that approximate a grizzly bear female home range, incorporate all seasonal habitats when possible, and generally follow watershed boundaries or other topographic features. These analysis areas have been delineated for the NCDE and are referred to as Bear Management Unit (BMU) subunits, or just subunits.

Due to motorized routes near enough to affect density or secure core within the analysis area(s), the BMU subunit(s) should be buffered at a distance to include any routes within the influence zone. For NCDE Conservation Strategy analyses, that distance is one mile (1609.344 meters), although the actual distance is 0.7072 miles (1138 meters) which is half the distance of the diagonal within the one mile square window. This buffered analysis area should be used for clipping all data as well as the area for the raster moving window analysis. If using a circular moving window, it is the radius of that circular window.

While BMU subunits are not needed to directly run the moving window or secure core analyses, it is required to summarize the results of the analyses. Moving window analyses may be used to look at road density for other purposes than grizzly bears. In those cases, it may be appropriate to use some other analysis area for summarizing the results.

**Road layer**

Each road which is applicable to the analysis should be uniquely identified. This allows the user to develop "what-if" scenarios. While it may be obvious to one person that several roads will always be included in all alternatives, someone else may wish to analyze the "what if those roads were decommissioned" situation. Regardless of whether or not each road is uniquely identified, roads should be attributed with their jurisdiction, road management, and, if applicable, type of closure device. Jurisdiction refers to what agency actually has jurisdiction on the road. This is not always the same as the landowner. For example, a State Department of Natural Resources & Conservation (DNRC) road crosses Forest Service land, the jurisdiction of the road is State, but the landowner is Forest Service. For the purposes of the motorized access analysis, it is a State road. Federal and state highways (primary and secondary only), county roads, and small private roads will need to be identified. Road management provides information on whether the road is open yearlong or seasonally, closed (=restricted) yearlong, etc. Seasonally open roads will need to have the dates of closure. If a road is closed for all or part of the year, the type of closure device will be required. Additionally, each road

should be attributed for the following characteristics during the non-denning season (April 1 through November 30). Definitions are based upon the IGBC Motorized Access Management report with verbal clarification from individual committee members (see Flathead NF, Land Resource Management Plan, Amendment 19 project file).

ROAD

All created or evolved routes that are >500 feet long (minimum inventory standard for the Forest Service INFRA data base), which are or were reasonably and prudently driveable with a conventional passenger car or pickup.

OPEN ROAD

A road without legal restriction or physical obstructions on motorized vehicle use.

RESTRICTED ROAD

A road on which motorized vehicle use is legally restricted, or physically obstructed, seasonally or yearlong. The road requires physical obstruction (gate, berm, jersey barrier, etc.). As indicated above, restricted roads will need two attributes: duration of restriction/obstruction, and type of closure device. For duration of restriction/obstruction, assign yearlong or seasonal. If the latter, include dates of restriction. For closure device, provide the type, such as gate, berm, barrier, rock, natural vegetation, etcetera.

HISTORICAL ROAD

Sometimes referred to as a reclaimed or obliterated road, a historical road has been treated in such a manner so as to no longer function as a road or trail, and the road is no longer considered part of the agency's road system. This can be accomplished through one or a combination of several means including: recontouring to original slope, placement of logging, road, or forest debris, planting or shrubs or trees, etc. Culverts and bridges may or may not be pulled.

**Trail layer**

All trails which are applicable to the analysis should be identified. Each trail should be attributed with the following characteristic during the non-denning season (April 1 through November 30). Definitions are based upon the IGBC Motorized Access Management report with verbal clarification from individual committee members.

TRAIL

All created or evolved access routes that do not qualify as a "road". They are not reasonably and prudently driveable with a conventional passenger car of pickup. Generally, these routes are maintained and inventoried as part of the trail system.

OPEN MOTORIZED TRAIL

A trail without legal restriction, or physical obstruction, open for motorized use by motorized vehicles. For the purposes of these analyses, an open yearlong or open seasonally motorzied trail is considered open. Trails use by 4-wheeler, 4-wheel drive vehicles and motorized trail bikes are examples of this type of access route.

RESTRICTED MOTORIZED TRAIL
A trail on which motorized use is legally restricted yearlong.

NON-MOTORIZED TRAIL
Any trail that does not have legal motorized use yearlong.

**Lake layer**

For the NCDE, if the project area contains all or a portion of any large lake (≥320 acres), the lake acreage will need to be subtracted from the analysis acres. The subtraction occurs after the moving window procedure has been completed. Either within or 1 mile from the NCDE Primary Conservation Area (PCA), the following is a list of large lakes: Flathead, Upper Stillwater, Whitefish, Echo, Swan, Holland, Lindbergh, Gray Wolf, and Big Salmon Lakes, Lake Blaine, and Hungry Horse Reservoir (Flathead N.F.); Duck and Lower Saint Mary Lake (Blackfeet I.R.); Dickey Lake (Murphy Lake R.D.); Kicking Horse Reservoir (Flathead I.R.); Waterton, Upper Kintla, Kintla, Bowman, Quartz, Logging, Lower McDonald, Harrison, Saint Mary, Two Medicine, Lower Two Medicine Lakes, and Lake Sherburne (Glacier N.P.); Bynum, Eureka, Farmers, Gibson, Swift and Nilan Reservoirs (Rocky Mtn Front R.D.).

Large lakes are generally not considered as grizzly bear habitat, and therefore these large bodies of water should not be considered when calculating secure habitat or motorized access densities. The 320 acre (1/2 square mile) figure was agreed to by Tom Wittinger (Flathead NF Forest Wildlife Biologist), Nancy Warren (Flathead NF Wildlife Biologist), and Kathy Ake (Flathead NF GIS Specialist) in 1994, and has been used for all IGBC motorzied access analyses since 1994.

**Land Ownership layer**

This layer is required for projects occurring within the NCDE for grizzly bears. Current direction from the US FWS states that roads within small private land holdings are not to be considered in calculating the motorized access densities. Small-tract private lands are treated just like the large lakes, by subtracting from the analysis acres before calculating the percent road density. The subtraction occurs after the moving window procedure has been completed. Originally, Plum Creek Timber Company (PC) lands were not considered small-tract private lands. However since the Montana Legacy Project, in which most of the Plum Creek Timber Company lands were purchased and transferred to public ownership through a cooperative effort, the acreage of PC lands in the NCDE have dramatically decreased. For the Conservation Strategy, PC lands will be considered small-tract private lands.

## GIS PROCESSES

This section provides a description of the processes and not actual GIS programs and steps. Nor does the section specify the requirements for motorized route access and secure core analyses in the NCDE Conservation Strategy.

**Moving Window Road Density Analysis**

The analysis entails having a moving 1 square mile window across the entire rasterized road/trail file. For a 1 square mile window, it is a 32x32 window size for 50 meter pixels, and 54x54 window size for 30 meter pixels. For a 'circular' 1 square mile window, it is a radius of 18 50 meter pixels and 31 30 meter pixels. If a 1 square kilometer (metric) window is required, it is 20x20 window size for 50 meter pixels, and 33x33 window size for 30 meter pixels. A circular 1 square kilomter window is 11 50 meter pixels and 19 30 meter pixels. The center pixel of the window is assigned the sum total number of road and trail pixel cells that fall within the window. Starting with the first pixel in the upper left corner, the program counts the total number of road and trail cells within the square mile window and assigns the value to the center pixel. Then the window moves over to the next pixel, counts the road and trail cells within the window and assigns the value to the center pixel. This process repeats itself until the entire file has been completed. Since the moving window uses a summation of the GIS values for each cell, the input GIS file for the actual moving window step needs to have value '1' for all roads and trails to be counted and value '0' for everything else. A 'nodata' or null pixel within the analysis area will not suffice; these cells need to be a value 0.

The output from the moving window program is a file where each pixel represents the number of road/trail cells within the surrounding window size. The next step is to recode the sum total values into one mile, or one kilometer, increments. To equate the sum totals to number of pixels for route density ranges, divide the mi/sq mi value by the miles/pixel value. This is based upon a 50 meter pixel equaling 0.03107 miles, and a 30 meter pixel equaling 0.018642 miles. Using a 50 meter pixel, for the 0.5 mi/sq mi break, divide 0.5 mi/sq mi by 0.03107 mi/pixel, and the number of pixels is 16. Thus, if the sum total value is between 1 and 16, the density is 0.1 to 0.5 miles per square mile. The following table is a breakdown for 50 meter and 30 meter pixel sizes for both English (miles) and metric (kilometer) windows. The number of pixels was rounded to the nearest whole number.

Table 1. Breakdown of Road Density Classes for Various Window and Pixel Cell Sizes.

| Route Density Class Range | Number of pixels for 1 SQ MILE | | Number of pixels for 1 SQ KM | |
|---|---|---|---|---|
| | At 30 meters | At 50 meters | At 30 meters | At 50 meters |
| 0.0 | 0 | 0 | 0 | 0 |
| 0.1- 0.5 | 1-27 | 1-16 | 1-17 | 1-10 |
| 0.6 - 1.0 | 28-54 | 17-32 | 18-33 | 11-20 |
| 1.1 - 1.5 | 55-80 | 33-48 | 34-50 | 21-30 |
| 1.6 - 2.0 | 81-107 | 49-64 | 51-67 | 31-40 |
| 2.1 - 2.5 | 108-134 | 65-80 | 68-83 | 41-50 |
| 2.6 - 3.0 | 135-161 | 81-97 | 84-100 | 51-60 |
| >3.0 | 162-last | 98-last | 101-last | 61-last |

Pixel cell sizes are not set in concrete. A 50 or 30 meter pixel size is not mandatory. The values just happen to be common pixel size. The smaller the pixel size the better the file approximates the actual width of a road, down to about a 10 meter file (approximately 32.8 feet). Changing a GIS layer to a smaller pixel size does not necessarily mean that the layer is more accurate. Accuracy level depends more upon the resolution and accuracy of the original map used to create the GIS layer.

**Security Analysis**

The analysis involves buffering by 500 meters specific roads and trails. While the total road and motorized trail density moving window analysis has a 0.0 route density category, this is not the same as areas over 500 meters (0.3 miles) from a motorized route. The user needs to execute a buffering routine to accurately calculate the security area.

**Summaries and Displays**

For each BMU subunit, or subunit, it is useful to have a summary table listing the following:

- percentage of each route density class for open route density
- percentage of each route density class for total route density
- percentage of secure core and non-core areas
- miles of roads and trails by their management class (open yearlong, closed yearlong by gate, etc.)

At minimum, the summary table should have the percentage >1.0 mi/sqmi for OMRD, the percentage >2.0 mi/sqmi for TMRD, and the percentage of Secure Core for each BMU subunit.

Maps will either show the open road density classes, total road density classes, or the secure core areas. Additional information should include the roads and trails by management, BMU subunit boundaries, and small-tract private or large lakes areas, if appropriate.

**Cautions**

It should be mentioned that the project window needs to be at least either half the distance of the diagonal of a square window, or the radius of a circular window, from the actual analysis area. A distance of 1 mile would cover all potential square mile or square kilometer window sizes, and 30 or 50 meter pixel sizes. If the analysis boundary line follows a ridge, then the project window needs to be another mile from the ridge line, so that the pixels on the boundary of the analysis area can be assigned the correct density value. If the area directly outside the analysis area is cut off, then those pixels just within the analysis area will not factor in any road or trail pixels that fall within 1 mile of the analysis area and influence the density values. This applies to the Secure Core analysis as well.

Additionally, all maps and outputs for the route density and security analyses should only display the analysis area with a buffer of a 1 mile. Nothing should be displayed beyond 1 mile from the analysis area. The user may or may not have the correct and/or updated information beyond their area of interest.

As different grizzly bear ecosystems develop standards for access management, it is very possible that slightly different steps, order of processes, pixel sizes, window shapes, and determinations of roads or trails required will occur. It is strongly suggested that the processes, parameters, and software package used to determine the standards are also used for running the analyses to measure compliance. For example, if the standard was developed using ERDAS software and their rasterization algorithm, measuring compliance using ARC/Info's rasterization algorithm would be inappropriate. ARC/Info results in approximately 18% more "road" pixels than the same vector coverage rasterized in ERDAS. If differences are unavoidable, then extra steps in the analysis may be needed so that, using the same GIS coverages, the processes and software used to analyze will provide the same results as the processes and software used to develop the standards.

**General Outline of the Procedures**

*I. Open Motorized Route Density*

a) Select required arcs from road layer
b) Select required arcs from trail layer
c) Combine required selected roads and trails
d) Rasterize vector dataset
e) Run the moving window
f) Recode raw density value to road density classes
g) Vectorize the road density raster layer
h) If appropriate or required, subtract out large lakes, and small private acreage
i) Summarize the percentage of each open route density class within the analysis areas
j) Create required maps

*II. Total Motorized Route Density*

a) Select required arcs from road layer
b) Select required arcs from trail layer
c) Combine required selected roads and trails
d) Rasterize vector dataset
e) Run the moving window
f) Recode raw density value to road density classes
g) Vectorize the road density raster layer
h) If appropriate or required, subtract out large lakes, and small private acreage
i) Summarize the percentage of each total route density class within the analysis areas
j) Create required maps

*III. Secure Core Analysis*

a) Select required arcs from road layer
b) Select required arcs from trail layer
c) Combine required selected roads and trails
d) Buffer combined roads/trails 500 meters
e) Recode output from buffer routine
f) If appropriate or required, subtract out large lakes, and small private acreage
g) Summarize the percentage of secure core areas within the analysis areas
h) Create required maps

## NCDE CONSERVATION STRATEGY ANALYSES

These procedures apply to all Federal, Tribal and State land agencies within the NCDE Conservation Strategy's Primary Conservation Area (PCA).

Motorized access route density and security analyses will be applied to BMU subunits. These areas are meant to approximate a grizzly bear female home range, incorporate all seasonal habitats if possible, and generally follow watershed boundaries or other topographic features. BMU subunits have been delineated by biologists from US Forest Service, US Fish & Wildlife Service, US National Park Service, MT Dept. Natural Resource Conservation, MT Dept. Fish, Wildlife and Parks, Confederated Salish & Kootenai Tribes, and Blackfeet Tribe for the entire NCDE.

With the Conservation Strategy, it was decided to keep the same process utlitized when the grizzly bear was listed. From a historical perspective for both NCDE and Flathead N.F. Amendment 19, the access standards were developed using EPPL7 software, 30 and 50 meter pixel sizes, a square 1 square mile window, breakpoints between classes as listed in Table 1, and due to software limitations a 32x32 window size. The area was the South Fork Grizzly Bear Study Area and radio-collared female grizzly bears were used for telemetry points. The recommended NCDE procedures have two steps added to the process to account for differences between ARC/Info's rasterization algorithm and EPPL7's algorithm as well as any other differences in cell and/or window size. The GRID THIN function is used to mitigate for the rasterization algorithm. A regression equation is applied after the moving window step to mitigate for the remaining differences. The regression equation was developed by comparing results from EPPL7 and ARC/Info software using the same road and analysis area files.

During the analysis for Flathead N.F's Amendment 19, many questions regarding small tract private lands, definitions for roads and road management classification were resolved for the motorized access analyses for both the NCDE and Amendment 19.

**Application Rules**

Table 5 from Chapter 3 of this Conservation Strategy is repeated below to provide the rule set and definitions for motorized access management on USFS, GNP, and BLM lands inside the PCA (referred to as Table 2 in this Appendix).

Table 6. (p. 1 of 2). The rule set and definitions for motorized access management standards on Federal lands inside the PCA.

| | |
|---|---|
| Changes in Secure Core | A project may mitigate its impact on Secure Core by providing replacement Secure Core habitat of equal size and similar quality (if possible) and function in the same grizzly subunit. The replacement habitat must either be in place before project initiation or be provided concurrently with project development as an integral part of the project plan. Alternatively, a project may also mitigate its impacts by adhering to the allowed levels of temporary changes summarized above and detailed in this Table. |
| Secure Core Habitat | More than 500 meters from an open motorized route (road or motorized trail), or helicopter flight line meeting the definition of "recurring." Must be greater than or equal to 2,500 acres in size. "Recurring" is defined as multiple trips per day for more than two consecutive days. |
| Open Motorized Route Density (OMRD) | Open motorized route density includes: all Federal, State, and Tribal roads and motorized trails that are open to public use for any part of the year and motorized routes closed by sign only. All roads are included in the database. However non-motorized trails, highway, county, private, decommissioned, or revegetated roads are not included in the calculations. |
| Total Motorized Route Density (TMRD) | Total motorized route density includes: all Federal, State, and Tribal roads and motorized trails, whether they are open or closed. All roads are included in the database. However, non-motorized trails, highway, county, private, decommissioned, or revegetated roads are not included in the calculations. |
| Motorized Access Routes in Database | All routes, regardless of ownership or jurisdiction, having motorized use or the potential for motorized use to exceed administrative use levels (restricted roads) including: motorized trails; highways; county/city, Federal, State, Tribal, corporate and private roads. |
| Lands in Database | All lands are included in database. However, large lakes (≥ 320 acres) and private lands are not included in calculations of Secure Core, OMRD, or TMRD. |
| Season Definitions | Denning season on the west side of the continental divide is from 1 December through 31 March. Denning season on the east side of the continental divide is from 1 December through 15 April. Wheeled motorized access standards do not apply during the denning season. |
| Project | A temporary activity requiring construction of new roads, reconstructing or opening a restricted road or recurring helicopter flights at low elevations (< 500m). |
| Activities Allowed in Secure Core | Activities that do not require road construction, reconstruction, opening a restricted road, or recurring, low-elevation helicopter flights. Aircraft used in emergency firefighting are allowed. Non-wheeled, over the snow use (i.e., snowmachines) allowed until research identifies a concern. Projects that remain within the limits established by the Application Rules for Temporary Changes in Motorized Access Management on Federal Lands. |
| Inclusions in Secure Core | Roads restricted with permanent physical barriers (not gates), decommissioned or obliterated roads, and/or non-motorized trails are allowed in Secure Core. |
| Administrative Use Levels | Motorized administrative use is permitted as either 6 trips (3 round trips) per week OR one 30-day unlimited use period during the non-denning season (Apr. 1 – Nov. 30). |

Table 6. (p. 2 of 2). The rule set and definitions for motorized access management standards on Federal lands inside the PCA.

| | |
|---|---|
| Temporary Changes in Motorized Access Management | Temporary changes to baseline values for OMRD, TMRD, and Secure Core will be allowed for projects if the 10-year running averages for these parameters in each subunit do not exceed a 5% increase in OMRD, a 3% increase in TMRD, or a 2% decrease in Secure Core. During these projects, changes in OMRD, TMRD, and Secure Core may exceed these limits in individual years but the 10-year running average will not exceed these limits. Secure Core and road density values must be restored within one year after completion of the project (i.e., when the road is no longer being used for project implementation beyond administrative levels). On occasion, unforeseen events affecting thousands of acres (e.g., fires, long-term mine clean-up, insect or disease-killed trees, flooding, avalanches, mudslides, etc.) may require a response action that would not stay within these Application Rules for Temporary Changes in Motorized Access Management. In such cases, site-specific NEPA analysis would be completed and effects considered. Due to the nature of these events and the need to quickly and efficiently resolve the impacts of these disturbances to maintain project, recreational, and administrative opportunities, such circumstances would not be considered a violation of this Conservation Strategy's habitat standards. Any responses to these unforeseen events would, however, be considered when proposing other projects in affected subunits. |
| Gravel Pits | The Forest Service and National Park Service will use all available resources at existing gravel pits before constructing new pits. |
| Permanent Changes to OMRD, TMRD, and Secure Core Values | Permanent changes in OMRD, TMRD, or Secure Core may occur due to unforeseen circumstances, natural events, or other reasonable considerations. Such changes will change the baseline values but will not be considered a violation of the motorized access management habitat standards and will not require mitigation responses. Acceptable changes that may permanently change baseline values include the following:<br>- the agency acquired better information or updated/improved the road information in their respective database(s) resulting in changed calculations without actual change on the ground;<br>- technology or projections changed, resulting in changed calculations without actual change on the ground (e.g., a switch from NAD27 to NAD83);<br>- the agency moved a road closure location a short distance (often <0.25 miles) to a better location for turn-arounds, less vandalism, or to improve enforcement of the road closure;<br>- the agency acquired or sold land;<br>- the agency built/opened a road for either handicapped access in a campground, or administrative site road;<br>- the agency moved a road to increase human safety or to decrease resource damage<br>- an adjacent, non-federal landowner made changes to their motorized access management which decreased Secure Core or increased motorized route densities on Federal lands. |

**Python script requirements**

To insure consistency across the NCDE, a Python script available through ArcToolBox will be used. Each agency unit will have a "master" grid to be used in the moving window routine. Through investigation, it has been discovered that the output values will vary even if slightly different extents are used for the moving window; therefore, a single "master" grid will be created for each agency's unit requiring a motorized access analysis. The script follows the steps from the General Outline of the Procedures in the GIS Processes section.

The remap table for converting the actual count of "road" cells in the one mile window to mile/square mile density classes has a specfic format. The table needs to be a text file with a '.txt' extension, and the specific values as shown in the last column below.

Table 3. Remap table for converting raw density values to mile/square mile classes.

| Mile/Square Mile Density Class | # of "route" pixels | Output GRID Value | Remap Table |
|---|---|---|---|
| 0.0 mile/squre mile | 0 | 1 | 0 0:1 |
| 0.1 to 1.0 mile/square mile | >0 - ≤54 | 2 | 0 54:2 |
| 1.1 to 2.0 mile/square mile | >54 - ≤107 | 3 | 54 107:3 |
| >2.0 mile/square mile | >107 - ≤5000 | 4 | 107 5000:4 |

The Python script requires specific values for road management, motorzied trails, ownership and large lakes. The following tables provide that information.

Table 4. Road mangement descriptions and attribute values used in OMRD and TMRD.

| Road Management Description | Specific Value in Attribute for Script | Road Used in Analysis | | |
|---|---|---|---|---|
| | | OMRD | TMRD | CORE |
| Open yearlong roads, no restriction | OPEN yearlong | X | X | X |
| Open seasonally roads, has seasonal restriction | OPEN seasonally | X | X | X |
| Closed yearlong by sign closure | CLOSED yrlng sign | X | X | X |
| Closed yearlong by gate closure, but with high administrative use[1] | CLOSED yrlng ADH | X | X | X |
| Closed yearlong by gate closure | CLOSED yrlng gate | | X | X |
| Closed yearlong by physical barrier, but should be closed by gate[2] | CLOSED yrlng BNC | | X | X |
| Closed yearlong by physical barrier[3] | CLOSED yrlng berm | | X | |
| Closed yearlong and naturally revegetated, but should be closed by gate[4] | CLOSED yrlng VEGNC | | X | X |
| Primary or secondary federal/state highways | hwys, cnty/city road | | | X |
| County or city roads | hwys, cnty/city road | | | X |
| Small-tract private roads or federal special use permitted roads[5] | small PVT roads | | | X |
| Closed yearlong and is either naturally revegetated, entrance has been obliterated, or bridge/large <4ft culvert removed. Essentially, the road is completely impassable | CLOSED yrlng impass | | | |
| | historic roads | | | |

[1] ADH – closed by gate but receives high administrative use (HH SB compounds). Has been specific to Flathead NF.

[2] BNC – closed by berm, but to be buffered for Security CORE. Barrier put in due to frequent damage to gate. Has been specific to Flathead NF.

[3] berm – refers to berms, rocks, jersey barriers, etcetera. Does not include roads closed by a bridge or large (<4ft) culvert being removed, obliterated entrances, and live vegetation. Any of these last three types make the road impassable (no standard vehicle or two-wheel motorized vehicle can pass). These roads are not included in any analyses. Has been incorporated this way since IGBC motorized access or Flathead NF's A19 started.

[4] VEGNC – refers to roads currently closed by live vegetation, but planning or project documents indicate that the road is to closed by gate. For the purposes of TOTAL route density and Security CORE, the road is to be included. Has been specific to Flathead NF.

[5] small PVT roads – Typcially the permitee of a Special Use permitted road does not have road management restrictions. As a result, the road could be open or closed according to the permittee, therefore the road is classified as "small PVT roads" for the analyses.

Roads that are decommissioned, labeled historic, and no longer on the system, are not included in the analyses, i.e. they do not count in OMRD or TMRD calculations, nor are they buffered in the Secure Core

analysis.

Similar to historical roads, roads that are naturally revegetated, have the entrance obliterated for >0.1 miles, or have the bridge or large >4ft culvert removed are also not included in the analyses, i.e. they do not count in OMRD or TMRD calculations, nor are they buffered in the Secure Core analysis. These roads are to be impassable by any vehicle (passenger car, truck, 4WD vehicle, ATV, motorcycle, etcetera). These roads are still on the system. Revegetated roads defined as so grown-in that they are no longer drivable. The vegetation growth is such that it is easier to walk on the side-hill as opposed to down the center of the road bed. The caveat is: if any of these 3 types of road is bladed open, or the bridge/culvert repaired, it will be included in analyses based upon the closure device. If a physical barrier (berm, rock, etc.) is put in, the road will be included in TMRD calculations. If a gate is put in, the road will be included in TMRD calculations, and will also be buffered in Secure Core analysis. If no closure device is put in (i.e. the road is open), the route will be included in both OMRD and TMRD calculations, and will be buffered in Security CORE analysis.

Table 5. Motorized route attributes.

| Motorized Route Description | Specific Value in Attribute for Script | Route Used in Analysis | | |
|---|---|---|---|---|
| | | OMRD | TMRD | CORE |
| Roads or trails legally open to motorized use anytime during the non-denning season. | M | X | X | X |
| Non-motorized routes | <blank> | | | |

The trail or road is considered motorized if the route is legally open to two-wheeled motorized traffic (ATV, motorcycles, etcetera). These routes can either be included in the road dataset or separate. Either way, a specific text attribute as indicated above is required.

Table 6. Attributes for ownership, small private lands, and large lakes.

| Land Ownership and Lake Descriptions | Specific Value in Attribute for Script |
|---|---|
| Federal, state, and tribal lands | FED STATE TRIBAL |
| Large lakes, >320 acres | large lakes |
| Small-tract private lands | small PVT lands |

While State and Tribal lands do not have OMRD, TMRD, and Secure Core standards, their lands are included in the analyses run by federal land agencies. For tribal lands, only those lands designated as "tribal" and open for public use are included. Tribal allotments (land owned by tribal members) and tribal fee lands (owned or leased to private individuals) are to be considered "small PVT lands" for the purposes of the anlsyses. For private lands, these are small-tract, corporate, or Non-Governmental Organization (NGO) lands.

Typcially, agencies have ownership and lakes in separate GIS datasets. For the purposes of the Python script, they will need to be combined and attributed as indicated.

**Standards**

Habitat Standards on Public Federal lands in the PCA:

- maintain or decrease 2011 levels of open motorized route densities (OMRD)
- maintain or decrease 2011 levels of total motorized route densities (TMRD)
- maintain or increase 2011 levels of Secure Core
- temporary increases are allowed if the 10-year running average does not exceed a
  5% increase in OMRD and
  3% increase in TMRD and
  2% decrease in Secure Core

Habitat Standards on DNRC, Blackfeet Nation, and CS&KT lands in the PCA:

- limits on net increases in open roads and/or road densities
- limits on net increases in total roads and/or road densities

**Analysis runs for NCDE reports and projects**

OMRD, TMRD, and Secure Core will be measured biennially on odd number years starting in 2011. The status of each of the 126 BMU subunits will be reported in that year's annual report, even though the OMRD, TMRD, and Secure Core standards only apply to federal lands.

Individual projects on federal lands will be analyzed if the project requires construction of new roads, reconstruction or opening a restricted road, use of a restricted road above administrative levels allowed, or recurring helicopter flights at low elevations (< 500m). Any project meeting this definition will require analysis to determine the OMRD, TMRD and Secure Core for the route management situation during the project, i.e. all routes used for the project will be labeled as 'OPEN yearlong' for the analysis. Temporary changes to baseline values for OMRD, TMRD, and Secure Core will be allowed for projects if the 10-year running averages for these parameters in each subunit do not exceed a 5% increase in OMRD, a 3% increase in TMRD, or a 2% decrease in Secure Core. During these projects, changes in OMRD, TMRD, and Secure Core may exceed these limits in individual years but the 10-year running average will not exceed these limits. Each agency or agency's unit will have a spreadsheet set up to record and determine if the project(s) meeting these standards for those BMU subunits they manage.

Individual projects on State or Tribal lands do not have a 10-year running average requirement for OMRD, TMRD, or Secure Core.

**Miscellaneous**

The Swan Valley Grizzly Bear Conservation Agreement (SVGBCA) pertains to 11 BMU subunits in the Swan Valley: South Fork Lost Soup, Goat Creek, Lion Creek, Meadow Smith, Buck Holland, Porcupine Woodward, Piper Creek, Cold Jim, Hemlock Elk, Glacier Loon, and Beaver Creek. Plum Creek Timber Company is divesting all their lands in the Swan Valley, with a vast majority being transferred to Forest Service and State agencies through the MT Legacy Project. The Forest Service and State are still abiding by the agreement until the fiber agreement is complete. Once the fiber agreements end, DNRC may shift to management according to their HCP. If this occurs, the USFS would continue to manage its lands by the terms described in the Swan Valley Conservation Agreement, in perpetuity.

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# Appendix 6

## Comparison Between NCDE Conservation Strategy Secure Core Levels and Current IGBC Security CORE Levels in Each Bear Management Subunit

| BMU | Subunit Name | Principal Agency | Cons. Strategy Secure Core | Current Security CORE |
|---|---|---|---|---|
| BATM | Badger | LCNF-Rocky Mtn Front RD | 94 | 94 |
| BATM | Heart Butte | LCNF-Rocky Mtn Front RD | 81 | 81 |
| BATM | Two Medicine | LCNF-Rocky Mtn Front RD | 87 | 87 |
| BGSM | Albino Pendant | FNF-Spotted Bear RD | 100 | 88 |
| BGSM | Big Salmon Holbrook | FNF-Spotted Bear RD | 100 | 87 |
| BGSM | Black Bear Mud | FNF-Spotted Bear RD | 100 | 84 |
| BGSM | Brushy Park | FNF-Spotted Bear RD | 100 | 84 |
| BGSM | Buck Holland | FNF-Swan Lake RD | 49 | 40 |
| BGSM | Burnt Bartlett | FNF-Spotted Bear RD | 100 | 92 |
| BGSM | Hungry Creek | FNF-Spotted Bear RD | 100 | 88 |
| BGSM | Little Salmon Creek | FNF-Spotted Bear RD | 100 | 98 |
| BGSM | Meadow Smith | FNF-Swan Lake RD | 41 | 41 |
| BGSM | White River | FNF, Spotted Bear RD | 100 | 74 |
| BITE | Birch | LCNF-Rocky Mtn Front RD | 93 | 93 |
| BITE | Teton | LCNF-Rocky Mtn Front RD | 75 | 75 |
| BNKR | Big Bill Shelf | FNF-Spotted Bear RD | 87 | 80 |
| BNKR | Bunker Creek | FNF-Spotted Bear RD | 92 | 92 |
| BNKR | Goat Creek | FNF-SLRD & MT DNRC | 42 | 39 |
| BNKR | Gorge Creek | FNF-Spotted Bear RD | 100 | 90 |
| BNKR | Harrison Mid | FNF, - Spotted Bear RD | 99 | 95 |
| BNKR | Jungle Addition | FNF-Spotted Bear RD | 68 | 68 |
| BNKR | Lion Creek | FNF-SLRD & MT DNRC | 51 | 41 |
| BNKR | South Fork Lost Soup | FNF-SLRD & MT DNRC | 40 | 40 |
| BNKR | Spotted Bear Mtn | FNF-Spotted Bear RD | 68 | 68 |
| CODV | Pentagon | FNF-Spotted Bear RD | 100 | 94 |
| CODV | Silvertip Wall | FNF-Spotted Bear RD | 100 | 97 |
| CODV | Strawberry Creek | FNF-Spotted Bear RD | 100 | 100 |
| CODV | Trilobite Peak | FNF-Spotted Bear RD | 100 | 100 |
| DELK | Falls Creek | LCNF-Rocky Mtn Front RD | 85 | 85 |
| DELK | Scapegoat | LCNF-Rocky Mtn Front RD | 83 | 83 |
| HGHS | Coram Lake Five | FNF-Hungry Horse RD | 18 | 14 |
| HGHS | Doris Lost Johnny | FNF-Hungry Horse RD | 36 | 36 |
| HGHS | Emery Firefighter | FNF-Hungry Horse RD | 53 | 53 |
| HGHS | Peters Ridge | FNF-HHRD & SLRD | 34 | 34 |
| HGHS | Riverside Paint | FNF-Hungry Horse RD | 73 | 72 |
| HGHS | Wounded Buck Clayton | FNF-Hungry Horse RD | 65 | 64 |
| LMFF | Dickey Java | FNF-Hungry Horse RD | 85 | 81 |

| | | | | |
|---|---|---|---|---|
| LMFF | Lincoln Harrison | Glacier NP | 98 | 90 |
| LMFF | Moccasin Crystal | FNF-Hungry Horse RD | 81 | 81 |
| LMFF | Muir Park | Glacier NP | 98 | 97 |

| BMU | Subunit Name | Principal Agency | Cons. Strategy Secure Core | Current Security CORE |
|---|---|---|---|---|
| LMFF | Nyack Creek | Glacier NP | 100 | 98 |
| LMFF | Ole Bear | Glacier NP | 94 | 93 |
| LMFF | Pinchot Coal | Glacier NP | 99 | 99 |
| LMFF | Stanton Paola | FNF-Hungry Horse RD | 83 | 81 |
| LNFF | Anaconda Creek | Glacier NP | 94 | 94 |
| LNFF | Apgar Mountains | Glacier NP | 81 | 70 |
| LNFF | Canyon McGinnis | FNF-GVRD & FNF-TLRD | 56 | 51 |
| LNFF | Cedar Teakettle | FNF-Glacier View RD | 24 | 24 |
| LNFF | Dutch Camas | Glacier NP | 93 | 86 |
| LNFF | Lake McDonald | Glacier NP | 85 | 66 |
| LNFF | Lower Big Creek | FNF-Glacier View RD | 66 | 66 |
| LNFF | Upper McDonald Creek | Glacier NP | 90 | 76 |
| LNFF | Werner Creek | FNF-Glacier View RD | 42 | 42 |
| MSRG | Beaver Creek | FNF-Swan Lake RD | 66 | 66 |
| MSRG | Cold Jim | FNF-Swan Lake RD | 43 | 43 |
| MSRG | Crane Mtn | FNF-Swan Lake RD | 38 | 26 |
| MSRG | Crow | Flathead IR | 92 | 92 |
| MSRG | Glacier Loon | FNF-Swan Lake RD | 45 | 41 |
| MSRG | Hemlock Elk | FNF-Swan Lake RD | 64 | 64 |
| MSRG | Piper Creek | FNF-SLRD & MT DNRC | 52 | 52 |
| MSRG | Porcupine Woodward | FNF-SLRD & MT DNRC | 15 | 15 |
| MSRG | Post Creek | Flathead IR | 87 | 87 |
| MSRG | Saint Marys | Flathead IR | 94 | 94 |
| MLFK | Alice Creek | HNF-Lincoln RD | 71 | 70 |
| MLFK | Arrastra Mountain | HNF-Lincoln RD | 75 | 75 |
| MLFK | Monture | LNF-Seeley Lake RD | 99 | 99 |
| MLFK | Mor-Dun | LNF-Seeley Lake RD | 78 | 74 |
| MLFK | N-Scapegt | LNF-Seeley Lake RD | 100 | 94 |
| MLFK | Red Mountain | HNF-Lincoln RD | 62 | 59 |
| MLFK | S-Scapegt | LNF-Seeley Lake RD | 79 | 78 |
| MULK | Krinklehorn | KNF-Fortine RD | 75 | 75 |
| MULK | Therriault | KNF-Fortine RD | 72 | 72 |
| NFSR | Lick Rock | LCNF-Rocky Mtn Front RD | 100 | 91 |
| NFSR | Roule Biggs | LCNF-Rocky Mtn Front RD | 100 | 89 |
| NEGL | Belly River | Glacier NP | 99 | 79 |
| NEGL | Boulder Creek | Glacier NP & Blackfeet IR | 76 | 64 |
| NEGL | Chief Mtn | Glacier NP & Blackfeet IR | 53 | 51 |
| NEGL | Poia Duck | Glacier NP & Blackfeet IR | 68 | 51 |

| | | | | |
|---|---|---|---|---|
| NEGL | Upper Saint Mary | Glacier NP | 89 | 68 |
| NEGL | Waterton | Glacier NP | 100 | 84 |
| RTSN | Mission | LNF-Seeley Lk RD & MFWP | 33 | 33 |
| RTSN | Rattlesnake | LNF-Missoula RD | 86 | 85 |
| RTSN | South Fork Jocko | Flathead IR | 59 | 59 |
| SUBW | South Fork Willow | LCNF-Rocky Mtn Front RD | 88 | 85 |

| BMU | Subunit Name | Principal Agency | Cons. Strategy Secure Core | Current Security CORE |
|---|---|---|---|---|
| SUBW | West Fork Beaver | LCNF-Rocky Mtn Front RD | 84 | 76 |
| SEGL | Divide Mtn | Glacier NP & Blackfeet IR | 67 | 59 |
| SEGL | Midvale | Glacier NP & Blackfeet IR | 87 | 78 |
| SEGL | Spot Mtn | Glacier NP & Blackfeet IR | 79 | 61 |
| STRV | Lazy Creek | MT DNRC | 10 | 5 |
| STRV | Stryker | MT DNRC | 50 | 50 |
| STRV | Upper Whitefish | MT DNRC | 54 | 54 |
| SLVN | Ball Branch | FNF-Spotted Bear RD | 84 | 84 |
| SLVN | Jewel Basin Graves | FNF-Hungry Horse RD | 72 | 65 |
| SLVN | Kah Soldier | FNF-Spotted Bear RD | 69 | 68 |
| SLVN | Logan Dry Park | FNF-HHRD & FNF-SBRD | 54 | 52 |
| SLVN | Lower Twin | FNF-Spotted Bear RD | 91 | 91 |
| SLVN | Noisy Red Owl | FNF-Swan Lake RD | 59 | 52 |
| SLVN | Swan Lake | FNF-Swan Lake RD | 46 | 45 |
| SLVN | Twin Creek | FNF-Spotted Bear RD | 100 | 100 |
| SLVN | Wheeler Quintonkon | FNF-HHRD & FNF-SBRD | 66 | 66 |
| TESR | Deep Creek | LCNF-Rocky Mtn Front RD | 73 | 70 |
| TESR | Pine Butte | LCNF-Rocky Mtn Front RD | 71 | 68 |
| UMFF | Flotilla Capitol | FNF-HHRD & FNF-SBRD | 100 | 99 |
| UMFF | Long Dirtyface | FNF-Hungry Horse RD | 100 | 100 |
| UMFF | Plume Mtn Lodgepole | FNF-HHRD & SBRD | 100 | 97 |
| UMFF | Skyland Challenge | FNF-Hungry Horse RD | 63 | 63 |
| UMFF | Tranquil Geifer | FNF-Hungry Horse RD | 90 | 85 |
| UNFF | Bowman Creek | Glacier NP | 93 | 70 |
| UNFF | Coal & South Coal | FNF-Glacier View RD | 72 | 72 |
| UNFF | Ford Akokala | Glacier NP | 93 | 92 |
| UNFF | Frozen Lake | FNF-Glacier View RD | 86 | 80 |
| UNFF | Hay Creek | FNF-Glacier View RD | 55 | 55 |
| UNFF | Ketchikan | FNF-Glacier View RD | 72 | 68 |
| UNFF | Kintla Creek | Glacier NP | 96 | 86 |
| UNFF | Logging Creek | Glacier NP | 94 | 94 |
| UNFF | Lower Whale | FNF-Glacier View RD | 50 | 49 |
| UNFF | Quartz Creek | Glacier NP | 93 | 86 |
| UNFF | Red Meadow Moose | FNF-Glacier View RD | 55 | 55 |
| UNFF | State Coal Cyclone | FNF-GVRD & MT DNRC | 59 | 59 |

| | | | | |
|---|---|---|---|---|
| UNFF | Upper Trail | FNF-Glacier View RD | 88 | 88 |
| UNFF | Upper Whale Shorty | FNF-Glacier View RD | 86 | 86 |
| USFF | Basin Trident | FNF-Spotted Bear RD | 100 | 85 |
| USFF | Gordon Creek | FNF-Spotted Bear RD | 100 | 82 |
| USFF | Jumbo Foolhen | FNF-Spotted Bear RD | 100 | 94 |
| USFF | Swan | LNF-Seeley Lake RD | 55 | 55 |
| USFF | Youngs Creek | FNF-Spotted Bear RD | 100 | 92 |

| | |
|---|---|
| | Indicates subunit is ≥50% federal or tribal wilderness of all lands within subunit. |

The differences between the process under the Conservation Strategy and the current IGBC Motorized Access are listed in the following table.

| **NCDE Conservation Strategy Process** | **Current IGBC Motorized Access Process** |
|---|---|
| Plum Creek Timber Company roads and lands are treated as "private" roads & lands. After the MT Legacy Project, Plum Creek Timber Company lands are a small percentage of the NCDE. | Plum Creek Timber Company roads and lands were treated like federal/state lands. Prior to the MT Legacy Project, Plum Creek Timber Company lands were a significant percentage in the NCDE. |
| Grizzly Bear Management Situation 3 (MS-3) is no longer used post delisting; therefore, these lands are now included in route density calculations. | Grizzly Bear Management Situation 3 (MS-3) lands were excluded from open & total route density calculations. |
| High Use (>20 parties/week for at least 25% of the non-denning season) trails are not used, i.e. they are not buffered when calculating Secure Core and do occur in Secure Core. | High Use (>20 parties/week for at least 25% of the non-denning season) trails were buffered when calculation Security CORE, i.e. high-use trails could not occur in Security CORE. |

# Appendix 7

## Subunit Management Under the Swan Valley Conservation Agreement

**Subunits Included (immediate subunit rotation for activity and past rotation):**

| | Mission BMU | Big Salmon BMU | Bunker BMU |
|---|---|---|---|
| 1997-1999 | Piper Ck<br>Beaver Ck | Meadow-Smith | Lost Soup |
| 2000-2002 | Porcupine-Woodward<br>Hemlock-Elk | Buck Holland | Lion Ck |
| 2003-2005 | Cold-Jim<br>Glacier-Loon | Meadow-Smith | Goat Ck |
| 2006-2008 | Piper Ck<br>Beaver Ck | Buck-Holland | Lost Soup |
| 2009-2011 | Porcupine-Woodward<br>Hemlock-Elk | Meadow-Smith | Lion Ck |
| 2012-2014 | Cold-Jim<br>Glacier-Loon | Buck-Holland | Goat Ck |
| 2015-2017 | Piper Ck<br>Beaver Ck | Meadow-Smith | Lost Soup |
| 2018-2020 | Porcupine-Woodward<br>Hemlock-Elk | Buck-Holland | Lion Ck |
| 2021-2023 | Cold-Jim<br>Glacier-Loon | Meadow-Smith | Goat Ck |
| 2024-2026 | Piper Ck<br>Beaver Ck | Buck-Holland | Lost Soup |
| 2027-2029 | Porcupine-Woodward<br>Hemlock-Elk | Meadow-Smith | Lion Ck |
| 2030-2032 | Cold-Jim<br>Glacier-Loon | Buck-Holland | Goat Ck |
| 2033-2035 | Piper Ck<br>Beaver Ck | Meadow-Smith | Lost Soup |

1. Definitions

This Agreement is consistent with the Flathead Land and Resource Management Plan, as amended (the "LRMP"). The Forest Service is bound by and/or accepts existing definitions found within the LRMP. The Forest Service will utilize existing definitions found in the LRMP, unless definitions found in this Agreement are more conservative in regard to the Bear, in which case, definitions found in this Agreement will be utilized.

"Active Subunit" shall mean those BMU Subunits in which the Parties are conducting Administrative and Commercial Use activities.

"Active Subunit Restricted Road" shall mean a gated or barriered road within an Active Subunit which is closed for all uses except Administrative Use and Commercial Use.

"Administrative Use" shall mean use by Forest Service (FS), or Department of Natural Resources (DNRC) associated with all land and resource management activities including, without limitation, timber sale layout, road location, pre-commercial thinning, road maintenance, tree planting, slash disposal and Salvage Harvest, but shall not include Commercial Use. Administrative Use also shall mean minor actions such as bough and post and pole harvest that are less than two consecutive weeks in duration.

"Bear" shall mean the grizzly bear (*Ursus arctos horribilis*).

"BMU Subunits" shall mean the female home range analysis areas specified on Attachment D hereto, which is hereby incorporated herein and made a part hereof.

"BMUs" shall mean Bear Management Units as set forth in Attachment A, which is hereby incorporated herein and made a part hereof.

"Commercial Use" shall mean major forest management activities by FS or DNRC including, without limitation, road construction, road reconstruction and timber harvest, but does not include Salvage Harvest.

"Conservation Area" shall mean certain National Forest and Department of Natural Resource lands set forth on Attachment B, which is hereby incorporated herein and made a part hereof, that lie within the Swan Valley in the Northern Continental Divide Ecosystem Grizzly Bear Recovery Zone.

"Core Areas" shall mean those areas as defined by the IGBC Access Task Force Report (July 1994) and set forth in Attachment C, which is hereby incorporated herein and made a part hereof.

"Cover" shall mean vegetation blocks having a minimum diameter of at least three Sight Distances, which on DNRC lands shall not be less than 300 feet.

"Denning Period" shall mean the period between November 16 and March 31.

"Even Age Cutting Unit" shall mean a harvest unit in which either a clearcut or seedtree silvicultural prescription is used or any other treatment that would result in openings of more than three (3) Sight Distances.

"Guidelines" shall mean the principles and guidelines for forest management set forth in Section 3 hereof, as the same may be amended from time to time.

"Inactive Subunit" shall mean those BMU Subunits in which the Parties are not conducting Commercial Use activities.

"Inactive Subunit Restricted Road" shall mean a gated or barriered road within an Inactive Subunit, which is closed for all uses except Administrative Use, and Commercial log haul when necessary.

"Linkage Zones" shall mean the areas necessary for linking populations of Bears specified on Attachment E, which is hereby incorporated herein and made a part hereof.

"Open Road" shall be any road on which there are no use restrictions. Open Road shall not mean Restricted Roads or highways, county roads, administrative site access roads and private residence access roads.

"Preferred Habitat" shall mean areas adjacent to streams and wetlands inside Linkage Zones as set forth in Attachment G, as the same may be changed from time to time by mutual agreement of the Parties based on field verification.

"Reclaimed Road" shall mean a road which (i) has been "put to bed" to address Bear security or to address watershed concerns by pulling culverts and revegetating with trees or grass; and (ii) is generally unusable for 4-wheeled vehicles due to physical obstructions such as "kelly humps" or other physical obstructions, rather than gates. Reclaimed Road shall also mean roads that are physically blocked using large cement blocks or equivalent barriers. A Reclaimed Road will not receive motorized Administrative or Commercial uses.

"Restricted Period" shall mean the non-denning period which runs between April 1 and November 15.

"Restricted Roads" shall mean Active Subunit Restricted Roads and Inactive Subunit Restricted Roads.

"Riparian Zone" shall mean a streamside management zone as defined on the date hereof in the Montana Streamside Management Zone Rules, a copy of which is attached hereto in Attachment F, which is hereby incorporated herein and made a part hereof.

"Salvage Harvest" shall mean short term activities to harvest dead or dying trees resulting from fire, disease, blowdown or the like and shall not continue for periods of more than two consecutive weeks or for more than 30 days in the aggregate during a given calendar year in the non-denning period (April 1 to November 15). Salvage activities that result from catastrophic fire or blowdown and that require more than two consecutive weeks to complete, will require special management considerations (refer to Section 3(b)(iv)).

"Sight Distance" shall mean the distance at which 90% of an animal is hidden from view, which on DNRC and National Forest lands is approximately 100 feet depending on the type of cover available.

“Spring Habitat” shall mean all areas within Linkage Zones below 5200 feet in elevation.

“Spring Period” shall mean period of time running from April 1 to June 15.

"Take" shall mean take of a species as contemplated under Section 9 of the Act.

"Visual Screening" shall mean a minimum of one Sight Distance.

1. Management Guidelines

DNRC, and the Forest Service agree to carry out forest management practices within the described subunits according to the practices and procedures that follow. In addition to the practices and procedures documented in this agreement, the Forest Service will continue to adhere to all Objectives, Standards and Guidelines found in the Flathead Forest LRMP, as amended

(a) Open Road Densities

(i) To minimize the risk of death or injury to Bears, the Parties will manage roads throughout the included subunits so that no more than 33% of any given BMU Subunit exceeds an Open Road density of one mile per square mile during the Restricted Period. This density will be achieved as soon as is practicable, but no later than five years after the termination of the Fiber Agreement that resulted from the sale of Plum Creek lands to FS and DNRC. (Planned to be 2018). This date may be extended if an

additional fiber agreement is put in place to obtain additional Plum Creek properties by either the National Forest or the Department of Natural Resource Conservation. The long-term goal is that no more than 21% of a BMU Subunit shall exceed the Open Road density of one mile per square mile. The reduction from 33% to 21% will be done by voluntary road closures by the Parties.

(ii) The share of the allowable possible deviation from the 1 mi/sq mile standard will be apportioned among the Parties in approximate proportion to land ownership within the BMU Subunit, provided that no Party shall take advantage of road reductions made by another Party, except as mutually agreed to by all Parties. No Party will be required to close roads if the required open road density of 33% set forth in Section 3(a)(i) is otherwise being met.

(iii) Open road densities of lands owned or managed by the Parties within each BMU Subunit will be calculated using a GIS moving window technique.

(b) Operations and Uses

(i) The Parties agree to stop all management activities (other than replanting and non-motorized Administrative Use) during the Spring Period in Spring Habitat, provided that (x) Administrative Use and the hauling of harvested logs may occur on roads that are open to the public that are in such Spring Habitat and (y) road use associated with replanting and limited spring burning is permitted on all roads. Roads within Linkage Zones at low elevation that are open to all Administrative Uses between April 1 and June 15 are shown in Attachment H.

(ii) The Parties agree to limit the number of Active Subunits within the Conservation Area by concentrating Commercial Use during the Restricted Period in four (4) out of the eleven (11) BMU Subunits on a rotational basis, leaving the other seven (7) BMU Subunits as Inactive Subunits during the Restricted Period for a minimum of three (3) years. The rotational schedule as it is currently contemplated is governed by Attachment I attached to and hereby made a part of this Agreement. At no one time during the Restricted Period will more than: two BMU Subunits be Active Subunits within the Mission Range BMU; one BMU Subunit be an Active Subunit within the Big Salmon BMU; and one BMU Subunit be an Active Subunit within the Bunker BMU. The Parties will commence such rotation on the date set forth in Attachment I, but in any event not later than three years after the Effective Date. Periodically, as necessary, the Parties may agree to adjust or modify these seasonal and

rotational concepts based on evolving science regarding the needs of the Bear. Insofar as possible, schedules will be developed 3 years in advance of the start of the Commercial Activity within a BMU Subunit.

(iii) Every effort will be made to minimize uses in Inactive Subunits, but when in the interests of local residents it may be possible to allow post and pole and bough collection in Inactive Subunits as long as the activity is less than two consecutive weeks in duration.

(iv) Salvage Harvests will not occur in Spring Habitat during the Spring Period. In Inactive Subunits, Salvage Harvests shall be conducted either: (x) between June 16 and August 31 as long as they do not exceed more than 30 days in the aggregate for a given Inactive Subunit within a given calendar year, or (y) during the Denning Period (November 16 to March 31). Salvage Harvests during the period June 16 to August 31 in Inactive Subunits resulting from extraordinary events such as catastrophic fire or blow-down that require more than two consecutive weeks or in the aggregate more than 30 days in a calendar year to complete, may require special management. The Parties agree to confer on a case-by-case basis with respect to such events to determine the special management opportunities that might compensate for any such Salvage Harvests.

(v) Although the Parties will attempt wherever feasible to avoid activities during the Spring Period in Spring Habitat outside of Preferred Habitat, they recognize that some Administrative and Commercial Use may need to occur in Active Subunits in such low elevation areas during such period. If a party wishes to conduct an activity within Spring Habitat (but outside of Preferred Habitat) during the Spring Period that is otherwise prohibited by subparagraphs (i) or (iv) above, such party may nevertheless conduct such activity provided that the activity complies with a plan prepared in accordance with this paragraph. Before conducting such activity, the Party proposing such activity agrees to confer with the Service on a disturbance avoidance plan to mitigate for such activity. Such plan, which shall be prepared by a wildlife biologist for the party proposing such activity after conferring with the Service, shall detail the steps that will be taken to avoid and/or minimize the impacts of the activity on Bears and be submitted to the Service for review at least four weeks prior to the commencement of the planned activity.

(c) Road Locations

(i) The Parties recognize the importance of Preferred Habitat and Riparian Zones to Bear security and the Service recognizes the Parties' need to

access their lands. Accordingly, the Parties will limit the construction of new roads in Preferred Habitat and Riparian Zones to those roads that are essential to forest management. In addition, any roads built in these areas will be constructed in such a manner as to minimize the density/mileage of roads in such areas. Existing roads will be analyzed and those not required for short term management will be Reclaimed, and those roads needed for ongoing primary access will be relocated when reasonable.

(ii) Within the Conservation Area, harvest or new road construction will leave Visual Screening between roads that are outside of Even Age Cutting Units and the Unit itself, although exceptions may be required to accommodate some cable yarding harvest.

(d) Cover

(i) The Parties will evaluate Cover across all ownerships and will manage their lands so that a minimum of 40% of all land in each BMU Subunit in the Conservation Area is maintained in Cover. To the extent feasible, Cover will be distributed evenly throughout the Subunit. Each party will be responsible for maintaining cover, at a level adequate to meet the 40% objective, in proportion to its ownership within the Subunit.

(ii) Visual Screening retention will be the management objective in areas adjacent to all Open Roads. The Parties will leave Visual Screening adjacent to Open Roads, although exceptions may be required for such situations as cable yarding harvest and in some exceptional cases of insects, disease, or blow down. Even-age treatments adjacent to Open Roads will be no larger than one acre.

(iii) The Parties will lay out Even Age Cutting Units in the Conservation Area so that no point in the unit is more than 600 feet from Cover. The Parties will use their best efforts to leave Cover around natural open areas so that no point of such openings is more than 600 feet from Cover. Catastrophic events will be dealt with on a case-by-case basis.

(iv) In large Even Age Cutting Units (larger than 40 acres) the Parties will retain Cover to reduce line-of-sight distances.

(e) Riparian Zones

The Parties will use uneven-aged forest management practices in Riparian Zones located in the Conservation Area.

(f) Security

(i) The Parties acknowledge that Reclaimed Roads and Restricted Roads are important for providing security for Bears. The Parties agree to contribute to security, particularly within Linkage Zones, by reclaiming or restricting roads. DNRC may voluntarily elect to contribute to security, particularly within Linkage Zones, by reclaiming (as defined in this Agreement) some roads that are not essential to their respective management. The Forest Service hereby agrees not to take management actions that increase total road density or open road density or to decrease Core Areas on its ownership. DNRC will voluntarily agree to contribute those areas set forth in Attachment C as Core Areas. The Forest Service also agrees to reclaim roads to enhance use of preferred and other high quality habitats, and to complement adjacent areas of secure habitat. The Parties will cooperate in identifying roads on their lands within the Conservation Area that are grown-in and/or unnecessary for management and will make such roads Reclaimed Roads from April 1 to November 15 in order to increase security for bears. The Parties agree not to reclaim existing roads accessing the other Parties' lands without first ensuring that reasonable alternative access exists. DNRC agrees to work with the Forest Service to minimize the number and length of new roads that will go through Core Areas; provided, however, that the foregoing will not require DNRC to accept alternate access that would preclude reasonable use of their lands. The Forest Service agrees that if the only reasonable access is through Core Areas that it will provide replacement Core Areas, where feasible, so that such access by DNRC is possible.

(ii) Both the FS and DNRC will prohibit their contractors that are working under contract from carrying firearms while on duty.

(iii) DNRC will not be subject to a total road density standard. The Forest Service will not take management actions that increase total road density on its ownership except to the extent required by law to grant access to in-holders. The Forest Service agrees to reclaim roads to the extent necessary to meet its total road density obligations. DNRC agrees to work with the Forest Service to minimize the total road density impact on the Forest Service caused by their access requests; provided that the foregoing will not require DNRC to accept alternative access that would preclude reasonable use of their respective lands.

(iv) Nothing in this Section 3(f) shall be construed to change the obligation of the Forest Service to maintain existing easements and permits or to

provide access to non-federal lands within the boundaries of the national forest, as required by law.

2. Monitoring and Coordination

(a) The Parties acknowledge that the principles of "adaptive management" should govern management within the Appendix __ subunits. As such, new information gained from monitoring and research, conducted either within or outside the appendix __ subunits, will be reviewed on an annual or more frequent basis, as necessary, to determine if changes in management direction are appropriate. The Parties may choose to support such research/monitoring by contributing to ongoing or future proposed Bear research projects.

(b) The Parties will cooperatively monitor the application and effectiveness of the Guidelines on an ongoing basis and provide the Service with the results thereof on an annual basis. Monitoring will include: (i) an analysis of open and total road densities, (ii) levels of Administrative Use in Inactive Subunits, (iii) levels of Administrative Use on Restricted Roads within Linkage zones during the Spring Period and fall period (September 1 to November 15).

(c) The Guidelines will be reviewed by the Parties annually and appropriately revised, pursuant to the procedures set forth in Section 10 hereof. Revisions will be commensurate with new research findings concerning Bear conservation practices and experience with the practicability of the strategies agreed to here.

(d) The Parties agree to develop strategies to inform the public about the needs of the Bear.

3. Application

The provisions of this Appendix have been tailored to protect Bears under the special conditions present within the Swan Valley of the Northern Continental Divide Ecosystem. The terms of this appendix apply only to the Subunits as defined in this Appendix.

4. Resources

Nothing in this Appendix shall require the DNRC or the Forest Service to expend funds that have not been lawfully appropriated and administratively allocated for such use.

# Appendix 8

Interagency Rocky Mountain Front Management Guidelines for Selected SpecieS

Interagency

# ROCKY MOUNTAIN FRONT

Wildlife Monitoring/Evaluation Program

## Management Guidelines for Selected Species, Rocky Mountain Front Studies.

Interagency Rocky Mountain Front
Wildlife Monitoring/Evaluation Program

Management Guidelines

| | |
|---|---|
| Grizzly Bear | Elk |
| Mountain Goat | Mule Deer |
| Bighorn Sheep | Raptors |

Approved By:

John D. Gorman, Forest Supervisor
Lewis & Clark National Forest

SEP 1 1987
Date

Wayne Winne, District Manager
Bureau of Land Management, Lewistown District

SEP 1 1987
Date

Wayne Brewster, Field Supervisor
U.S. Fish & Wildlife Service

SEP 1 1987
Date

Daniel Vincent, Regional Supervisor
Montana Department Fish, Wildlife and Parks

SEP 1 1987
Date

# INTRODUCTION

The Interagency Rocky Mountain Front Monitoring and Evaluation Program was initiated in 1980 in response to the collective needs of the participating agencies. These needs involved both the proactive management of the diverse wildlife resource as well as planning and evaluation of a multitude of human use activities and management of other natural resources. The guidelines developed from this coordinated interagency effort are best management practices to maintain or enhance selected wildlife species and their habitats. Application and monitoring of the guidelines will assist land and wildlife managers in meeting their wildlife and habitat objectives, will assist managers in coordinating multiple-use objectives with the biological requirements of these wildlife resources and will provide an analytical tool in evaluating effects of proposed activities.

It is recognized that all potential activities cannot be conducted simultaneously while maximizing outputs from all resource uses. Multiple-use involves both complimentary and competing activities at various times and locations and by definition may involve maximizing benefits from one resource use while precluding all or parts of the benefits of a competing use. The guidelines were not developed with the intent of precluding certain activities, but rather to assist in providing a balance of land uses while at the same time preserving the integrity and diversity of these wildlife resources. It is recognized that application of these guidelines in designing activities may require certain activities to be modified, restricted, or even precluded in order to conserve the diverse wildlife resources of the Rocky Mountain Front. On the other hand, they identify windows of opportunity where little or no competition exists, they identify opportunities for enhancement of these wildlife resources, and finally, they identify those instances where there is competitive overlap so more informed management decisions can be made, resulting in balanced stewardship of the broad array of national resources.

In the event that future efforts or information result in the need for a new guideline or the modification of an existing guideline, it can be submitted at anytime to an appropriately designated interagency committee for review and approval.

The following management guidelines are based on the best information currently available. They are a result of current or recently completed studies on selected wildlife species. Field investigators conducting the studies have completed extensive literature reviews on the various species considered. The guidelines which have been formulated and presented in this document are not only the result of the study findings and literature review, but incorporate the professional judgement of the technical personnel involved.

# OBJECTIVES

The need for management is predicated on management concerns involving the effects of existing and proposed land uses and human activities upon various wildlife species and their habitat. The objective of the development and application of management guidelines is to avoid or minimize the following effects of human related activities which may adversely impact some or all of the selected wildlife species being considered:

A. Physical destruction of important wildlife habitat components.
B. Human disturbance that would displace various wildlife species from important seasonal use areas.
C. Increased direct human caused mortality.
D. Increased stress due to higher human activity levels.
E. Direct mortality or physical impairment resulting from environmental (chemical) contaminates.
F. Increased wildlife/human interaction resulting from habitat intrusion or displacement.

# MANAGEMENT GUIDELINES

Management guidelines provide coordination measures designed to avoid or minimize the potential conflicts previously identified between human related activities and wildlife. Although many of the guidelines are applicable to a variety of human activities, some of them are specific to a single activity. Oil and gas exploration and development has received special emphasis due to the relatively high level of activity in recent years. As a result, some of the guidelines apply specifically to that activity.

The guidelines have not been submitted for interdisciplinary analysis, public comment, or NEPA review. Where they have been employed, they were exposed to this review as part of the public planning process. Decision makers for each agency involved will determine what is a reasonable and prudent application of these guidelines in each case. The resulting planning, evaluation, and decision process will conform to the NEPA process. Departure from the guidelines, the impacts resulting from that departure, and the justification for such departure will be displayed in the appropriate planning documents.

Approved management guidelines will be included in permits, contracts or other formal authorizations of human activities as applicable. Omissions or modifications of guidelines as they are applied to specific activities will be documented in compliance with NEPA.

# MONITORING

A majority of the radio tracking and habitat survey data collected to date has been baseline information including the identification of seasonal ranges, reproduction areas, breeding areas and migration corridors. Future studies will place increasing emphasis on the monitoring of effects of increased human activity levels, particularly those associated with oil and gas exploration, on the wildlife species being studied. The management guidelines presented in this document are only partially based on monitoring information collected during the current studies on the Rocky Mountain Front. An important consideration in further monitoring efforts will be to test and validate the guidelines as to their effectiveness and applicability. Projects that may be proposed in the future should include as part of the cost of the project, funding to help assist in validating these guidelines.

# PART A — GENERAL MANAGEMENT GUIDELINES

The following general management guidelines are applicable coordination measures that will be considered when evaluating the effects of existing and proposed human activities in identified seasonally important habitats for a variety of wildlife species:

1. Identify and evaluate for each project proposal the cumulative effects of all activities, both existing uses and other planned projects. Potential site specific effects of the project being analyzed are a part of the cumulative effects evaluation which will apply to all lands within a designated biological unit. A biological unit is an area of land which is ecologically similar and includes all of the yearlong habitat requirements for a sub-population of one or more selected wildlife species.

2. Evaluate human activities, combinations of activities, or the zones of influence of such activities that occur on seasonally important wildlife habitats and avoid those which may adversely impact the species or reduce habitat effectiveness.

3. Space concurrently active seismographic lines or line segments at least nine (9) air miles apart to allow an undisturbed corridor into which wildlife can move when displaced (Olson, G., 1981).

4. Establish helicopter flight patterns of not more than one-half (1/2) mile in width along all seismographic lines, between landing zones and the lines, and between landing zones and other operations, unless flying conditions dictate deviations due to safety factors.

5. Because helicopters produce a more pronounced behavioral reaction by big game and raptors than do fixed-wing aircraft, helicopters will maintain a minimum altitude of 600 feet (183 meters) above ground level when flying between landing zones and work areas where landing zones are not located on seismic lines, unless species specific guidelines recommend otherwise (Hinman, H., 1974; McCourt, K.H., et al. 1974; Klein, D.R., 1973; Miller, F.L. and A. Gunn, 1979).

6. Designate landing zones for helicopters in areas where helicopter traffic and associated human disturbances will have the minimum impact on wildlife populations. Adequate visual and/or topographic barriers should be located between landing zones and occupied seasonal use areas.

7. The use of helicopters instead of new road construction to accomplish energy exploration and development is encouraged.

8. Base road construction proposals on a completed transportation plan which considers important wildlife habitat components and seasonal use areas in relation to road location, construction period, road standards, seasons of heavy vehicle use, road management requirements, etc.

9. Use minimum road and site construction specifications based on projected transportation needs. Schedule construction times to avoid seasonal use periods for wildlife as designated in the species specific guidelines.

10. Locate roads, drill sites, landing zones, etc. to avoid important wildlife habitat components based on a site specific evaluation.

11. Insert "dog-legs" or visual barriers on pipelines and roads built through dense vegetative cover areas to prevent straight corridors exceeding one-fourth (1/4) mile where vegetation has been removed (Stubbs, C.W. and G.J. Markham, 1979).

12. Roads which are not compatible with area management objectives and are no longer needed for the purpose for which they were built will be closed and reclaimed. Native plant species will be used whenever possible to provide proper watershed protection on disturbed areas. Wildlife forage and/or cover species will be utilized in rehabilitation projects where deemed appropriate.

13. Keep roads which are in use during oil and gas exploration and development activity closed to unauthorized use. Place locked gates and/or road guards at strategic locations to deter unauthorized use when activities are occurring on key seasonal ranges.

14. Impose seasonal closures and/or vehicle restrictions based on wildlife or other resource needs on roads which remain open.

15. Bus crews to and from drill sites to reduce activity levels on roads. Shift changes should be scheduled to avoid morning and evening wildlife feeding periods.

16. Keep noise levels at a minimum by muffling such things as engines, generators and energy production facilities.

17. Prohibit dogs during work periods.

18. Prohibit firearms during work periods or in vehicles traveling to and from work locations.

19. Seismographic and exploration companies should keep a daily log of activities. Items such as shift changes, shut down/start up times, major changes in noises or activity levels, and the location on the line where seismic crews are working should be recorded.

# GRIZZLY BEAR

The Interagency Grizzly Bear Committee approved the application of guidelines on National Forest System, Bureau of Land Management (BLM) and National Park System lands throughout grizzly bear ecosystems in the States of Idaho, Montana, Washington, and Wyoming. (November 26, 1986 Federal Register, Vol. 51, No. 228). These guidelines are known as the Interagency Grizzly Bear Guidelines (IGBG). The IGBG provide definition and management direction for grizzly bear Management Situations I, II, III, IV and V and further provide generalized guidelines on "how to coordinate various activities with the bear in the various management situations. Grizzly bear habitat along the Rocky Mountain Front has been stratified into grizzly bear management situations pursuant to the IGBG.

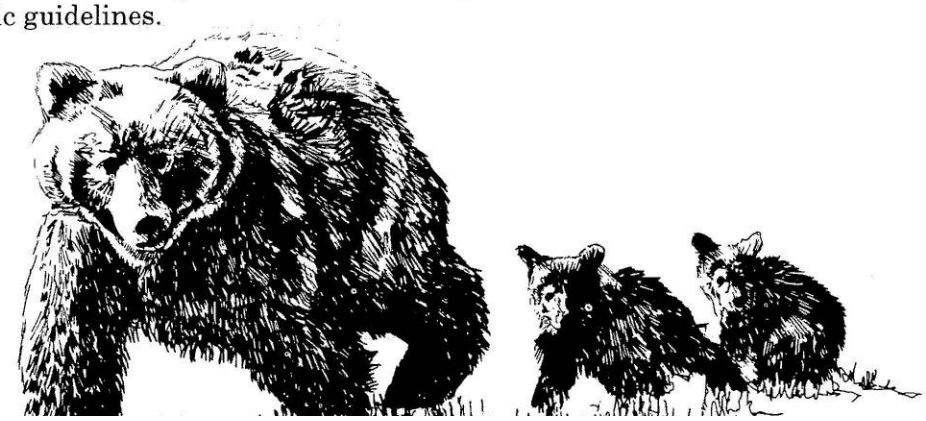
The Rocky Mountain Front Guidelines (RMFG) found in this document do not identify management situations or provide definitions or management directions of the stratification. The Management Situations designated on the Front pursuant to the IGBG identify where the emphasis on grizzly bear needs to be placed, and if there is a conflict, where the conflict should be resolved in favor of the bear. The RMFG represent best management practices for coordinating multiple use activities within the grizzly bear management situations delineated on the Front. The RMFG are detailed coordination measures for specific activities that will assist land managers in meeting the management direction provided in the IGBG. They are consistent with the IGBG and further refine the IGBG to specific habitat conditions on the Front.

Study results documented to date along the east Rocky Mountain Front are the basis for the development of management guidelines for grizzly bear and their habitat. During the period from 1977-1979, research was carried out by the Border Grizzly Project under a contract with the BLM.

Since 1980 the Montana Department of Fish, Wildlife and Parks has assumed the intensive grizzly bear monitoring work with funding continuing from the Interagency Rocky Mountain Front Task Force, private industry (ARCO, Mobil Oil Corporation, Shell Oil, American Petrofina, Williams Exploration, Sun Exploration) and the Nature Conservancy. In addition, a BLM funded livestock/ grizzly bear interaction study was conducted by a graduate student from Montana State University during the field seasons of 1985 and 1986.

These guidelines were developed as a direct result of grizzly bear monitoring conducted on the East Front. They represent guidelines that, when followed, will mitigate but not totally eliminate influences of human activities on grizzly bears and grizzly bear habitat. Human activities within grizzly bear range will have effects, however subtle, on grizzly bears.

All previously mentioned "general management guidelines" are applicable coordination measures that should be considered when evaluating human activities in grizzly bear habitat. The following are additional species specific guidelines.



1. Avoid human activities in identified grizzly bear habitat constituent elements or portions of constituent elements containing specific habitat values during the following seasonal use periods (see data summarization):

| | | |
|---|---|---|
| A. | Spring habitat (concentrated use areas) | April 1 - June 30 |
| B. | Alpine feeding sites | July 1 - Sept. 15 |
| C. | Subalpine fir/whitebark pine habitat types | Aug. 1 - Nov. 30 |
| D. | Denning habitat | Oct. 15 - Apr. 15 |

2. Avoid human activities in grizzly bear habitat components which provide important food sources during spring and early summer, April 1 - July 15. These habitat components include riparian shrub types, *Populus* stands, wet meadows, sidehill parks, and avalanche chutes. Maintain an undisturbed zone of at least 1/2 mile between activities and the edge of these habitat components where many important bear foods occur.

3. Establish flight patterns in advance when activities require the use of helicopters. Flight patterns should be located to avoid seasonally important grizzly bear habitat constituent elements and habitat components during the designated seasonal use periods.

4. No seismic or exploratory drilling activities should be conducted within a minimum of one mile of den sites during the October 15 - April 15 period (Reynolds, P.E. et al, 1983).

5. Seismic permits should include a clause providing for cancellation or temporary cessation of activities, if necessary, to prevent grizzly/human conflicts.

6. Scheduling of well drilling on adjacent sites, within important grizzly bear use areas, should be staggered to provide a disturbance free area for displaced bears.

7. Pipeline construction required for the development of a gas or oil field should be condensed into the shortest time frame possible and subject to seasonal restrictions when conducted in important grizzly bear habitat.

8. Field operation centers associated with seismic or oil/gas exploration activities should be placed carefully to avoid seasonally important habitat components or constituent elements. Such placement of sites is necessary in order to avoid direct or potential conflicts between man and grizzly bear.

9. Retain frequent dense cover areas adjacent to roads for travel corridors and security cover necessary to protect important habitat components. Three sight distances are desirable to provide visual security for grizzlies. A sight distance is the average distance at which a grizzly or other large animal is essentially hidden from the view of an observer by vegetation cover. The same security cover guidelines also applies to timber harvest units.

10. No off-duty work camps will be allowed within occupied seasonally important constituent elements.

11. Incinerate garbage daily or store in bear proof containers and remove to local landfill dumps daily.

12. Commercial activities permitted on public land should be planned and coordinated to avoid conflicts with grizzly bear trapping operations being conducted under the monitoring program. General public use of areas where trapping operations are active will be controlled through appropriate administrative actions by the agencies involved.

The following are grizzly bear management guidelines specifically oriented toward livestock grazing:

1. Livestock grazing on riparian plant communities should be deferred until after July 1.

2. In pastures grazed after July 1, cattle should be removed before the amount of the riparian forage base is reduced by 50 percent by either grazing or structural damage.

3. Exceptions to the July 1 entry date can be made when a pasture is part of a grazing system (for example, rest rotation or deferred rest rotation) that does not cause a decrease in the condition or size of the riparian plant communities.

4. In riparian habitats that receive high amounts of bear use, fencing to exclude livestock grazing and trampling may be necessary where livestock turn-out dates prior to July 1 are allowed.

5. Boneyards and livestock dumps are prevalent along the East Front and are frequented by grizzly bears. Ranchers and landowners should be encouraged to place carcasses of dead livestock and garbage on remote areas of their land. Dead cows and calves should be hauled a considerable distance from calving grounds to discourage bears from feeding on carion and newborn calves.

6. Options given in the IGBG for sheep allotments will be followed: "On sheep allotments where grizzly — livestock depredation has been authenticated, adjustments will be made for the primary purpose of grizzly bear conservation. The following options are available:

   (a) change the season of use, bedding practices, or grazing area to avoid known problem areas or other habitat important to grizzlies in time and space;

   (b) change the class of livestock from sheep to cattle if the range is suitable for cattle; or

   (c) remove all livestock and close the allotment. Vacant sheep allotments will not be restocked with sheep."

In addition to the guidelines listed above for livestock grazing practices, the following research/ management recommendations are presented; and will be considered as allotment management plans are updated.

1. The condition and trend of all riparian plant communities and their production of *Angelica arquta, Heracleum lanatum*, and *Osmorhiza occidentalis* need to be determined on all East Front public lands grazed by livestock.

2. For pastures where the condition of riparian plant communities needs improving, the construction of special use pastures is recommended. A special use pasture should be constructed where large areas of riparian vegetation are enclosed so an adequate forage base will be available to allow for stocking rates compatible with livestock operations. (Exclosures should be considered if riparian areas are too small.) These pastures should only be grazed after July 1, and the livestock should be removed before the utilization of the riparian forage base reaches 50% or the special use pastures should be incorporated into a deferred rest rotation grazing system similar to that described by Marlow (1985). Some other methods which may be used to reduce impacts to riparian include; development of alternate water sources, placement of salt away from riparian, and improved herding practices.

3. For riparian areas where the abundance of important plant species used by grizzlies for cover (*Populus tremuloides, Populus tricocarpa, Salix* spp., or *Betula* spp.,) or food (*Angelica arquta, Heracleum lanatum*, or *Osmorhiza occidentalis*) has been reduced, reestablishment should be attempted.

# Appendix 9

## Private Lands – 2011 Values Inside the PCA

| BMU Name | miscellaneous businesses, day-use, etc. | residences & overnight use | unknown |
|---|---|---|---|
| | | | |
| Badger Two Medicine | 10 | 79 | |
| Big Salmon | 26 | 390 | 5 |
| Birch Teton | 2 | 55 | 1 |
| Bunker | | 42 | |
| Dearborn Elk Creek | | 163 | |
| Hungry Horse | 1488 | 1515 | 14 |
| Lower Middle Fork Flathead | 119 | 305 | 4 |
| Lower North Fork Flathead | 179 | 379 | |
| Mission Range | 5 | 563 | 3 |
| Monture Landers Fork | 1 | 97 | |
| Murphy Lake | | 10 | |
| Northeast Glacier | 89 | 271 | 1 |
| Rattlesnake | | 6 | |
| South Fork Sun Beaver Willow | 1 | 34 | |
| Southeast Glacier | 83 | 245 | 1 |
| Stillwater River | 19 | 27 | |
| Sullivan | 111 | 674 | 9 |
| Teton Sun River | 1 | 97 | 2 |
| Upper Middle Fork Flathead | 21 | 76 | 5 |
| Upper North Fork Flathead | 177 | 331 | 3 |
| Upper South Fork Flathead | | 5 | |
| | | | |
| **sub-totals** | **2332** | **5364** | **48** |

**Spatial data used in this analysis:**

Katherine Ake, NCDE Data Base Coordinator. USFS. Northern Continental Divide Ecosystem Bear Management Units (BMU) for GrizzlyBears. Kalispell, MT. 2008.

Montana Base Map Service Center/Montana State Library. Montana Structures Framework. Helena, MT. January 2, 2013.

Montana Base Map Service Center/Montana State Library. Public Lands (Cadastral Version). Helena, MT. November 13, 2012.

**Data Analysis Notes:**

Structures locations where value_ IS NULL or value_ = “Structure (abstract)” were not used in this analysis because these locations were generated from address data and are typically duplicate locations for the structures digitized using aerial imagery. Structures occurring on public lands were excluded from the analysis. Structure types were generalized into the classification descriptions as noted in the corresponding Structures Lookup worksheet in this spreadsheet file.

# Appendix 10

## Detailed Summary of Current USFS Management Plan Direction Relevant to Grizzly Bears in Management Zones 1 and 2

### HABITAT MANAGEMENT – ZONE 1

Habitat Standards from Existing Forest Plans and/or Biological Assessments for Grizzly Bears

Programmatic Decisions or Actions beneficial for Grizzly Bears

- Regional INLAND Native Fish Strategy, 1996 – amends Forest plans (Flathead, Helena, Kootenai, Lolo and Deerlodge) in western Montana and provides direction in the form of riparian management objectives, standards and guidelines. Riparian direction provides consistent direction to maintain productivity of highly used bear habitat component.

- Off-Highway Vehicle Record of Decision for Montana, January 2001 – amends Forest Plans in Montana and establishes a new standard that restricts yearlong, wheeled motorized cross-country travel, where it is already not restricted, with specific exceptions. Restricting motorized cross-country travel would benefit all terrestrial species by reducing disturbance to wildlife and the soil (OHV FEIS)

- Roadless Area Conservation Strategy, 2001 – prohibits road construction, road reconstruction, and or timber cutting, sale or removal in inventoried roadless areas except under certain circumstances. Subsequent litigation resulted after this decision. On October 21, 2011 the US Court of Appeals for the Tenth Circuit unanimously ruled to restore the Roadless Rule, ending a 2008 national injunction. The Roadless Rule blocks road-building and commercial timber harvesting on expanses of National Forest roadless areas. This decision is likely to provide a vast area of secure habitat for terrestrial species.

- Northern Rockies Lynx Management Direction, 2007 – may beneficially affect grizzly bears by maintaining riparian habitat, reducing the disturbance associated with minerals and human uses, reducing habitat fragmentation and providing for animal movement.

- The Montana Legacy Project is a cooperative project of The Nature Conservancy, The Trust for Public Land and state, federal and private partners that have transferred ownership of about 310,000 of former Plum Creek lands to conserve vital wildlife habitat and water resources, maintain the forestland production and restoration opportunities that sustain both the land and local economies, and to conserve

traditional access for a broad variety of outdoor recreation activities. Many of these acres are located within current grizzly bear habitat and connectivity areas.

- Participation with other federal, state, county, and private partners in land management and conservation such as the Swan Valley Bear Resources and Forest Stewardship programs, the Blackfoot Challenge, and Vital Ground which promote programs and projects to reduce bear-human conflicts and promote habitat connectivity.

General Management Directions

Upon delisting the grizzly bear will be designated a Forest Service Sensitive Species.

- As part of the National Environmental Policy Act process, conduct analyses to review programs and activities, and determine their potential effect on sensitive species. The biological evaluation shall be conducted or reviewed by qualified persons as determined by the Forest Supervisor. Adverse impacts to sensitive species or their habitats should be avoided. If impacts cannot be avoided, the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole will be analyzed. Project decisions will not result in loss of species viability or create significant trends towards federal listing.

- To further minimize and avoid risks to species the proposed action will include the following additional clauses as conservation measures[1]. These clauses or provisions were selected from Forest Service Handbook 2709.11 – Special Uses Handbook Chapter 50 - Terms and Conditions, Section 52 - supplemental terms and conditions and the Region 1 Special Uses Handbook Supplement No. 2709.11-2000-1 for resource and improvement protection.

- X-8. Protection of Habitat of Endangered, Threatened, and Sensitive Species.

  Location of areas needing special measures for protection of plants or animals listed as threatened or endangered under the Endangered Species Act of 1973, as amended, or as sensitive by the Regional Forester under authority of FSM 2670, derived from ESA Section 7 consultation, may be shown on a separate map, hereby made a part of this authorization, or identified on the ground. Protective and mitigative measures specified by the authorized officer shall be the responsibility of the authorization holder. If protection measures prove inadequate, if other such areas are discovered, or if new

[1] **Conservation measures** - are actions to benefit or promote the recovery of listed species that are included by the Federal agency as an integral part of the proposed action. These actions will be taken by the Federal agency or applicant, and serve to minimize or compensate for, project effects on the species under review. These may include actions taken prior to the initiation of consultation, or actions which the Federal agency or applicant have committed to complete in a biological assessment or similar document.

species are listed as federally threatened or endangered or as sensitive by the Regional Forester, the authorized officer may specify additional protection regardless of when such facts become known. Discovery of such areas by either party shall be promptly reported to the other party.

- R1-X10 - Grizzly Bear Protection. Mandatory in all special-use authorizations within occupied grizzly bear habitat.

  This special-use authorization includes land which is part of the habitat of the grizzly bear. Therefore, in compliance with Forest Service responsibilities under the Endangered Species Act of 1973, 16 U.S.C. 1531, the following conditions apply to this special-use authorization:
  1. The authorized officer may order an immediate temporary suspension of all human activities permitted by this authorization and, if needed, revoke or terminate the special-use authorization when, in his/her judgment, such action is necessary in order to prevent confrontation or conflict between humans and grizzly bears. The holder shall immediately comply with such order. The United States shall not be liable for any consequences from such a suspension, revocation, or termination. Such suspension, revocation, or termination may be appealed to the next higher level as provided in 36 CFR 251, Subpart C *(For easements under Title V FLPMA, 43 U.S.C. 1761-1771, change authority to 7 CFR 1.130-1.151)*
  2. The holder, his/her agents, employees, contractors, and subcontractors will comply with the requirements of the attached Grizzly Bear Management and Protection Plan dated _____ in the conduct of any and all activities authorized. The authorized officer may review and revise the plan as needed. *(The Grizzly Bear Management and Protection Plan will, as a minimum, address the following: 1. Camp locations and period of time each location is to be used. 2. Areas to avoid or enter, by type of activities, schedule. 3. Seasonal or other human activity limitations. 4. Identify livestock and pets. a. By location, b. Numbers, c. Types (horses, dogs, and so forth), d. Treatment of carcasses. 5. Food storage. a. Livestock and pets, b. Human. 6. Food preparation and cleanup. 7. Garbage and refuse disposal. a. Livestock and pets, b. Human. 8. Storage of game meat, if applicable. 9. Suggestions for minimizing direct conflict. 10. Human safety. 11. Provisions for amendment or modification).*
  3. The holder assumes full responsibility and shall hold the United States harmless from any and all claims by him/her or by third parties for any damages to life or property arising from the activities authorized by this special-use authorization and encounters with grizzly bears, or from suspension, revocation or termination of activities authorized by this special-use authorization.
  4. Intentional or negligent acts by the holder, his/her agents, employees, contractors, and subcontractors that result in injury or death of a grizzly bear will be cause for revocation or termination of this authorization in whole or in part.
  5. Failure to comply with provisions 1, 2, or 3 may result in suspension, revocation, or termination of this authorization in whole or in part, and may cause criminal action to be taken against the holder under provisions of the Endangered Species Act of 1973, as amended, or other applicable authority.

B6.24 Protection Measures Needed for Plants, Animals, Cultural Resources, and Cave Resources.

- Locations of known areas needing special measures for the protection of plants, animals, cultural resources, and/or cave resources are shown on Sale Area Map and/or identified on the ground. Special protection measures needed to protect such known areas are identified in C6.24.

- In addition to any special protection measures noted, Purchaser has a general duty to protect all known and identified resources referenced in this Subsection from damage or removal during Purchaser's Operations. Discovery of additional areas, resources, or members of species needing special protection shall be promptly reported to the other party, and operations shall be delayed or interrupted at that location, under B8.33, if Contracting Officer determines there is risk of damage to such areas, resources, or species from continued operations.

- Wheeled or track-laying equipment shall not be operated in areas identified as needing special measures for the protection of cultural resources, except on roads, landings, tractor roads, or skid trails approved under B5.1 or B6.422. Unless agreed otherwise, trees will not be felled into such areas. Purchaser may be required to backblade skid trails and other ground disturbed by Purchaser's Operations within such areas in lieu of cross ditching required under B6.6.

- Purchaser shall immediately notify Forest Service if disturbance occurs to any area identified as needing special protection measures and shall immediately halt operations in the vicinity of the disturbance until Forest Service authorizes Purchaser to proceed. Purchaser shall bear costs of resource evaluation and restoration to identified sites. Such payment shall not relieve Purchaser from civil or criminal liability otherwise provided by law. Nothing in this Subsection shall be interpreted as creating any warranty that all locations and special measures for the protection of plants, animals, cultural resources, and cave resources have been described herein, elsewhere in the contract, or designated on the ground.

Standard Provisions for a Timber Sale Contract include:

B6.24 Protection Measures Needed for Plants, Animals, Cultural Resources, and Cave Resources.

- Locations of known areas needing special measures for the protection of plants, animals, cultural resources, and/or cave resources are shown on Sale Area Map and/or identified on the ground. Special protection measures needed to protect such known areas are identified in C6.24.

- In addition to any special protection measures noted, Purchaser has a general duty to protect all known and identified resources referenced in this Subsection from damage or removal during Purchaser's Operations. Discovery of additional areas, resources, or members of species needing special protection shall be promptly reported to the other party, and operations shall be delayed or interrupted at that location, under B8.33, if Contracting Officer determines there is risk of damage to such areas, resources, or species from continued operations.

- Wheeled or track-laying equipment shall not be operated in areas identified as needing special measures for the protection of cultural resources, except on roads, landings, tractor roads, or skid trails approved under B5.1 or B6.422. Unless agreed otherwise, trees will not be felled into such areas. Purchaser may be required to backblade skid trails and other ground disturbed by Purchaser's Operations within such areas in lieu of cross ditching required under B6.6.

- Purchaser shall immediately notify Forest Service if disturbance occurs to any area identified as needing special protection measures and shall immediately halt operations in the vicinity of the disturbance until Forest Service authorizes Purchaser to proceed. Purchaser shall bear costs of resource evaluation and restoration to identified sites. Such payment shall not relieve Purchaser from civil or criminal liability otherwise provided by law. Nothing in this Subsection shall be interpreted as creating any warranty that all locations and special measures for the protection of plants, animals, cultural resources, and cave resources have been described herein, elsewhere in the contract, or designated on the ground.

B8.33 Contract Suspension and Modification, (a) Contracting Officer may, by written order, delay or interrupt authorized operations under this contract or modify this contract, in whole or in part:

- To prevent environmental degradation or resource damage, including, but not limited to, harm to habitat, plants, animals, cultural resources, or cave resources;

- To ensure consistency with land and resource management plans or other documents prepared pursuant to the National Environmental Policy Act of 1969, 42 USC 4321-4347;

- To conduct environmental analysis, including, but not limited to, engaging in consultation pursuant to the Endangered Species Act of 1973, 16 USC 1531, *et seq.*; or …

<u>Food and Attractant Storage Special Orders</u>

The Kootenai, Flathead and Lolo have mandatory forest wide orders that were established in 2011. The Helena currently has orders for the NCDE recovery zone and the Lincoln RD. Orders are included in contracts and permits on a portion of the Helena RD. The Helena NF will be establishing a forestwide order in the near future.

**Road Density Standards**

Flathead LRMP Standards

- Miles of existing "open" roads on a yearlong or seasonal basis will generally not increase above current "open" mileage.

- To assure wildlife security needs within the different Geographic Units, unrestricted road density requirements have been established (refer to Table II-6). (Unrestricted roads do not have seasonal or yearlong closure to public motorized access; restricted roads are physically closed by a gate, berm, or revegetation.)

Table II-6. Geographic Unit Unrestricted Road Density Standards outside the NCDE recovery zone.

| Geographic Unit | LRMP Road Density Requirement (Mi / mi²) |
|---|---|
| Olney-Martin Creek | 1.3 to 1.8 |
| Upper Good Creek | 1.3 to 1.8 |
| Sylvia Lake | 1.3 to 1.8 |
| Star Meadow-Logan Creek | 1.8 to 2.2 |
| Tally Lake-Round Meadow | 1.8 to 2.2 |
| Mountain Meadow-Rhodes Draw | 1.8 to 2.2 |
| Upper Griffin | 2.0 to 3.2 |
| Ashley Lake | 2.0 to 3.2 |
| Island Unit | 2.0 to 3.2 |

Helena LRMP Standards

- Implement an aggressive road management program to maintain or improve big game security.

- Road management will be implemented to at least maintain big game habitat capability and hunting opportunity. To provide for a first week bull elk harvest that does not exceed 40% of the total bull harvest, roads will be managed during the general big game hunting season to maintain open road densities with the following limits.

| Existing Percent Hiding Cover (according to FS definition of hiding cover[1] | Existing Percent Hiding Cover (according to MDFWP definition of hiding cover[2] | Max Open Road Density |
|---|---|---|
| 56 | 80 | 2.4 mi / mi² |
| 49 | 70 | 1.9 mi / mi² |
| 42 | 60 | 1.2 mi / mi² |
| 35 | 50 | 0.1 mi / mi² |

[1]A timber stand which conceals 90% or more of a standing elk at 200 ft. [2]A stand of coniferous trees having a crown closure of greater than 40%.

- Unacceptable damage to soils, watershed, fish, wildlife, or historical/archaeological sites will be mitigated by road restrictions or other road management actions as necessary. Restrictions for wildlife reasons will be coordinated with the MDFWP.

- APPENDIX D Forest Plan Grizzly Bear Management Outside of Recovery Areas. Outside the recovery zone has a forest-wide standard of 0.55 miles/mile$^2$ of open road density for areas of occupied grizzly habitat. Grizzly bear habitat is identified by documentation of Biological Activity Centers which are verified grizzly bear observations over the last 6 years out of 10, which would include females with cubs or yearlings at least 5 of the 10 years.

- Populations of wildlife "indicator species" will be monitored t o measure the effect of management activities on representative wildlife habitats with the objective of ensuring that viable populations of exiting native and desirable non-native plant and animal species are maintained (the threatened and endangered species include grizzly bear, gray wolf, bald eagle and peregrine falcon;

Kootenai LRMP Forestwide Standards (*an access amendment was signed Nov 2011, and a draft revised forest plan 2012 is released for public review)*

- Developmental activities will be rigorously examined to insure that the minimum number and length of roads are constructed to the minimum standard necessary.

- Outside the recovery zone there is an open road density standard of 0.75 miles/mile$^2$ for big game emphasis management area 12 and an open road density standard of 3.0 miles/mile$^2$ for recreation and timber emphasis management areas 15 – 18.

- *The recently signed access amendment applies to seven grizzly bear recurring use areas (i.e., BORZ areas) located outside of the CY and NCDE Grizzly Bear Recovery Zones and will ensure no increases in permanent linear miles of open and total roads on National Forest System lands in any individual BORZ, above the baseline conditions identified within the sixth code watersheds comprising the BORZ. Listed exceptions are included in the Access Amendment and include but are not limited to ANILCA claims, and identification of RS24477 thoroughfares. Areas within the BORZ boundary can increase or decrease based on the criteria developed by the Level 1 consultation team representing the CYE.*

Lolo LRMP Forestwide Standards

- Motorized vehicles will be limited to system roads and trails which are designated open in the Lolo Forest Travel Plan.
- Lolo National Forest roads will be the minimum number and meet the minimum design standards possible while still meeting safety, user and resource needs.
- Manage Forest roads to provide for resource protection, wildlife needs, commodity removal, and a wide range of recreation opportunities.
- On highly productive big game summer range, open road densities of existing roads will be restricted to a maximum of 1.1 miles of road per section and all new roads, except arterials, will be closed year-round (average values calculated over designated herd-unit analysis areas).
- New roads will be closed to the public year-round in areas of moderate big game summer range, but roads now open (1984 Travel Plan) will remain open.
- Areas with high potential for walk-in hunting or fishing experiences will be considered for road closures.
- Roads within grizzly bear habitat may be closed seasonally if it is determined that an open road may be increasing the risk of human-caused bear mortality. Within designated Essential Habitat spring range, all non-arterial systems will be closed April 15 to June 15. On summer range, roads that bisect identified critical habitat components will be closed July 15 thru October 15.

**Vegetation Standards and Guidelines**

Flathead LRMP

- Maintain or restore existing old growth consistent with Wildlife and Fish objectives and standards.

- Elk summer habitat* will be given appropriate protection and managed in accordance with the following selected recommendations from the Coordinating Elk and Timber Management, Final Report of the Cooperative Elk-Logging Study, 1970-1985, January 1985.

Helena LRMP

- On important summer (see Glossary in Forest Plan) and winter range, adequate thermal and hiding cover will be maintained to support the habitat potential.

* Elk summer habitat, as defined above, encompasses some 30,000 acres of tentatively suitable timberland on the Flathead National Forest. Of the 30,000 acres, 6,500 are in riparian areas.

- An environmental analysis for project work will include a cover analysis. The cover analysis should be done on drainage or elk herd unit basis. (See Montana Cooperative Elk-Logging Study in Appendix C of the Forest Plan for recommendations and research findings on how to maintain adequate cover during project work.)

- Subject to hydrologic and other resource constraints, elk summer range will be maintained at 35 percent or greater hiding cover and areas of winter range will be maintained at 25 percent or greater thermal cover in drainages or elk herd units.

Kootenai LRMP

- The standard for evaluation of elk habitat quality and for formulation of the prescriptions for timber sales and road development projects is The Montana Cooperative Elk-Logging Study, January, 1985.

- Key habitat components (wallows, wet meadows, bogs, etc) will be avoided when constructing roads. As they are identified, those key components will be mapped and managed as riparian areas.

- Manage to provide habitat diversity including cover and forage areas in a ratio appropriate for the species being considered (see list of species in MA goals).

Lolo LRMP Forestwide Standards

- Wildlife features such as wallows, mineral licks and seeps will be protected……]
- A wildlife biologist will examine and recommend vegetative objectives for managing and protecting all winter range whenever activity is proposed within it.
- The document, "Coordinating Elk and Timber Management" (Final Report of the Montana Cooperative Elk-Logging Study, 1970-1985) which summarizes the results of 15 years of interagency elk/logging research will be used as a basic tool for assessing the affects of timber harvest upon elk habitat and for making decisions that affect the overall big game resource.
- When considering activities in lands with intermingled ownership, the effects of activities by all landowners on the big game resource will be analyzed.

**Livestock Grazing Standards and Guidelines**

Flathead LRMP

- Control livestock grazing in riparian areas to maintain water quality and fisheries habitat.

- Management of domestic livestock grazing allotments will be consistent with management area direction.

Helena LRMP

- Riparian condition within livestock allotments will be mapped and become part of the Allotment Management Plan
- Where analysis shows range resource damage, the cause will be identified and corrective action will be initiated through an allotment management plan.
- Best management practices will be used to minimize livestock damage to lakeside soils, streamsides, and other fragile areas.
- Allotment management plans will specify the utilization standards of key plant species needed to protect the soil and water quality.

Kootenai LRMP

- Management of domestic livestock grazing allotments will be consistent with Management Area direction.
- The soil and water conservation practices specified in FSH 2509.22 will be applied during Forest plan implementation to ensure that Forest water quality goals are met.

Lolo LRMP Forestwide Standards

- Conflicts between livestock and big game will be resolved so big game are allocated the forage required to meet their needs. Domestic livestock will be allowed to utilize any forage surplus not conflicting with the planned expansion of big-game populations. Reductions in livestock numbers will be avoided if possible, but will be acceptable to meet management goals.
- Allotments with no AUM's shown for the Proposed Action in Appendix B will be phased out unless the permittee is willing to make necessary investments in livestock management and structural improvement to maintain range condition at an acceptable level.
- 1995 Lolo Forest Plan amendment closed a number of livestock allotments and removed sheep grazing from the forest.

**Oil and Gas Leasing / Minerals Standards and Guidelines**

Flathead LRMP - In addition, to assist land managers in meeting established goals for the grizzly bear, the following guidelines have been developed.

- All oil and gas planning, leasing, and implementing activity on the Flathead National Forest will be in accordance with the EA (Environmental Assessment), Flathead National Forest, 1980, other NEPA documents covering the portions of the Forest not covered by the 1980 environmental assessment, or other NEPA documents or processes that may be required by the current litigation challenging that 1980 EA.

- Scheduling of mineral exploration and other development activities will be established so as to provide security areas immediately adjacent to project analysis areas.

- Temporary living facilities for exploration and/or development personnel may be onsite but with restrictions as necessary. Offsite camps will be encouraged. Approved camps will include restrictions on food storage, garbage disposal, firearms, and domestic pets.

- Avoid superimposing activities on seasonally important grizzly bear habitats which may adversely affect the species or reduce habitat effectiveness.

- Establish flight patterns (corridors) in advance when activities require the use of helicopters. Flight patterns should be located to avoid seasonally important grizzly bear habitat constituent elements and habitat components during bear-use periods. In some instances altitudinal restrictions could safeguard bears as well as flight corridors.

Helena LRMP - Amendment 3 and 13– Leasable Minerals. The Forest Plan does not make leasing recommendations. The Plan identifies where oil and gas leasing could potentially occur, where it would be compatible or incompatible with surface resource management direction and what stipulations may be applied to the leasing activity should it occur. Before any action is recommended on lease applications, site-specific analysis of environmental effects will be done in accordance with the NEPA process. Stipulations displayed in Appendix N which are based upon the EA for Oil and Gas Leasing on the Helena NF, 1981, will be recommended in accord with management area direction in Chapter III. Amendment 13 replaced Appendix N with a new Appendix N which contains lease notices and new stipulations for leases issued for available lands. The need to change the Forest Plan to incorporate the uniform format for the lease stipulations and the decisions resulting from the leasing analysis on the Helena NF based on the 1987 Oil and Gas Leasing Reform act.

- Contact the Forest Service to determine if a biological evaluation is required (FSM 2670.31-32). The Forest Service is responsible for ensuring that the leased land is examined through a biological evaluation, prior to undertaking any surface-disturbing activities, to determine effects upon any plant or animal species listed or proposed for listing as threatened, endangered, or sensitive.

- The lessee or operator may choose to conduct the evaluation on the leased lands at their discretion and cost. This biological evaluation must be done by or under the supervision of a qualified biologist/botanist approved by the Forest Service. An acceptable report must be provided to the Forest Service identifying the anticipated effects of a proposed action on threatened, endangered, or sensitive species. An acceptable biological evaluation is to be submitted to the Forest Service for review and approval no later than that time when an otherwise complete application for approval of drilling or subsequent surface-disturbing operation is submitted.

- Implement mitigation measures required by the Forest Service. Mitigation may include the relocation of proposed lease-related activities or other protective measures. The findings of the biological evaluation may result in some restrictions to the operator's plans or even disallow use and occupancy to comply with the 1973 Endangered Species Act (as amended), threatened and endangered regulations and Forest Service regulations.

- If threatened, endangered, or sensitive plant or animal species are discovered in the area after any required biological evaluation has concluded, an evaluation will be conducted to assess the effect of ongoing and proposed activities. Based on the conclusion drawn in the evaluation, additional restrictions or prohibitions may be imposed to protect the species or their habitats.

Kootenai LRMP

- Before recommendations are made on any lease applications, additional, site specific analysis of environmental effects will be made. Stipulations which are displayed in Appendix 10 will be recommended in accord with management direction in Chapter III. Stipulations are for erosion control, and controlled or limited surface use.

Lolo LRMP - Appendix F Oil and Gas Stipulations

- Over the entire study area, conduct biological evaluation and, if needed, initiate formal consultation with the FWS for all oil and gas activities found to result in a may affect situation as per FSM 2670.

- Prevent long-term or extensive disturbance within key T&E species habitat.

- No surface occupancy will be allowed in grizzly bear denning areas.

**Developed Sites Standards and Guidelines**

Flathead LRMP

- Retain the existing capacity of National Forest developed recreation sites on the Flathead National Forest during the next 10 years. The quality of the developed recreation opportunities available will be improved through "full-service" maintenance[2] or redesign and reconstruction of existing sites to better accommodate present and future needs. Some slight capacity changes may occur as a result of these improvements; however, the changes will provide a better service to the public.

[2] "Full Service" maintenance is specified in Forest Service standards and guidelines on Cleaning Recreation Sites, July 1980, USDA FS #80231801, pages 6-7.

- No expansion of campground capacity will be permitted if the expansion competes with campgrounds in the private sector.

- Subdivisions - District Rangers will work closely with city/County planning and zoning organizations when proposed subdivisions affect National Forest resources. Early input into development plans are needed to minimize potential problem areas such as: access, garbage disposal, utilities, water systems, sewage disposal, TV and/or radio antennas, boundary line accuracy, fencing, covenants, fire hazards, and visual problems. As subdivisions develop, requests for individual use will be discouraged in favor of group or community requests. Initial individual (developer) permits will be phased out and incorporated in community permits.

Helena LRMP

- New campgrounds and other developed recreation facilities, such as boat ramps or picnic areas, will generally not be constructed. Continue to maintain existing developed sites, but emphasize providing dispersed recreation opportunities. Removal of existing sites may be necessary in some cases, due to site deterioration or excessive maintenance cost.

- Subdivisions - District Rangers will work closely with city/County planning and zoning organizations when proposed subdivisions affect National Forest resources. Early input into development plans are needed to minimize potential problem areas such as: access, garbage disposal, utilities, water systems, sewage disposal, TV and/or radio antennas, boundary line accuracy, fencing, covenants, fire hazards, and visual problems. As subdivisions develop, requests for individual use will be discouraged in favor of group or community requests. Initial individual (developer) permits will be phased out and incorporated in community permits.

Kootenai LRMP

- Provide displays and information to make site users more aware of and informed about the area wildlife.

- New recreation sites will be located away from important wildlife habitat such as calving areas, meadows, winter range, etc. If the only available sites are on wildlife habitat, the recreation use season will be adjusted to avoid conflict with important wildlife use seasons.

Lolo LRMP Forestwide Standards

- The Forest will not significantly expand the capacity of developed recreation sites on the Lolo National Forest during the next 10-year period.

## HABITAT MANAGEMENT – ZONE 2

### Lewis and Clark National Forest – Jefferson Division

Portions of 3 Ranger Districts:

- Judith – northeast portion of the Little Belt Mountains
- White Sulphur Springs – western Little Belt Mountains, north Castle Mountains
- Musselshell – southeast portion of Little Belts, north Crazies

***Access Management***

- Some road density restrictions are in place based on Management Areas (MAs):
    - 19% of Division in 05.-1.5 mi/sq mi open road density (ORD)
    - 30% in 1.5-3 mi/sq mi ORD
    - 7% in 3+ mi/sq mi ORD (developed recreation areas and mining sites; corresponds with what would likely be MS-3 habitat)
- Some restrictions on road-building exist that do not involve specific road density numbers, in remaining MAs:
    - 19% of Division allows construction for harvest only within first mile from roads documented in 1983 inventory; these to remain closed to public except seasonal firewood cutting
    - 23% of Division specify no construction for surface uses, and roads built for subsurface minerals must be closed to public
- 1.4% does not allow any road construction except in small area for limited harvest; roads there must be obliterated and re-contoured
- Forest Plan does not address motorized trails
- Forest-wide big game standard establishes numeric standard for hiding cover, calculation of which includes road density component (methods to be based on MT Elk-Logging Study)
- Current motorized routes set by 2007 Travel Plan, part of which has been remanded in litigation and interim direction applied that increases motorized route density in specific areas (mainly WSAs) from what was reported in Travel Plan FEIS and ROD.
- Requires NEPA process to alter current Travel Plan (i.e. create additional open motorized routes)

BVRD - RECREATION AND TRAVEL MANAGEMENT

*Table – Density of Roads and Trails Open to Summer Motorized Use by Landscape*

| Landscape | Desired Summer Open Motorized Road and Trail Density Mi/mi$^2$* | Food Storage Order Applies |
|---|---|---|
| Boulder River | 1.9 | |
| Clark Fork - Flints | 1.9 | |
| Jefferson River | 1.6 | |
| Upper Clark Fork | 2.0 | |

**This does not include roads available for permitted or administrative use.*

*Table – Hunting Season Open Motorized Road/Trail Densities by Hunting Unit*

| Hunting Unit | Desired Fall Open Motorized Road and Trail Density Mi/mi$^2$* |
|---|---|
| 215 | 1.5 |
| 318 | 1.8 |
| 350 | 1.3 |
| 370 | 1.0 |

**This does not include roads available for permitted or administrative use.*

Outside the PCA in areas identified in state management plans as biologically suitable and socially acceptable for grizzly bear occupancy, accommodate grizzly bear populations with other land use activities, if feasible, but not to the extent of the exclusion of other uses. "Feasible" means one, which is compatible with (does not make unobtainable) major goals and objectives of other uses.

***Food Storage***

Currently, Food Storage Order in place only for campgrounds in Little Belt mountains.

## Helena National Forest

Portions of 2 Ranger Districts:

- Helena – north Boulder Highlands, NW Elkhorns, N Big Belts
- Townsend – E Elkhorns, S Big Belts

***Access Management***

- Limited area (approx. 25,000 ac) specifically restricted to $\leq$ 2 mi/sq mi ORD in north Boulder/Highlands; no other specific density standards. January 2013 a site specific amendment is being intiated that modifies this to create less density and more security overall. This amendment will supercede this standard. As a result there will be specific areas that will have higher densities and others less.
- Forest-wide big game standard establishes numeric standard for hiding cover, calculation of which includes road density component (methods to be based on MT Elk-Logging Study). Specific open road densities are established for hunting season in order to achieve specific cover objectives.
- Forestwide standards include provisions to close/restrict roads in seasonally important wildlife habitats
- Access for minerals development is to be on case-by-case basis, with full analysis of impacts to all potentially affected resources
- No specific references to motorized trails (old Forest Plan, pre-dates most recreational ATV use)

***Food Storage***

No food storage in place anywhere except the portion of the Lincoln RD that is outside the PCA. We anticipate food storage orders being implemented in Zones 1 and 2 by 2014.

***Sheep Grazing***

- Townsend RD (Big Belts) has 2, with total of about 1200 sheep; no plans to phase out
- No sheep allotments on the Helena RD (Big Belts)
- Lincoln RD has 2

## Gallatin National Forest

Portions of 3 Ranger Districts:

- Bozeman – Bridgers and Bangtails
- Livingston - West Crazies
- Big Timber – East Crazies

***Access Management***

- Travel Planning Decision in 2006 removed via Forest Plan Amendment specific standards for road density based on elk hiding cover
- Travel Plan also amended several MA standards out of the Plan that limited new road or trail construction based on Recreation Opportunity Spectrum; the purpose of amending them out was to allow the Travel Planning analysis process to determine appropriate and detailed goals, objectives, standards, and guidelines for individual geographic areas. Some MAs were retained that allow, limit, or prevent new road or trail construction, depending on MA goals and objectives.
- Detailed goals, objectives, standards, and guidelines are established in Travel Plans for individual geographic areas
- Travel Plan ROD states that roads can be built or re-opened for specific uses but that "it will be necessary however to effectively close these routes to public motorized use after completion of the activity unless theyare otherwise designated for such use through the Travel Plan."
- Travel Plan ROD and BO may provide further information about access management; also USFWS 1996 Biological Opinion (BO), Gallatin Forest Plan Amendment 19 (may apply only to occupied habitat), and the 2004 BO for the Forest Plan outside the recovery zone

***Food Storage***

The entire Gallatin National Forest is under a Food Storage Order

***Sheep Grazing***

There are no domestic sheep grazing allotments on the GNF

## Beaverhead-Deerlodge National Forest

Portions of 6 Landscapes (planning areas) all in Boulder/Highlands mtns:

- Boulder River (N and NE of Butte)
- Elkhorn

- Jefferson River (E of Butte)
- possibly small portion of Upper Clark Fork (N of Butte)
- possibly small portion of Clark Fork-Flints (E of Deer Lodge)

Also includes SW portion of Elkhorns but defer mgmt. to Helena

***Access Management***

- Forest Plan states for wildlife secure areas and connectivity to "manage density of open motorized roads and trails by landscape year-round, except fall rifle big game season, to achieve levels at or below the following; if they exceed these densities, manage for no net increase:
    - Boulder River: 1.9 mi open motorized/sq mi
    - Jefferson River: 1.6 mi open motorized/sq mi
    - Upper Clark Fork: 2.0 mi open motorized/sq mi
    - Clark Fork-Flints: 1.9 mi open motorized/sq mi
- Plan established desired ORD for Fall by hunting district (all in the Boulder/Highlands mtn range; all at or lower than summer ORDs); if they exceed these densities, manage for no net increase
- Deferring update of management in Elkhorn Unit of B-D to Helena NF; currently no motorized use and none anticipated

***Food Storage***

No Food Storage requirements north/east of I-90 currently but anticipated by November 2014.

***Sheep Grazing***

No sheep allotments in the Boulder Highlands or Elkhorns ranges

BVRD - RECREATION AND TRAVEL MANAGEMENT

*Table 13. Density of Roads and Trails Open to Summer Motorized Use by Landscape*

| Landscape | Desired Summer Open Motorized Road and Trail Density Mi/mi$^2$* | Food Storage Order Applies |
|---|---|---|
| Boulder River | 1.9 | |
| Clark Fork - Flints | 1.9 | |
| Jefferson River | 1.6 | |
| Upper Clark Fork | 2.0 | |

**This does not include roads available for permitted or administrative use.*

*Table 14. Hunting Season Open Motorized Road/Trail Densities by Hunting Unit*

| Hunting Unit | Desired Fall Open Motorized Road and Trail Density Mi/mi$^2$* |
|---|---|
| 215 | 1.5 |
| 318 | 1.8 |
| 350 | 1.3 |
| 370 | 1.0 |

**This does not include roads available for permitted or administrative use.*

Outside the PCA in areas identified in state management plans as biologically suitable and socially acceptable for grizzly bear occupancy, accommodate grizzly bear populations with other land use activities, if feasible, but not to the extent of the exclusion of other uses. “Feasible” means that which is compatible with (does not make unobtainable) major goals and objectives of other uses.

# Appendix 11

## Detailed Summary of Current BLM Management Plan Direction Relevant to Grizzly Bears in the PCA, Management Zone 1, and 2 for the Butte, Lewistown, and Missoula Field Offices

**Butte Field Office Resource Management Plan**

The Butte Field Office has 232,000 acres in Zones 1 and 2 (5,000 acres in the PCA). Management of BLM lands here occurs under the Butte Resource Management Plan 2009. The following management guidelines in the plan are relevant to grizzly bears and/or their habitat:

- Manage dry forest types to contain healthy, relatively open stands with reproducing site-appropriate, desired vegetation species.
- Manage moist forest types to contain healthy stands that combine into a diversity of age classes, densities, and structure (including dead and down material).
- Forest and woodland health assessments will be incorporated into Land Health Standards at the activity plan level to determine forest health conditions in project areas.
- Vegetation manipulation projects will be designed to minimize impacts to wildlife habitat and improve it when possible.
- New permanent and temporary road construction will be kept to a minimum. Temporary roads will be decommissioned (route will be closed and rehabilitated to eliminate resource impacts such as erosion, and rendered no longer useable for public or administrative uses) within one year of project completion. In addition, replacement, maintenance, or decommissioning of existing roads to meet transportation planning and management objectives may also occur as part of forest product removals or stewardship treatment projects.
- Firewood cutting will not be allowed within 100 feet of live (yearlong flow) streams or within 50 feet of intermittent streams.
- When salvage is proposed in dead and dying forests, contiguous acres of undisturbed standing and down woody material will be retained in adequate amounts for those wildlife species that depend on this type of habitat.
- The BLM will strive to maintain and/or restore stands with old forest structure within historic range of variability to maintain and/or enhance habitat for species dependent on this type of habitat. Existing and developing old forests will be retained and protected from uncharacteristically severe natural disturbances such as; stand replacing wildland fire, and insect and disease epidemics.
- Manage riparian and wetland communities to move toward or remain in proper functioning condition (appropriate vegetative species composition, density, and age structure for their specific area). Manage these communities to be sustainable and provide physical stability and adequate habitat for a wide range of aquatic and riparian dependent species.
- At the Field Office scale, management will maintain, protect, restore and/or improve riparian areas and wetlands. Riparian areas that are functioning at risk will be a high priority for restoration.

- Restorative treatments in riparian areas will focus on re-establishing willows, aspen, and cottonwood stands as well as other riparian vegetation, and to move towards pre-fire suppression stem densities in conifer stands.
- Where conifers are outcompeting or precluding regeneration of aspen, or preventing establishment of aspen or cottonwood stands, conifers will be removed (via mechanical methods and/or prescribed burning) to provide suitable habitat for expansion of these species.
- Forested riparian habitats will be managed to accelerate the development of mature forest communities to promote shade, bank stability, and down woody material recruitment. Late-successional riparian vegetation will be promoted in amounts and distribution similar to historic conditions.
- Grazing practices in riparian areas (accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of riparian goals or proper functioning condition will be modified.
- Sufficient forage and cover will be provided for wildlife on seasonal habitat.
- BLM will develop and implement appropriate grazing strategies in grizzly bear management zones.
- BLM will continue to use a combination of cultural, physical, chemical, and biological treatments for weed control.
- BLM will encourage the development of weed management areas where the landowners and users are cooperatively working to manage noxious weeds within designated areas.
- BLM will focus prevention of weed spread along roads, trails, waterways, recreation sites, and disturbed sites associated with project implementation.
- Weed management prescriptions will be included in all new vegetation treatment projects and incorporated where possible in all existing contracts, agreements, and land use authorizations that would result in ground-disturbing activities.
- Weed seed free forage will be used on BLM lands. Forage subject to this rule will include hay, grains, cubes, pelletized feeds, straw, and mulch.
- The BLM will maintain an up-to-date record of the grizzly bear conflicts and management actions that occur on lands managed by the Butte Field Office.
- The BLM will manage habitat for sensitive terrestrial and aquatic species in a manner consistent with current and future restoration, conservation and recovery plans, and conservation agreements. Management activities will be designed and implemented consistent with adopted conservation strategies, including Montana's Comprehensive Fish and Wildlife Conservation Strategy (MFWP 2005), and current, accepted science for special status and priority species.
- The BLM will emphasize actions that promote conservation of special status wildlife species and the ecosystems on which they depend. BLM will also emphasize maintaining and supporting healthy, productive, and diverse populations and communities of native plants and animals (including big game species such as deer, elk, and bighorn sheep) appropriate to soil, climate, and landform.

- The BLM will maintain functional blocks of security habitat for big game species across BLM lands. Where minimum-size blocks of security habitat (250 acres), as defined by Hillis et al. (1991), are located, they will be addressed and retained in a suitable condition throughout project planning and implementation. Protection of larger blocks of security habitat will also be addressed during project or watershed level planning. Where security habitat is limited or fragmented across the landscape, the BLM will emphasize improving habitat through vegetation treatments and road closures (including seasonal closures) to increase security habitat for big game species.
- To minimize disturbance to big game and grizzly bears, there will be no net increase in permanent roads built in areas where open road densities are 1 mi/mi$^2$ or less in big game winter and calving ranges, and within the current distribution of grizzly bear unless this is not possible due to rights-of-way, leases, or permits. All practicable measures will be taken to assure that important habitats with low road densities remain in that condition. Open road densities in big game winter and calving ranges, and within the current distribution of grizzly bear will be reduced where they currently exceed 1 mi/mi$^2$.

Grazing:

BLM will include a clause in all new and revised grazing permits for the area within the grizzly bear distribution line requiring the permittee to properly treat or dispose of livestock carcasses as deemed necessary on a case-by-case basis by BLM in coordination with USFWS, so as to eliminate any potential attractant for bears. BLM will include guidance to permittees to contact MFWP if they need carcass disposal assistance.

Connectivity:

The BLM will participate in ongoing interagency efforts to identify, map and manage linkage habitats essential to grizzly bear movement between ecosystems.

The BLM will maintain suitable habitat conditions and minimize fragmentation in linkage corridors among habitats for priority species.

The BLM will continue to manage roads on BLM lands to achieve lower road densities in grizzly bear habitat.

Vegetation Management

- Where grizzly bear use is known or likely to occur and where practicable, the BLM will delay disturbing activities during the spring in spring habitats to minimize displacement of grizzly bears.
- There will be a focus on biological diversity by restoring vegetation cover types and structural stages that have declined substantially including dry, open forest habitats with low tree densities, meadow habitats, shrub and hardwood dominated riparian systems, as well as open grasslands and shrublands with low tree densities.

- As identified through project-level NEPA analyses, seasonal timing restrictions on projects that cause disturbance to wildlife will be applied where needed to minimize the impacts of human activities on important seasonal wildlife habitat including grizzly bear spring and summer range (4/1 to 9/1), and grizzly bear denning habitat (10/1 to 4/30). These dates may be revised when new data become available.

BLM will develop and implement human food storage regulations and guidelines in grizzly bear distribution zones in coordination with MFWP and other agencies.

Human food storage regulations will be developed and implemented for all recreation sites with high potential and/or known encounters between people and bears.

Oil and Gas StipulationsOil and gas stipulation - Timing Limitation. Activity is prohibited from April 1 to June 30 and from September 15 – October 15 in the Grizzly Bear Distribution Zone.

**Lewiston Field Office Resource Management Plan** (Revision potentially beginning in 2013)

Lewistown Field Office has a total of 16,000 acres within the PCA). BLM lands within the Conservation Strategy Management Area within the Lewistown Field Office are managed under the 1984 Headwaters Resource Management Plan. **The following management guidelines in the PCA would protect grizzly bear under this plan:**

1. Special guidance for oil and gas development along the Rocky Mountain Front – for federal mineral estate (includes both surface and sub-surface acres) 3,167 acres
2. Low priority for forest management (8,361 acres)
3. High priority for forest management (398 acres)
4. No disposal of BLM lands (4,119 acres)
5. Closed to motorcycles (3,131 acres) –
6. Closed to motorized use (0 acres).
7. Restricted motorized use (3,131 acres) –
8. Avoidance areas for utility and transmission corridors (3,131 acres)

Guidelines that could benefit the grizzly bear on all BLM Lewistown Field Office management lands in Zones 1 and 2 (19,000 acres) include:

- Habitat improvement projects will be implemented where necessary to stabilize and/or improve unsatisfactory or declining wildlife habitat condition.
- Seasonal restrictions – no activity in grizzly bear spring and summer range (4/1 through 9/1) and denning habitat (10/1 through 4/30)
- To the extent practicable, management actions within occupied grizzly bear habitat will be consistent with the goals and objectives contained in the Grizzly Bear Recovery Plan.
- Sufficient forage and cover will be provided for wildlife on seasonal habitat.

- Vegetative manipulation projects will be designed to minimize impact on wildlife habitat and to improve it whenever possible.
- Montana Fish, Wildlife and Parks will be consulted in advance on all vegetative manipulation projects, including timber harvest activities involving: the construction of new access into roadless elk summer/fall ranges; critical, crucial or essential wildlife habitat and sales over 250,000 board feet.
- Management actions within floodplains and wetlands will include measures to preserve, protect and, if necessary, restore their natural functions.
- Management techniques will be used to minimize the degradation of streambanks and the loss of riparian vegetation.
- Riparian habitat needs will be taken into consideration in developing livestock grazing systems and pasture designs.
- Manage public access to maintain the habitat effectiveness of security cover and key seasonal habitat (such as winter range and calving/nursery areas) for elk and deer.
- Maintain adequate untreated peripheral zones around important wet meadows, springs and riparian zones.
- Discourage thinning immediately adjacent to clearcuts.
- Use of new grizzly bear information acquired from current or future studies of the effects of oil and gas development on grizzly bear will be incorporated into activity decisions affecting the species (from FWS BO).

**Missoula Field Office Resource Management Plan** (1986, with amendments; revision potentially beginning in 2014)

The most recent RMP under which Missoula FO has been operation does not address grizzly management in the original document. In 2006, Backlog Consultation as conducted with FWS to amend the RMP. FWS issued a Biological Opinion with terms and conditions to address effects to grizzlies from livestock and roads.

The Missoula Field Office has **129,956 acres** in Zone 1 and 2 (no acres in the PCA). BLM lands within the Conservation Strategy Management Area within the Missoula Field Office are managed under the Garnet Resource Area Resource Management Plan 1986. **The following management guidelines would protect grizzly bear under this plan:**

Riparian Protection Zones (411 acres) - where the emphasis is on maintaining or enhancing riparian values while providing elements of old-growth or mature forest for wildlife habitat and providing opportunities for other uses. Utility corridors will not be permitted. Timber management activities will be prohibited. These lands will remain in public ownership.

Elk Summer and Fall Habitat Components (9,605 acres) - where the emphasis is on maintaining or improving elk summer and fall habitat components and other wildlife habitat values while managing timber and providing for other uses. A broad range of timber management activities will be allowed but will be designed to maintain or improve elk summer and fall habitat components and will include special measures to protect riparian values. These lands will remain in public ownership.

Big Game Summer and Fall Range (43,374 acres) - where the emphasis will be on balancing forage and cover requirements for big game on summer and fall ranges while managing timber and providing for other uses. Timber management will be designed to maintain or improve big game summer and fall habitat, particularly cover and forage relationships, and include special measures to protect riparian values.

Big Game Winter Range (14,494 acres) – where the emphasis will be on enhancing forage production and cover for big game on winter ranges while managing timber and providing for other uses. Timber management will be designed to maintain or improve big game winter range, particularly cover and forage relationships, and include special measures to protect riparian values.

Management activities in riparian zones generally will be designed to maintain or, where possible, improve riparian habitat condition. Roads and utility corridors will avoid riparian zones to the extent practicable. Prescribed fire will not be used within **75** feet of stream channels.

Corrective measures will be applied where unsatisfactory watershed conditions are identified. Such measures may be implemented through project-level plans (watershed, habitat, allotment, or compartment management plans); such measures may also be implemented through stipulations attached to permits, leases, and other authorizations.

All oil and gas leases will be issued with standard stipulations attached. Special stipulations will be attached where needed to protect seasonal wildlife habitat and/or other sensitive resource values. In highly sensitive areas, where special stipulations are not sufficient to protect important surface values, stipulations prohibiting surface occupancy will be attached.

Habitat improvement and maintenance projects will be implemented where needed to stabilize or improve habitat conditions. These projects will be identified through coordinated resource activity plans.

Road and area closures will be pursued for wildlife security and other resource values. Wildlife habitat goals and objectives will be included in all resource activity plans and projects that could affect wildlife habitat.

The Montana Department of Fish, Wildlife, and Parks (MFWP) will be consulted prior to vegetative manipulation projects in accordance with Supplement #1of the Master Memorandum of Understanding, 1977. In addition, MFWP will be consulted on timber harvest and timber stand improvement projects

Management actions within floodplains and wetlands will include measures to preserve, protect, and if necessary, restore their natural functions,

Food Storage stipulations under Special Recreation Permits – Food/attractant storage stipulations for conservation of the grizzly bear and other wildlife – Human, pet and livestock food (except baled or cubed hay without additives), and garbage will be attended or stored in an approved bear-resistant manner (a) during daytime hours, at least one adult person must be physically present within 100’ of attractants. During nighttime hours, all attractants shall be stored in a bear-resistant manner and (b) Food, garbage and other attractants will be stored using an approved storage technique when camp is unattended. Attractants will not be buried, discarded or burned in an open campfire. Leftover food, food waste or other attractants may be placed in an appropriate, sealed container and packed out with

garbage or could be burned in a contained stove. Wildlife carcasses, birds, fish or other animal parts that are within ½ mile of any camp or sleep area will be stored in a bear-resistant manner during nighttime hours.

# Appendix 12

## Summary of Protective Measures in the DNRC Habitat Conservation Plan Outside of the PCA

The full document is available online at: http://dnrc.mt.gov/HCP/FinalEIS.asp

**On all HCP lands (referred to as PR lands in the HCP) (574,370 acres; 2,324 sq km),** the DNRC commits to:

- minimizing construction of new open roads in riparian areas, wetlands, and avalanche chutes. (p. 2-6);
- providing I&E brochures about living and working in bear habitat to all contractors and employees;
- providing bear encounter avoidance training to DNRC personnel every 5 years;
- prohibiting DNRC employees and contractors from carrying firearms while on duty
- requiring all DNRC employees and contractors store food, garbage, and other attractants properly;
- suspending any motorized forest management activity within 0.6 miles of an active den site until May 31 or earlier if DNRC confirms the bear has left the den site vicinity;
- retaining visual cover for grizzly bears in riparian and wetland areas by maintaining a 50 foot no-harvest buffer for Class 1 streams and lakes;
- managing and preventing noxious weeds at gravel pit sites;
- minimizing helicopter operations requiring flights lower than 500m in seasonally important grizzly habitat by designing flight paths at least 1 mile from such areas, where practicable.

**On non-recovery occupied habitat and lands in the PCA (NR lands and RZ lands) (220,718 acres; 893 sq km),** the DNRC commits to:

The DNRC will manage their forested lands within Zone 1 and the Recovery Zone by their final Habitat Conservation Plan (HCP). This HCP applies to approximately 126,285 acres (511 sq km) outside the PCA in occupied habitat (called "Non Recovery Zone Occupied Habitat" in the HCP). On these lands **and** lands within the PCA, DNRC has agreed to implement the following protective measures for the 50-year term of the HCP:

The DNRC will manage their forested lands within Zone 1 by their final Habitat Conservation Plan (HCP). This HCP applies to approximately 126,285 acres (511 sq km) outside the PCA in occupied habitat (called "Non Recovery Zone Occupied Habitat" in the HCP). On these lands, DNRC has agreed to implement the following protective measures for the 50-year term of the HCP:

- minimizing the construction of new open roads;
- prohibiting commercial forest management activities during the spring period (Apr. 1-June 15) in spring habitat, as defined in the HCP;
- prohibiting pre-commercial thinning and heavy equipment slash treatments during the spring period in spring habitat;
- minimizing motorized activities on restricted roads during the spring period associated with low-intensity forest management;
- discouraging new domestic sheep grazing allotments;
- submitting a mitigation plan to the USFWS 30 days prior to a decision about the use of small livestock to manage weeds;
- minimizing helicopter operations requiring flights lower than 500m in seasonally important grizzly habitat by designing flight paths at least 1 mile from such areas, where practicable;
- discouraging the granting of future easements that relinquish DNRC control of roads, except for reciprocal access agreements, cost share agreements, and other federal road agreements;
- ensuring that vegetation or topographic breaks be no greater than 600 feet in at least 1 direction from any point in the unit for new clear cut and seed tree cutting units (except for when this is impractical due to steep open faces, broadcast burning as a post-harvest treatment, or where insects, disease, prescribed fire, or wildfire have hampered retention of live vegetation);
- submitting a mitigation plan to the FWS 30 days prior to a decision about the use of small livestock to manage weeds;
- limiting the number of active gravel pits in occupied habitat outside the recovery zone to 3 per administrative unit, with no more than 2 of these being large pits
- Retention of visual cover for grizzly bears in riparian and wetland areas by maintaining a 50 foot no-harvest buffer and restrictions on cover removal within defined riparian management zones.

**<u>On DNRC lands in the PCA (RZ lands)</u> (147,843 acres; 598 sq km),** the DNRC commits to applying these additional protective measures within the PCA for the 50-year term of the HCP:

Development of site-specific mitigation measures to minimize the impacts to important grizzly bear habitat elements (berry fields, avalanche chutes, riparian areas, wetlands, WBP stands, and feeding/congregation areas);

- Retention of up to 100 feet of vegetation between open roads and clearcut or seed tree harvest units;
- Examine and repair all primary road closure devices annually;

- Prohibit authorization of any new grazing licenses for sheep and other small livestock (smaller than a cow);
- Will not initiate any new grazing licenses in this zone. Public generated proposals could be considered;
- Carefully review and incorporate mitigations to the extent possible to minimize adverse impacts associated with granting access easements to private entities across DNRC lands;
- Prohibit motorized activities above 6,300 feet elevation from April 1 through May 31;
- Require access restrictions that are a part of the Stillwater Block and Swan River State Forest that cap open and restricted road amounts;
- Require 4-year commercial activity with 8 year rest restrictions on blocked and scattered lands;
- No net increase in open roads on scattered lands at the administrative unit level;

# Appendix 13

## Detailed Summary of DNRC Habitat Management Developed for Grizzly Bears in the PCA, Zone 1, and Zone 2

***Introduction***

The Trust Land Management Division (TLMD) of DNRC manages state trust lands to generate revenue for the maintenance and support of public state schools and institutions. Management actions on state trust lands are carried out under the direction of the Montana Board of Land Commissioners, which consists of Montana's top five elected officials: the Governor, Attorney General, Superintendent of Public Instruction, Commissioner of Securities and Insurance, and the Secretary of State. In cooperation with the Montana Board of Land Commissioners, DNRC's obligation for management of trust lands is to obtain the greatest benefit for the beneficiaries. Within the TLMD, there are four bureaus: 1) the Agriculture and Grazing Management Bureau; 2) the Forest Management Bureau; 3) the Minerals Management Bureau (includes mining and oil and gas development); and 4) the Real Estate Management Bureau. Within the entirety of the NCDE grizzly bear Delisting Area, DNRC manages approximately 574,370 acres of state trust lands. Of these acres, approximately 204,060 occur within the PCA. The following draft measures would be intended to apply to one or more of the four management areas identified in this Conservation Strategy: the Primary Conservation Area (PCA) (existing recovery zone), Management Zone 1, Management Zone 2, and Management Zone 3.

**DNRC NCDE GRIZZLY BEAR CONSERVATION MEASURES**

***PROGRAMS -- ALL [Real Estate, Ag and Grazing, Minerals Management, Forest Management]***

1) DNRC shall consider grizzly bears as a sensitive species in Montana during planning and environmental review on all TLMD projects for the term of this Conservation Strategy. **[applicable to all lands covered by this Conservation Strategy]**

2) For the term of this agreement, DNRC trust lands staff, while also considering Trust obligations, shall cooperate with Montana FWP bear management specialists to eliminate or minimize to the extent possible, any associated risks to bears associated with trust lands projects, leases, or agreements that may adversely affect grizzly bears. **[applicable to all lands included in this Conservation Strategy]**

3) For the term of this Conservation Strategy, for all TLMD projects and developments having potential to influence grizzly bears or their habitat, DNRC shall incorporate mitigations to minimize impacts to the extent possible, while also considering Trust obligations. **[applicable to all lands included in this Conservation Strategy]**

4) For the term of this Conservation Strategy, for all TLMD projects and developments on State Trust Lands within **the PCA, Zone 1, and Zone 2**, DNRC will incorporate mitigations into lease, license, and operating plan agreements (as applicable), to minimize adverse impacts to grizzly bears at a level commensurate with the level of intensity, risk, scope, and duration of effects likely to occur as a result of implementing the project or activity. When risk of bear impacts is deemed present, mitigations shall at a minimum consider proper storage of bear attractants (food, garbage, pet foods, livestock

carcasses, game carcasses etc. Attachment 1 below), vegetation/cover alteration, seasonal use of important habitats (particularly riparian), firearms restrictions, information/education and avoidance of bear-human encounters, minimization of new motorized access routes, and minimization of disturbance during spring and fall periods. DNRC employees and contractors and their employees are prohibited from carrying firearms while on duty, unless the person is specifically authorized to carry a firearm under DNRC policy 3-0621 (grazing licensees and lessees excluded).

5) **Inside the PCA, Zone 1, and Zone 2**, all TLMD lease and license agreements that permit uses and/or activities that may involve the use or presence of bear attractants (eg. leases/licenses for cabin and home sites, grazing, outfitting, group use licenses for camping, picnicking etc.) shall contain applicable clauses requiring unnatural bear foods and attractants to be contained and/or managed in a bear-resistant manner.

### *PROGRAM -- FOREST MANAGEMENT*

*HCP and Non-HCP Lands* **[Portions of the PCA, Zone 1, and Zone 2]**

6) As the primary component of a conservation strategy for grizzly bears on state trust lands associated with the NCDE and elsewhere in western Montana, DNRC would rely primarily on successful implementation of its Habitat Conservation Plan (HCP) for forest management activities, in cooperation with the USFWS. The HCP provides protective measures regarding forest management for grizzly bears across approximately 548,500 acres in western Montana. Within **the PCA, Zone 1, and Zone 2**, the HCP would require the implementation of agreed-to conservation measures on approximately 257,800 acres, of which 147,200 occur within the PCA. The plan contains measures that include: requiring restriction of open road density, requiring food storage protections that apply to employees and contractors, providing security during important seasons, restricting use of firearms, providing cover, protecting important areas for feeding and denning, and monitoring. The term of the HCP and associated Incidental Take Permit is 50 years.

7) Within **the PCA, Zone 1, and Zone 2**, on all non-HCP Trust lands where forest management activities would occur, grizzly bears would be considered a sensitive species and administrative rules for forest management activities would be in place that would provide protective measures addressing: storage of unnatural foods and attractants, firearms possession, cover retention (particularly along riparian areas), duration of activities, seasonal restrictions, protection of important feeding areas, and minimization of roads.

### *PROGRAM -- AG AND GRAZING*

8) Within **the PCA, Zone 1, and Zone 2**, all grazing leases and licenses issued within these geographic areas would require the following language:

a. Re-locate livestock carcasses in areas with high risk of bringing grizzlies into conflict with humans within 24 hours of discovery to minimize risk of human/bear conflicts. Lessee shall cooperate with DNRC managers and FWP bear management specialists as necessary to address prompt removal of problem livestock carcasses.

b. Established bone yards that would promote habituation and frequent use by grizzly bears are prohibited.

9) Within **the PCA** (Recovery Zone) for the term of this Conservation Strategy, DNRC will prohibit authorization of any new small livestock (smaller than a cow) grazing leases, including those for the purposes of weed control, and will also not convert existing licenses to allow the grazing of small livestock.

10) For the term of this Conservation Strategy, within **Zone 1**, grazing of domestic sheep would be discouraged on DNRC lands to minimize risk to grizzly bears. DNRC may authorize grazing of small livestock (including use for weed control) following development and implementation of a management plan incorporating measures effective for minimizing risks to grizzly bears. Mitigation measures in the plan may include, but are not limited to, requirement of a full-time shepherd, guard dogs, nighttime electric pens, prohibition of grazing in spring habitat during spring periods etc. When grazing small livestock in this zone, the lessee shall assume any cost of losses associated with grizzly bears and the bear will typically not be removed unless management authorities judge that the particular circumstances warrant removal and document those circumstances (e.g., the behavior resulted in a human fatality, the bear had a prior conflict history, etc).

11) To limit attractants associated with dispersed recreation on state trust lands within **the PCA, Zone 1, and Zone 2**, DNRC shall maintain its existing pack-it-in/pack-it-out policy for litter control, limit camping to 2 days on leased or licensed lands in areas not designated as campgrounds, and prohibit campfires on leased and licensed lands ARM 36.25.149. Camping shall be restricted in designated campgrounds to 14 consecutive days, and it shall be restricted on unleased or unlicensed lands outside a campground to 14 days per calendar year, unless permission for a longer period is obtained from the department ARM 36.25.149. DNRC lands managed as a part of block management areas and wildlife management areas in cooperation with MFWP, will adhere to regulations agreed to by both agencies specific to each block management area (ARM 36.25.149(i), ARM 36.25.163).

12) For the term of this Conservation Strategy, DNRC will make information/education materials available at all applicable field offices, emphasizing effective storage of foods and other grizzly bear attractants.

13) For the term of this Conservation Strategy, where DNRC lands exist within Wildlife Management Areas (WMA) and Block Management Areas managed by Montana Fish, Wildlife and Parks, food storage policies applicable to the WMA and BMAs as appropriate shall apply and be enforced.

14) For the term of this Conservation Strategy, DNRC will cooperate with other entities and agencies as opportunities arise to enact and enforce food storage measures in high use recreation areas, trailheads etc. to minimize risks to grizzly bears.

### *PROGRAM -- REAL ESTATE MANAGEMENT [Includes cabin/home sites, other developments, wind generation facilities, outfitting, camping, and other special use licenses etc.]*

[Measures 1 through 4 above would also apply.]

15) Within the **PCA, Zone 1, and Zone 2**, for the term of this Conservation Strategy on cabin sites leased by DNRC, containment of garbage, proper sewage disposal, prohibition of livestock and prohibition of the use of firearms would be enforced through DNRC's existing "Rules and Regulations –

[for] DNRC Cabin sites," and "Terms and Conditions –DNRC Residential Lease Lots" and renewal inspections.

16) Within the **PCA, Zone 1, and Zone 2**, in areas where land uses are non-compatible with grizzly bear conservation goals DNRC will, to the extent practicable in its sole discretion, cooperate with other entities to enact land transactions (eg. land sales, conservation easements, land exchanges etc.) that facilitate conservation of grizzly bears.

### *PROGRAM -- MINERALS MANAGEMENT [Includes oil and gas, coal, gravel, metalliferous and non-metalliferous leases]*

#### *Seismic Exploration*

17) For the term of this Conservation Strategy, within **the PCA and Zone 1** (**Rocky Mountain Front Portion**), the following measures would be incorporated as applicable into stipulations developed to mitigate impacts to grizzly bears.

a. Limit the window of operation to the extent possible to avoid the spring period from April 1 to June 30, and fall period September 15 to November 30.

b. To minimize disturbance to grizzly bears, limit the duration of activities to the extent possible.

c. Prohibit activities within 0.25 miles of riparian areas and prohibit ground crews from entering such areas.

d. To minimize the spatial extent of displacement, to the extent practicable, conduct activities in a sequential (localized) versus a concurrent, dispersed manner where activities would be occurring at different locations at the same time.

e. To minimize disturbance and displacement of bears, prohibit aerial flight routes within 0.25 miles of dense shrublands, wooded areas and riparian areas.

f. For human safety, train staff conducting ground activities on working safely in bear habitat and the effective use of bear spray and require crews to carry bear spray.

g. Bear attractants (including food and garbage) must be stored in a bear-resistant manner at all times when unattended. On-site camping is prohibited. No vehicle oil changes or petroleum disposal shall occur on the state land.

h. To avoid risk of human/bear encounters in known high use bear areas, nighttime foot travel away from vehicles is prohibited.

i. To minimize potential for disturbance and adverse impacts to important bear foods and feeding areas, all use of vehicles, ATVs and ground crews are not authorized within 100 feet of wetlands and other riparian areas on or adjacent to state lands.

#### *Oil and Gas Exploration and Development*

18) Oil and Gas exploration, development and reclamation activities on state lands are under the regulatory authority of the Montana Board of Oil and Gas Conservation. Measures, mitigations, and

reviews will recognize this regulatory permitting process and authority, and may not conflict with regulatory requirements. Where appropriate, the department may participate in or rely on MEPA analysis prepared by applicable regulatory agencies. Any action by the DNRC is contingent upon a determination by the regulatory oil & gas permitting agency that the proposed action creates a significant impact on grizzly bears or habitat within the NCDE area. The DNRC will implement mitigation measures consistent with the requirements of the permitting agency.

State trust lands within **the PCA and Zone 1**, shall be considered as Sensitive Areas and the DNRC Montana Oil and Gas Stipulations (December 2009) shall apply. The density of appreciable surface operations shall be limited to the extent practicable, while allowing for prudent development of the resource and protection from drainage by adjacent operations. Density of surface operations shall be addressed through implementation of these stipulations following appropriate MEPA environmental review and development of approved operating plans that minimize impacts on grizzly bears. Measures as described in the *"Interagency Rocky Mountain Front, Wildlife Monitoring/Evaluation Program, Management Guidelines for Selected Species"* (September 1987) shall be incorporated into operating plans prior to their approval, as specified by the DNRC Montana Oil and Gas Stipulations (December 2009) [Attachment 2].

### *Mineral Mining*

Within the **PCA and Zone 1**, mortality risk to grizzly bears from mineral development on DNRC lands will be largely mitigated through project specific mitigation measures. The purpose of these guidelines is to avoid, minimize and mitigate environmental impacts to grizzly bears and their habitat from mining activities occurring on State lands. The guidelines would be applied during review and approval of a site-specific plan of operations. Operating procedures, reclamation plans, or other mitigating measures would be incorporated into the Operating Plan, or could become agency-imposed operating conditions, provided such measures were consistent with applicable mining laws. All exploration, development production, mitigation measures, reclamation, and closure activities for locatable minerals on Federal, State and private lands are under the regulatory permitting authority of the Montana Department of Environmental Quality (DEQ). DNRC works cooperatively with the DEQ in the administration and management of mining operations. Mitigation measures may not conflict with the regulatory permitting authority of the DEQ. Any action by the DNRC is contingent upon a determination by DEQ [the permitting agency] that the proposed action creates a significant impact on grizzly bears or habitat within the PCA and/or Zone 1. The DNRC will implement mitigation measures consistent with the requirements of the permitting agency. The following measures would apply to all new hardrock mining Plans of Operation on lands managed by the DNRC in both the PCA and Zone 1.

### Project Evaluation

The potential effects to grizzly bears and bear habitat, and the necessary mitigation measures will be determined at the project level by the authorizing or permitting agency through project review, an Environmental Assessment or Environmental Impact Statement. For projects with the potential to significantly, negatively affect grizzly bears or their habitat, operating plans, notices and permits will include a mitigation plan with measures to protect grizzly bears and minimize detrimental impacts to

them during and after operations. Operators are required to comply with the mitigation plan through the agency's approval of the Operating Plan.

Operating plans and notices will include specific measures to reasonably mitigate potential impacts to grizzly bears or their habitat from the following activities:

- Land surface and vegetation disturbance,
- Water table alterations,
- Construction, operation, and reclamation of mine-related facilities such as impoundments, rights of way, roads, pipelines, canals, transmission lines or other structures,
- Food storage and sanitation.

Performance of operating and reclamation measures, and site-specific mitigation measures used to protect grizzly bears or bear habitat will be enforced through the respective DEQ and Federal surface management regulations. Operators who fail to comply with mitigation measures for grizzly bear protection in the DEQ approved operating plan will be subject to a noncompliance order or notice issued by the DEQ. Non-compliance orders specify the noncompliance and what is needed for the operator to come into compliance. The financial assurance (bond) for reclamation performance will be calculated and managed by the agencies. Bonding may include the cost of implementing the reclamation measures required to mitigate impacts to grizzly bears and bear habitat. The financial assurance instrument for reclamation performance will be held by the Montana DEQ for mining operations on private lands.

For operations where it is determined there is potential for significant impacts ("significance" as determined through environmental review and permitting) to the grizzly bear population or its habitat, a monitoring plan will be developed by the operator with approval by the DEQ, and in close coordination with MFWP for the life of the project. The monitoring plan will outline how changes in habitat and disturbance to bears will be measured (and include monitoring of reclamation measures). The plan will identify trigger levels or criteria for habitat parameters to determine if direct research of local grizzly bears (i.e., capturing and radio-collaring bears) is warranted and to what extent monitoring should be conducted.

### Food and Attractants

For projects with the potential to significantly affect grizzly bears or their habitat, mitigations plans will include food storage/handling and garbage disposal measures and will incorporate any existing food storage measures for human occupancy. Mitigation plans for grizzly bears will include the following measures regarding food and attractants:

- Bear proof containers will be used and garbage will be removed in a timely manner at mine facilities.
- Road kills will be removed daily to a designated location determined in close coordination with MFWP.

- The use of clover will be discouraged as part of any reclamation seed mixes used during mine construction, operation, or when reclamation activities are concurrent with operations. Native seed mixes will be promoted and used whenever practicable.
- No feeding of any wildlife will be allowed.

Implementation of the Food and Attractants measures is the sole responsibility of the operator. Compliance with these requirements will be evaluated during site inspections conducted by the authorizing agencies. The number and type of inspections as well as the mechanism for inspections will be identified through the planning process (MEPA or NEPA). Failure to comply with the measures will subject the operator to a noncompliance process as noted above.

### Motorized Access

For projects with the potential to significantly affect grizzly bears or their habitat, mitigation plans will include the following measures regarding motorized access:

- New roads constructed for mineral exploration and/or development will be single-purpose roads only and will be closed to public use not associated with mineral activities.
- A traffic management plan will be developed as part of any proposed activity to identify when and how mine roads will be used, maintained, and monitored, if required, and how roads will be closed after mineral activities have ended.
- On State lands only, roads constructed for mineral operations may be retained by the land management agency for use associated with other concurrent or future activities (such as timber sales or rights-of-ways). However, impacts associated with all uses of the road(s) must be analyzed in a MEPA environmental review, and impacts to grizzly bears minimized to the extent practicable.

### Habitat

For projects with the potential to significantly affect grizzly bears or their habitat, mitigation plans will include the following measures regarding habitat:

- Mineral exploration and/or development activities will occur at a time or season when the area is of little or no biological importance to grizzlies. If timing restrictions are not practicable, reasonable and appropriate measures will be taken to mitigate negative impacts of mineral activity to the bear.
- Reasonable and appropriate measures regarding the maintenance, rehabilitation, restoration or mitigation of functioning aquatic systems and riparian zones will be implemented. State regulatory permits may include reasonable and appropriate measures as part of a riparian reclamation plan identifying how reclamation will occur, vegetation species used in reclamation, a timeframe of when reclamation will be completed, and monitoring criteria.

- Reclamation and revegetation of roads, drilling pads, and other areas disturbed from mineral exploration and development activities will be completed as soon as practicable by the operator.
- For new projects in the **PCA** with the potential to significantly affect grizzly bears or their habitat, DNRC will work cooperatively with DEQ, lessees and operators to minimize adverse impacts. The level of mitigation required for individual projects would be commensurate with the degree and duration of impacts to affected lands. DNRC would be responsible only for ensuring mitigation of impacts associated with their lands. To minimize potentially significant impacts to grizzly bears the following measures would be considered and implemented to the extent reasonable and practicable as determined by DNRC.
- In the first order of preference, operators shall be required to reclaim the affected area back to suitable bear habitat that has similar or improved characteristics and qualities as the original habitat (such as the same native vegetation).
- If reclamation efforts alone are deemed inadequate or inappropriate by DNRC for mitigating impacts to grizzly bears, the following measures may be considered and applied.
- Operators and/or lessees as applicable may either acquire a perpetual conservation easements or purchase fee title comparable or better replacement grizzly bear habitat in the PCA to mitigate adverse impacts. A purchase rate of >1:1 on an acreage basis would be considered for acquiring habitat, depending on the quality of habitat degraded and the habitat available for acquisition. Acquisition of habitat in distant areas of the PCA associated with identified linkage corridors could also be considered for mitigation, and maybe desirable. Prior to any purchase, MFWP will be given at least 30 days to provide input to DNRC on the quality and suitability of the lands proposed as mitigation. DNRC will have final approval as to the adequacy and suitability of proposed mitigations. Easements/deeds would be transferred to a Federal or State agency, or private conservation organization to ensure the long-term integrity of the habitat as deemed appropriate by DNRC.
- Other feasible measures to offset adverse impacts to grizzly bears could include (but would not be limited to) radio telemetry monitoring of grizzly bear movements in an affected area in coordination with MFWP, or other more intensive grizzly bear research efforts conducted with MFWP involvement. Other feasible measures could include providing regional funding to help support the acquisition and distribution of bear-resistant waste containers, electric fencing materials, information/education outreach efforts regarding living safely in bear habitat, and/or funding a bear management specialist or enforcement officer.

**Human Conflict**

For projects with the potential to significantly affect grizzly bears or their habitat, the Operating Plan will include the following mitigation measures regarding human conflict:

- Firearms will be prohibited on site during operations except for security personnel and other designated persons. Carrying of bear spray will be recommended to the operator.

- The operator should require employees to attend training related to living near and working in grizzly bear habitat prior to starting work and on an annual basis thereafter.

# [ATTACHMENT 1]

**Example Recommended Language to Address Food Storage Requirements in the PCA, Zone 1, and Zone 2.**

List of measures that would be included in new or existing licenses/leases on renewal to address food storage risks to grizzly bears (adapted from the Draft FWP measures for WMAs dated Feb. 2011).

1. Human, pet and livestock food (except baled or cubed hay without additives), garbage, and all other attractants shall be stored in an approved bear resistant manner or container when camp is unattended. (see definition of attended below) or during nighttime hours.
2. Wildlife carcasses, birds, fish or other animal parts that are within 1/2-mile of any camp or sleeping area shall be stored in an approved bear-resistant manner or container during when unattended. If a wildlife carcass is within an attended camp during daytime hours it may be on the ground. In areas where upright supports such as poles or trees are not present, carcasses shall be removed as soon as prudently possible to minimize the potential for attracting grizzly bears into camp areas.
3. Attractants (such as food leftovers or bacon grease) shall not be buried, discarded, or burned in an open campfire.
    a. Leftover food or food waste products shall be placed in an appropriate, sealed container and packed out with garbage.
    b. Leftover food or other attractants may be burned in a contained stove fire.
    c. Attractants may be placed into a suitable container (i.e. tin can) to prevent leaching into the ground and burned over an open campfire. Any remaining attractants unconsumed by burning shall be packed out.
4. The responsible party shall report the death and location of any livestock to a DNRC employee within 24 hours of discovery.
5. Approved bear-resistant containers for use in grizzly country meet the following criteria: A securable container constructed of solid material capable of withstanding 200 foot-pounds of energy applied by direct impact. The container, when secured and under stress, will not have any openings greater than one-quarter (1/4) inch, that would allow a bear to gain entry by biting or pulling with its claws.
6. Bear-resistant manner means any attractants, including food and garbage, must be stored in one of the following ways if unattended:
    a. Secured in a hard-sided camper or vehicle trunk or cab or trailer cab.
    b. Secured in a hard-sided dwelling or storage building.
    c. Suspended at least 10 feet up (from the bottom of the suspended item) and 4 feet out from any upright support, i.e. tree, pole.
    d. Stored in an agency approved bear-resistant container.

e. Stored within an approved and operating electric fence.

f. Stored in any combination of these methods.

# [ATTACHMENT 2]

**DNRC MONTANA OIL AND GAS STIPULATIONS (December 2009)**

These stipulations may be used on MT oil and gas leases, in the Special Provisions Section (36), "Exhibit A" depending on the specific circumstances for the tract being leased.

Sensitive Areas

F-1. This lease includes areas that may be environmentally sensitive. Therefore, if the lessee intends to conduct any activities on the lease premises, the lessee shall submit to TLMD one copy of an Operating Plan or Amendment to an existing Operating Plan, describing in detail the proposed activities. No activities shall occur on the tract until the Operating Plan or Amendments have been approved in writing by the Director of the Department. TLMD shall review the Operating Plan or Amendment and notify the lessee if the Plan or Amendment is approved or disapproved.

After an opportunity for an informal hearing with the lessee, surface activity may be denied or restricted on all or portions of any tract if the Director determines in writing that the proposed surface activity will be detrimental to trust resources and therefore not in the best interests of the trust.

F-2. This lease is located near the Rocky Mountain Front and includes areas that are environmentally sensitive. Therefore, except as otherwise provided below, the lessee shall not conduct any surface operations on the lease premises. If the lessee determines that surface operation on the lease premises may be required, the lessee shall submit a proposed Operating Plan or Amendment to an existing Operating Plan to the State Board of Land Commissioners describing in detail the proposed operations. No surface activities shall occur on the lease premises unless and until the Operating Plan or Amendment is approved by the Board. In determining whether to approve the proposed Operating Plan or Amendment, the following provisions shall apply:

1) If the lessee proposes an activity that does not entail any significant surface disturbance, the Board may approve the same after completion of the appropriate environmental review in accordance with the Montana Environmental Policy Act (MEPA) and an opportunity for public comment on the proposed activity has been provided.

2) Before the Board approves any proposed activity on the lease premises that entails a significant surface disturbance, an environmental impact statement (EIS) shall be completed in accordance with MEPA. The EIS shall analyze the potential impacts of alternative and future potential levels of oil and gas development and extraction on an ecosystem scale as the ecosystem is defined by

the "Limits of Acceptable Change--Bob Marshall Wilderness Complex" adopted by the Montana Department of Fish, Wildlife & Parks in December 1991. The analysis shall consider all relevant information, which may include, but is not limited to, existing environmental reviews and management plans. Public involvement in the environmental review process shall be actively solicited by the preparer of the environmental review document and shall include, at minimum, adequately noticed public meetings in at least three communities including Great Falls and Helena.

3) The proposed surface activity shall adhere to the "Interagency Rocky Mountain Front, Wildlife Monitoring/Evaluation Program, Management Guidelines for Selected Species" adopted by the Montana Department of Fish, Wildlife & Parks in September 1987, or any successor guidelines thereto.

4) The Board may refuse to approve any proposed surface operations if it determines that they do not constitute the best use of trust resources or are not in the best interest of the State of Montana.

F-3. This lease is located within or adjacent to the Sleeping Giant and Sheep Creek Wilderness Study Area, the Beartooth State Wildlife Management Area, and/or the Gates of the Mountains Wilderness and includes areas that are environmentally sensitive. Therefore, except as otherwise provided below, the lessee shall not conduct any surface operations on the lease premises. If the lessee determines that surface operation on the lease premises may be required, the lessee shall submit a proposed Operating Plan or Amendment to an existing Operating Plan to the State Board of Land Commissioners describing in detail the proposed operations. No surface activities shall occur on the lease premises unless and until the Operating Plan or Amendment is approved by the Board. In determining whether to approve the proposed Operating Plan or Amendment, the following provisions shall apply:

1) If the lessee proposes an activity that does not entail any significant surface disturbance, the Board may approve the same after completion of the appropriate environmental review in accordance with the Montana Environmental Policy Act (MEPA) and an opportunity for public comment on the proposed activity has been provided.

2) Before the Board approves any proposed activity on the lease premises that entails a significant surface disturbance, an environmental impact statement (EIS) shall be completed in accordance with MEPA. The EIS shall analyze the potential impacts of alternative and future potential levels of oil and gas development and extraction on an ecosystem scale. The analysis shall consider all relevant information, which may include, but is not limited to, existing environmental reviews and management plans. Public involvement in the environmental review process shall be actively solicited by the preparer of the environmental review document and shall include, at minimum, adequately noticed public meetings in at least two communities including Great Falls and Helena.

3) The Board may refuse to approve any proposed surface operations if it determines that they do not constitute the best use of trust resources or are not in the best interest of the State of Montana.

F-4. This lease is located within the Rocky Mountain Front area established under federal legislation removing mineral leasing and development on federal fee title lands, and federal minerals and has been identified as environmentally sensitive. The Rocky Mountain Front area is a crucial fish or wildlife area or corridor; has FWP owned surface rights; has an existing or is in the process of having conservation easements established and has important recreational value to the citizens of Montana. Therefore, except as otherwise provided below, the lessee shall not conduct any surface operations on the lease premises. If the lessee determines that surface operation on the lease premises may be required, the lessee shall submit a proposed Operating Plan or Amendment to an existing Operating Plan to the State Board of Land Commissioners and notify the Director of Fish, Wildlife and Parks describing in detail the proposed operations. No surface activities shall occur on the lease premises unless and until the Operating Plan or Amendment is approved by the Board. In determining whether to approve the proposed Operating Plan or Amendment, the following provisions shall apply:

1) If the lessee proposes an activity that does not entail any significant surface disturbance (not in excess of 1 well pad/640 acres), the Board may approve the same after completion of the appropriate environmental review in accordance with the Montana Environmental Policy Act (MEPA). As part of the MEPA process, DNRC will provide for an on the ground consultation with FWP, and an opportunity for public comment on the proposed activity. Public involvement in the environmental review process shall be actively solicited by the preparer of the environmental review document and shall include, at minimum, adequately noticed public meetings in three major daily publications including Missoula, Great Falls and Helena; legal notices to those non-daily papers in the affected counties, and detailed notification of landowners who own the surface rights, or directly adjacent rights, who would be impacted by development.

2) Before the Board approves any proposed activity on the lease premises that entails a significant surface disturbance (in excess of 1 well pad/640 acres), an environmental impact statement (EIS) shall be completed in accordance with MEPA. The EIS shall analyze the potential impacts of alternative and future potential levels of oil and gas development and extraction on an ecosystem scale as the ecosystem is defined by the "Limits of Acceptable Change - Bob Marshall Wilderness Complex" adopted by the Montana Department of Fish, Wildlife and Parks in December 1991, and any successor thereto. The analysis shall consider all relevant information, which may include, but is not limited to, existing environmental reviews and management plans, and new data concerning climate change, private lands conservation efforts, and fish and wildlife distribution and migration patterns. Public involvement in the environmental review process shall be actively solicited by the preparer of the environmental review document and shall include, at minimum, adequately noticed public meetings in at least three communities including Great Falls and Helena.

3) The proposed surface activity shall adhere to the "Interagency Rocky Mountain Front, Wildlife Monitoring/Evaluation Program, Management Guidelines for Selected Species" adopted by the Montana Department of Fish, Wildlife and Parks in September 1987, or any successor guidelines thereto.

4) The Board may refuse to approve any proposed surface operations if it determines that they do not constitute the best use of trust resources or are not in the best interest of the State of Montana.

# Appendix 14

Bureau of Land Management Draft Habitat Standards for Management Zone 1

Because the definition of Secure Core habitat requires areas at least 2,500 acres in size and most BLM lands inside the PCA and Zone 1 are scattered parcels or smaller acreages, there are limited amounts of Secure Core habitat managed by the BLM in these areas. BLM lands in Zone 1 were evaluated to determine if they currently provide secure grizzly bear habitat or if they have the potential to provide secure habitat. Secure Core Habitat is defined as areas greater than 500 m from an open motorized route (road or trail) or recurring helicopter flight and at least 2,500 acres in size. Open roads are defined as any roads open to public use during the period of April 1 through November 30. Closed roads or roads open only to administrative uses would not be considered "open" roads. In Zone 1, three blocks of BLM managed lands were identified as currently providing occupied secure habitat (Chamberlain/Murray Douglas, Hoodoos and the Lower Blackfoot Corridor). Occupied bear habitat is also found in Marcum Mountain but conditions could be improved through additional road closures.

All areas currently providing secure habitat are located in the Missoula Field Office. No blocks of BLM land were found to be large enough in the Butte or Lewistown Field Offices to provide secure grizzly bear habitat.

Road density standards and vegetation management standards/guidelines would only be applicable in the Chamberlain/Murray Douglas, Hoodoos, Lower Blackfoot Corridor and Marcum Mountain Areas.

Chamberlain/Murray Douglas - 42,500 acres
Hoodoos - 26,000 acres
Lower Blackfoot Corridor – 11,000 acres
Marcum Mountain – 13,000 acres

## Road Density and Secure Habitat Standards

If the BLM is able to provide large blocks of land (greater than 2,500 acres) through acquisitions, analysis would be completed to determine if road density standards should apply in these areas (this would apply to all Field Offices).

## Draft Standards for Chamberlain/Murray Douglas, Hoodoos, Lower Blackfoot Corridor and Marcum Mountain Areas (Missoula Field Office)

To minimize disturbance to grizzly bear Secure Core habitat (Chamberlain/Murray Douglas, Hoodoos and the Lower Blackfoot Corridor), open road densities will be maintained below 1 mi/sq. mi unless this is not possible due to rights-of-way, leases, or permits. All practicable measures will be taken to assure that important habitats with low road densities remain in that

condition. Currently, open road densities in Chamberlain/Murray Douglas, Hoodoos and the Lower Blackfoot Corridor are under 1 mi/sq. mi.

In the Marcum Mountain Area (potential secure habitat), the BLM will move towards meeting an open road density of less than 2.5 mi/sq. mi. to allow for management activities while improving secure habitat for bears. Road densities in the Marcum Mountain area are currently high at 3-5 mi/sq. mi. Implementation of the habitat standard (<2.5 mi/sq. mi) in Marcum Mountain will begin after on-going restoration activities and would be expected to be met within 10 years. A comprehensive travel plan analysis will be completed during the Resource Management Plan revision and the road density standard for Marcum Mountain could be modified at this time.

Secure Core habitat in the Chamberlain/Murray Douglas, Hoodoos and Lower Blackfoot Corridor areas will be maintained or increased. In the Marcum Mountain Area, Secure Core Habitat will be created through the reduction of open roads.

Adequate vehicle access will be maintained for management activities and treatments. Temporary road locations will be minimized in important bear habitats such as foraging areas, riparian habitats, and elk calving areas.

Temporary roads will be closed or decommissioned within one year of project completion (roads could stay open for one year after project completion to allow for firewood cutting, weed control or other short-term uses of the road). Project completion refers to all work associated with a project including, but not limited to timber harvest, thinning, seeding, broadcast burning, pile burning and weed spraying.

The Missoula Field Office will monitor administrative use of closed roads for 3 years to determine the baseline using surveys and road counters. After baseline levels are determined, the Field Office will identify the appropriate level of administrative use. After the appropriate level of administrative use is identified, this type of use will be monitored. How long-term administrative use is monitored will be identified by the Field Office.

Exceptions to administrative use could be granted for longer term projects (such as habitat restoration activities, salvage logging, etc.) after analysis of the effects to grizzly bear have been completed and disturbance to the bear has been considered and minimized to the extent possible. Another exception to administrative use is for monitoring/documenting trespass livestock.

## Vegetation Standards and Guidelines for Zone 1

### Apply to Chamberlain/Murray Douglas, Hoodoos, Lower Blackfoot Corridor and Marcum Mountain Areas (Missoula Field Office)

**Standards**

All proposed management activities will be evaluated for their effects on grizzlies and/or their habitats. Vegetation manipulation projects will be designed to minimize impacts to or improve grizzly bear habitat unless the project is designed primarily to benefit a Federally Listed species.

Timber sale contracts will include a clause providing for cancellation or temporary cessation of activities if needed to resolve a grizzly-human conflict situation (i.e. such as kill sites). Prior to beginning work all contractors, operators and their employees will be informed of safe procedures for working and recreating in grizzly country.

Contracts will include a clause prohibiting firearms on site during operations related to the contracts. Carrying of bear pepper spray will be recommended to contractors.

Contractors, operators and contractor employees must follow food/attractant storage orders.

Contractors must get approval before camping on BLM lands.

Fire camps must follow food/attractant storage orders.

Activities that will permanently reduce habitat quality or quantity, reduce the population of grizzly bear or cause bears to be conditioned to human food or presence will not be permitted.

Vegetation structure, density, species composition, patch size, pattern, and distribution will be managed in a manner to maintain or improve grizzly bear habitat across the landscape.

Whitebark pine restoration will be promoted at suitable sites. Whitebark pine is a minor component of the forests on BLM lands in Zone 1.

**Guidelines**

Silvicultural treatments, restoration activities, and prescribed burning may be used to improve grizzly bear habitat.

Silvicultural treatments in forested cover should provide a balance of all successional stages at the landscape scale.

Vegetation and fuels management activities should occur at a time or season when the area is of little or no biological importance to grizzlies.

## Livestock Grazing Habitat Standards – for Zone 1 Unless Otherwise Identified

No sheep allotments will be allowed in Zone 1.

The use of sheep and goats for the purpose of weed control will be allowed and follow existing federal/state permitting processes.

In areas currently unleased, no new livestock grazing allotments will be created for any class of livestock in Zone 1.

If BLM acquires lands that were grazed before the acquisition occurred, grazing will be allowed for livestock but not for sheep. If monitoring data indicates over utilization or other land health issues, the number of AUMs could be reduced and the season of use modified.

If BLM acquires lands that were not grazed before the acquisition occurred, grazing allotments will not be allowed in Chamberlain/Murray Douglas, Hoodoos, the Lower Blackfoot Corridor and Marcum Mountain Areas. In all other areas of Zone 1, livestock grazing (with the exception of sheep) could be considered on these newly acquired lands.

Within Zone 1, the BLM will include a clause in all new and revised grazing permits/leases requiring the permittee/lessees to properly treat or dispose of livestock carcasses to eliminate any potential attractant for bears. The BLM will work with the permittee/lessee and Montana Fish, Wildlife and Parks (MFWP) on the appropriate manner and location of carcass disposal.

Within Zone 1, the BLM will include a clause in all new and revised grazing permits/leases requiring the permittee/lessee to notify the BLM as soon as practical of any grizzly bear depredation on livestock or conflicts between grizzly bears and livestock, even if the conflict does not result in the loss of livestock.

No apiaries would be permitted in Chamberlain/Murray Douglas, Hoodoos, the Lower Blackfoot Corridor and the Marcum Mountain Areas. Outside these areas, apiaries permitted on public lands must be enclosed within an approved and operating electric fence as described in the NCDE Food Storage Order. Currently, there are no permitted apiaries on BLM lands in Zone 1.

Livestock salting/minerals will be allowed in all Zones.

## Oil and Gas Leasing Standard – for the PCA and Zone 1

No Surface Occupancy for all BLM and split estate lands in Zone 1.

**Stipulation:** No Surface Occupancy. Surface occupancy and use is prohibited within the boundary of the Grizzly Bear Recovery Zone and Management Zone 1.

**Objective:** To avoid surface disturbing and disruptive activities in the Grizzly Bear Recovery Zone (called the PCA in this Conservation Strategy) and Management Zone 1.

**Exception:** An exception may be granted by the authorized officer if the operator submits a plan which demonstrates that the proposed action will not affect grizzly bears or grizzly bear habitat. If the authorized officer determines that the action may have an adverse effect, the operator may submit a plan demonstrating that the impacts can be adequately mitigated. This plan must be approved by BLM in close coordination with MFWP.

**Modification:** This stipulation may be modified if the authorized officer, in coordination with MFWP determines a portion of the area is no longer important to grizzly bear conservation or the boundaries of the stipulated area may be modified if the area can be occupied without adversely affecting grizzly bears or grizzly bear habitat.

**Waiver:** This stipulation may be waived if the authorized officer, in coordination with MFWP, determines that the entire leasehold can be occupied without adversely affecting grizzly bears or grizzly bear habitat.

## Mining Standards for Zone 1

Mining standards would be the same for Zone 1 as described for the PCA in the Conservation Strategy.

## Developed Sites Standards and Guidelines in Zone 1

### Guidelines

The BLM will try to prevent changes in the capacity of sites or creating new developed sites but this will not always be possible. Any potential detrimental effects to bears will be mitigated to the best of BLM's ability.
Where conflicts occur between grizzly bear and humans in the Chamberlain/Murray Douglas, Hoodoos, Lower Blackfoot Corridor and Marcum Mountain Areas, the BLM will consider elimination of dispersed camping.

New communication site users will be grouped into existing facilities at established communication sites, to the extent practicable, to reduce impacts and expedite application processing.

New right-of-way facilities will be located within or adjacent to existing rights-of-way, to the extent practicable, in order to minimize adverse environmental impacts and the proliferation of separate rights-of-way.

**Standards**

Any proposed increase, expansion, or change of use of developed sites will be analyzed, and potential detrimental and positive impacts documented through project evaluation by the BLM. Areas with high risk of grizzly bear/human interaction (such as riparian areas) will be avoided.

All new developed sites will have mandatory food storage regulations in place as well as education kiosks.

Communication site plans will be completed prior to authorizing communication site uses in new areas.

Right-of-way applications across roads that have been closed or have seasonal restrictions will be analyzed on a case-by-case basis.

## Food/Attractant Storage Strategy for Zones 1 and 2

**Introduction**

Grizzly bear occurrence is increasing on BLM lands along with an increase in human population and recreational use within the region. In order to reduce the potential for negative human/wildlife conflicts related to accessibility to food, refuse, and other attractants, the Bureau of Land Management (BLM) has developed food storage orders for all BLM managed lands in Zones 1 and 2 identified in the Grizzly Bear Conservation Strategy.

The purpose of these restrictions are to minimize grizzly bear-human conflicts and, thereby, provide for visitor safety and recovery of the grizzly bear within the Northern Continental Divide Ecosystem (NCDE).

**Communication Plan:**

To educate and inform the public before food storage orders take effect, one or more of the following will be implemented starting upon adoption of the Conservation Strategy:

- Development of press releases for local newspapers, television and radio stations.
- Development of flyers, brochures, and educational materials.
- Development of kiosk notices and signage to be installed at various BLM campgrounds, boat launches, parking areas, and other locations with concentrated recreational use.
- Internal and external dissemination of information to agencies, local governments, clubs, schools, permittees, contractors, outfitters/guides, non-governmental organizations, and the general public.

**Management Practices:**

- Special Food Order requirements will be applied to BLM lands in Zones 1 and 2 and will be in effect from April 1 to December 1, annually.

- Bear-resistant containers may be placed and maintained at priority BLM locations having the potential for concentrated human activity, such as: campgrounds, trailheads, parking areas, and boat launches.

- The BLM lands in Zone 2 would be placed under mandatory food storage orders except where superseded by site specific regulations such as those for designated campgrounds or developed recreation sites. This exception would mostly be in the high use, high traffic recreation sites (e.g. along the Missouri River) where congestion and urban interface make food storage orders difficult to implement and of marginal effectiveness when considering other activities in the area.

- For campgrounds and recreation areas without specifice regulations, the BLM would review the specific needs of each facility and determine the appropriate food storage restrictions. Mandortory or voluntary food storage orders could be implemented depending on the location of the site and the types of habitat. In additions, there could be a phased-in schedule in conjunction with infrastructure upgrades and public education efforts.

- Should the frequency bear-human interactions (including black bear) increase in the vicinity of recreation facilities, the BLM would modify those areas where mandatory food storage orders would apply.

**UNDER THIS FOOD STORAGE ORDER IT IS REQUIRED THAT:**

The following restrictions will be implemented in the Missoula, Butte and Lewistown Field Offices within the PCA, Zone 1 and Zone 2. These restrictions shall remain in effect until rescinded or revoked.

**1. Human, pet and livestock food (except baled or cubed hay without additives or salt for livestock), and garbage should be attended or stored in an approved bear-resistant manner:** Food, garbage, and other attractants, including all livestock grain and pellets, should be stored using an approved storage technique when camp is unattended.

**2. Wildlife carcasses, birds, fish or other animal parts that are within 1/2-mile of any camp or sleeping area should be stored in a bear-resistant manner during nighttime hours:** If a wildlife carcass is within an attended camp during daytime hours it may be on the ground.

**3. Attractants (such as food leftovers or cooking grease) should not be buried, discarded, or burned in an open campfire:**

a. Leftover food or food waste products may be placed in an appropriate, sealed

container and packed out with garbage.

b. Leftover food or other attractants may be burned in a contained stove fire.

c. Attractants may be placed into a suitable container (i.e. tin can) to prevent leaching into the ground and burned over an open campfire. Any remaining attractants unconsumed by burning should be placed with other garbage and packed out.

**4. Approved bear-resistant containers will meet the following criteria:** A securable container constructed of solid material capable of withstanding 200 foot-pounds of energy applied by direct impact. Only commercial and personal-use bear-resistant containers, approved for use by the USDA, Forest Service, Missoula Technology and Development Center (MTDC), should be used.

**5. The responsible party shall report the death and location of any livestock to a BLM or Forest Service Official within 24 hours of discovery.** In some very remote areas, it may not be possible to meet the 24-hour requirement. In these special cases, the responsible party shall report to a BLM or Forest Official the discovery of any dead livestock within 48 hours.

The following persons may be exempt from this order (The BLM State Director is delegated the authority to grant the exemption in writing):

1. Persons with a permit specifically authorizing the prohibited act or omission.

2. Any Federal, State, or local officer, or member of an organized rescue or firefighting force in the performance of an official duty.

Violations for these prohibitions are punishable by a fine of not more than $1,000 or imprisonment for not more than 12 months, or both (FLPMA Section 303 43 U.S.C. 1733).

**DEFINITIONS:**

1. **Attended:** At least one adult person (attendee) is physically present within 100 feet of attractants during **daytime hours**. During the **nighttime hours**, all attractants must be within 50 feet of the attendee, or attractants must be stored in a bear-resistant manner.

2. **Attractant:** Food as defined below and garbage from human, livestock or pet foods.

3. **Food:** Any nourishing substance, which includes human food or drink (canned, solid or liquid), livestock feed (except baled or cubed hay without additives) and pet food.

4. **Attendee:** An adult (18 years of age or older) in control of attractants.

5. **Bear-resistant container:** A securable container constructed of solid material capable of

withstanding 200 foot-pounds of energy applied by direct impact. The container, when secured and under stress, will not have any openings greater than one-quarter (1/4) inch, that would allow a bear to gain entry by biting or pulling with its claws.

6. **Bear-resistant manner:** Any attractants, including food and garbage, stored in one of the following ways if unattended:

a. Secured in a hard-sided camper or vehicle trunk or cab or trailer cab.

b. Secured in a hard-sided dwelling or storage building.

c. Suspended at least 10 feet up (from the bottom of the suspended item) and 4 feet out from any upright support, i.e. tree, pole.

d. Stored in an approved bear-resistant container.

e. Stored within an approved and operating electric fence.

f. Stored in any combination of these methods, or

g. Stored by methods other than those described in Section #6, a-f, that are approved in writing by the BLM.

7. **Contained fire stove:** a metal stove that completely encloses the fire.

8. **Daytime:** 1/2-hour before sunrise until 1/2-hour after sunset.

9. **Nighttime:** 1/2-hour after sunset until 1/2-hour before sunrise.

10. **Livestock:** A domesticated animal, such as mule, horse, llama, or goat.

11. **Wildlife carcass:** The body, or any parts thereof, of any deceased wild animal, bird, or fish.

12. **An approved electric fence will meet at a minimum the following specifications:**

a. The fence will be set up as a “tight wire” fence. The wire will be tight and under tension, not loose or sagging.

b. Minimum fence height = 4 feet.

c. Minimum post height = 5 feet.

d. Maximum spacing between posts = 8 feet.

e. Conductors (wire): Minimum of 7 wires, with 6-10 inch spacing between wires. Bottom wire must be within 2 inches of the ground. All wire must be smooth metal fence wire of at least 16 gauge or poly wire, except the top wire which may be poly tape of at least six strand stainless steel.

f. The system will be set up to operate both as a ground wire return and a grounded system. The 2 top wires will be hot, with all other wires alternating hot and ground. The minimum length ground rod is 2 feet.

g. Fence charger (minimum): (1) stored energy of 0.7 joules; (2) tested peak output of 5000 volts; (3) 40 shocks per minute. User must be able to test electrical output in the field.

h. The charger must be made inaccessible to disturbance from a bear. The charger may be stored within the interior of the fence or located a minimum of 10 feet above ground.

i. Minimum distance between fence and items enclosed by electric fence = 3 feet.

# Appendix 15

## Lead Agencies and Tribes Responsible for Monitoring Population and Habitat Parameters under this Conservation Strategy Agencies

| TASK | LEAD AGENCY | SUPPORTING AGENCIES |
|---|---|---|
| Secure habitat/OMRD/TMRD | USFS | GNP, BLM, FIR, BIR |
| Developed Sites | USFS | GNP, BLM |
| Livestock allotments | USFS | GNP, BLM, FIR, BIR, DNRC, MFWP |
| Prepare annual habitat monitoring reports | USFS | GNP, BLM, FIR, BIR, DNRC, MFWP |
| Prepare annual population monitoring reports | MFWP | |
| Private land status | MFWP | |
| Limiting mortality to sustainable levels | MFWP | GNP, FIR, BIR |
| Distribution of females w/ offspring | MFWP | USFS, GNP, BLM, FIR, BIR, DNRC |
| Radio collar sample of 25 females | MFWP | USFS, GNP, FIR, BIR |
| Annual conflict reporting | MFWP | GNP, FIR, BIR |
| Public outreach and education | MFWP | |
| Conflict management and response | MFWP, GNP, FIR, BIR | |
| Calculate 6-year running average annual population growth rate (i.e., $\lambda$) annually | MFWP | USFS, GNP, FIR, BIR |
| Calculate 6-year running average of independent female survival annually | MFWP | USFS, GNP, FIR, BIR |

# Appendix 16

Annual Cost Estimates by Agency for Implementing this Conservation Strategy

# Appendix 17

Grizzly Bear Management Plan for Western Montana

AVAILABLE ONLINE:
http://fwp.mt.gov/fishAndWildlife/management/grizzlyBear/managementPlan.html