

# Wildlife

## C-5 Other Big Game Species: Mule Deer

### January 2013

OUTPUT, MANAGEMENT PRESCRIPTION, EFFECTS TO BE MEASURED	REPORTING PERIOD	VARIABILITY (+/-) WHICH WOULD INITIATE FURTHER EVALUATION
Other Big Game Species: Mule Deer, population trend, sex and age ratios	Annually	Decrease of 10% or more in 3 year running means for mule deer

#### Introduction

The Lewis and Clark National Forest Plan (USDA Forest Service 1986) identifies mule deer as a Management Indicator Species (MIS) for the “commonly hunted and fished” category. Forest-wide management standard C-5 states that:

- population levels of MIS should be monitored as described in the monitoring plan displayed in Chapter V of the Forest Plan (USDA Forest Service 1986, page 2-37).
- use Montana Department of Fish, Wildlife & Parks (MFWP) annual progress reports which contain mule deer harvest and population trend and sex and age ratios when monitoring this MIS
- a decrease of 10 percent or more in a 3-year running mean would initiate further evaluation (USDA Forest Service 1986, page 5-11).

The “Lewis and Clark National Forest Evaluation and Compliance with National Forest Management Act Requirements to Provide for Viability and Diversity of Animal Communities” (USDA Forest Service 2011) report provides a discussion of mule deer populations in central Montana, that portion of Montana which contains the Lewis and Clark National Forest. That document states that mule deer numbers are “slightly below, to appreciably below, long-term population and harvest objectives,” as shown in Figures 1 and 2 below (MFWP data, updated in 2013). That document further describes that the current trend in mule deer numbers is very similar to population lows that were observed during the mid-1990s and mid-1970s, also shown in Figures 1 and 2 below.

#### History

In the years since the Lewis and Clark National Forest Plan was adopted the Forest has produced many monitoring reports. In the 1999 monitoring report a statewide decline in mule deer population numbers was noted and discussed. That report also recommended that the Forest continue working with MFWP in managing MIS, and to collaboratively develop a better and more consistent monitoring and evaluation approach for the Forests across Montana. That report further recommended revising, or changing, the C-5 Forest Plan monitoring item. Since then, and largely because of low mule deer population levels across much of Montana during the 1990s, MFWP adopted a deer management plan titled Adaptive Harvest Management (MFWP 2001). This Adaptive Harvest Management (AHM) plan -- which incorporates mule deer population objectives, special management districts, a monitoring program, and population

modeling and deer management policies that are used in developing and adopting hunting regulation strategies – is still in use by MFWP, including on the LCNF.

### Monitoring

Montana Fish, Wildlife & Parks has two mule deer trend survey areas associated with the Little Belt Mountain Range. They are located on the north side, and in the foothills, of the Little Belt Mountains, primarily on non-Forest lands. These survey areas are known as the Hunting District 413 Mule Deer Trend Area and the Little Belts Front Mule Deer Trend Area; the latter lies within hunting districts 418, 420, 432 and 448. Count data for these trend areas was provided by MFWP, which has inferred that the majority of the mule deer counted on non-Forest lands during these late winter and early spring surveys, actually spend summer, and depending on weather, sizable portions of spring and fall, on the Forest.

Also worth noting is that the accuracy of mule deer trend counts is dependent on many factors, such as type of aircraft used, pilot and or observer used, timing of the survey relative to spring green up of vegetation, and wind speeds and ambient temperature. Tables 1 and 2 below, provide three-year running means of total mule deer counted, ratio of fawns to adults counted, and the calculated yearly differences of these running means for these two mule deer trend areas according to Forest Plan monitoring item C-5.

**Table 1. Hunting District 413 Mule Deer Trend Area surveys showing three year running means and percent differences.**

Years	3-Yr Running mean of total	% difference in 3-Yr Running mean of total	3-Yr Running Mean of Fawn/Adult Ratio	% difference in 3-Yr Running mean of fawn/Adult Ratio
2000-02	468			
2001-03	498	6.3%		
2002-04	449	-9.8%		
2003-05	492	9.7%		
2004-06	344	-30.2%		
2005-07* <sup>v</sup>	334	-3.0%		
2006-08* <sup>v</sup>	172	-48.6%	31	
2007-09* <sup>v</sup>	191	11.4%	25	-19.6%
2008-10* <sup>v</sup>	191	0%	22	-12.8%
2009-11* <sup>v</sup>	165	-13.6%	14	-37.2%
2010-12* <sup>v</sup>	206	24.5%	17	25.9%

\* - 2-YEAR AVERAGE DUE TO LACK OF DATA FROM 2007 AND 2010

**Table 2. Little Belts Front Mule Deer Trend Area surveys showing three year running means and percent differences.**

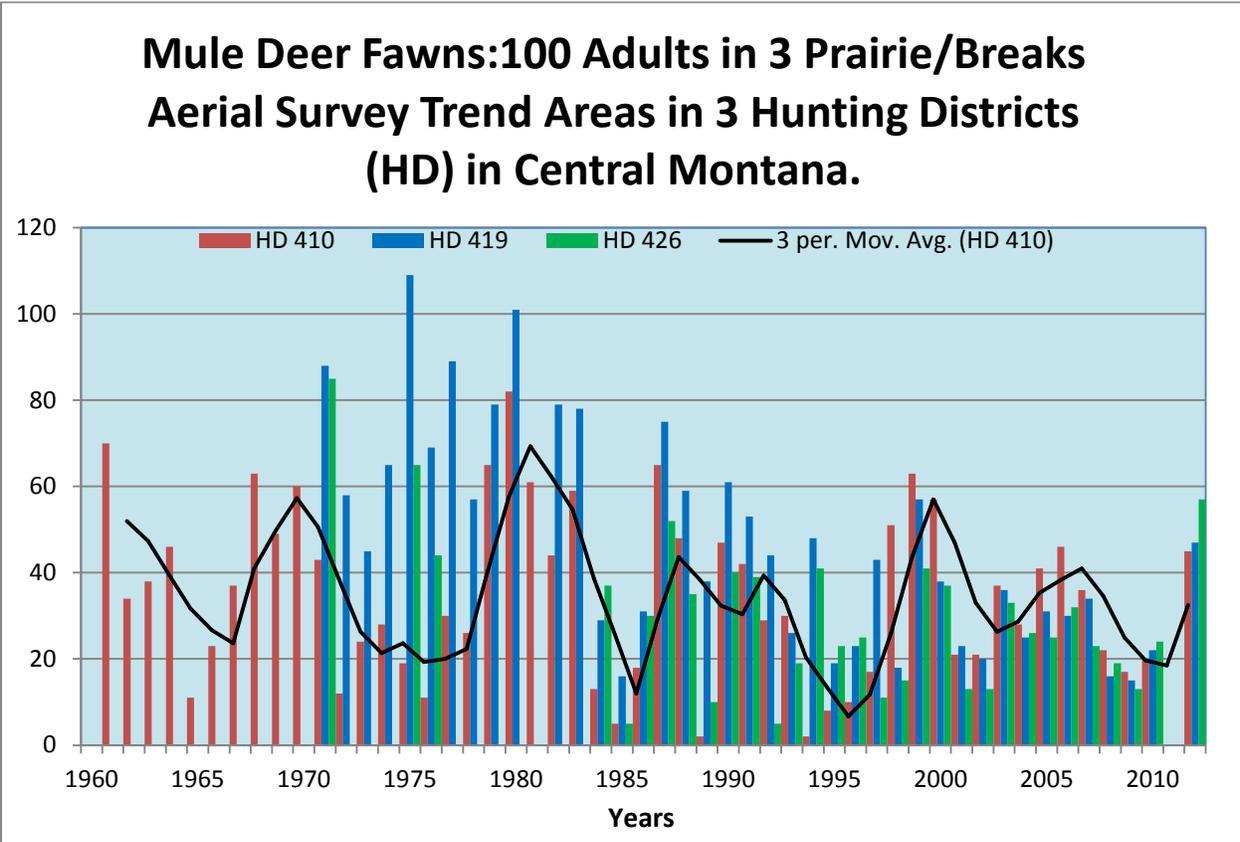
<b>Years</b>	<b>3-Yr Running mean of total</b>	<b>% difference in 3-Yr Running mean of total</b>	<b>3-Yr Running Mean of Fawn/Adult Ratio</b>	<b>% difference in 3-Yr Running mean of fawn/Adult Ratio</b>
2000-02	3119		37	
2001-03	2761	-11.5%	31	-18.2%
2002-04	2368	-14.2%	28	-9.9%
2003-05	2227	-5.9%	28	0.1%
2004-06	2316	4.0%	26	-5.5%
2005-07	2238	-3.4%	28	7.0%
2006-08	2000	-10.6%	30	6.6%
2007-09	1571	-21.4%	25	-16.0%
2008-10	1448	-7.9%	21	-16.0%
2009-11	1316	-9.1%	17	-18.7%
2010-12	1262	-4.1%	19	8.9%

As can be seen from the three year running means for both total mule deer counted and fawns per 100 adults, this mule deer population has declined in most years since 2000. The variability of a decrease of more than ten percent was exceeded on the Hunting District 413 Trend Area for total population in three different three-year running means (2004-06, 2006-08, 2009-11); and in ratio of fawns to adults in three different three-year running means (2007-09, 2008-10, 2009-11).

The allowable variability was also exceeded on the Little Belt Front Trend Area for total population in four different three-year running means (2001-03, 2002-04, 2006-08, and 2007-09); and in ratio of fawns to adults in four different three-year running means (2001-03, 2007-09, 2008-10, and 2009-11). Population numbers increased in the 2010-12 three-year running mean in the Hunting District 413 Trend Area, as did the ratio of fawns to adults in both trend areas. Although there was still a negative trend in population numbers on the Little Belt Front Trend area in 2010-12, the number did not exceed the allowed variability.

The following graphs (Figures 1 and 2 below) come from data provided by MFWP’s Region 4 and are used here because they represent long term data sets that depict trends in mule deer numbers for central Montana, which is where the vast majority of the LCNF lies (21 MFWP hunting districts overlap the LCNF, 18 of which are in MFWP Region Four and 3 are in Region Five).

Data in Figure 1 shows fluctuations in mule deer fawn recruitment in 3 different mule deer populations in prairie breaks and timbered breaks habitats of Central Montana since the early 1960s. These data (from aerially surveyed trend areas in Hunting Districts 410, 419 and 426) were also used because the amplitude of fawn recruitment, and the subsequent mule deer population fluctuations, is generally greater in prairie and timbered breaks habitats than in mountain foothill environments (Mackie et al. 1998), which is similar to what is found on the Rocky Mountain and Jefferson Divisions of the LCNF.

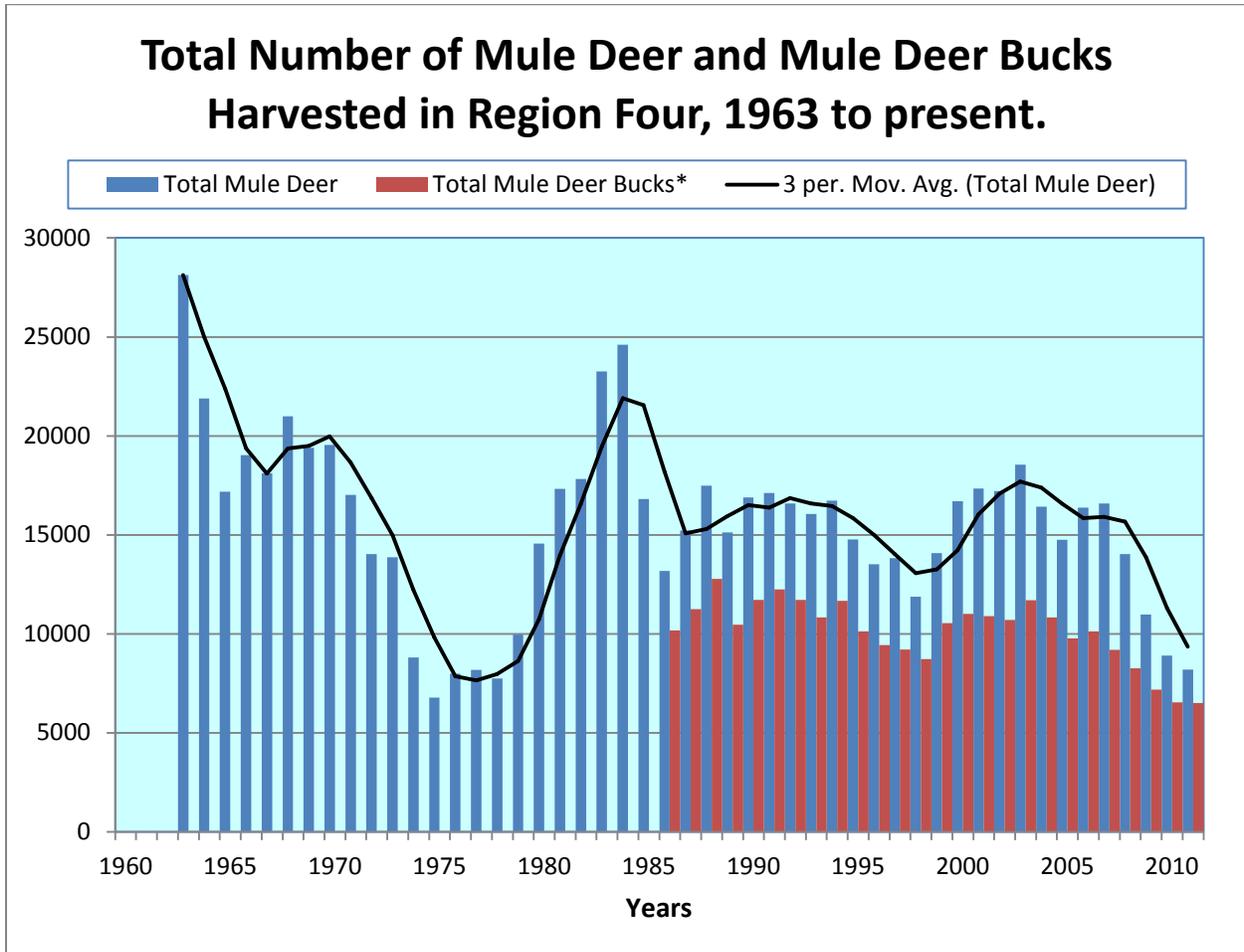


**Figure 1. Mule deer fawns per 100 adults counted during late winter or early spring in 3 prairie breaks aerial survey areas located in 3 different hunting districts in Central Montana since 1960.**

The Figure 2 graph (below) shows the trend in the total number of mule deer, and buck mule deer, harvested in MFWP’s Region Four since 1963. Over these years the vast majority of the hunting districts that comprise Region Four had standard or liberal hunting regulation type seasons, where any hunter could harvest a buck or doe mule deer using a general deer hunting license. Consequently, and for the most part, this graph mirrors the mule deer population and its fluctuations over these years. The graph also shows the comparatively high mule deer numbers (that had built up during the early 1900s) present during the 1960s and early 1970s, coinciding with MFWP encouraging hunters to harvest more antlerless mule deer by issuing multiple doe licenses in much of central and eastern Montana during this period. Those highs were followed by environmental conditions less favorable to mule deer and a subsequent drop in the population and a reduced harvest in the mid to late 1970s. A buildup of mule deer numbers was observed in the 1980s, concurrent with generally more conservative hunting seasons (fewer additional doe licenses were issued) and less severe fluctuations in numbers harvested since (MFWP personal communications and Regional Progress Reports).

These graphs, and the above discussion, are included in order to show that mule deer fawn numbers, and thus population levels, do fluctuate over time over large geographical areas, and

are currently low across a larger area of central Montana than what is suggested by the Hunting District 413 and Little Belt Front Mule Deer Trend Area data for the north side of the Little Belt Mountains, particularly if the latter data are considered alone.



**Figure 2. Total number of mule deer and mule deer bucks harvested in Region Four since 1963. (\* Mule deer buck harvest data are not available prior to 1986.)**

### Discussion

In 1998 Montana Fish, Wildlife & Parks published Ecology and Management of Mule Deer and White-tailed Deer in Montana (Mackie and others 1998). This document provides a comprehensive summary of the results of many research studies, from the 1940s through 1990s, conducted across Montana for both mule deer and white-tailed deer. The information is presented for each environment studied: mountain-foothills, timbered breaks, prairie-badlands and prairie-agricultural, plains river bottom, and northwest montane forest. The majority of the Lewis and Clark National Forest (Rocky Mountain East Front and the Highwood and Crazy and Castle and Little Belt Mountains) is located within a mountain-foothills environment similar to the Bridger Mountains study area discussed in the document. This monitoring report document summarizes information presented by Mackie and others (1998) specific to mule deer and the mountain-foothills environment. Please refer to Mackie and others (1998), or the original studies cited, for a complete discussion.

Studies in Montana have described two different strategies employed by overwintering deer, energy conservation and selective foraging (Mackie and others 1998, page 30). Energy conservation involves specialized use of coniferous timber and broken topography habitats, particularly in deep snow environments, to limit energy loss. Selective foraging is employed in open environments with limited snowfall or the presence of agricultural croplands. According to Mackie and others (1998, page 28):

The broad distribution of winter maintenance habitat for both species of deer in mountain environments was associated with areas receiving minimal snow accumulation. These conditions were created by the interaction of geographic location, topography, climate and vegetation. Local site characteristics determined the specific location, size, and shape of each winter range and patterns of deer dispersal within it. Vegetation structure and composition were typically only third order factors for mule deer.

On the east slope of the Bridger Mountains, mule deer were found to move easily below areas of deep snow in order to utilize “extensive expanses of rolling shrub-grassland” (Pac and others 1991, as cited in Mackie and others 1998, page 31). The winter range had limited topographic sites that offered protection from cold temperatures and strong winds, and tree and shrub cover was lacking. Mule deer here moved widely and selectively foraged across expansive open ridges. “They focus on specific habitats and microenvironments only when conditions are unusually severe” (Mackie and others 1998, page 31). Pac and others (1991, page 52) also found that on the west side of the Bridger range, on steep southerly aspects snow accumulation and duration of snow cover were both greatly reduced and thus selected by mule deer for wintering.

Mackie and others (1998) also reported the following regarding mule deer winter maintenance habitat:

- Variation in precipitation and temperature prior to and during the growing season determined forage quantity and quality. Consequently, the physical condition of deer as they entered winter varied from year to year as did winter severity (page 122).
- While critical to the occurrence of deer in mountain environments, winter range was not the primary factor determining deer numbers and dynamics (page 131).
- During storm-free winter conditions mule deer preferred open Douglas-fir stands often associated with steep shrub fields and rock outcrops that acted as solar radiators (page 136).
- Commercial thinning of conifer canopies or reduction in understory conifer density “may be neutral for mule deer and beneficial for elk” (page 136).
- Winter maintenance habitat appeared to exert less influence than total amount and quality of reproductive and summer maintenance habitat on population size or overall density of deer (page 76).

Summer habitat is described in terms of reproductive habitat and summer maintenance habitat. Reproductive habitat for mule deer is found at intermediate elevations in diverse, moist montane forests while summer maintenance habitat includes sub-alpine, alpine and shrub-grass steppe habitat both above and below the montane forest zone (Mackie and others 1998, pages 25-27). Mackie and others (1998, page 76) reported that in their studies, “the amount, quality, and

distribution of reproductive habitat appeared to be the primary factor influencing density distribution and potential total numbers of productive adult females in each population.”

Hamlin and Mackie (1989) also found a close correlation between summer forage production and conditions, and productivity and fawn survival to early winter. “Forage quality, as determined by the succulence of vegetation, and the timing and length of the period when green, succulent vegetation was available, appeared to be most important” (Mackie and others 1998, page 101). And Pac and others (1991) found that mature Douglas-fir stands (150 to 300 years) provide critical fawn rearing habitats in mountain-foothill environments. They concluded that it was because these stands have “irregular canopies and structure that promote a patchwork of understory diversity” (Mackie and others 1998, page 136).

Mackie and others (1998, page 135 to 138) provide management recommendations for land uses in Montana. For timber management they recommend the following:

For mule deer in mountain ranges east of the Divide, timber management should avoid large scale removal of (mature Douglas-fir stands) to ensure that regenerating stands are allowed to reach the age where these attributes are replaced. Cutting units that focus on large, even-aged stands of lodgepole pine could benefit mule deer.

In October 2012, discussions occurred with Adam Grove, MFWP area wildlife biologist, in the Little Belts Mountains regarding the current low mule deer populations. According to Grove (pers. comm. October 29, 2012) weather probably has been the biggest contributor to the current mule deer population trends in the Little Belts, as well as similar trends observed by other biologists elsewhere in central and eastern Montana. Drought in the early 2000s impacted forage availability. The availability of forage in the summer months, as described by Hamlin and Mackie (1989), is important for winter survival and fawn recruitment. For a stable population fawn recruitment should be about 30 fawns per 100 doe annually in the Little Belts area. Since 2000, the recruitment on the Little Belts Front Trend Survey has often been below 30 fawns per 100 doe, and occasionally dropped into the teens.

According to Grove (October 29, 2012 Blankenship Field Review) the greater concern regarding mule deer habitat management in the Blankenship project area and the Little Belt Mountains in general is reduced quality and quantity of forage on reproductive habitat and summer maintenance habitat. In particular, thick conifer encroachment in openings and dense, young Douglas-fir thickets that preclude understory plant development may reduce availability of forage for mule deer.

Literature supports that historically a mixed fire regime maintained openings and an open overstory of mature Douglas-fir (Heyerdahl and others 2006, page 107; Arno 2002, pages 110-111). The Forest Service’s long standing policy of fire suppression altered historic fire regimes and contributed to conifer encroachment in openings and increased density of Douglas-fir stands. In 2008, the Forest Service revised manual direction to allow “using fire to achieve land and resource management desired conditions” (Forest Service Manual 5100- Fire Management, Chapter 5140 – Fire Use). This policy shift increases

opportunities for the Lewis and Clark National Forest to manage natural fires to improve mule deer habitat by setting back plant succession in mid to upper elevation reproductive and summer maintenance habitat.

Table 3 below displays activities completed within the Little Belt Mountains since 2004 that specifically address Grove’s concern. As is shown, over 3,600 acres were treated and resulted in maintenance of openings or thinning of Douglas-fir stands. This list does not include other activities, such as wildland fires or prescribed burning, that may also have contributed to available mule deer reproductive or summer maintenance habitat. The broad scale and context of wildland fires that have occurred on the LCNF, and the importance of these successional stands to mule deer, was briefly discussed in the “Lewis and Clark National Forest Evaluation and Compliance with National Forest Management Act Requirements to Provide for Viability and Diversity of Animal Communities” report (USDA Forest Service 2011). A more thorough, and up to date, accounting and documentation of these wildland fires, and their effects to mule deer habitat is needed.

**Table 3: Vegetation Projects in the Little Belts Mountains that improved spring/summer/fall habitat by thinning dense Douglas-fir stands or removing conifer encroachment in openings.**

<b>Year</b>	<b>Project</b>	<b>Habitat improved</b>	<b>Acres</b>
2004	Judith Range	Dense Douglas-fir stands thinned	62
2007	Musselshell EA	Opening maintenance	358
2008	Musselshell EA	Opening maintenance	24
2008	South Park	Opening maintenance	266
2009	Belt Creek Range	Opening maintenance	30
2009	South Park	Opening maintenance	140
2009	Decker	Opening maintenance	332
2009	Musselshell EA	Opening maintenance	1228
2009	Belt Creek Range	Opening maintenance	432
2010	Ettien Ridge	Opening maintenance	245
2010	Belt Creek Range	Opening maintenance	19
2011	Musselshell EA	Opening maintenance	306
2011	Sheep Creek Aspen	Opening maintenance	153
2012	Belt Creek Range	Opening maintenance	62
2012	Musselshell EA	Opening maintenance	17
<b>TOTAL</b>			<b>3674</b>

In 2001, as mentioned earlier in this report, MFWP adopted an Adaptive Harvest Management (AHM) concept into the hunting regulation season setting process (MFWP 2001). The four major components of the system are population objectives, a monitoring program, hunting regulation alternatives, and modeling. MFWP established population objectives in each of five Population Management Units (PMUs) across the state. Most of the LCNF (Rocky Mountain Front, Little Belts, Highwood, Castles and Crazyes) lies within the Prairie-Mountain Foothills PMU. In this PMU the objective is to “maintain the total number of deer observed during spring on population survey areas within 25% of the long term average (at least ten years).” When that objective isn’t met, “**OR**, in the absence of long-term aerial survey data, the buck harvest is at

least 25% below the long-term average,” a Restrictive Hunting Regulation will be recommended (MFWP 2001, page 20).

The Big and Little Snowy Mountains are within the Prairie/Breaks PMU where the objective is to “maintain the total number of deer observed during the spring on population survey areas within the range of 20% above and 30% below the long-term average.” And when that objective isn’t met, “**OR**, in the absence of long-term aerial survey data, the buck harvest is at least 25% below the long-term average,” a Restrictive Hunting Regulation will also be recommended for the Prairie/Breaks PMU (MFWP 2001, page 27). Monitoring results from the Hunting District 413 and Little Belts Front Mule Deer Trend Areas are described above. Depending on such results from actual count or harvest monitoring, MFWP then recommends either a standard hunting regulation, a restrictive hunting regulation, or a liberal hunting regulation. In response to the recent, and broad scale, decline in the mule deer population (as noted under monitoring), MFWP recommended and adopted restrictive hunting regulations for the 2010 hunting season.

Prior to that, for example in 2009, 30 of 36 deer hunting districts in MFWP’s Region Four were either under the standard or liberal hunting regulation (the underlying foundation for both regulations is 5 weeks of either sex mule deer hunting on a general deer license, with none to moderate numbers of antlerless B licenses to liberal numbers of antlerless B licenses with option for issuing multiple licenses per hunting district either through the drawing or over the counter). The other 6 hunting districts had some form of antlered buck hunting, which is characteristic of the restrictive hunting regulation. It should be noted that some of these 6 hunting districts with restrictive deer (bucks only) seasons are either overtly, or in practice managed as trophy buck areas, thus restrictive harvest of bucks is routine. In 2010, MFWP’s Region Four implemented restrictive deer (bucks only) seasons in 29 of its 36 deer hunting districts, which are still in effect. All of the hunting districts that overlay the Little Belt Mountains are currently under the restrictive regulation. An increase in fawn numbers and recruitment have been noticed by FS biologists when doing field work during spring, summer and fall 2012, which should signify the beginning of a positive growth curve for mule deer populations in central Montana.

## Evaluation

The widespread nature of the population decline, which includes areas of central Montana and farther without appreciable forest cover, indicates that factors other than forest management are contributing. According to Adam Grove, Fish, Wildlife & Parks Biologist, weather is probably the biggest contributor to the current mule deer population trends in the Little Belt Mountains, as well as the greater part of central and eastern Montana (pers. comm. 2012). The availability of forage in the summer months is important for winter survival and fawn recruitment, and the drought in the early 2000s impacted forage availability.

The Forest Plan Monitoring and Evaluation requirements were established to compare the results being achieved with those projected in the plan, and to identify whether changes were needed to the Plan (USDA Forest Service 1986 page 5-6 to 5-7). Monitoring item C-5 for mule deer was developed as part of the monitoring plan. Although the monitoring item shows that mule deer population trend and age ratios exceed the defined variability, our further evaluation, as presented above, indicates that this variability is primarily due to weather and the associated availability of forage during the summer. Consideration of the importance of reproductive

habitat and forage availability during project development and design will continue, as will coordination with Montana Department of Fish, Wildlife and Parks as required by Management Standard C-1 (1) which states:

Strengthen wildlife habitat coordination with all Forest uses by improving cooperation with the MDFW&P (Montana Department of Fish, Wildlife, and Parks). Identify wildlife habitat values early in the planning of other resource projects. Protect those values through involvement of appropriate MDFW&P personnel during all stages of project planning and implementation.

This item will continue to be monitored until such time as a more appropriate measure of management impacts on mule deer is developed.

## References

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