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Acknowledgement

The field data contained in these reports was collected by the combined efforts of the Laramie Region Wildlife Division personnel including District Wildlife Biologists, District Game Wardens, the Wildlife Technicians, the Habitat Biologist, the Wildlife Management Coordinator and Region Supervisor, and other Department personnel and volunteers working at check stations. The authors wish to express their appreciation to all those who assisted in data collection.
2015 - JCR Evaluation Form

SPECIES: Pronghorn
HERD: PR520 - CHALK BLUFFS
HUNT AREAS: 111

PREPARED BY: MARTIN HICKS

<table>
<thead>
<tr>
<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hunter Satisfaction Percent</td>
<td>72%</td>
<td>84%</td>
</tr>
<tr>
<td>Landowner Satisfaction Percent</td>
<td>29%</td>
<td>85%</td>
</tr>
<tr>
<td>Harvest:</td>
<td>148</td>
<td>107</td>
</tr>
<tr>
<td>Hunters:</td>
<td>207</td>
<td>109</td>
</tr>
<tr>
<td>Hunter Success:</td>
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<td>98%</td>
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<td>Active Licenses:</td>
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<tr>
<td>Active License Success:</td>
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<td>77%</td>
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<tr>
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<tr>
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<td>17</td>
</tr>
<tr>
<td>Juveniles per 100 Females</td>
<td>42</td>
<td>49</td>
</tr>
</tbody>
</table>

Satisfaction Based Objective: 60%
Management Strategy: Recreational
Percent population is above (+) or (-) objective: 24%
Number of years population has been + or - objective in recent trend: 2

PR520 Satisfaction Survey Percentages

![Graph showing Hunter Percent, Landowner Percent, and Objective Percent over JCR Years 2010 to 2015](image-url)
2016 HUNTING SEASONS
CHALK BLUFFS PRONGHORN HERD (520)

<table>
<thead>
<tr>
<th>Hunt Area</th>
<th>Type</th>
<th>Season Dates</th>
<th>Quota</th>
<th>License</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>111</td>
<td>1</td>
<td>Sept. 20</td>
<td>100</td>
<td>Limited quota</td>
<td>Any antelope</td>
</tr>
<tr>
<td>111</td>
<td>1</td>
<td>Nov. 15</td>
<td></td>
<td></td>
<td>Doe or fawn</td>
</tr>
<tr>
<td>111</td>
<td>6</td>
<td>Sept. 20</td>
<td>50</td>
<td>Limited quota</td>
<td>Doe or fawn</td>
</tr>
<tr>
<td>111</td>
<td>6</td>
<td>Nov. 15</td>
<td></td>
<td></td>
<td>Doe or fawn</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Special Archery Season Hunt Areas</th>
<th>Opening Date</th>
<th>Closing Date</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>111</td>
<td>Aug. 15</td>
<td>Sept. 19</td>
<td>Refer to Section 2 of this Chapter</td>
</tr>
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</table>

Management Evaluation
Current Hunter/Landowner Satisfaction Management Objective: Landowner and hunter satisfaction; Target goal > 60%
Management Strategy: Private Land
2015 Hunter Satisfaction: 84% Satisfied, 7% Neutral, 9% Dissatisfied
2015 Landowner Satisfaction Estimate: 85% (44% response)
Most Recent 3-year Running Average Hunter Satisfaction Estimate: 77%
Most Recent 3-year Running Average Landowner Satisfaction Estimate: 47%

Herd Unit Issues
The management objective for the Chalk Bluffs Pronghorn Herd Unit numeric post-season population objective was changed starting the 2013 season to a landowner and hunter satisfaction based objective with a private land management strategy. The change was based on public involvement during the 2013 herd objective review process. Classification is now collected to gauge pronghorn numbers and locations prior to the season opener.

There is not a postseason population estimate for a variety of reasons: 1) Open population with Colorado and Nebraska, 2) Restricted access due to urban encroachment and industrial gas
development, which prevents our ability to influence harvest, 3) Poor classification data, which is always well below the adequate sample size and 4) No reliable working model.

Oil and gas along with rural development have become an increasing problem in the past 5 years. It appears this development has shifted pronghorn movement and habitat occupation.

**Weather**
Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Chalk Bluffs herd unit the reviewer is referred to the following link: [http://www.ncdc.noaa.gov/cag/](http://www.ncdc.noaa.gov/cag/).

**Habitat**
Forage availability continued to improve in 2015 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Cheatgrass continues to be a major threat to native rangelands and big game ranges, particularly at all elevations below 6,500’. Its presence ties the hands of habitat managers limiting habitat enhancement options, and may result in reduced carrying capacities of rangelands if it is the predominant specie. The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species.

In Summer 2015, population biologists and habitat managers began working together to modify habitat monitoring techniques utilized statewide and to improve overall consistency among the regions. Identification of key herd units per big game species, assessing habitats through landscape scale inventory methods versus monitoring a handful of permanent monitoring sites, assessing habitats in all seasonal ranges (summer, transition, winter), and development of correlations to amounts of and timing of precipitation will help improve the overall value of data collected and result in our abilities to more strongly correlate management decisions for populations based off habitat conditions.

**Field and Harvest Data**
Due to our inability to collect data there is little confidence in classification data. In the adjacent Hawk Springs Herd Unit’s fawn ratios remained about the same as 2014 which contributed to a slight increase in the population, it was expected the same is true for this herd unit. However, without a reliable population estimate, interstate movement with Colorado, and an increase in industrial and residential expansion, license numbers will remain conservative. Type 1 license
success in 2015 (75%) increased significantly compared to 2014 (55%) and the 5-year average of
64%. Effort in 2015 (6.5 days/harvest) was higher than 2014 (5.9 days/harvest), and well above
the five-year state-wide effort of 3.8 days/harvest. The increase in success was most likely the
result of increased pronghorn movement from Colorado into Wyoming. Increased effort could
be contributed to limited access. Type 6 license success in 2015 (81%) was significantly higher
than 2014 (54%) and the five-year average (59%). Type 6 license effort in 2015 (3.3
days/harvest) was significantly lower than 2014 (5.3 days/harvest) and the five-year average (6.2
days/harvest) but more in line with the five-year state-wide effort (3.8 days/harvest). There
could be two possibilities for the increase in success: 1) the population increased or 2) increased
movement into Wyoming. The improvement in effort is somewhat confusing given the lack of
access. A possible explanation is hunters waited to harvest a doe when they came into Wyoming
from Colorado during the late season (November/December) when access was easier to obtain.

One year of improved harvest data does not warrant an increase in Type 1 or Type 6 license
numbers given poor access and as increase in residential and industrial development. Harvest is
dependent on movement into Wyoming from Colorado, which is not reliable. In addition the
majority of landowners (85%) responded that population is at or about at the desired level
(Appendix A). The sportsmen echoed landowner comments with 83% of the hunters satisfied
with their overall hunt, indicating pronghorn are at desired levels for sportsmen. Response rate
was 44% which exceeded the minimum return threshold of 25%.

The number of pronghorn classified each August is always well below the adequate samples
size. Typically pronghorn are still in Colorado during survey time so it is difficult to infer any
population parameters. Managers will still use classification data to give hunters anecdotal
information for the upcoming hunting season (e.g. distribution, buck quantity and quality).

Management Summary
The opening date will remain the same at September 20 with no change in Type 1 and Type 6
license numbers. Landowners are still in favor of the late season hunt from November 15 –
December 31 to address any damage concerns. Based on past seasons we predict a harvest of 50
bucks, 20 does and 10 fawns for a total of 80 pronghorn.
Appendix A
PH520 Landowner Satisfaction Survey

Please indicate your satisfaction level with the current pronghorn population:
15.4% 84.6%

1- Above Desired Levels 0
2- At or About at Desired Levels 11
3- Below Desired Levels 2
1- Above Desired Levels 0%
2- At or About at Desired Levels 85%
3- Below Desired Levels 15%

Additional Comments

Last 2 years oil pipeline put on ranch no pronghorn population. Since 2010 yr, oil mule and all of their trucks-no pronghorn population on ranch. Can not answer survey till activity dies down!!
The only problem we have people come out just before sun down and want to get out and hunt. also they are not hunters they are shooters.
Oil and gas operations have really moved the population. THought the antelope would get use to the traffic-noise-fearing-but NOT
This doesn't really concern me I don't hunt and I don't live over there.-Janet
would like to see the herd have a 50% increase over the next few years.
Close to desired-maybe a little below
used to see quite a few. now hardly see any
2015 - JCR Evaluation Form

SPECIES: Pronghorn
HERD: PR521 - HAWK SPRINGS
HUNT AREAS: 34
PREPARED BY: MARTIN HICKS

<table>
<thead>
<tr>
<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population:</td>
<td>6,760</td>
<td>7,200</td>
</tr>
<tr>
<td>Harvest:</td>
<td>1,098</td>
<td>1,320</td>
</tr>
<tr>
<td>Hunters:</td>
<td>1,208</td>
<td>1,469</td>
</tr>
<tr>
<td>Hunter Success:</td>
<td>91%</td>
<td>90%</td>
</tr>
<tr>
<td>Active Licenses:</td>
<td>1,387</td>
<td>1,487</td>
</tr>
<tr>
<td>Active License Success:</td>
<td>79%</td>
<td>89%</td>
</tr>
<tr>
<td>Recreation Days:</td>
<td>4,888</td>
<td>4,039</td>
</tr>
<tr>
<td>Days Per Animal:</td>
<td>4.5</td>
<td>3.1</td>
</tr>
<tr>
<td>Males per 100 Females</td>
<td>42</td>
<td>41</td>
</tr>
<tr>
<td>Juveniles per 100 Females</td>
<td>52</td>
<td>65</td>
</tr>
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Population Objective (± 20%): 6000 (4800 - 7200)
Management Strategy: Recreational
Percent population is above (+) or below (-) objective: 20%
Number of years population has been + or - objective in recent trend: 1
Model Date: 02/18/2016

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

<table>
<thead>
<tr>
<th>JCR Year</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females ≥ 1 year old:</td>
<td>12%</td>
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<tr>
<td>Males ≥ 1 year old:</td>
<td>48%</td>
</tr>
<tr>
<td>Juveniles (&lt; 1 year old):</td>
<td>.4%</td>
</tr>
<tr>
<td>Total:</td>
<td>15%</td>
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Proposed change in post-season population: -2% -8%
## 2010 - 2015 Preseason Classification Summary

for Pronghorn Herd PR521 - HAWK SPRINGS

<table>
<thead>
<tr>
<th>Year</th>
<th>Pre Pop</th>
<th>MALES</th>
<th>FEMALES</th>
<th>JUVENILES</th>
<th>Males to 100 Females</th>
<th>Young to Adult</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Ylg</td>
<td>Adult</td>
<td>Total</td>
<td>% Total</td>
<td>%</td>
</tr>
<tr>
<td>2010</td>
<td>8,800</td>
<td>69</td>
<td>161</td>
<td>230</td>
<td>18%</td>
<td>658</td>
</tr>
<tr>
<td>2011</td>
<td>8,000</td>
<td>104</td>
<td>160</td>
<td>264</td>
<td>21%</td>
<td>669</td>
</tr>
<tr>
<td>2012</td>
<td>7,400</td>
<td>94</td>
<td>132</td>
<td>226</td>
<td>23%</td>
<td>517</td>
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<tr>
<td>2013</td>
<td>6,800</td>
<td>88</td>
<td>201</td>
<td>289</td>
<td>26%</td>
<td>558</td>
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<tr>
<td>2014</td>
<td>8,800</td>
<td>59</td>
<td>155</td>
<td>214</td>
<td>21%</td>
<td>498</td>
</tr>
<tr>
<td>2015</td>
<td>8,600</td>
<td>117</td>
<td>179</td>
<td>296</td>
<td>20%</td>
<td>729</td>
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2016 HUNTING SEASON
HAWK SPRINGS PRONGHORN HERD (PR521)

<table>
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<tr>
<th>Hunt Area</th>
<th>Type</th>
<th>Season Dates</th>
<th>Quota</th>
<th>License</th>
<th>Limitations</th>
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<tbody>
<tr>
<td>34</td>
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<td>Sept. 20</td>
<td>1,000</td>
<td>Limited quota</td>
<td>Any antelope</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Oct. 15</td>
<td></td>
<td></td>
<td>Doe or fawn</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Sept. 20</td>
<td>900</td>
<td>Limited quota</td>
<td>Doe or fawn</td>
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<td></td>
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<th>Special Archery Season</th>
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<th>Limitations</th>
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<td>Hunt Areas</td>
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<th>Hunt Area</th>
<th>Type</th>
<th>Quota change from 2015</th>
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<td>+200</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>+300</strong></td>
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Management Evaluation
Current Management Objective: 6,000 (4,800-7,200)
Management Strategy: Recreational
2015 Postseason Population Estimate: ~7,200
2016 Proposed Postseason Population Estimate: ~6,400
2015 Hunter Satisfaction: 87% satisfied, 9% Neutral, 4% Dissatisfied

Herd Unit Issues
The management objective for the Hawk Springs Herd Unit is a post-season population objective of 6,000 pronghorn. The objective was changed in 2014 from 7,000 to 6,000 and Hunt Areas 34-36 were combined into Hunt Area 34 as a result of the herd unit objective review process in 2013. The management strategy is recreational management with a pre-season buck ratio range of 20-59 Bucks:100 Does.

The 2015 post-season population estimate was about 7,200 pronghorn putting the population 20% above the objective of 6,000. The last line-transect survey conducted in this herd unit was June 2007 that resulted in a population estimate of 21,000 pronghorn. This survey implied the herd increased by 62% from the previous line-transect conducted in 2003 with a population estimate of 8,100. Given poor fawn production, poor habitat conditions, and loss of habitat this estimate does not seem plausible. As a result this model is anchored to the 2003 line-transect estimate.
The southern end of the herd unit along Interstate Highway 80 to U.S. Highway 85 has experienced an increase in urban and industrial development resulting in a decrease in usable habitat. The northern 2/3 of the unit is comprised of dryland farming, irrigated farming and land enrolled into the Conservation Reserve Program (CRP) and native rangeland. The majority of issues with landowners occur when there are high densities of pronghorn on irrigated and non-irrigated agricultural fields. This typically results in damage issues which is the rationale behind the late season doe/fawn licenses.

A majority of this herd unit is comprised of private land (84%). Access is available through the Department’s PLPW program and limited access to 350 square miles of state land.

**Weather**
Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Hawk Springs herd unit the reviewer is referred to the following link: [http://www.ncdc.noaa.gov/cag/](http://www.ncdc.noaa.gov/cag/).

**Habitat**
Forage availability continued to improve in 2015 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. Cheatgrass continues to be a major threat to native rangelands and big game ranges, particularly at all elevations below 6,500’. Its presence ties the hands of habitat managers limiting habitat enhancement options, and may result in reduced carrying capacities of rangelands if it is the predominant specie. This herd unit is comprised of a mix of native rangelands, CRP, dryland and irrigated croplands.

Habitat fragmentation caused by urban sprawl east of Cheyenne, and on-going oil exploration in eastern Laramie County are likely having negative impacts on pronghorn in this portion of the herd unit.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species.

In Summer 2015, population biologists and habitat managers began working together to modify habitat monitoring techniques utilized statewide and to improve overall consistency among the
regions. Identification of key herd units per big game species, assessing habitats through landscape scale inventory methods versus monitoring a handful of permanent monitoring sites, assessing habitats in all seasonal ranges (summer, transition, winter), and development of correlations to amounts of and timing of precipitation will help improve the overall value of data collected and result in our abilities to more strongly correlate management decisions for populations based off habitat conditions.

**Field Data**
The Hawk Spring Pronghorn Herd Unit experienced a slight decrease in population from 2014 to 2015 as a result of increased harvest on the female segment of the population and average fawn production (64 fawns:100 does). Doe/fawn license issuance has fluctuated around 750 for the past 5 years but was decreased for the 2014 season to try and increase the population, which was accomplished by 30%. To maintain herd objective Type 6 licenses were increased from 500 to 700 in 2015, which resulted in 155 more doe pronghorn harvested compared to 2014. Buck ratios were similar compared to 2014 and are within the upper recommended recreational management range of 20-59 Bucks: 100 Does (41 Bucks:100 Does in 2015). Current buck ratios warrant an increase in Type 1 licenses. The sample size for field check tooth data collected in the field was too small to provide any relevancy for population parameters. Of the hunters surveyed in 2015, 87% were satisfied with their hunt. Based on comments in the field during the 2015 hunting season hunters had more success accessing private land and they appreciated the number of acres enrolled into the PLPW program.

**Harvest Data**
Active license success of 89% in 2014 was significantly higher than five-year average of 79% and moderately higher than the five-year state-wide average of 82%. Access is still difficult to obtain in the southern portion of the herd unit, but access did open up with the Nimmo HMA and private land in the northern portion of the herd unit, which could explain the increase in success. Hunter effort of 3.1 days per harvest in 2015 was lower than both the herd unit’s and state-wide’s five-year average of 4.4 and 3.8 days per harvest respectfully. Increased access through the Department’s PLPW and landowners opening up access in the northern portion of the herd unit most likely contributed to the decrease in effort.

**Population**
The “Constant Juvenile – Constant Adult Survival” (CJ,CA) spreadsheet model was chosen for the post season population estimate of this herd. The model did have the lowest AIC score, and the population estimate appears reasonable. The line-transect in 2007 was ignored because it doubled the population in three years and given poor fawn recruitment this is biologically improbable. The independent estimates of 2001 and 2003 are similar to model estimates, which the model does run through. The model predicted a decreasing trend since 2007; given poor fawn production despite years (2014,2015) with good forage production and consistent harvest of around 600 doe pronghorn, this seems plausible. WGFD personnel observations indicate that pronghorn densities would support this trend in certain portions of the herd unit. During the 2015/16 winter severe snow storm events forced pronghorn on dryland wheat fields resulting in perceived damage to the annual grain by landowners along the Wyoming Highway 313 corridor. Trends in harvest statistics (increase in success, and a decrease in effort) do not support a decreasing trend in the population. Given constant survival rates for the adults and juveniles the
model is trying to align with a slowly decreasing buck ratio, thus bringing the population down. However, given the population is on the upper end of the objective range and buck ratios are also on the recreational management range it appears there is room to increase harvest on both the male and female segment of the population. This model is ranked fair since the only data available is harvest and classification data and the most recent LT estimate is from back in 2003.

**Management Summary**

The 2015 season is designed to try and decrease the population with an additional 200 doe/fawn licenses and have the unused Type 1 licenses valid for doe or fawn from October 15 to December 31. With adequate buck ratios there is opportunity to increase buck harvest so Type 1 licenses will increase by 100. Given previous harvest rates and the 1,900 licenses available (1,000 Type 1 licenses, and 900 Type 6 licenses) we expect to harvest around 1,520 pronghorn, resulting in a post-season population estimate of 6,400 pronghorn.
2015 - JCR Evaluation Form

SPECIES: Pronghorn
HERD: PR522 - MEADOWDALE
PREPARED BY: MARTIN HICKS

<table>
<thead>
<tr>
<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population:</td>
<td>4,860</td>
<td>5,200</td>
</tr>
<tr>
<td>Harvest:</td>
<td>509</td>
<td>447</td>
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<tr>
<td>Hunters:</td>
<td>564</td>
<td>479</td>
</tr>
<tr>
<td>Hunter Success:</td>
<td>90%</td>
<td>93%</td>
</tr>
<tr>
<td>Active Licenses:</td>
<td>634</td>
<td>535</td>
</tr>
<tr>
<td>Active License Success:</td>
<td>80%</td>
<td>84%</td>
</tr>
<tr>
<td>Recreation Days:</td>
<td>1,841</td>
<td>1,458</td>
</tr>
<tr>
<td>Days Per Animal:</td>
<td>3.6</td>
<td>3.3</td>
</tr>
<tr>
<td>Males per 100 Females</td>
<td>36</td>
<td>46</td>
</tr>
<tr>
<td>Juveniles per 100 Females</td>
<td>56</td>
<td>70</td>
</tr>
</tbody>
</table>

Population Objective (± 20%): 5000 (4000 - 6000)

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: 4%

Number of years population has been + or - objective in recent trend: 2

Model Date: 02/18/2016

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

<table>
<thead>
<tr>
<th>JCR Year</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females ≥ 1 year old:</td>
<td>6%</td>
</tr>
<tr>
<td>Males ≥ 1 year old:</td>
<td>29%</td>
</tr>
<tr>
<td>Juveniles (&lt; 1 year old):</td>
<td>0.7%</td>
</tr>
<tr>
<td>Total:</td>
<td>7%</td>
</tr>
</tbody>
</table>

Proposed change in post-season population: +6%
Harvest

Number of Hunters

Harvest Success
## 2010 - 2015 Preseason Classification Summary

for Pronghorn Herd PR522 - MEADOWDALE

<table>
<thead>
<tr>
<th>Year</th>
<th>Pre Pop</th>
<th>MALES</th>
<th>FEMALES</th>
<th>JUVENILES</th>
<th>Males to 100 Females</th>
<th>Young to Adult</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total %</td>
<td>Total %</td>
<td>Total %</td>
<td>Tot Cls</td>
<td>Cls Obj</td>
</tr>
<tr>
<td>2010</td>
<td>6,000</td>
<td>20%</td>
<td>543 50%</td>
<td>319 30%</td>
<td>1,079 1,404</td>
<td>15 25 40 15</td>
</tr>
<tr>
<td>2011</td>
<td>5,500</td>
<td>15%</td>
<td>612 55%</td>
<td>334 30%</td>
<td>1,118 1,426</td>
<td>5 23 28 5</td>
</tr>
<tr>
<td>2012</td>
<td>4,900</td>
<td>20%</td>
<td>553 58%</td>
<td>211 22%</td>
<td>959 838</td>
<td>11 24 35 11</td>
</tr>
<tr>
<td>2013</td>
<td>5,100</td>
<td>23%</td>
<td>402 47%</td>
<td>252 30%</td>
<td>853 1,154</td>
<td>15 35 50 15</td>
</tr>
<tr>
<td>2014</td>
<td>5,400</td>
<td>17%</td>
<td>637 50%</td>
<td>411 32%</td>
<td>1,266 1,327</td>
<td>8 27 34 8</td>
</tr>
<tr>
<td>2015</td>
<td>5,600</td>
<td>21%</td>
<td>590 46%</td>
<td>412 32%</td>
<td>1,271 1,441</td>
<td>18 28 46 18</td>
</tr>
</tbody>
</table>
2016 HUNTING SEASONS
MEADOWDALE PRONGHORN HERD (PR522)

<table>
<thead>
<tr>
<th>Hunt Area</th>
<th>Type</th>
<th>Season Dates</th>
<th>Quota</th>
<th>License</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>1</td>
<td>Oct. 1</td>
<td>Oct. 31</td>
<td>350</td>
<td>Limited quota</td>
</tr>
<tr>
<td>11</td>
<td>6</td>
<td>Oct. 1</td>
<td>Oct. 31</td>
<td>200</td>
<td>Limited quota</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Special Archery Season Hunt Areas</th>
<th>Opening Date</th>
<th>Closing Date</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Aug. 15</td>
<td>Sept. 30</td>
<td>Refer to Section 2 of this Chapter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hunt Area</th>
<th>Type</th>
<th>Quota change from 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>1</td>
<td>None</td>
</tr>
<tr>
<td>11</td>
<td>6</td>
<td>None</td>
</tr>
</tbody>
</table>

**Management Evaluation**

**Current Management Objective:** 5,000 (4,000-6,000)

**Management Strategy:** Recreational

**2015 Post-season Population Estimate:** ~5,200

**2016 Proposed Post-season Population Estimate:** ~5,500

**2015 Hunter Satisfaction:** 87% Satisfied, 11% Neutral, 2% Dissatisfied

**Herd Unit Issues**

The management objective for the Meadowdale Pronghorn Herd Unit of 6,000 was decreased to 5,000 as a result of internal and public input received during the 2013 herd objective review process. The management strategy is recreational management, which is a 20-59 buck:100 doe range.

The 2015 post-season population estimate was about 5,100 pronghorn with the population fluctuating around 5,000 pronghorn since 2010. The last line-transect was conducted in June of 2003 that resulted in an estimate of 5,800 pronghorn. The northern portion of the herd unit continues to have the highest densities of pronghorn resulting in more acres of private lands enrolled into the PLPW walk-in program as well as landowners allowing access, particularly during the doe/fawn season.

**Weather**

Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received
during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Meadowdale herd unit the reviewer is referred to the following link: [http://www.ncdc.noaa.gov/cag/](http://www.ncdc.noaa.gov/cag/).

**Habitat**

Forage availability continued to improve in 2015 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. Cheatgrass continues to be a major threat to native rangelands and big game ranges, particularly at all elevations below 6,500’. Its presence ties the hands of habitat managers limiting habitat enhancement options, and may result in reduced carrying capacities of rangelands if it is the predominant species.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species.

In Summer 2015, population biologists and habitat managers began working together to modify habitat monitoring techniques utilized statewide and to improve overall consistency among the regions. Identification of key herd units per big game species, assessing habitats through landscape scale inventory methods versus monitoring a handful of permanent monitoring sites, assessing habitats in all seasonal ranges (summer, transition, winter), and development of correlations to amounts of and timing of precipitation will help improve the overall value of data collected and result in our abilities to more strongly correlate management decisions for populations based off habitat conditions.

**Field Data**

The Meadowdale population has been stable since 2010. In 2015 fawn ratios (70 fawns: 100 does) increased significantly compared to the five year average of 56 fawns:100 does, which resulted in a slight increase in the herd. The sample size was 12% below the 90% CI so herd classification data does need to be interpreted with some caution, but the increase was expected given above average precipitation during spring months. However, the same cold, wet weather most likely contributed to some neonate mortality. Buck to doe ratios have fluctuated from a low of 28:100 to a high of 50:100 within the last five years. Given the 2015 sample size was somewhat adequate the buck ratio of 46 bucks:100 does appears reasonable. As fawn ratios have fluctuated so has the population, but neither has seen a drastic change either positive or negative keeping the population within objective range of ±20% of 5,000 pronghorn. With the population at a desired level there is not a proposal to increase Type 6 licenses, and given buck ratios are within the recommended recreation management strategy parameters there is not a proposal to increase Type 1 licenses. However, to provide more consistency with Hunt Area 9 which allows harvest for any pronghorn from October 16 to October 31 in those portions of Hunt Area 11 in Converse and Niobrara counties there is a proposal to increase the season length for the Type 1 licenses by 16 days (10/1-10/31). This should result in an increase in harvest of both bucks and
does. Sample size for tooth data collected in the field is too small to infer any population dynamics.

**Harvest Data**
The 2015 hunter success rate of 93% was similar to the five-year average of 90%, and the exact same as the 2014 success rate. Effort in 2015 was 3.3 days per harvest which is slightly lower than the five-year average of 3.6 days per harvest, and significantly lower than 2014 (4.2 days/harvest). The 2015 harvest statistics (stable success and less effort) support a population that has been fluctuating slightly the past five years. License numbers have remained the same the past two years and there has not been a change in access in the past five years. Five-year trends in success and effort have slightly ebbed and flowed which mirrors the population trend. The hunter satisfaction survey showed that 87% of the hunters were satisfied or very satisfied with their hunt. Based on positive comments received from the field the survey seems plausible.

**Population**
The “Constant Juvenile – Constant Adult Survival” (CJCA) spreadsheet model was chosen to use for the post-season population estimate of this herd. This model did have the lowest AIC score, the best fit and the population estimate appears reasonable. We conducted line-transects in 1996, 1998, 2000 and 2003 that provide independent population estimates that were similar to the model estimates. Based on relatively consistent harvest regimes and classification surveys this population typically fluctuates around 5,000 pronghorn, (2015 post-season estimate: 5,100 pronghorn) and has not experienced a significant increase or decrease in the past 5 years. Adult and juvenile survival constraints were adjusted to account for a biologically unrealistic model (page 27, User Guide: Spreadsheet Model for Ungulate Population data). This model is ranked poor since the last LT this population was anchored to was in 2003, and the only other data available is harvest and classification data. WGFD personnel, landowner and hunter observations indicate that pronghorn densities remain low in the southern portion of the hunt area and high in the northern portion. Landowners in the northern portion of the herd unit have damage problems and have voiced their concern at several Department meetings over the past three years, so a proposal to increase the Type 1 season length is warranted.

**Management Summary**
The 2015 season was designed to maintain the population within the objective, which is the same goal for the 2016 season. However, there appears to be more opportunity and landowner support to increase the season length for the Type 1 licenses to the end of October. Given previous harvest rates we expect to attain a harvest of 470 pronghorn. We predict a 2016 post-season population estimate of 5,500 pronghorn, 10% above the objective of 5,000, but within the ±20% recommended range for herd management.
2015 - JCR Evaluation Form

SPECIES: Pronghorn
HERD: PR523 - IRON MOUNTAIN
HUNT AREAS: 38
PREPARED BY: LEE KNOX

<table>
<thead>
<tr>
<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population:</td>
<td>10,537</td>
<td>12,424</td>
</tr>
<tr>
<td>Harvest:</td>
<td>1,514</td>
<td>1,443</td>
</tr>
<tr>
<td>Hunters:</td>
<td>1,690</td>
<td>1,675</td>
</tr>
<tr>
<td>Hunter Success:</td>
<td>90%</td>
<td>86%</td>
</tr>
<tr>
<td>Active Licenses:</td>
<td>1,881</td>
<td>1,727</td>
</tr>
<tr>
<td>Active License Success:</td>
<td>80%</td>
<td>84%</td>
</tr>
<tr>
<td>Recreation Days:</td>
<td>5,714</td>
<td>5,951</td>
</tr>
<tr>
<td>Days Per Animal:</td>
<td>3.8</td>
<td>4.1</td>
</tr>
<tr>
<td>Males per 100 Females</td>
<td>48</td>
<td>63</td>
</tr>
<tr>
<td>Juveniles per 100 Females</td>
<td>67</td>
<td>79</td>
</tr>
</tbody>
</table>

Population Objective (± 20%): 13000 (10400 - 15600)
Management Strategy: Recreational
Percent population is above (+) or below (-) objective: -4.4%
Number of years population has been + or - objective in recent trend: 20
Model Date: 2/26/2015

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

<table>
<thead>
<tr>
<th>JCR Year</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females ≥ 1 year old:</td>
<td>13%</td>
</tr>
<tr>
<td>Males ≥ 1 year old:</td>
<td>21%</td>
</tr>
<tr>
<td>Juveniles (&lt; 1 year old):</td>
<td>1%</td>
</tr>
<tr>
<td>Total:</td>
<td>10%</td>
</tr>
</tbody>
</table>

Proposed change in post-season population: 2%

Population Size - Postseason

![Graph showing population size over years](image-url)
## 2010 - 2015 Preseason Classification Summary

for Pronghorn Herd PR523 - IRON MOUNTAIN

<table>
<thead>
<tr>
<th>Year</th>
<th>Pre Pop</th>
<th>MALES</th>
<th>FEMALES</th>
<th>JUVENILES</th>
<th>Males to 100 Females</th>
<th>Young to</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tot Ylg</td>
<td>Total</td>
<td>Total</td>
<td>Total</td>
<td>Cis Cls Obj</td>
<td>Conf</td>
</tr>
<tr>
<td>2010</td>
<td>12,968</td>
<td>182</td>
<td>370</td>
<td>552</td>
<td>22%</td>
<td>1,186</td>
</tr>
<tr>
<td>2011</td>
<td>11,827</td>
<td>51</td>
<td>89</td>
<td>140</td>
<td>23%</td>
<td>339</td>
</tr>
<tr>
<td>2012</td>
<td>12,359</td>
<td>100</td>
<td>260</td>
<td>360</td>
<td>21%</td>
<td>789</td>
</tr>
<tr>
<td>2013</td>
<td>11,005</td>
<td>120</td>
<td>233</td>
<td>353</td>
<td>27%</td>
<td>608</td>
</tr>
<tr>
<td>2014</td>
<td>12,870</td>
<td>145</td>
<td>276</td>
<td>421</td>
<td>21%</td>
<td>861</td>
</tr>
<tr>
<td>2015</td>
<td>14,011</td>
<td>212</td>
<td>217</td>
<td>429</td>
<td>26%</td>
<td>676</td>
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</table>
2016 HUNTING SEASONS
IRON MOUNTAIN PRONGHORN (PR523)

<table>
<thead>
<tr>
<th>Hunt Area</th>
<th>Type</th>
<th>Season Dates</th>
<th>Quota</th>
<th>License</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>1</td>
<td>Oct. 5</td>
<td>Oct. 31</td>
<td>1,250</td>
<td>Limited Quota</td>
</tr>
<tr>
<td>38</td>
<td>6</td>
<td>Oct. 5</td>
<td>Oct. 31</td>
<td>1,050</td>
<td>Limited Quota</td>
</tr>
<tr>
<td>38</td>
<td></td>
<td>Nov. 1</td>
<td>Dec. 31</td>
<td></td>
<td></td>
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</tbody>
</table>

Special Archery Season Hunt Areas

<table>
<thead>
<tr>
<th>Hunt Areas</th>
<th>Opening Date</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>Aug. 15</td>
<td>Refer to Section 2 of this Chapter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Area</th>
<th>Type</th>
<th>Change from 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
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<td>+150</td>
</tr>
<tr>
<td>38</td>
<td>6</td>
<td>+175</td>
</tr>
<tr>
<td>Herd</td>
<td>1</td>
<td>+150</td>
</tr>
<tr>
<td>6</td>
<td>+175</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>+325</td>
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</tbody>
</table>

Management Evaluation
Current Postseason Population Management Objective: 13,000 (10,400-15,600)
Management Strategy: Recreational
2015 Postseason Population Estimate: 12,400
2016 Proposed Postseason Population Estimate: 13,500
2015 Hunter Satisfaction: 89% Satisfied, 9% Neutral, 2% Dissatisfied

The management objective for the Iron Mountain Pronghorn Herd Unit is a post-season population objective of 13,000 pronghorn. The management strategy is recreational management with a post hunt buck ratio of 30 to 59:100 does. The objective and management strategy was last revised in 2014.

Herd Unit Issues
The Iron Mountain Herd Unit consists of Hunt Areas 38, (combined 39, 40 and 104 into Hunt Area 38 in 2014) which is predominately private lands with traditional agricultural uses. The 2015 post-season population estimate was 12,400 with the population trending upward. Limited public access in this herd unit has typically deterred many hunters and in past years we would have licenses go unsold; however with significant license cuts state wide we have seen an insurgence of both residents and nonresidents hunting 38.
Weather
Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Iron Mountain herd unit the reviewer is referred to the following link: http://www.ncdc.noaa.gov/cag/.

Habitat
Forage availability continued to improve in 2015 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. While early season growing conditions were optimal, late summer and fall precipitation were lacking. A significant die-off of big sagebrush and antelope bitterbrush did occur in portions of the Laramie Range due to a rapid freeze event that occurred in November 2014. The die-off was widespread, from the Front Range of Colorado to the Eastern Plains of Montana. The severity of the die-off is unknown at this time, and whether or not the shrubs will recover. Affected shrubs did not show any significant signs of re-sprouting in summer 2015. Cheatgrass continues to be a major threat to native rangelands and big game ranges, particularly at all elevations below 6,500’. Its presence ties the hands of habitat managers limiting habitat enhancement options, and may result in reduced carrying capacities of rangelands if it is the predominant specie.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species. In summer 2015, population biologists and habitat managers began working together to modify habitat monitoring techniques utilized statewide and to improve overall consistency among the regions. Identification of key herd units per big game species, assessing habitats through landscape scale inventory methods versus monitoring a handful of permanent monitoring sites, assessing habitats in all seasonal ranges (summer, transition, winter), and development of correlations to amounts of and timing of precipitation will help improve the overall value of data collected and result in our abilities to more strongly correlate management decisions for populations based off habitat conditions.

Field Data
A total of 1,641 pronghorn were classified, which is below the recommended classification objective of 3,000. Fawn ratios were 79:100 does which is a decline from 2014 but above the 5 year average of 71:100 and expected after the excellent amount of spring/summer forage. The buck ratio increased from 49:100 does in 2014 to 63:100 however adult buck ratios remained at 32:100 in 2014 and 2015. The yearling buck ratio doubled from 2014 to 2015 at 31:100 and indicates a great survival of 2014 fawns. The hunter satisfaction survey showed 89% of hunters were either satisfied or very satisfied with their hunt which has been increasing since 2012.
**Harvest Data**
Hunter success declined slightly from 91% in 2014 to 86%. Hunter success on the type 6 license actually increased from 2014 to 2015, while the hunter success on the Type 1 license declined by 12% to 79%. This herd is typically a low priority area for resident hunters, due to lack of public access, and many of the licenses are purchased after the draw by nonresidents, typically 60% - 65% of the license holders. In 2015 nonresidents accounted for 48% of the licenses due to an increase in resident license holders, which may also explain the decrease in hunter success. License issuance has been the same since 2013; in 2013 we had 728 licenses left over after the draw, in 2014 230 type 6s, and in 2015 none. We assume the increase in interest is due to the decrease in licenses state wide in 2014, hunters to draw their 2nd and 3rd choices.

**Population**
The population is increasing due to exceptional spring/summer forage the last three years producing the highest fawn ratios in a decade. The spreadsheet model for this herd estimates a post hunt population of 12,400. This estimate uses the Constant Juvenile & Adult Survival model which had a AIC score of 28 and a best fit score of 18. This is a poor model due to little data available; ratio data, if available, considered highly biased because of poor sample sizes or an inability to survey the entire area; results not biologically defensible. To get the model to run we truncated years to 2002 to eliminate years of poor classification data. We also did not include LT estimates as they are also of poor quality due to such large deviations in terrain height resulting in large standard errors.

**Management Summary**
This herd has always been hard to manage due to limited population data and a large percentage of inaccessible private lands. We combined Hunt Areas 38, 39, 40 and 104 in 2014 to simplify regulations and allow hunters more opportunity to move where the pronghorn are most accessible. With the model indicating a growing population, high hunter success, and a renewed interest by hunters, we will be increasing the type 1 license by 150 and the type 6 licenses by 175 for a total of 2,300 licenses in 2016.
2015 - JCR Evaluation Form

SPECIES: Pronghorn
HERD: PR524 - DWYER
HUNT AREAS: 103
PREPARED BY: MARTIN HICKS

<table>
<thead>
<tr>
<th></th>
<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population:</td>
<td>5,040</td>
<td>5,400</td>
<td>5,600</td>
</tr>
<tr>
<td>Harvest:</td>
<td>537</td>
<td>487</td>
<td>640</td>
</tr>
<tr>
<td>Hunters:</td>
<td>541</td>
<td>518</td>
<td>715</td>
</tr>
<tr>
<td>Hunter Success:</td>
<td>99%</td>
<td>94%</td>
<td>90%</td>
</tr>
<tr>
<td>Active Licenses:</td>
<td>641</td>
<td>564</td>
<td>755</td>
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<tr>
<td>Active License Success:</td>
<td>84%</td>
<td>86%</td>
<td>85%</td>
</tr>
<tr>
<td>Recreation Days:</td>
<td>2,043</td>
<td>1,372</td>
<td>1,900</td>
</tr>
<tr>
<td>Days Per Animal:</td>
<td>3.8</td>
<td>2.8</td>
<td>3.0</td>
</tr>
<tr>
<td>Males per 100 Females</td>
<td>49</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>Juveniles per 100 Females</td>
<td>50</td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

Population Objective (± 20%): 4000 (3200 - 4800)
Management Strategy: Recreational
Percent population is above (+) or below (-) objective: 35%
Number of years population has been + or - objective in recent trend: 2
Model Date: 02/18/2016

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

<table>
<thead>
<tr>
<th></th>
<th>JCR Year</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females ≥ 1 year old:</td>
<td>8.8%</td>
<td>10.9%</td>
</tr>
<tr>
<td>Males ≥ 1 year old:</td>
<td>16.3%</td>
<td>18.2%</td>
</tr>
<tr>
<td>Juveniles (&lt; 1 year old):</td>
<td>1.3%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Total:</td>
<td>8.1%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Proposed change in post-season population: +8%
### 2010 - 2015 Preseason Classification Summary

for Pronghorn Herd PR524 - DWYER

<table>
<thead>
<tr>
<th>Year</th>
<th>Pre Pop</th>
<th>MALES</th>
<th>FEMALES</th>
<th>JUVENILES</th>
<th>Males to 100 Females</th>
<th>Young to Adult</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Tot</td>
<td>Cls</td>
<td>Obj</td>
<td>Ylng</td>
<td>Adult</td>
</tr>
<tr>
<td>2010</td>
<td>5,800</td>
<td>356</td>
<td>185</td>
<td>732</td>
<td>22</td>
<td>32</td>
</tr>
<tr>
<td>2011</td>
<td>5,600</td>
<td>326</td>
<td>140</td>
<td>665</td>
<td>29</td>
<td>33</td>
</tr>
<tr>
<td>2012</td>
<td>5,800</td>
<td>552</td>
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<td>295</td>
<td>1,096</td>
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<td>2014</td>
<td>5,400</td>
<td>466</td>
<td>234</td>
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<td>2015</td>
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2016 HUNTING SEASONS
DWAYER PRONGHORN HERD (524)

<table>
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<tr>
<th>Hunt Area</th>
<th>Type</th>
<th>Season Dates</th>
<th>Quota</th>
<th>License</th>
<th>Limitations</th>
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<tr>
<td>103</td>
<td>1</td>
<td>Oct. 5</td>
<td>Oct. 31</td>
<td>475</td>
<td>Limited quota</td>
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<tr>
<td>6</td>
<td>6</td>
<td>Oct. 5</td>
<td>Dec. 31</td>
<td>450</td>
<td>Limited quota</td>
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<td>Doe or fawn</td>
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<th>Special Archery Season Hunt Areas</th>
<th>Opening Date</th>
<th>Closing Date</th>
<th>Limitations</th>
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<tr>
<td>103</td>
<td>Aug. 15</td>
<td>Oct. 4</td>
<td>Refer to Section 2 of this Chapter</td>
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<table>
<thead>
<tr>
<th>Hunt Area</th>
<th>Type</th>
<th>Quota change from 2015</th>
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<tr>
<td>103</td>
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<td>+100</td>
</tr>
<tr>
<td>103</td>
<td>6</td>
<td>+100</td>
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<tr>
<td>Total</td>
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<td>+200</td>
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Management Evaluation
Current Management Objective: 4000 (3,200-4,800)
Management Strategy: Recreational
2015 Postseason Population Estimate: ~5,400
2016 Proposed Post-season Population Estimate: ~5,600
2015 Hunter Satisfaction: 89% Satisfied, 8% Neutral, 3% Dissatisfied

Management Issues
The management objective for the Dwyer Pronghorn Herd Unit is a post-season population objective of 4,000 pronghorn. The management strategy is recreational management with a 20-59 buck:100 doe ratio range. The herd objective and management strategy was reviewed in 2014 and to the decision was made to maintain the same population objective of 4,000 pronghorn and recreational management.

The 2015 post-season population estimate of 5,400 was derived from the end-of- the biological year 2014 line-transect estimate. The spreadsheet model was then anchored to that density estimate which increased the population by 38% compared to the 2015 post-season population estimate without the LT density estimate. This report will reflect the population trend from 2010-2016 that is anchored to the 2014 line-transect estimate.

There has been little urban and industrial development within this herd unit. The herd unit is comprised of 90% private land and some accessible state land. Land use is comprised of native range land, irrigated and dry land agriculture fields, and land enrolled into the Conservation
Reserve Program (CRP). The majority of access is in the northern portion of the herd unit via the PLPW program and private land opened up address damage situations.

Weather
Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Dwyer herd unit the reviewer is referred to the following link: http://www.ncdc.noaa.gov/cag/.

Habitat
Forage availability continued to improve in 2015 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Cheatgrass continues to be a major threat to native rangelands and big game ranges, particularly at all elevations below 6,500’. Its presence ties the hands of habitat managers limiting habitat enhancement options, and may result in reduced carrying capacities of rangelands if it is the predominant species.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species.

In Summer 2015, population biologists and habitat managers began working together to modify habitat monitoring techniques utilized statewide and to improve overall consistency among the regions. Identification of key herd units per big game species, assessing habitats through landscape scale inventory methods versus monitoring a handful of permanent monitoring sites, assessing habitats in all seasonal ranges (summer, transition, winter), and development of correlations to amounts of and timing of precipitation will help improve the overall value of data collected and result in our abilities to more strongly correlate management decisions for populations based off habitat conditions.

Field Data
Based on the 2014 line-transect density estimate of 5,400 the previous 5 years of population data was retrofitted to reflect population trends that are anchored to the 2014 end-of-the-year line-transect density estimate of 5,400 pronghorn. The model simulates a population that from 2010-2015 fluctuated around 5,000 pronghorn. The sample size for pre-season classifications has not been met in the past 6 years so herd composition data should be interpreted with caution. Fawn ratios have fluctuated around 50 fawns:100 does from 2010-2015 which is a level that does not grow a herd. However buck ratios that have fluctuated from a low of 33:100 to a high of 61:100 from 2010-2015 are well within recreational management levels. In fact they fall at the
upper level of the recreation management range, which indicates that fawns are surviving into adults providing for a healthy population that is maintaining itself. Sample size for tooth data collected in the field is too small to infer any population dynamics.

**Harvest Data**
Active license success (86%) in 2015 was similar to the herd unit five-year average (84%) and the five-year state-wide average (82%). Effort (2.8 days per harvest) decreased significantly in 2015 compared to the five-year herd unit and state-wide average of 3.8 days per harvest. Private land access dynamics have remained stable but additional access has opened up in central portion of the herd unit which could explain the decrease in effort. The hunter satisfaction survey showed that 89% of the hunters were either satisfied or very satisfied with their hunt, a increase compared to 2014 (78%). Additional hunting opportunity most likely affected hunter attitudes.

**Population**
A 2014 end-of-the biological year line transect (LT) was completed in June 2015 (Appendix A). The half-normal cosine model was selected. The % CV was 11.74 and had the lowest AIC score. The histogram misses the B and C bands, this is most likely due to observers concentrating more on the B and C bands. Given the low CV the population of 5,752 appears plausible. Pre-season classifications are not a reliable gauge to determine fawn recruitment since they very rarely reach the sample size to challenge the LT density estimate. In other words this estimate is more reliable than trying to model male and juvenile ratios in the spreadsheet model for a post-season population estimate.

The “Time Specific Juvenile- Constant Adult Survival” (TSJ, CA) spreadsheet model was chosen over the simpler Constant Juvenile-Constant Adult (CJ,CA) model, and resulted in a post-season population of 5,400 pronghorn. The simpler CJ,CA model tries to run through the previous LT’s and underestimates the 2014 LT density estimate by 1,000 pronghorn. By allowing for a variation in juvenile survival the TSJ,CA model runs through the 2014 LT and provides a plausible population estimate. The CJ,CA’s AIC score was slightly lower than the TSJ,CA score, but the TSJ,CA has a better fit than the CJ,CA model. This model is ranked fair since it runs through one sample-based population estimate and has ratio data for all the years.

**Management Summary**
Managers have been trying to maintain a population within the range of 3,200-4,800 pronghorn. Based on the 2014 end-of-the-biological year density estimate this population is 30% above the objective. To try and change population growth Type 6 licenses increased by 100. This will slow the population down but not decrease it. Managers want to take small steps in reducing the herd by not flooding the area with too many doe/fawn licenses. To take advantage of buck ratios in the upper end of the recreational range Type 1 licenses increased by 100.

If the projected harvest of 640 pronghorn is attained coupled with normal fawn recruitment the pronghorn population will slightly increase to 5,600, 40% above the objective of 4,000.
Appendix A

2014 End-of-the-Year Line Transect Results for PH524

<table>
<thead>
<tr>
<th>Point Parameter</th>
<th>Standard Estimate</th>
<th>Percent Error</th>
<th>Coef. of Variation</th>
<th>95% Percent Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>DS</td>
<td>5.2216</td>
<td>0.58906</td>
<td>11.28</td>
<td>4.1836 6.5171</td>
</tr>
<tr>
<td>E(S)</td>
<td>1.4649</td>
<td>0.47702E-01</td>
<td>3.26</td>
<td>1.3740 1.5617</td>
</tr>
<tr>
<td>D</td>
<td>7.6489</td>
<td>0.89813</td>
<td>11.74</td>
<td>6.0747 9.6311</td>
</tr>
<tr>
<td>N</td>
<td>5752.0</td>
<td>675.39</td>
<td>11.74</td>
<td>4568.0 7243.0</td>
</tr>
</tbody>
</table>

Measurement Units
---------------------------------
Density: Numbers/Sq. miles
ESW: meters

Component Percentages of Var(D)
-------------------------------
Detection probability : 55.1
Encounter rate : 37.2
Cluster size : 7.7

Estimation Summary - Encounter rates
--------------------------------------
Estimate %CV df 95% Confidence Interval
--------------------------------------
n 358.00
k 47.000
L 792.30
n/L 0.45185 7.16 46.00 0.39126 0.52182
Left 0.0000
Width 206.00

Estimation Summary - Detection probability
--------------------------------------
Estimate %CV df 95% Confidence Interval
--------------------------------------
Half-normal/Cosine
m 2.0000
LnL -573.83
AIC 1151.7
AICc 1151.7
BIC 1159.4
Chi-p 0.18013E-03
f(0) 0.71806E-02 8.72 356.00 0.60514E-02 0.85206E-02
p 0.67604 8.72 356.00 0.56972 0.80219
ESW  139.26  8.72  356.00  117.36  165.25

Estimation Summary - Expected cluster size

<table>
<thead>
<tr>
<th>Estimate</th>
<th>%CV</th>
<th>df</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average cluster size</td>
<td>1.7402</td>
<td>5.86</td>
<td>357.00</td>
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</table>

Half-normal/Cosine

<table>
<thead>
<tr>
<th>r</th>
<th>-0.10126</th>
</tr>
</thead>
<tbody>
<tr>
<td>r-p</td>
<td>0.27803E-01</td>
</tr>
<tr>
<td>E(S)</td>
<td>1.4649</td>
</tr>
</tbody>
</table>

Estimation Summary - Density&Abundance

<table>
<thead>
<tr>
<th>Estimate</th>
<th>%CV</th>
<th>df</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Half-normal/Cosine</td>
<td>DS</td>
<td>5.2216</td>
<td>11.28</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>7.6489</td>
<td>11.74</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>5752.0</td>
<td>11.74</td>
</tr>
</tbody>
</table>
2015 - JCR Evaluation Form

SPECIES: Pronghorn
HERD: PR525 - MEDICINE BOW
HUNT AREAS: 30-32, 42, 46-48
PREPARED BY: LEE KNOX

<table>
<thead>
<tr>
<th></th>
<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>29,206</td>
<td>35,675</td>
<td>39,200</td>
</tr>
<tr>
<td>Harvest</td>
<td>5,417</td>
<td>2,139</td>
<td>2,200</td>
</tr>
<tr>
<td>Hunters</td>
<td>6,054</td>
<td>2,270</td>
<td>2,300</td>
</tr>
<tr>
<td>Hunter Success</td>
<td>89%</td>
<td>94%</td>
<td>96%</td>
</tr>
<tr>
<td>Active Licenses</td>
<td>6,711</td>
<td>2,487</td>
<td>2,500</td>
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<tr>
<td>Active License Success</td>
<td>81%</td>
<td>86%</td>
<td>88%</td>
</tr>
<tr>
<td>Recreation Days</td>
<td>19,759</td>
<td>6,626</td>
<td>6,600</td>
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<tr>
<td>Days Per Animal</td>
<td>3.6</td>
<td>3.1</td>
<td>3</td>
</tr>
<tr>
<td>Males per 100 Females</td>
<td>44</td>
<td>42</td>
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</tr>
<tr>
<td>Juveniles per 100 Females</td>
<td>63</td>
<td>78</td>
<td></td>
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Population Objective (± 20%): 40000 (32000 - 48000)
Management Strategy: Recreational
Percent population is above (+) or below (-) objective: -10.8%
Number of years population has been + or - objective in recent trend: 10
Model Date: 2/26/2016

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

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<tr>
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<th>JCR Year</th>
<th>Proposed</th>
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<tr>
<td>Females ≥ 1 year old</td>
<td>2.3%</td>
<td>2%</td>
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<tr>
<td>Males ≥ 1 year old</td>
<td>25%</td>
<td>21%</td>
</tr>
<tr>
<td>Juveniles (&lt; 1 year old)</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Total</td>
<td>6%</td>
<td>6%</td>
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</tbody>
</table>

Proposed change in post-season population: 6% 6%
Active Licenses

Days Per Animal Harvested

Preseason Animals per 100 Females
### 2010 - 2015 Preseason Classification Summary

**for Pronghorn Herd PR525 - MEDICINE BOW**

<table>
<thead>
<tr>
<th>Year</th>
<th>Pre Pop</th>
<th>MALES</th>
<th>FEMALES</th>
<th>JUVENILES</th>
<th>Males to 100 Females</th>
<th>Young to 100 Females</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Tot</td>
<td>Cls</td>
<td>Obj</td>
<td>Conf Int</td>
<td>100 Adult</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ylng</td>
<td>Adult</td>
<td>Total</td>
<td>Conf</td>
<td>Int</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td>%</td>
<td>Total</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>39,649</td>
<td>446</td>
<td>840</td>
<td>1,286</td>
<td>21%</td>
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<td>15</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td>27</td>
</tr>
<tr>
<td>2011</td>
<td>37,998</td>
<td>299</td>
<td>994</td>
<td>1,293</td>
<td>27%</td>
<td>1,306</td>
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<td>2,222</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>46%</td>
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<tr>
<td>2012</td>
<td>32,743</td>
<td>312</td>
<td>616</td>
<td>928</td>
<td>24%</td>
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<td>1,439</td>
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<tr>
<td>2013</td>
<td>29,495</td>
<td>301</td>
<td>614</td>
<td>915</td>
<td>17%</td>
<td>1,698</td>
</tr>
<tr>
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<td>23</td>
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<tr>
<td>2014</td>
<td>35,942</td>
<td>514</td>
<td>617</td>
<td>1,131</td>
<td>20%</td>
<td>1,882</td>
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<td></td>
<td></td>
<td>19</td>
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<tr>
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<td>424</td>
<td>529</td>
<td>953</td>
<td>19%</td>
<td>1,747</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>35%</td>
</tr>
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<td>19</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>24</td>
</tr>
</tbody>
</table>

### Notes

- Tot: Total
- Cls: Class
- Obj: Object
- Conf: Confidence
- Int: Interval

### Additional Information

- ± 2 indicates a 95% confidence interval with a margin of error of ±2%.
- ± 3 indicates a 90% confidence interval with a margin of error of ±3%.
- ± 4 indicates an 80% confidence interval with a margin of error of ±4%.
2016 HUNTING SEASONS
MEDICINE BOW PRONGHORN (PR525)

<table>
<thead>
<tr>
<th>Hunt Area</th>
<th>Type</th>
<th>Season Dates</th>
<th>Quota</th>
<th>License</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>1</td>
<td>Oct. 5 – Oct. 31</td>
<td>400</td>
<td>Limited quota</td>
<td>Any antelope</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Oct. 5 – Oct. 31</td>
<td>50</td>
<td>Limited quota</td>
<td>Doe or fawn</td>
</tr>
<tr>
<td>31</td>
<td>1</td>
<td>Sep. 25 – Oct. 31</td>
<td>150</td>
<td>Limited quota</td>
<td>Any antelope</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Sep. 25 – Oct. 31</td>
<td>50</td>
<td>Limited quota</td>
<td>Doe or fawn</td>
</tr>
<tr>
<td>32</td>
<td>1</td>
<td>Sep. 25 – Oct. 31</td>
<td>300</td>
<td>Limited quota</td>
<td>Any antelope</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Sep. 25 – Oct. 31</td>
<td>100</td>
<td>Limited quota</td>
<td>Doe or fawn</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>Sep. 25 – Oct. 31</td>
<td>50</td>
<td>Limited quota</td>
<td>Doe or fawn valid on private land</td>
</tr>
<tr>
<td>42</td>
<td>1</td>
<td>Sep. 25 – Oct. 31</td>
<td>400</td>
<td>Limited quota</td>
<td>Any antelope</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Sep. 25 – Oct. 31</td>
<td>50</td>
<td>Limited quota</td>
<td>Doe or fawn</td>
</tr>
<tr>
<td>46</td>
<td>1</td>
<td>Sep. 25 – Oct. 31</td>
<td>100</td>
<td>Limited quota</td>
<td>Any antelope</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Oct. 5 – Oct. 31</td>
<td>150</td>
<td>Limited quota</td>
<td>Any antelope</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Sep. 25 – Oct. 31</td>
<td>75</td>
<td>Limited quota</td>
<td>Doe or fawn</td>
</tr>
<tr>
<td>47</td>
<td>1</td>
<td>Sep. 25 – Oct. 31</td>
<td>400</td>
<td>Limited quota</td>
<td>Any antelope</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Oct. 5 – Oct. 31</td>
<td>150</td>
<td>Limited quota</td>
<td>Any antelope</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Sep. 25 – Oct. 31</td>
<td>150</td>
<td>Limited quota</td>
<td>Doe or fawn</td>
</tr>
<tr>
<td>48</td>
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<td>Sep. 25 – Oct. 31</td>
<td>100</td>
<td>Limited quota</td>
<td>Any antelope</td>
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<td>2</td>
<td>1</td>
<td>Oct. 5 – Oct. 31</td>
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<td>Limited quota</td>
<td>Any antelope</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Sep. 25 – Oct. 31</td>
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<td>Limited quota</td>
<td>Doe or fawn</td>
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**Special Archery Season Hunt Areas**

<table>
<thead>
<tr>
<th>Opening Date</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug. 15</td>
<td>Refer to Section 2 of this Chapter</td>
</tr>
</tbody>
</table>

Management Evaluation

**Current Postseason Population Management Objective:** 40,000 (32,000 – 48,000)

**Management Strategy:** Recreational Management

**2015 Postseason Population Estimate:** ~35,700

**2016 Proposed Postseason Population Estimate:** ~39,300

**2015 Hunter Satisfaction:** 89% Satisfaction, 6% Neutral, 5% Dissatisfied

The management objective for the Medicine Bow Pronghorn Herd Unit is a post-season population objective of 40,000. The management strategy is recreational which requires maintaining a buck ratio of 30-59:100 does. The objective and management strategy were last revised in 2014.
**Herd Unit Issues**
The Medicine Bow Herd Unit encompasses hunt areas 30, 31, 32, 42, 46, 47 and 48. These hunt areas vary between predominantly public land and exclusively private land. Large scale wind farms and coal mining within this herd may be negatively impacting habitat and productivity. The population saw a large decline from a high of 49,700 in 2004 to 25,000 in 2013. Most recently the population has been increasing to the current estimate of 35,700. In the early 2000s the Department was trying to reduce the population below the objective of 60,000 to try and prevent irreparable habitat damage in the Shirley Basin and Bates Hole areas. At the same time this herd was hit hard by harsh winters, drought, and disease, causing the herd to decline below 30,000 pronghorn. Current season structure and license issuance are designed to increase the population. The herd objective was last reviewed in 2014; the herd objective was decreased from 60,000 to 40,000 pronghorn post season. This will still allow the herd to increase substantially and at the same time manage for a more sustainable population in line with habitat.

**Weather**
Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Medicine Bow herd unit the reviewer is referred to the following link: [http://www.ncdc.noaa.gov/cag/](http://www.ncdc.noaa.gov/cag/).

**Habitat**
Forage availability continued to improve in 2015 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. While early season growing conditions were optimal, late summer and fall precipitation were lacking. The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species.

Shrubs within this herd unit continue to be comprised of predominantly mature to decadent age classes and show signs of excessive historical herbivory. Historical overutilization of key shrubs in much of this herd unit will likely limit the herd’s growth potential. The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species.

In summer 2015, population biologists and habitat managers began working together to modify habitat monitoring techniques utilized statewide and to improve overall consistency among the regions. Identification of key herd units per big game species, assessing habitats through landscape scale inventory methods versus monitoring a handful of permanent monitoring sites, assessing habitats in all seasonal ranges (summer, transition, winter), and development of
correlations to amounts of and timing of precipitation will help improve the overall value of data collected and result in our abilities to more strongly correlate management decisions for populations based off habitat conditions.

**Field Data**
A total of 5,000 pronghorn were classified in 2015, exceeding the estimated classification objective of 2,800. Classification methods were changed from aerial to ground in 2013 due to budget and time constraints. Buck ratios are comparable to 2014 at 42:100 does. Adult buck ratios are 24:100 does, well below the 10 year average of 30:100 does, however, the yearling buck ratio of 19:100 is above the 10 year average of 16:100. Since 2012 herd unit wide fawn ratios have been increasing and 2015 was no exception at 78:100 does. Most hunt areas saw fawn ratios that either remained stable or increased except in hunt area 30, which declined to 59:100. The hunter satisfaction survey shows 89% of hunters were either satisfied or very satisfied with their hunt and 6% remaining neutral, comparable to past years.

**Harvest Data**
Hunter success for all active licenses types was 94%, up from 92% in 2014 and 82% in 2013. All hunt areas saw an increase in success except for in hunt area 31 which declined below 80% for both license types. Hunter effort for the herd unit declined for the third straight year to 3.1 days to harvest in 2015. We expect to have high success and lower effort with the current season structure and license issuance. We hope we will be able to increase hunter opportunity in the next few years, however, it is concerning that some of the populations within hunt areas 30, 31 and 48 do not seem to be recovering as quickly.

**Population**
The spreadsheet model for this herd indicates the population is increasing with a post hunt population of 35,700. This estimate was derived using the Time-Specific Juvenile and Constant Adult Survival model which had a AIC score of 261 and a best fit score of 169. The last line transect was conducted in 2011 with an estimate of 31,132 with a standard error of 4,328. The model is of good quality, predicted end of year population trends align well with past line transect estimates, and is comparable with what field personnel have noted from landowner and hunter comments. The model has 15-20 years of data; ratio data available for all years in model; juvenile and adult survival estimates with standard errors available at least 2 out of 10 years, (Grogan et al and Taylor, 2014) and at least one sample-based population estimate with standard error available.

**Management Summary**
If the projected harvest of 2,200 is attained, and the average fawn ratio of 70 fawns: 100 does is maintained, the population is estimated to increase to near 40,000. If we have another year of good spring/summer forage, the population will increase even more substantially. License issuance will remain status quo so that we can continue to grow the population towards objective.

**Bibliography of Herd Specific Studies**
Grogan, R. Lindzey, F. *Pronghorn survival in Wyoming*. Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming, Laramie, WY, 82071, USA
2015 - JCR Evaluation Form

SPECIES: Pronghorn
HERD: PR526 - COOPER LAKE
PREPARED BY: LEE KNOX

<table>
<thead>
<tr>
<th></th>
<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
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<td>84%</td>
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<td>2,500</td>
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<td>Males per 100 Females</td>
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<td>Juveniles per 100 Females</td>
<td>80</td>
<td>94</td>
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Population Objective (± 20%): 3000 (2400 - 3600)
Management Strategy: Recreational
Percent population is above (+) or below (-) objective: 78%
Number of years population has been + or - objective in recent trend: 20
Model Date: 2/26/2015

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

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<th>JCR Year</th>
<th>Proposed</th>
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<tbody>
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<tr>
<td>Males ≥ 1 year old:</td>
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<tr>
<td>Juveniles (&lt; 1 year old):</td>
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</tr>
<tr>
<td>Total:</td>
<td>11%</td>
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Proposed change in post-season population: -12% -15%
### 2010 - 2015 Preseason Classification Summary

for Pronghorn Herd PR526 - COOPER LAKE

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<thead>
<tr>
<th>Year</th>
<th>Pre Pop</th>
<th>MALES</th>
<th>Females</th>
<th>Juveniles</th>
<th>Males to 100 Females</th>
<th>Young to 100 Adult</th>
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<tr>
<td></td>
<td></td>
<td>Tot Ylg Adult Total %</td>
<td>Total %</td>
<td>Total %</td>
<td>Tot Cls Cls Obj</td>
<td>Ying Adult Total Conf Int</td>
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<tr>
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<td>599 46%</td>
<td>468 36%</td>
<td>1,303 2,318</td>
<td>15 25 39 ± 4</td>
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<tr>
<td>2011</td>
<td>5,230</td>
<td>56 162 218 19%</td>
<td>544 47%</td>
<td>406 35%</td>
<td>1,168 2,231</td>
<td>10 30 40 ± 5</td>
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<tr>
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<td>5,154</td>
<td>33 52 85 18%</td>
<td>209 45%</td>
<td>167 36%</td>
<td>461 2,064</td>
<td>16 25 41 ± 8</td>
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<tr>
<td>2013</td>
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<td>45 82 127 15%</td>
<td>409 48%</td>
<td>314 37%</td>
<td>850 1,784</td>
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<td>5,558</td>
<td>101 96 197 25%</td>
<td>300 38%</td>
<td>303 38%</td>
<td>800 1,538</td>
<td>34 32 66 ± 9</td>
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<td>2015</td>
<td>6,052</td>
<td>68 92 160 20%</td>
<td>325 41%</td>
<td>307 39%</td>
<td>792 2,352</td>
<td>21 28 49 ± 7</td>
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2016 HUNTING SEASONS
COOPER LAKE PRONGHORN (PR526)

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<th>Hunt Area</th>
<th>Type</th>
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<th>Quota</th>
<th>License</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>43</td>
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<td>Sept. 15</td>
<td>Oct. 14</td>
<td>400</td>
<td>Limited quota</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Sept. 15</td>
<td>Oct. 14</td>
<td>600</td>
<td>Limited Quota</td>
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**Archery**

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<th>Opening Date</th>
<th>Limitations</th>
</tr>
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<td>Refer to Section 2 of this Chapter</td>
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</table>

<table>
<thead>
<tr>
<th>Area</th>
<th>Type</th>
<th>Change from 2015</th>
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</thead>
<tbody>
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<td>43</td>
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<td>+150</td>
</tr>
<tr>
<td>Herd Totals</td>
<td>6</td>
<td>+150 +150</td>
</tr>
</tbody>
</table>

**Management Evaluation**

Current Postseason Population Management Objective: 3,000 (2,400-3,600)

Management Strategy: Recreational

2015 Postseason Population Estimate: ~ 5,300

2016 Proposed Postseason Population Estimate: ~ 5,000

2015 Hunter Satisfaction: 90% Satisfied, 5% Neutral, 5% Dissatisfied

The management objective for the Cooper Lake Pronghorn Herd Unit is a post-season population objective of 3,000 pronghorn. The management strategy is recreational management with a buck ratio of 30 to 59:100 does. The objective and management strategy was last revised in 2013.

**Herd Unit Issues**

Recent trends show the population increasing from 4,200 in 2013 to the current population estimate at 5,300. The last line transect survey was conducted in 2013, estimating 8,953 pronghorn with an estimated standard error of 1,603. This herd is predominately private land with increasing urban sprawl near Laramie, and a large wind farm in the western portion of the herd. Limited public access has hindered efforts to decrease this herd through harvest. Currently most public hunting is limited to the Diamond Lake and Laramie River Hunter Management Areas (HMA) which encompass half of the Herd Unit. Field staff documented Epizootic Hemorrhagic Disease (EHD) in the herd unit in 2012 and 2013.

**Weather**

Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts
were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Cooper Lake herd unit the reviewer is referred to the following link: http://www.ncdc.noaa.gov/cag/.

Habitat
Forage availability continued to improve in 2015 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. While early season growing conditions were optimal, late summer and fall precipitation were lacking.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species.

In summer 2015, population biologists and habitat managers began working together to modify habitat monitoring techniques utilized statewide and to improve overall consistency among the regions. Identification of key herd units per big game species, assessing habitats through landscape scale inventory methods versus monitoring a handful of permanent monitoring sites, assessing habitats in all seasonal ranges (summer, transition, winter), and development of correlations to amounts of and timing of precipitation will help improve the overall value of data collected and result in our abilities to more strongly correlate management decisions for populations based off habitat conditions.

Field Data
A total of 800 pronghorn were classified which is below the estimated sample size of 2,300. Classification samples have been below the estimated sample size since 2006. Routes were established in 2013 so that some inference can be made between classification samples year to year and since 2013 we have sampled near 800 pronghorn each year; Additional routes may need to be added to reach the estimated sample size. With another green spring and summer, fawn ratios remain high at 94 fawns:100 does. We are seeing similar adult buck ratios to 2014 and even though yearling numbers declined they are still good compared to past years. The total buck ratio of 49:100 is down which is mostly due to fewer yearlings sampled than last year but overall still a high buck ratio for this herd.

Harvest Data
We issued 850 licenses which did not completely sell in the resident draw but were picked up after the draw by non-residents who account for 78% of the licenses sold. Hunter success rebounded to similar percentages before 2014, with type 1s at 93% and type 6s at 87%. We are not sure why it dipped in 2014 and rebounded in 2015 considering similar weather, hunting
access and license issuance. The Hunter Satisfaction Survey shows 90% of hunters were either satisfied or very satisfied with their hunt.

**Population**
The model estimates the population is near 5,300 pronghorn and predicts it will decline to 5,000 in 2016. The Constant Juvenile-Constant Adult Mortality Rate (CJCA) spreadsheet model was chosen to use for the post season population estimate of this herd. The model chosen had the lowest AIC of all three models and the end of year population estimate trends well with the past LTs. We conducted a Line Transect in June 2014 that estimates an end of bio year estimate of 8,900 with a standard error of 1,600. The histogram for this survey shows that the E band is higher than the B, C or D bands, and therefore breaks the first assumption. This is a poor model due to ratio data, if available, considered highly biased because of poor sample sizes or an inability to survey the entire area; lacks adult and juvenile survival data; results not biologically defensible.

**Management Summary**
This herd is very productive and has recovered quickly from the drought in 2012. The current population estimate is over objective and increasing. We are increasing doe fawn type 6 licenses by 150, which we estimate will be enough harvest to curb the growth of this herd.
## 2015 - JCR Evaluation Form

**SPECIES:** Pronghorn  
**PERIOD:** 6/1/2015 - 5/31/2016  
**HERD:** PR527 - CENTENNIAL  
**HUNT AREAS:** 37, 44-45  
**PREPARED BY:** LEE KNOX

### 2010 - 2014 Average, 2015, 2016 Proposed

<table>
<thead>
<tr>
<th></th>
<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population:</td>
<td>12,484</td>
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<td>12,000</td>
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<tr>
<td>Harvest:</td>
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<td>1,000</td>
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<td>Hunters:</td>
<td>1,374</td>
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<tr>
<td>Hunter Success:</td>
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<td>1,200</td>
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<td>83%</td>
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</tr>
<tr>
<td>Males per 100 Females</td>
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</tr>
<tr>
<td>Juveniles per 100 Females</td>
<td>72</td>
<td>68</td>
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**Population Objective (± 20%):** 14000 (11200 - 16800)  
**Management Strategy:** Recreational  
**Percent population is above (+) or below (-) objective:** -12.1%  
**Number of years population has been + or - objective in recent trend:** 10  
**Model Date:** 02/18/2016

### Proposed harvest rates (percent of pre-season estimate for each sex/age group):

<table>
<thead>
<tr>
<th></th>
<th>JCR Year</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females ≥ 1 year old</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>Males ≥ 1 year old</td>
<td>22%</td>
<td>22%</td>
</tr>
<tr>
<td>Juveniles (&lt; 1 year old)</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Total</td>
<td>8%</td>
<td>8%</td>
</tr>
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</table>

**Proposed change in post-season population:** 3% -2%
Harvest

Number of Hunters

Harvest Success
### 2010 - 2015 Preseason Classification Summary

for Pronghorn Herd PR527 - CENTENNIAL

<table>
<thead>
<tr>
<th>Year</th>
<th>Pre Pop</th>
<th>MALES</th>
<th>FEMALES</th>
<th>JUVENILES</th>
<th>Males to 100 Females</th>
<th>Young to 100 Females</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Tot</td>
<td>Cls</td>
<td>Obj</td>
<td>Tot</td>
<td>Conf Int</td>
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<tr>
<td></td>
<td>Tot</td>
<td>Cls</td>
<td>Obj</td>
<td>Ylng</td>
<td>Adult</td>
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<tr>
<td>2011</td>
<td>14,978</td>
<td>59</td>
<td>214</td>
<td>273</td>
<td>741</td>
<td>641</td>
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<tr>
<td>2012</td>
<td>13,611</td>
<td>190</td>
<td>252</td>
<td>442</td>
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<td>113</td>
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<td>352</td>
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<td>277</td>
<td>476</td>
<td>1,161</td>
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### 2016 HUNTING SEASONS
#### CENTENNIAL PRONGHORN (PR527)

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<th>License</th>
<th>Limitations</th>
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<tr>
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<td>Sep. 20</td>
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<td>150</td>
<td>Limited Quota</td>
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<td>Sep. 15</td>
<td>Oct. 31</td>
<td>150</td>
<td>Limited Quota</td>
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<tr>
<td>45</td>
<td>1</td>
<td>Sep. 15</td>
<td>Oct. 31</td>
<td>350</td>
<td>Limited Quota</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Sep. 15</td>
<td>Oct. 31</td>
<td>350</td>
<td>Limited Quota</td>
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<thead>
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<th>Special Archery Season</th>
<th>Opening Date</th>
<th>Limitations</th>
</tr>
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<tbody>
<tr>
<td>Hunt Areas 37, 44, 45</td>
<td>Aug. 15</td>
<td>Refer to Section 2 of this Chapter</td>
</tr>
</tbody>
</table>

### Management Evaluation

**Current Postseason Population Management Objective:** 14,000 (11,200 – 15,800)

**Management Strategy:** Recreational

**2015 Postseason Population Estimate:** ~12,300

**2016 Postseason Population Estimate:** ~12,000

**2015 Hunter Satisfaction:** 93% Satisfied, 6% Neutral, 1% Dissatisfied

The Management objective for the Centennial Pronghorn Herd Unit is a post-season population of 14,000. The management strategy is recreational management requiring a buck ratio of 30 to 59:100 does. The objective and management strategy was last revised in 2013.

### Herd Unit Issues

The Centennial Pronghorn Herd Unit encompasses hunt areas 37, 44, and 45 which are predominately private land with little public access. The 2015 post-season population estimate was approximately 12,300 with the population trending downward from 18,000 in 2004. The last line transect was conducted in 2013. Harvest strategies are designed to maximize harvest where possible. Most of the harvest is limited to Hunter Management Areas (HMA). This herd is experiencing a steady loss of habitat from an increase in subdivisions being built annually. There is significant interchange with Colorado; most if not all of the pronghorn in hunt area 37 winter in Colorado, while it is thought most of the pronghorn in the Laramie River Valley from Colorado winter in hunt area 44.
Weather
Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Centennial herd unit the reviewer is referred to the following link: http://www.ncdc.noaa.gov/cag/.

Habitat
Forage availability continued to improve in 2015 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. While early season growing conditions were optimal, late summer and fall precipitation were lacking Residential development / subdivisions continue to fragment seasonal ranges in this herd unit. New fences that are often associated with subdivisions can have impacts on migratory movements of pronghorn, and may limit their ability to traverse to key wintering areas.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species.

In summer 2015, population biologists and habitat managers began working together to modify habitat monitoring techniques utilized statewide and to improve overall consistency among the regions. Identification of key herd units per big game species, assessing habitats through landscape scale inventory methods versus monitoring a handful of permanent monitoring sites, assessing habitats in all seasonal ranges (summer, transition, winter), and development of correlations to amounts of and timing of precipitation will help improve the overall value of data collected and result in our abilities to more strongly correlate management decisions for populations based off habitat conditions.

Field Data
A total of 2,459 pronghorn were classified, exceeding the estimated classification objective of 2,207. Classification routes have been standardized so that some inference can be made from year to year classifications; in 2 of the 3 hunt areas we saw an increase in pronghorn. Fawn production in 2015 was 68:100 does, 10 fawns: 100 less than in 2014. Fawn ratios in hunt areas 45 and 37 declined while hunt area 44 we saw an increase. Buck ratios declined from 50 bucks: 100 does in 2014 to 40 bucks: 100 does in 2015; however the decline was mostly in the yearling age class while the adult buck ratio remained similar to previous years.

Harvest Data
Hunter success in 2015 was similar to 2014 at 97%, and hunter effort decreased slightly to 3.9 days to harvest even with the increased season length in 2015. The hunter satisfaction survey showed 93% of hunters were satisfied or very satisfied with their hunt, 6% of respondents
remaining neutral. Overall the current season structure and license issuance is working well and it is reflected in the high hunter success and satisfaction. This herd unit is popular with nonresidents who accounted for 40% of the licenses in 2015, and in past years as high as 60%. Residents interested in this herd has increased, claiming more of their allocation of licenses, but we believe this is an effect of the statewide decrease in license issuance that occurred in 2014, caused more residents to draw their second and third choices.

Population
The Constant Juvenile – Constant Adult Mortality Rate (CJCA) spreadsheet model was chosen to use for the post season population estimate of this herd. This model did not have the lowest relative AIC score but had the most reasonable population estimate, and considering the issue with herd data we wanted to use the simplest model. We truncated the years to 2000 to eliminate low quality data. The model estimates the Centennial pronghorn herd has slowly trended downward since 2004 when the population was estimated at 18,000 and is currently near the population objective. This is a poor model due to ratio data, if available, considered highly biased because of poor sample sizes or an inability to survey the entire area; significant interchange with populations in Colorado; lacks adult and juvenile survival data; results not biologically defensible. We conducted a line transect survey for this herd in the spring of 2014 which estimates 21,009 pronghorn with a standard error of 3,300. The CI is between 15,370 and 28,700 pronghorn. E band estimates are too high and violates the first assumption of the LT survey.

Management Summary
In the past we have not been able to manage this herd through harvest due to high fawn ratios and limited access. Due to extreme weather events and increased hunter access we estimate the population has been reduced by half since 2004 and we are near objective. With the high fawn ratios and mild winter, we expect the herd will start increasing. We will maintain the current number of licenses that were issued in 2014 and 2015 as we believe we have reached a good balance with hunter densities. Extending the season to the end of October in hunt areas 44 and 45 worked well to provide more opportunity by spreading out hunting pressure and was well received by landowners and hunters. If we attain the projected harvest of 1,000 pronghorn and have fawn ratios near 70 to 75, the population will remain near the objective. We predict a 2016 post-season population of approximately 12,000 pronghorn.
2015 - JCR Evaluation Form

SPECIES: Pronghorn
HERD: PR528 - ELK MOUNTAIN
HUNT AREAS: 50
PREPARED BY: WILL SCHULTZ

<table>
<thead>
<tr>
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<th>2016 Proposed</th>
</tr>
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<td>4,189</td>
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<td>781</td>
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<td>90%</td>
<td>80%</td>
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<td>87%</td>
<td>80%</td>
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<td>Days Per Animal:</td>
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<tr>
<td>Males per 100 Females</td>
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<td>Juveniles per 100 Females</td>
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<td>71</td>
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Population Objective (± 20%) : 5000 (4000 - 6000)
Management Strategy: Recreational
Percent population is above (+) or below (-) objective: -16.2%
Number of years population has been + or - objective in recent trend: 5
Model Date: 01/20/2016

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

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<thead>
<tr>
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<td>1%</td>
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<td>Juveniles (&lt; 1 year old)</td>
<td>1%</td>
<td>.2%</td>
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<tr>
<td>Total</td>
<td>-8%</td>
<td>-6%</td>
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</table>

Proposed change in post-season population: 5% 7%
#### for Pronghorn Herd PR528 - ELK MOUNTAIN

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<tr>
<th>Year</th>
<th>Pre Pop</th>
<th>MALES</th>
<th>FEMALES</th>
<th>JUVENILES</th>
<th>Males to 100 Females</th>
<th>Young to 100 Adult</th>
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<tr>
<td></td>
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<td>%</td>
<td>Total %</td>
<td>Total %</td>
<td>%</td>
</tr>
<tr>
<td>2010</td>
<td>6,000</td>
<td>91 305 396</td>
<td>23%</td>
<td>907 53%</td>
<td>396 23%</td>
<td>1,699 1,668</td>
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<tr>
<td>2011</td>
<td>4,800</td>
<td>82 140 222</td>
<td>17%</td>
<td>764 59%</td>
<td>303 24%</td>
<td>1,289 1,221</td>
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<tr>
<td>2012</td>
<td>4,200</td>
<td>73 115 188</td>
<td>17%</td>
<td>545 50%</td>
<td>367 33%</td>
<td>1,100 1,098</td>
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<tr>
<td>2013</td>
<td>3,331</td>
<td>75 95 170</td>
<td>18%</td>
<td>510 55%</td>
<td>239 26%</td>
<td>919 1,000</td>
</tr>
<tr>
<td>2014</td>
<td>3,337</td>
<td>64 111 175</td>
<td>18%</td>
<td>511 53%</td>
<td>280 29%</td>
<td>966 1,021</td>
</tr>
<tr>
<td>2015</td>
<td>4,502</td>
<td>118 108 226</td>
<td>18%</td>
<td>612 48%</td>
<td>437 34%</td>
<td>1,275 1,153</td>
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2016 HUNTING SEASONS
ELK MOUNTAIN PRONGHORN (PR528)

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<tr>
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<th>Type</th>
<th>Season Opens</th>
<th>Dates Closes</th>
<th>Quota</th>
<th>License</th>
<th>Limitations</th>
</tr>
</thead>
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<td>1</td>
<td>Sep. 16</td>
<td>Oct. 31</td>
<td>300</td>
<td>Limited quota</td>
<td>Any antelope</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Sep. 16</td>
<td>Oct. 31</td>
<td>25</td>
<td>Limited quota</td>
<td>Doe or fawn</td>
</tr>
<tr>
<td>0</td>
<td></td>
<td>Sep. 1</td>
<td>Sep. 15</td>
<td>50</td>
<td>Limited quota</td>
<td>Any antelope, muzzle-loading firearms only</td>
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<tr>
<td>Archery</td>
<td></td>
<td>Aug. 15</td>
<td>Aug. 31</td>
<td></td>
<td></td>
<td>Refer to license type and limitations in Section 3 of Chapter 5</td>
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</table>

Management Evaluation
Current Postseason Population Management Objective: 5,000 (4,000 – 6,000)
Management Strategy: Recreational
2015 Postseason Population Estimate: 4,200
2016 Proposed Postseason Population Estimate: 4,500
2015 Hunter Satisfaction: 92% Satisfied, 6% Neutral, 2% Dissatisfied

Pronghorn in the Elk Mountain herd unit are managed toward a numeric objective of 5,000. The population was estimated using a spreadsheet model developed in 2012 and updated in 2016. The herd is managed for recreational opportunity. The objective was reviewed in 2014 and retained at a postseason estimate of 5,000 pronghorn.

Herd Unit Issues
The Elk Mountain herd unit is comprised predominantly of either private or land-locked public land. Hunter access to these lands is limited, particularly east of Elk Mountain, where most pronghorn in this herd unit are found during the hunting season. Private lands open to hunters receive a large amount of pressure. Much of the herd unit’s sagebrush ecosystem remains intact. However, increased agricultural, energy, and residential development does threaten the sagebrush habitat in this area.
Weather
Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were average, to slightly above average at all elevations throughout the herd unit. No significant prolonged periods of extreme heat or cold temperatures were observed or. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. Weather patterns most likely had a positive influence on pronghorn. Mild fall temperatures and lack of persistent snow allowed pronghorn to stay longer in spring, summer, and fall ranges providing additional relief for winter ranges that have historically been over utilized. Snow accumulation began mid December and persisted in lower elevation winter ranges through February. For specific meteorological information for the Elk Mountain herd unit the reviewer is referred to: http://www.ncdc.noaa.gov/cag/

Habitat
Positive trends in habitat conditions were observed in bio-year 2015 due to timely and adequate amounts of precipitation received in this herd unit. The limited number of habitat transects that have been established within this herd unit do not provide sufficient data to make reliable inferences about habitat quantity or quality. The vast majority of shrub habitats in this herd unit are in need of treatments which would result in improved nutritive content and increased production for shrubs.

Field Data
Preseason ratios for this herd were 37 bucks and 71 fawns/100does in 2015. Buck ratios and fawn ratios both increased in recent classification trend. Beginning in 2011, classification surveys have been conducted from the ground and have lower sample sizes than those previously completed from fixed-wing aircraft. The ground surveys also may contain more sampling biases in comparison with surveys conducted prior to 2011 due to limited data from more remote areas of the herd unit.

Harvest Data
The 2015 harvest survey indicated a total of 295 pronghorn were harvested which was an increase of 15% from 2014. Overall harvest success decreased 10% to 90% for 327 licensed hunters in 2015. The days/pronghorn increased from 3.2 in 2014, to 4.4 days/harvest in 2015. The decrease in harvest success and increase in days/harvest was attributed to the relatively hot weather which was experienced in the early portion of the season which appeared to lower hunter participation rates.

Population
Spreadsheet model estimates indicated the Elk Mountain herd is currently below the management objective of 5,000 pronghorn. The CJ, CA model was selected again for the Elk Mountain herd unit in 2015. The model’s population estimates are plausible and match trends in harvest and preseason classifications. The model’s end-of-year estimates
are less than the corresponding year Line-Transect survey density estimates conducted in 2007, 2010, and 2012. A portion of the Elk Mountain herd unit was used a control area for the University of Wyoming’s Dunlap Wind Farm research project. We incorporated adult survival rates from this research into the model for bio-year 2010 and 2011.

We rated this model as fair, and biologically defensible in our evaluation. This rating was based on criteria identified in the user’s guide for the WGFD spreadsheet model (Morrison 2012).

Management Summary
The reduced numbers for the Type 6 license numbers were maintained again for the 2015 season. Liberal seasons in the recent past and severe winters have reduced pronghorn numbers in this herd unit during the past 5 years. The decreased license numbers will assist in increasing the population toward the management objective. The popular muzzleloader only season continued to be offered in 2015.

Literature Cited

Bibliography of Herd Specific Studies
2015 - JCR Evaluation Form

SPECIES: Pronghorn
HERD: PR529 - BIG CREEK
HUNT AREAS: 51
PREPARED BY: WILL SCHULTZ

<table>
<thead>
<tr>
<th></th>
<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
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<tr>
<td>Population:</td>
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<tr>
<td>Harvest:</td>
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<td>Hunters:</td>
<td>55</td>
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</tr>
<tr>
<td>Hunter Success:</td>
<td>100%</td>
<td>100%</td>
<td>100 %</td>
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<tr>
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<tr>
<td>Juveniles per 100 Females</td>
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Population Objective (± 20%) : 800 (640 - 960)
Management Strategy: Recreational
Percent population is above (+) or below (-) objective: -0.5%
Number of years population has been + or - objective in recent trend: 1
Model Date: 01/20/2016

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

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<th></th>
<th>JCR Year</th>
<th>Proposed</th>
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</thead>
<tbody>
<tr>
<td>Females ≥ 1 year old</td>
<td>9%</td>
<td>8%</td>
</tr>
<tr>
<td>Males ≥ 1 year old</td>
<td>25%</td>
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<td>Juveniles (&lt; 1 year old)</td>
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<tr>
<td>Total</td>
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Proposed change in post-season population: -4% 2%
## 2010 - 2015 Preseason Classification Summary

### for Pronghorn Herd PR529 - BIG CREEK

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<th>Year</th>
<th>Pre Pop</th>
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<th>FEMALES</th>
<th>JUVENILES</th>
<th>Males to 100 Females</th>
<th>Young to 100 Females</th>
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</thead>
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<td>Tot</td>
<td>Cls</td>
<td>Obj</td>
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<td>%</td>
<td>Total</td>
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<tr>
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2016 HUNTING SEASONS
BIG CREEK PRONGHORN (PR529)

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<td>6</td>
<td>Sep. 16</td>
<td>Nov. 14</td>
<td>50</td>
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</tr>
<tr>
<td>Archery</td>
<td></td>
<td>Aug. 15</td>
<td>Sep. 15</td>
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<td>Herd Unit Total</td>
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Management Evaluation
Management Strategy: Recreational
2015 Postseason Population Estimate: 800
2016 Proposed Postseason Population Estimate: 810
2015 Hunter Satisfaction: 89% Satisfied, 9% Neutral, 2% Dissatisfied

Pronghorn in the Big Creek herd unit are managed toward a numeric objective of 800. The population was estimated using a spreadsheet model developed in 2012 and updated in 2016. The herd is managed for recreational opportunity. The management objective was reviewed in 2014 and increased to a postseason population estimate of 800 pronghorn.

Herd Unit Issues
Pronghorn damage to alfalfa crops has diminished due to the low number of pronghorn observed in this herd unit. Access is difficult except for on those private lands receiving damage. Recent changes in land use have been observed in this herd unit. Several sections of abandoned wheat fields have been converted into cattle pastures which have been grazed intensively. Development in the Trail Run subdivision is also continuing. In the past these areas provided pronghorn with seasonal habitat and the observed changes in land use appear to be displacing pronghorn into other areas.
Weather
Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were average, to slightly above average at all elevations throughout the herd unit. No significant prolonged periods of extreme heat or cold temperatures were observed or. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. Weather patterns most likely had a positive influence on pronghorn. Mild fall temperatures and lack of persistent snow allowed pronghorn to stay longer in spring, summer, and fall ranges providing additional relief for winter ranges that have historically been over utilized. Snow accumulation began mid December and persisted in lower elevation winter ranges through February. For specific meteorological information for the Big Creek herd unit the reviewer is referred to: http://www.ncdc.noaa.gov/cag/

Habitat
Positive trends in habitat conditions were observed in bio-year 2015 due to timely and adequate amounts of precipitation received in this herd unit. The limited number of habitat transects that have been established within this herd unit do not provide sufficient data to make reliable inferences about habitat quantity or quality. The vast majority of shrub habitats in this herd unit are in need of treatments which would result in improved nutritive content and increased production for shrubs.

Field Data
The 2015 preseason ratios were 60 bucks and 57 fawns per 100 does produced from a less than adequate sample of 538 pronghorn obtained through ground surveys. 2015 fawn ratios had increased from 51 fawns/100 does in 2014, to 57 fawns/100 does in 2015. This increase was attributed to mild spring weather having been more conducive to fawn survival than in previous years.

Harvest Data
The harvest survey data for the 2015 hunting season indicated a total of 78 pronghorn, 41 bucks, 32 does, and 5 fawns were harvested with an overall harvest success rate of 100%. This high success rate was due to many of the successful hunters possessing both Type 1 and Type 6 licenses and is typical for this herd unit.

Population
In 2015, the CJ, CA spreadsheet model was selected again for the Big Creek herd unit because it produced the lowest AICc score. The population estimate from this model was also considered to be plausible and representative of field observations. The end of year density estimates developed from Line-Transect density surveys appeared to overestimate actual pronghorn abundance in this herd unit. Small sample sizes and interstate movements of pronghorn for this herd unit may produce bias in Line-Transect survey estimates for this herd unit.
We rated this model as poor, and not biologically defensible in our evaluation. This rating was based on criteria identified in the user’s guide for the WGFD spreadsheet model (Morrison 2012). The poor rating was primarily due to inadequate sample sizes for preseason classification surveys and the likely violation of an assumption that this is a closed population.

**Management Summary**
A total of 50 Type 1 and 50 Type 6 licenses were maintained in 2016 for the Big Creek herd unit. The postseason population estimate was at the management object for 2015 and predicted to be maintained at that level in 2016 with the prescribed hunting season. Interstate movement of pronghorn complicates monitoring and subsequent management activities in this herd unit.

**Literature Cited**

**Bibliography of Herd Specific Studies**
None.
2015 - JCR Evaluation Form

SPECIES: Bighorn Sheep
HERD: BS516 - DOUGLAS CREEK
PREPARED BY: LEE KNOX

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<td>Juveniles per 100 Females</td>
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Population Objective (± 20%): 350 (280 - 420)
Management Strategy: Special
Percent population is above (+) or below (-) objective: -78.6%
Number of years population has been + or - objective in recent trend: 200
Model Date: 2/22/2016

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

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Proposed change in post-season population: 0%

![Population Size - Postseason](image.png)
## 2010 - 2015 Postseason Classification Summary

for Bighorn Sheep Herd BS516 - DOUGLAS CREEK

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2016 HUNTING SEASONS
DOUGLAS CREEK BIGHORN SHEEP (BS516)

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<th>Quota</th>
<th>License</th>
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<td>Opens</td>
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<tr>
<td>Herd Totals</td>
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Management Evaluation
Current Postseason Population Management Objective: 350
2015 Postseason Population Estimate: ~ 75
2016 Proposed Postseason Population Estimate: ~ 75
Management Strategy: Special
The management objective for the Douglas creek Bighorn Sheep Herd Unit is a post-season population objective of 350 bighorn sheep. The management strategy is special management. The herd objective and management strategy were last revised in 1986 and will be reviewed in 2016.

Herd unit Issues
The Douglas Creek Herd Unit is located primarily in the Savage Run and Platte River wilderness areas in the Snowy Range Mountains on the Medicine Bow National Forest. The herd is under special management guidelines which require a mean age of harvested rams to be between 6-and 8 years old. This direction was taken to provide trophy opportunity to the public and allow this herd to grow. Pine beetles have dramatically changed the landscape in the Medicine Bow National Forest where a large percentage of mature pines have died and starting to fall over. The impacts from the beetle kill are unclear but could improve sheep habitat as the forest becomes more open. Area 18 was closed from 2004 through 2007 and then again in 2009, 2011, 2013, 2015 because this population has remained below desired levels. Hunt Area 18 will be open for 1 resident and 1 nonresident in 2016.
Weather
Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Douglas Creek herd unit the reviewer is referred to the following link: http://www.ncdc.noaa.gov/cag/.

Habitat
Forage availability continued to improve in 2015 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs in low elevations. At upper elevations, May, June, and July precipitation was also above average, and created favorable forage conditions. While early season growing conditions were optimal, late summer and fall precipitation were lacking Conifer encroachment and windthrow of beetle-killed pine trees is suspected to, or likely will have negative impacts on bighorn sheep movements and migrations. Cheatgrass prevalence at lower elevations is also concerning to habitat managers, particularly on south facing aspects in the Platte Valley.
The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species.
In summer 2015, population biologists and habitat managers began working together to modify habitat monitoring techniques utilized statewide and to improve overall consistency among the regions. While this effort is targeted at mule deer initially, it is hoped efforts will expand to other big game species as methodologies are perfected and adopted. Identification of key herd units per big game species, assessing habitats through landscape scale inventory methods versus monitoring a handful of permanent monitoring sites, assessing habitats in all seasonal ranges (summer, transition, winter), and development of correlations to amounts of and timing of precipitation will help improve the overall value of data collected and result in our abilities to more strongly correlate management decisions for populations based off habitat conditions.

Field Data
We have very little data on this population. The general public provides a few reports during the summer and hunting seasons. Our field personnel make some effort to document the status of segments of the herd during other big game surveys and an annual winter ground survey. Past observation data consistently documents low post-weaning lamb survival. Poor habitat conditions, lack of habitat, and the lack of well-defined seasonal migrations, and perhaps lingering effects of Pasteurellosis or some other disease may be stagnating this population. We classified 21 sheep in February, with a lamb to ewe ratio of 80:100, which is up from previous years. Fifteen sheep were also observed by highway 230 at the state line.
Harvest Data
Hunting season was closed in 2015

Population
Data is not adequate for developing a reasonable population model. We are unable to collect the data needed to reliably estimate the population size of this sheep herd.

Management Strategy
We open the season for 2 rams every other year to maintain the opportunity to harvest a 6 year or older age class ram, which is specified by the special management guidelines. The season will be open in 2016 for one nonresident and one resident.
2015 - JCR Evaluation Form

SPECIES: Bighorn Sheep


HERD: BS517 - LARAMIE PEAK

HUNT AREAS: 19

PREPARED BY: MARTIN HICKS

<table>
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<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
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<td>Juveniles per 100 Females</td>
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Population Objective (± 20%): 0 (0 - 0)

Management Strategy: Special

Percent population is above (+) or below (-) objective: N/A%

Number of years population has been + or - objective in recent trend: 0

Model Date: None

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

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<td>Total:</td>
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Proposed change in post-season population: na%
## 2010 - 2015 Postseason Classification Summary

for Bighorn Sheep Herd BS517 - LARAMIE PEAK

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<td>22%</td>
<td>117 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>117</td>
<td>100</td>
<td>24</td>
<td>± 0</td>
<td>38 ± 0 29</td>
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<td>2014</td>
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<td>8</td>
<td>25</td>
<td>33</td>
<td>41%</td>
<td>81 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>31</td>
<td>38%</td>
<td>17</td>
<td>21%</td>
<td>81 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>81</td>
<td>100</td>
<td>81</td>
<td>± 0</td>
<td>55 ± 0 27</td>
</tr>
<tr>
<td>2015</td>
<td>0</td>
<td>2</td>
<td>21</td>
<td>23</td>
<td>28%</td>
<td>82 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>42</td>
<td>51%</td>
<td>17</td>
<td>21%</td>
<td>82 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>82</td>
<td>100</td>
<td>55</td>
<td>± 0</td>
<td>40 ± 0 26</td>
</tr>
</tbody>
</table>
Management Evaluation

Current Management Objective:
1) 5-year running average of >75% hunter success: 94%
2) 5-year running average age of harvested rams between 6 and 8 years of age: 2011-2015 Average Age: 6 years old
3) Documented occurrence of adult rams in the population: ~45 observed rams

Management Strategy: Recreational

Herd Unit Issues
The management objective for the Laramie Peak Bighorn Sheep herd was a post-season population objective of 500 wild sheep. The management strategy is recreational management. The objective and strategy were last revised in 1978. The population objective was reviewed during the winter/spring of 2014. Based on department staff, landowner, and public comments the following population management alternative objectives were approved by the WGFD Commission:
1) 5-year running average of ≥ 75% hunter success
2) 5-year running average age of harvested rams between 6 and 8 years of age
3) Documented occurrence of adult rams in the population

The Laramie Peak Herd Unit is comprised of 70% private land. The southern portion (south of WY Hwy 34) is over 90% private land. Hunters can expect to pay a trespass/trophy or outfitter fee to hunt on private land. There are two state sections that hunters can access that hold sheep throughout the season and have produced adult rams in past hunting seasons. A portion of occupied sheep habitat was within the 2012 Arapahoe fire that burned over 98,000 acres. This affected sheep distribution post-fire, but above average summer/fall precipitation in 2013 and spring precipitation in 2014 resulted in increased vegetation production for pre-winter diets and early spring green up that will benefit parturition areas for pregnant ewes. The fire will have
long-term benefits for wild sheep, but initially there has been a flush of noxious weeds (e.g. cheatgrass, Canada thistle) that land managers will need to address. A majority of wild sheep are harvested within the northern portion of the herd unit. The Laramie Peak Wildlife Habitat Management Unit is essential for sheep habitat and harvest where 200 plus sheep inhabit. In 2007 forty-two sheep were released in this area from the Perma-Paradise Herd in Montana. These sheep have thrived and improved the overall genetics and health of the existing herd.

During the winter of 2015/16 the WGFD tried to gather biological samples for disease surveillance, with a target goal of 15 bighorn sheep across Wyoming through the use of drop nets, free-darting, and aerial captures. The goal of this effort is to obtain information on each herd and its overall health. Some animals will be fitted with GPS radio-collars to increase our understanding of movements and habitat use. The goal for the Laramie Peak Herd Unit was to collect samples from 15 wild sheep between Sybille Canyon and Iron Mountain. The drop net was not set up on Iron Mountain due to high winds and lack of sheep in the area. Grants through the Governor’s Big Game License Coalition and the Wyoming Wild Sheep Foundation will be submitted for aerial capture efforts during the 2016/17 winter to obtain the necessary sample size of 15.

**Weather**

Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Laramie Peak herd unit the reviewer is referred to the following link: [http://www.ncdc.noaa.gov/cag/](http://www.ncdc.noaa.gov/cag/).

**Habitat**

Forage availability continued to improve in 2015 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. While early season growing conditions were optimal, late summer and fall precipitation were lacking.

Cheatgrass prevalence at lower elevations such as Sybille Canyon and areas burned by the Arapaho Fire of 2012 is concerning to habitat managers. While wildfires have reduced conifer canopies in the Laramie Range, deemed to be largely conducive to bighorn sheep movements and migrations, the prevalence of cheatgrass is cause for concern. In Summer 2015, Colorado State University natural resource program scientists worked cooperatively with WGFD and USFS personnel to map cheatgrass infestations via satellite imagery and on-the-ground vegetation sampling efforts. This data showing cheatgrass prevalence will be available for habitat managers to utilize in 2016. Future herbicide applications to control cheatgrass will likely be largely based off of this data. With recent completion of an Environmental Assessment
by the USFS, options have expanded greatly to control cheatgrass, including aerial application of herbicides.

A significant die-off of big sagebrush and antelope bitterbrush did occur in portions of the Laramie Range due to a rapid freeze event that occurred in November 2014. The die-off was widespread, from the Front Range of Colorado to the Eastern Plains of Montana. The severity of the die-off is unknown at this time, and whether or not the shrubs will recover. Affected shrubs did not show any significant signs of re-sprouting in Summer 2015.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species. In Summer 2015, population biologists and habitat managers began working together to modify habitat monitoring techniques utilized statewide and to improve overall consistency among the regions. While this effort is targeted at mule deer initially, it is hoped efforts will expand to other big game species as methodologies are perfected and adopted. Identification of key herd units per big game species, assessing habitats through landscape scale inventory methods versus monitoring a handful of permanent monitoring sites, assessing habitats in all seasonal ranges (summer, transition, winter), and development of correlations to amounts of and timing of precipitation will help improve the overall value of data collected and result in our abilities to more strongly correlate management decisions for populations based off habitat conditions.

Field Data
In 2015 there were eight out of the nine bighorn sheep harvested in with an average of 6 years old for a 88% success rate. The five-year age average is also 6 years old and the five-year running success average is 94%, which met the two alternative objective criteria.

Since 1964 there have been a total of 228 wild sheep released from two herd sources: Whiskey Mountain in Wyoming and Perma-Paradise in Montana (Table 1). These transplants have helped to supplement the herd and improve overall herd health.

Table 1. Transplant release data for the Laramie Peak Bighorn Sheep Herd.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
<th>Release Location</th>
<th>Source Herd</th>
</tr>
</thead>
<tbody>
<tr>
<td>1964</td>
<td>40</td>
<td>North Laramie River Canyon</td>
<td>Whiskey Mountain Herd</td>
</tr>
<tr>
<td>1965</td>
<td>36</td>
<td>Labonte Canyon</td>
<td>Whiskey Mountain Herd</td>
</tr>
<tr>
<td>1966</td>
<td>21</td>
<td>Labonte Canyon</td>
<td>Whiskey Mountain Herd</td>
</tr>
<tr>
<td>1973</td>
<td>42</td>
<td>Duck Creek Canyon</td>
<td>Whiskey Mountain Herd</td>
</tr>
<tr>
<td>1982</td>
<td>27</td>
<td>Marshall</td>
<td>Whiskey Mountain Herd</td>
</tr>
<tr>
<td>1989</td>
<td>20</td>
<td>Marshall</td>
<td>Whiskey Mountain Herd</td>
</tr>
<tr>
<td>2007</td>
<td>42</td>
<td>Hay Canyon</td>
<td>Perma-Paradise- MT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>228</td>
</tr>
</tbody>
</table>

Lamb recruitment continues to improve compared to ratios prior to the 2007 release. There were a total of 82 wild sheep classified in 2015 with lamb ratios (40 lambs:100 ewes) slightly below the 5-year average of 50 lambs:100 ewes. Adult ram ratios were 50 rams:100, which was
slightly above the 4-year average of 49 rams:100 ewes (2014 was thrown out due to poor
classification data). Yearling ram ratios were similar to the 5-year average. Based on surveys
there is a well represented number for each age class. Several 8+ old rams were observed in the
Duck Creek sub-herd. Hunters reported seeing 75-100 bighorn sheep within the Duck Creek
sub-herd and 30-45 of those were rams.

**Harvest Data**
Success has reached 100% three out of the past five years. This last year active license hunters
harvested 8 out of 9 rams, with a success rate of 88%. There was one carry over license from
2014. Hunters who pre-scout and/or hire an outfitter typically harvest their ram within 3-5 days.
This year the average hunter effort was 12.8 days, which is slightly higher than the five-year
average of 11.9 days per harvest. Hunters that chose not to use an outfitter spend more time
scouting and hunting. There is limited public land within occupied wild sheep habitat.
Overcrowding is an issue that results in pushing bighorn sheep onto private land, where there is
no access. To maintain high harvest success no more than 8 licenses are issued. In the past
when the quota was increased to 12, success decreased drastically. There were issues this year
with nine hunters going to the field. The majority chose to hunt the Duck Creek sub-herd, and
based on conversations with those hunters there were some crowding issues. However, the
majority of hunters communicated with each other to try and avoid any conflicts. The one hunter
that did not harvest a ram was a nonresident that was looking for a 180” plus ram. He had
several opportunities to harvest a mature ram but opted to try and pursuit a ram that would meet
those criteria.

Two rams stood out in the 2015 harvest data. The first was a ram from the 2007 transplant from
Montana that was released as a yearling (now 9 years old) and the second was a 10 year old ram
that scored 186 points using the Boone and Crocket (B&C) scoring system. Typically the older
rams harvested in this herd unit score around 175 B&C points. News about this ram went viral
on social media and most likely license demand for 2016 will go up.

The Laramie Peak bighorn sheep season has been September 1-October 31 for the past 25 years.
Prior to that, the season ran from September 1- October 14. The increased season length appears
to provide adequate opportunity to harvest a ram, given this is typically a once in a lifetime
license.

In 2012 there were several fires that burned within bighorn sheep occupied habitat. The
Arapahoe, Cow Camp, and Russell’s Camp fires burned over 112,000 acres, with the Arapahoe
fire being the largest (98,000 acres). Throughout the area there is observed recovery in
vegetation. Photo points have been established throughout the fire to document plant succession.
Perennial forbs and grasses along with aspen have re-established post-fire.

There is not a reliable working model for this herd unit due to limited population data collected
on an annual basis.

For the 2016 season, 8 licenses will be offered for any ram. Given previous harvest statistics
hunters should have a high probability of harvesting a mature ram. To improve harvest success
hunters will need to put more time into scouting and hunting if they are accessing public lands.
2015 - JCR Evaluation Form

SPECIES: Bighorn Sheep
HERD: BS519 - ENCAMPMENT RIVER
HUNT AREAS: 21
PREPARED BY: WILL SCHULTZ

<table>
<thead>
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<th>2010 - 2014 Average</th>
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<th>2016 Proposed</th>
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<tr>
<td>Hunter Success:</td>
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<td>0%</td>
<td>100%</td>
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<tr>
<td>Days Per Animal:</td>
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<td>Males per 100 Females</td>
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<tr>
<td>Juveniles per 100 Females</td>
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<td>45</td>
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Population Objective (± 20%): 200 (160 - 240)
Management Strategy: Special
Percent population is above (+) or below (-) objective: N/A%
Number of years population has been + or - objective in recent trend: 20
Model Date: None

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

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<thead>
<tr>
<th></th>
<th>JCR Year</th>
<th>Proposed</th>
</tr>
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<tbody>
<tr>
<td>Females ≥ 1 year old:</td>
<td>NA%</td>
<td>NA%</td>
</tr>
<tr>
<td>Males ≥ 1 year old:</td>
<td>NA%</td>
<td>NA%</td>
</tr>
<tr>
<td>Juveniles (&lt; 1 year old):</td>
<td>NA%</td>
<td>NA%</td>
</tr>
<tr>
<td>Total:</td>
<td>NA%</td>
<td>NA%</td>
</tr>
</tbody>
</table>

Proposed change in post-season population: NA%

Population Size - Postseason

![Graph showing population size over years](image-url)
## 2010 - 2015 Postseason Classification Summary

for Bighorn Sheep Herd BS519 - ENCAMPMENT RIVER

<table>
<thead>
<tr>
<th>Year</th>
<th>Post Pop</th>
<th>MALES</th>
<th>FEMALES</th>
<th>JUVENILES</th>
<th>Males to 100 Females</th>
<th>Young to Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Cls</td>
<td>Cls Obj</td>
<td>Ylng Adult Total Conf</td>
<td>100 Fem Conf</td>
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<td>15</td>
<td>21</td>
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<td>33 33 ± 0 7 ± 0 5</td>
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<td>12</td>
<td>25</td>
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<td>83 83 ± 0 25 ± 0 14</td>
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<tr>
<td>2012</td>
<td>0</td>
<td>10</td>
<td>18</td>
<td>0</td>
<td>70 70 ± 0 10 ± 0 6</td>
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<tr>
<td>2013</td>
<td>0</td>
<td>10</td>
<td>18</td>
<td>0</td>
<td>30 30 ± 0 50 ± 0 38</td>
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<tr>
<td>2014</td>
<td>0</td>
<td>17</td>
<td>28</td>
<td>0</td>
<td>18 24 ± 0 41 ± 0 33</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>0</td>
<td>11</td>
<td>26</td>
<td>0</td>
<td>73 91 ± 0 45 ± 0 24</td>
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2016 HUNTING SEASONS
Encampment River Bighorn Sheep (BS519)

<table>
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<th>Hunt Area</th>
<th>Type</th>
<th>Opens</th>
<th>Closes</th>
<th>Quota</th>
<th>License</th>
<th>Limitations</th>
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<tr>
<td>18, 21</td>
<td>1</td>
<td>Sep. 1</td>
<td>Oct. 31</td>
<td>2</td>
<td>Limited quota</td>
<td>Any ram (1 resident, 1 nonresident)</td>
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<tr>
<td>Archery</td>
<td></td>
<td>Aug. 15</td>
<td>Aug. 31</td>
<td></td>
<td></td>
<td>Refer to license type and limitations in Section 4 of Chapter 9</td>
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</table>

<table>
<thead>
<tr>
<th>Hunt Area</th>
<th>License Type</th>
<th>Quota change from 2015</th>
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<td>18, 21</td>
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<td>+2</td>
</tr>
<tr>
<td>Herd Unit Total</td>
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<td>+2</td>
</tr>
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</table>

**Management Evaluation**

**Current Postseason Population Management Objective:** 200 (160-240)

**Management Strategy:** Special

**2015 Postseason Population Estimate:** NA

**2016 Proposed Postseason Population Estimate:** NA

Bighorn sheep in the Encampment River herd unit are managed toward a postseason population objective of 200. A population model has not been constructed for the herd unit. The herd is managed under the bighorn sheep special management strategy. The objective was last reviewed in 1987. We plan to review the management objective in 2016.

**Herd Unit Issues**

Bighorn sheep numbers in this herd unit appeared to peak in the late 1970s, not long after reintroduction efforts. Bighorn sheep numbers have been in decline since the early 1980s. The lack of a rebound in numbers has been attributed to decadent habitat. Domestic sheep in grazing on the west slope of the Sierra Madres also poses a disease concern for managers. The population is now at such a low number it is assumed natural recovery is not possible. Limited harvest opportunities have been offered in past years, in combination with the Douglas Creek bighorn sheep herd unit.
In 2013, the State of Wyoming, and thus the Wyoming Game and Fish Department, intervened on behalf of the U.S. Forest Service, in the U.S. District Court case, BIODIVERSITY CONSERVATION ALLIANCE vs. BUTCH BLAZER, et al. This case continues to await a ruling, and may affect future management of bighorn sheep in this herd unit.

**Weather**
Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were average, to slightly above average at all elevations throughout the herd unit. No significant prolonged periods of extreme heat or cold temperatures were observed or. The timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. Weather patterns most likely had a positive influence on bighorn sheep. Mild fall temperatures and lack of persistent snow allowed bighorn sheep to stay longer in spring, summer, and fall ranges providing additional relief for winter ranges that have historically been over utilized. Snow accumulation began mid December and persisted in lower elevation winter ranges through February. For specific meteorological information for the Encampment River herd unit the reviewer is referred to: [http://www.ncdc.noaa.gov/cag/](http://www.ncdc.noaa.gov/cag/)

**Habitat**
Positive trends in habitat conditions were observed in bio-year 2015 due to timely and adequate amounts of precipitation received in this herd unit. The limited number of habitat transects that have been established within this herd unit do not provide sufficient data to make reliable inferences about habitat quantity or quality. The vast majority of shrub habitats in this herd unit are in need of treatments which would result in improved nutritive content and increased production for shrubs.

**Field Data**
Adequate classification data for this herd has been difficult to collect. 2015 postseason classification observations were obtained while conducting a mule deer sightability survey from a helicopter in February of 2016. The classification results were 8 adult rams, 2 yearling ram, 11 ewes, and 5 lambs. Past postseason classification efforts generally have located a greater number of ewes and lambs than what was observed in 2015. We received several reports of a group of 25+ ewes and lambs in the Miner Creek area during the summer of 2015 but we were unable to locate this number of ewes and lambs for classification in December.
**Population**
A population model has not been constructed for this herd unit due to limited classification and no annual survival information. Based on the trend of classification data and casual observations, a reasonable estimate of 30-50 bighorn sheep should be considered for this herd unit. A review of the management objective, currently at 200 bighorn sheep postseason, will be evaluated in 2016.

**Harvest Data**
In 2015 the hunting season was closed in this herd unit.

**Management Summary**
The hunting season will be reopened in 2016. We will offer two Type 1 licenses, 1 resident and 1 nonresident, valid for any ram. This hunting opportunity will be valid in both Hunt Area 18 (Douglas Creek herd unit) and Hunt Area 21.

**Bibliography of Herd Specific Studies**


2015 - JCR Evaluation Form

SPECIES: Elk
HERD: EL531 - IRON MOUNTAIN
HUNT AREAS: 6

<table>
<thead>
<tr>
<th></th>
<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population:</td>
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<td>4,200</td>
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<td>Harvest:</td>
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<td>726</td>
<td>730</td>
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<tr>
<td>Hunters:</td>
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<td>1,638</td>
<td>1,600</td>
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<tr>
<td>Hunter Success:</td>
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<td>Active Licenses:</td>
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<td>1,600</td>
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<tr>
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<td>43%</td>
<td>46%</td>
</tr>
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<td>Days Per Animal:</td>
<td>12.6</td>
<td>11.9</td>
<td>11.6</td>
</tr>
<tr>
<td>Males per 100 Females</td>
<td>23</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>Juveniles per 100 Females</td>
<td>49</td>
<td>58</td>
<td></td>
</tr>
</tbody>
</table>

Population Objective (± 20%): 1800 (1440 - 2160)
Management Strategy: Recreational
Percent population is above (+) or below (-) objective: 155%
Number of years population has been + or - objective in recent trend: 20
Model Date: 02/18/2016

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

<table>
<thead>
<tr>
<th>JCR Year</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females ≥ 1 year old:</td>
<td>20%</td>
</tr>
<tr>
<td>Males ≥ 1 year old:</td>
<td>30%</td>
</tr>
<tr>
<td>Juveniles (&lt; 1 year old):</td>
<td>4.5%</td>
</tr>
<tr>
<td>Total:</td>
<td>25%</td>
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</tbody>
</table>

Proposed change in post-season population: -15%
### 2010 - 2015 Postseason Classification Summary for Elk Herd EL531 - IRON MOUNTAIN

<table>
<thead>
<tr>
<th>Year</th>
<th>Post Pop</th>
<th>MALES</th>
<th>FEMALES</th>
<th>JUVENILES</th>
<th>Males to 100 Females</th>
<th>Young to 100 Females</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Tot</td>
<td>Cls</td>
<td>Obj</td>
<td>Conf Int 100 Fem</td>
<td>Conf Int 100 Adult</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ylng</td>
<td>Adult</td>
<td>Total %</td>
<td>100 Ylng</td>
<td>100 Adult</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>2010</td>
<td>4,932</td>
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<td>26</td>
<td>79 8%</td>
<td>961 617</td>
<td>9 4 13 ± 2</td>
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<tr>
<td></td>
<td>5,059</td>
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<td>16</td>
<td>36 9%</td>
<td>92 617</td>
<td>9 7 15 ± 3</td>
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<tr>
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<td>98 26%</td>
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<td>9 7 15 ± 3</td>
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<tr>
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<td>86</td>
<td>161 16%</td>
<td>991 707</td>
<td>9 7 15 ± 3</td>
</tr>
<tr>
<td>2012</td>
<td>4,597</td>
<td>152</td>
<td>142</td>
<td>294 23%</td>
<td>1,265 0</td>
<td>25 23 48 ± 4</td>
</tr>
<tr>
<td>2013</td>
<td>3,125</td>
<td>44</td>
<td>67</td>
<td>111 13%</td>
<td>846 671</td>
<td>9 13 22 ± 3</td>
</tr>
<tr>
<td>2014</td>
<td>4,597</td>
<td>152</td>
<td>142</td>
<td>294 23%</td>
<td>1,265 0</td>
<td>25 23 48 ± 4</td>
</tr>
<tr>
<td>2015</td>
<td>4,932</td>
<td>53</td>
<td>26</td>
<td>79 8%</td>
<td>961 617</td>
<td>9 4 13 ± 2</td>
</tr>
</tbody>
</table>
### 2016 HUNTING SEASONS
IRON MOUNTAIN ELK (EL531)

<table>
<thead>
<tr>
<th>Hunt Area</th>
<th>Type</th>
<th>Season Dates</th>
<th>Quota</th>
<th>License</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Oct. 1</td>
<td>Oct. 31</td>
<td>General</td>
<td>Any elk valid off national forest</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Nov. 1</td>
<td>Nov. 30</td>
<td>General</td>
<td>Antlerless elk valid off national forest</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Oct.15</td>
<td>Oct. 31</td>
<td>75</td>
<td>Limited quota</td>
<td>Any elk</td>
</tr>
<tr>
<td>1</td>
<td>Nov.1</td>
<td>Jan. 31</td>
<td>Limited quota</td>
<td>Unused Area 6 Type 1 licenses valid for antlerless elk</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Nov. 1</td>
<td>Jan. 31</td>
<td>100</td>
<td>Limited Quota</td>
<td>Antlerless elk</td>
</tr>
<tr>
<td>6</td>
<td>Aug. 15</td>
<td>Jan. 31</td>
<td>1100</td>
<td>Limited Quota</td>
<td>Cow or calf valid off national forest</td>
</tr>
</tbody>
</table>

### Special Archery Season

<table>
<thead>
<tr>
<th>Hunt Areas</th>
<th>Season Dates</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>General</td>
<td>Sep. 1 Sep. 30</td>
</tr>
<tr>
<td>1,4</td>
<td>Sep. 1 Sep. 30</td>
<td>Valid in the entire area</td>
</tr>
<tr>
<td>6</td>
<td>Sep. 1 Sep. 30</td>
<td>Valid off National Forest</td>
</tr>
</tbody>
</table>

### MANAGEMENT EVALUATION
Current Postseason Population Management Objective: 1,800 (1,440-2,160)
Management Strategy: Recreational
2015 Postseason population Estimate: ~ 4,600
2016 Proposed Postseason Population Estimate: 4,200
2015 Hunter Satisfaction: 65% Satisfied, 18% Neutral, 17% Dissatisfied

The management objective for the Iron Mountain Elk herd unit is a post-season population objective of 1,800 elk. The management strategy is recreational management which requires maintaining a post hunt bull ratio of 15 to 29:100 cows. The objective and management strategy were last revised in 2013.

### Herd Unit Issues
The Iron Mountain Elk herd unit includes hunt area 6 (combined hunt areas 5 and 6 for 2014 season) which is composed of mostly private lands except for the Pole Mountain National Forest.
segment which is managed under a limited quota license to maintain hunt quality. Urban sprawl and nontraditional landowners are increasing in the herd unit, as well as growing stone quarries in parts of Rogers canyon as well as between I-80 and Wyoming Highway 287. This herd unit continues to be a concern with landowners due to large wintering herds of elk sometimes exceeding 800 elk. At the same time most all of the landowners in the herd unit outfit bull elk hunts to some degree on their property, and bull quality and quantity are a concern. The 2015 post-season population estimate was 4,600 with the population trending downward from a high of 6,200 in 2011.

Weather
Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Iron Mountain herd unit the reviewer is referred to the following link: http://www.ncdc.noaa.gov/cag/.

Habitat
Forage availability continued to improve in 2015 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. While early season growing conditions were optimal, late summer and fall precipitation were lacking. A significant die-off of sagebrush and antelope bitterbrush did occur in portions of the Laramie Range due to a rapid freeze event that occurred in November 2014. The die-off was widespread, from the Front Range of Colorado to the Eastern Plains of Montana. The severity of the die-off is unknown at this time, and whether or not the shrubs will recover. Affected shrubs did not show any significant signs of re-sprouting in summer 2015.

One prescribed burn was completed on the Iron Mountain Ranch in late March 2015, impacting 2,500 acres of mixed mountain shrub habitats. Initial herbaceous and woody plant response following treatment was excellent, as expected with the above average precipitation that fell in spring 2015. Previous prescribed burns completed within the Iron Mountain herd unit continue to outperform untreated habitats, particularly in shrub annual leader production. Cheatgrass continues to be a major threat to native rangelands and big game ranges, particularly at all elevations below 6,500’. Its presence ties the hands of habitat managers limiting habitat enhancement options, and may result in reduced carrying capacities of rangelands if it is the predominant specie.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species.
In summer 2015, population biologists and habitat managers began working together to modify habitat monitoring techniques utilized statewide and to improve overall consistency among the regions. Identification of key herd units per big game species, assessing habitats through landscape scale inventory methods versus monitoring a handful of permanent monitoring sites, assessing habitats in all seasonal ranges (summer, transition, winter), and development of correlations to amounts of and timing of precipitation will help improve the overall value of data collected and result in our abilities to more strongly correlate management decisions for populations based off habitat conditions.

**Field Data**  
A total of 1,300 elk were classified, exceeding the estimated classification objective of 700. Classification flights occurred after extreme cold and heavy snows which caused elk to be heavily concentrated in the northeast corner of the herd unit. Bull ratios are high at 48:100 cows with half being yearlings. Considering the conditions during the flight we believe few bull or cow groups were missed and the total bull ratio well represents what is actually on the ground. This herd has been very productive and continues to be so with 58 calves: 100 cows. After changing the license issuance from limited quota to general, hunter numbers have been on a steady decline from a high of 2,480 hunters in 2012 to 1,600 in 2015. We may now be seeing hunter numbers stabilizing with 2015 seeing similar numbers to 2014 at 1,600 hunters.

**Harvest Data**  
Elk harvest appears to be stabilizing after changing to a general season strategy in 2012. Elk harvest in 2015 is similar to the past two years at 700 elk. More landowners are taking advantage of the liberal cow elk season structure and harvest levels in the herd are being maintained at an appropriate level to decrease the population towards objective. General license hunters were most successful in September and October. Only 8% of the elk harvested on a general tag were harvested after November (Figure 1.).

![Figure 1. The Percent of harvest by general licenses per month in the Iron Mountain Herd Unit.](image)

Both the type 1 and type 4 licenses remain very popular with the public. For the type 1 license drawing odds are less than 10% for residents and nonresidents need 5 or more preference points.
Hunter success has been declining on the type 1 license from 65% in 2012 to 45% in 2015. The type 4 licenses have always been a more difficult hunt but success declined from 35% in 2014 to 13% in 2015. Harvest was poor with only 11 elk harvested on the type 4 licenses in 2015.

Population
This is the third year that we have collected adequate classification data for the model to not crash. The constant juvenile and adult survival model had an AIC score of 468 and a best FIT of 478. It did not have the lowest AIC score but considering the lack of data the more complicated models are not appropriate for this herd unit. This model predicts the population declining from a high of 6,800 in 2011 to the current population estimate of 4,600 in 2015. This model has a tendency to jump around each time an additional year of data is added and although the population trend may be accurate, the population estimate is most likely not. This Model is ranked Poor for a variety of reasons including: little data available; ratio data, if available, considered highly biased because of poor sample sizes or an inability to survey the entire area; herd unit closure issues apparent; results not biologically defensible.

Management Summary
The 2015 season structure went well and maintained the 2014 harvest of 700 elk. We will remain status quo for license issuance in the 2016 season. If we harvest a minimum of 650 elk, we will continue to reduce the population towards the objective. There are concerns from Department personnel and landowners of increased poaching and trespassing cases due to hunt area 6 being one of the last general seasons to close. After October, hunt area 6 attracts hunters from around the state that still have a general license to fill, and frankly we do not have any access or landowners to send them to. As shown in figure 1, very few elk are harvested on a general license after November. We hired a Hunt Management Coordinator (HMC) for Iron Mountain in 2015. Through no fault of his own, the HMC was only able to get a very limited amount of private access for hunters, and harvest was minimal. Considering the ample number of type 6 licenses that provide opportunity through January 31st, we will end the general license on November 30th.
<table>
<thead>
<tr>
<th></th>
<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population:</td>
<td>8,462</td>
<td>7,402</td>
<td>6,800</td>
</tr>
<tr>
<td>Harvest:</td>
<td>1,892</td>
<td>1,888</td>
<td>1,890</td>
</tr>
<tr>
<td>Hunters:</td>
<td>5,800</td>
<td>6,056</td>
<td>5,900</td>
</tr>
<tr>
<td>Hunter Success:</td>
<td>33%</td>
<td>31%</td>
<td>32%</td>
</tr>
<tr>
<td>Active Licenses:</td>
<td>6,017</td>
<td>6,328</td>
<td>6,200</td>
</tr>
<tr>
<td>Active License Success:</td>
<td>31%</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>Recreation Days:</td>
<td>45,387</td>
<td>47,914</td>
<td>46,000</td>
</tr>
<tr>
<td>Days Per Animal:</td>
<td>24.0</td>
<td>25.4</td>
<td>24.3</td>
</tr>
<tr>
<td>Males per 100 Females</td>
<td>23</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Juveniles per 100 Females</td>
<td>45</td>
<td>46</td>
<td></td>
</tr>
</tbody>
</table>

Population Objective (± 20%): 6000 (4800 - 7200)

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: 23%

Number of years population has been + or - objective in recent trend: 23

Model Date: 02/20/2016

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

<table>
<thead>
<tr>
<th></th>
<th>JCR Year</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females ≥ 1 year old</td>
<td>17%</td>
<td>17%</td>
</tr>
<tr>
<td>Males ≥ 1 year old</td>
<td>51%</td>
<td>64%</td>
</tr>
<tr>
<td>Juveniles (&lt; 1 year old)</td>
<td>5%</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>21%</td>
<td>23%</td>
</tr>
</tbody>
</table>

Proposed change in post-season population: -6% -9%
<table>
<thead>
<tr>
<th>Year</th>
<th>Post Pop</th>
<th>MALES</th>
<th>FEMALES</th>
<th>JUVENILES</th>
<th>Males to 100 Females</th>
<th>Young to</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Ylg</td>
<td>Adult</td>
<td>Total</td>
<td>% Total</td>
<td>% Total</td>
</tr>
<tr>
<td>2010</td>
<td>10,000</td>
<td>318</td>
<td>200</td>
<td>518</td>
<td>12%</td>
<td>2,633 60%</td>
</tr>
<tr>
<td>2011</td>
<td>9,300</td>
<td>145</td>
<td>109</td>
<td>254</td>
<td>12%</td>
<td>1,306 61%</td>
</tr>
<tr>
<td>2012</td>
<td>8,331</td>
<td>252</td>
<td>218</td>
<td>470</td>
<td>13%</td>
<td>2,181 60%</td>
</tr>
<tr>
<td>2013</td>
<td>6,686</td>
<td>292</td>
<td>456</td>
<td>748</td>
<td>17%</td>
<td>2,539 59%</td>
</tr>
<tr>
<td>2014</td>
<td>7,993</td>
<td>259</td>
<td>148</td>
<td>407</td>
<td>14%</td>
<td>1,609 57%</td>
</tr>
<tr>
<td>2015</td>
<td>7,402</td>
<td>206</td>
<td>190</td>
<td>396</td>
<td>13%</td>
<td>1,885 60%</td>
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</table>
# 2016 Hunting Seasons
## Snowy Range Elk (EL533)

<table>
<thead>
<tr>
<th>Hunt Area</th>
<th>Type</th>
<th>Dates of Seasons Opens</th>
<th>Quota</th>
<th>License</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>1</td>
<td>Oct. 1</td>
<td>150</td>
<td>Limited quota</td>
<td>Any elk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oct. 31</td>
<td></td>
<td></td>
<td>Valid for any elk west of Sand Creek Road (Albany County Road 34) and antlerless elk east of Sand Creek Road (Albany County Road 34)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nov. 1</td>
<td>150</td>
<td>Limited quota</td>
<td>Cow or calf</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jan. 31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Aug. 15</td>
<td>100</td>
<td>Limited quota</td>
<td>Cow or calf</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jan. 31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>6</td>
<td>Oct. 15</td>
<td>150</td>
<td>Limited quota</td>
<td>Cow or calf valid on private land</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oct. 31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>General</td>
<td>400</td>
<td>Limited quota</td>
<td>Cow or calf valid on private land</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Aug. 15</td>
<td></td>
<td></td>
<td>Cow or calf valid off national forest</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sep. 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oct. 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dec. 31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jan. 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jan. 31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>6</td>
<td>Oct. 15</td>
<td>150</td>
<td>Limited quota</td>
<td>Cow or calf valid on private land</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oct. 31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>General</td>
<td>400</td>
<td>Limited quota</td>
<td>Cow or calf valid on private land</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oct. 1</td>
<td></td>
<td></td>
<td>Cow or calf valid off national forest</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sep. 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oct. 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nov. 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dec. 1</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Jan. 1</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Jan. 31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>Oct. 1</td>
<td>150</td>
<td>Limited quota</td>
<td>Any elk</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Oct. 1</td>
<td>150</td>
<td>Limited quota</td>
<td>Antlerless elk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oct. 31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Aug. 15</td>
<td>150</td>
<td>Limited quota</td>
<td>Cow or calf valid off national forest and off the Wyoming Game and Fish Commission’s Wick Wildlife Habitat Management Area</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jan. 31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sep. 1</td>
<td>50</td>
<td>Limited quota</td>
<td>Any elk, archery only</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sep. 30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>6</td>
<td>Oct. 15</td>
<td>150</td>
<td>Limited quota</td>
<td>Cow or calf</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oct. 31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>General</td>
<td>150</td>
<td>Limited quota</td>
<td>Cow or calf valid west of Wyoming Highway 130</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Oct. 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nov. 14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nov. 15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Aug. 15</td>
<td>75</td>
<td>Limited quota</td>
<td>Cow or calf valid on private land</td>
</tr>
<tr>
<td>12, 13, 15, 110</td>
<td>7</td>
<td>Aug. 15</td>
<td>75</td>
<td>Limited quota</td>
<td>Cow or calf valid on private land</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jan. 31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>110</td>
<td>6</td>
<td>Oct. 1</td>
<td></td>
<td></td>
<td>Cow or calf</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nov. 14</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oct. 31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hunt Area</td>
<td>Type</td>
<td>Dates of Seasons</td>
<td>Quota</td>
<td>License</td>
<td>Limitations</td>
</tr>
<tr>
<td>-----------</td>
<td>------</td>
<td>------------------</td>
<td>-------</td>
<td>---------</td>
<td>-------------</td>
</tr>
<tr>
<td>114</td>
<td>1</td>
<td>Oct. 1 Jan. 31</td>
<td>50</td>
<td>Limited quota</td>
<td>Any elk</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Aug. 15 Jan. 31</td>
<td>75</td>
<td>Limited quota</td>
<td>Cow or calf</td>
</tr>
<tr>
<td>125</td>
<td>1</td>
<td>Oct. 1 Dec. 31 Jan. 1 Jan. 31</td>
<td>200</td>
<td>Limited quota</td>
<td>Any elk Valid for antlerless elk</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Oct. 1 Jan. 31</td>
<td>200</td>
<td>Limited quota</td>
<td>Cow or calf Archery Refer to Section 3 of Chapter. 7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hunt Area</th>
<th>License Type</th>
<th>Quota change from 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herd Unit Total</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Management Evaluation
Current Management Objective: 6,000 (4,800 – 7,200)
Management Strategy: Recreational
2015 Postseason Population Estimate: 7,400
2016 Proposed Postseason Population Estimate: 6,800
2015 Hunter Satisfaction: 62% Satisfied, 20% Neutral, 18% Dissatisfied

Elk in The Snowy Range herd unit are managed toward a numeric objective of 6,000. The population was estimated using a spreadsheet models developed in 2012 and updated in 2014. The herd is managed for recreation opportunity. The objective was last reviewed in 2013.

Herd Unit Issues
The Snowy Range herd unit covers a large portion of south central Wyoming. Issues here include development in the form of energy, agricultural, residential, invasive and noxious plants, forestry and range management, and travel management in important elk habitat.

Weather
Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed; or were extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking.
Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Snowy Range herd unit the reviewer is referred to the following link: http://www.ncdc.noaa.gov/cag/.

Habitat
Habitat conditions continued to improve in 2015 with increased amounts of timely precipitation being received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Cheatgrass continued to be a threat to native rangelands; particularly on south facing aspects and in areas of high fire severity associated with the 11,000 acre Squirrel Creek Wildfire of 2012. During habitat assessments conducted during the summer 2015, aspen regeneration in areas burned by wildfire was excellent, and showed little sign of browsing by wildlife or livestock. This may be due to the fact that the areas which recently burned have a high road density and are heavily utilized by motorized recreationists; resulting in displacement of elk from these preferred habitats. The limited number of habitat transects established throughout the Laramie Region have not provided sufficient data to make reliable inferences about habitat quantity or quality.

Field Data
In 2015, we classified elk from a helicopter in conjunction with local mule deer classifications. A postseason classification sample of 3,157 elk produced ratios of 21 bulls and 46 calves per 100 cows in this herd unit. Figure 1 illustrates the trend in bull and calf ratios during the past 10 years for the Snowy Range herd unit. High calf ratios continued to provide for an excellent recruitment rate in this herd unit.

Figure 1. Bull and calf ratios per 100 cows in the Snowy Range elk herd unit, 2006-2015, Wyoming.
Harvest Data
The 2015 harvest survey data indicated 6,055 active licensed hunters harvested 1,883 elk, which was an 8% decrease from 2014. The total harvest success rate of 31% was a 3% decrease from 2014. Branch antlered bulls accounted for 95% of the male harvest in 2015 and 49% of the overall harvest. The spikes excluded seasons in General season Hunt Areas 9, 10, 12 and 110 did result in lower spike harvest rates in those hunts when compared to previous year’s harvest rates. The proportion of spikes in the male harvest for the entire herd unit declined from 11% in 2014 to 5% in 2015. Antlerless elk accounted for 51% of the total 2015 elk harvest. Harvest rates, days per harvest, and harvest success rates under the current liberal hunting season structure continued to be considered acceptable. The addition of 50 Type 9 archery licenses in Hunt Area 11 in 2015 did not appear to significantly increase archery harvest rate in this area. In 2014, 11% of the overall elk harvest was attributed to archery; while in 2015, 15% of the overall elk harvest was attributed to archery.

Population
In 2015, we continued to use the CJ,CA spreadsheet model to simulate Snowy Range herd unit population dynamics. The other 2015 models in the spreadsheet model suite had either ceased to function due to predicting bull harvest exceeding the number estimated to be available; or were not biologically realistic (i.e. 50,000 elk in 1993). Without other information such as an independent abundance estimate or historical survival data to incorporate into the model, accuracy of estimates will continue to be unknown. We rated this model as poor, and biologically defensible in our evaluation. This rating was based on criteria identified in the user’s guide for the WGFD spreadsheet model (Morrison 2012).

The 2015 postseason population estimate for the Snowy Range herd unit was 7,400 elk. The change in model types in 2014, and the relatively high 2014 calf ratio, increased the postseason population estimates by approximately 2,000 elk over what we were predicting prior to 2014. A decreasing trend in the annual estimate continued with CJ,CA model and was considered to be consistent with the observations by field managers. We considered the 2015 postseason population estimate produced by the CJ,CA spreadsheet model to be plausible.

Management Summary
The hunting seasons in the Snowy Range Herd Unit continued to provide opportunities to reduce the overall elk population. Elk numbers appear to be declining towards the management objective and we may need to consider reducing antlerless harvest rates in the not so distant future. The spikes excluded limitations were removed from all General season limitations for the 2016 hunting season.
Literature Cited
Wyoming Cooperative Fish and Wildlife Research Unit, University of Wyoming,
Laramie. USA. 41 pp.

Bibliography of Herd Specific Studies
2001. Wyoming Cooperative Fish and Wildlife Research Unit, University of
2015 - JCR Evaluation Form

SPECIES: Elk
HERD: EL534 - SHIRLEY MOUNTAIN
HUNT AREAS: 16
PREPARED BY: WILL SCHULTZ

<table>
<thead>
<tr>
<th></th>
<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
</tr>
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<tr>
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<td>Harvest:</td>
<td>358</td>
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<td>360</td>
</tr>
<tr>
<td>Hunters:</td>
<td>594</td>
<td>620</td>
<td>625</td>
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<tr>
<td>Hunter Success:</td>
<td>60%</td>
<td>56%</td>
<td>58%</td>
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<td>Active Licenses:</td>
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<td>Active License Success</td>
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<td>Recreation Days:</td>
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<td>Days Per Animal:</td>
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<tr>
<td>Males per 100 Females:</td>
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<tr>
<td>Juveniles per 100 Females:</td>
<td>42</td>
<td>40</td>
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</table>

Trend Based Objective (± 20%): 800 (640 - 960)
Management Strategy: Special
Percent population is above (+) or (-) objective: 120%
Number of years population has been + or - objective in recent trend: 1

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

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<tr>
<th>JCR Year</th>
<th>Proposed</th>
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<tbody>
<tr>
<td>Females ≥ 1 year old:</td>
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<tr>
<td>Males ≥ 1 year old:</td>
<td>NA%</td>
</tr>
<tr>
<td>Juveniles (&lt; 1 year old):</td>
<td>NA%</td>
</tr>
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</table>

EL534 Trend Count

Three Year Trend Count Average
### 2010 - 2015 Postseason Classification Summary

**for Elk Herd EL534 - SHIRLEY MOUNTAIN**

<table>
<thead>
<tr>
<th>Year</th>
<th>Post Pop</th>
<th>Males</th>
<th>Females</th>
<th>Juveniles</th>
<th>Males to 100 Females</th>
<th>Young to Total</th>
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<td></td>
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<td>MALES</td>
<td>FEMALES</td>
<td>JUVENILES</td>
<td>Tot Cls</td>
<td>Cls Obj</td>
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<td>2010</td>
<td>1,400</td>
<td>49</td>
<td>42</td>
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<td>449</td>
<td>151</td>
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<td>2011</td>
<td>1,200</td>
<td>0</td>
<td>0</td>
<td>0%</td>
<td>0</td>
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<tr>
<td>2012</td>
<td>880</td>
<td>8</td>
<td>32</td>
<td>23%</td>
<td>81</td>
<td>53</td>
</tr>
<tr>
<td>2013</td>
<td>1,462</td>
<td>52</td>
<td>90</td>
<td>21%</td>
<td>365</td>
<td>165</td>
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<tr>
<td>2014</td>
<td>767</td>
<td>14</td>
<td>47</td>
<td>13%</td>
<td>294</td>
<td>127</td>
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<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0%</td>
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### 2016 HUNTING SEASONS
**SHIRLEY MOUNTAIN ELK (EL534)**

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<th>Hunt Area</th>
<th>Type</th>
<th>Season Dates</th>
<th>Quota</th>
<th>License</th>
<th>Limitations</th>
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<td>16</td>
<td>1</td>
<td>Oct. 1 - Oct. 31</td>
<td>150</td>
<td>Limited quota</td>
<td>Any elk</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Dec. 1 - Jan. 31</td>
<td></td>
<td></td>
<td>Antlerless elk</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>Nov. 1 - Nov. 30</td>
<td>50</td>
<td>Limited quota</td>
<td>Any elk</td>
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<tr>
<td></td>
<td>2</td>
<td>Dec. 1 - Jan. 31</td>
<td></td>
<td></td>
<td>Antlerless elk</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Oct. 1 - Jan. 31</td>
<td>300</td>
<td>Limited quota</td>
<td>Antlerless elk</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Aug. 15 - Sep. 30</td>
<td>200</td>
<td>Limited quota</td>
<td>Cow or calf valid on private land</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Oct. 1 - Jan. 31</td>
<td></td>
<td></td>
<td>Cow or calf</td>
</tr>
<tr>
<td>Archery</td>
<td>Archery</td>
<td>Sep. 1 - Sep. 30</td>
<td></td>
<td></td>
<td>Refer to license type and limitations in Section 3 of Chapter 7</td>
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<table>
<thead>
<tr>
<th>Hunt Area</th>
<th>License Type</th>
<th>Quota change from 2015</th>
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<tbody>
<tr>
<td>Herd Unit Total</td>
<td>None</td>
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</tr>
</tbody>
</table>

**Management Evaluation**

**Current Mid-Winter Trend Count Management Objective:** 800 (640-960)

**Management Strategy:** Special

**2015 Trend Count:** 1,759

**Most Recent 3-year Running Average Trend Count:** Not available until 2017

**2015 Hunter Satisfaction:** 76% Satisfied, 11% Neutral, 13% Dissatisfied

Elk in the Shirley Mountain herd unit are managed toward a numeric objective of 800. The management strategy was changed in 2015 from recreational management to special management. The management objective was reviewed in 2015 and changed from a postseason population objective of 800 elk to a mid-winter trend count of 800 elk.

**Herd Unit Issues**

Wind energy developments are a relatively new land use in this herd unit. There are currently 2 wind farms in this herd unit and there is interest in developing more wind farms. Our ability to manage elk numbers through harvest is difficult because a large portion of the elk habitat in this herd unit is owned by one landowner who provides a very limited amount of access. Elk damage in this herd unit is minimal. Interchange of elk with adjacent herd units may compromise the closed population assumption for this herd unit. Annual population monitoring efforts and results have been highly variable.
Weather
Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were average, to slightly above average at all elevations throughout the herd unit. No significant prolonged periods of extreme heat or cold temperatures were observed or. The timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. Weather patterns most likely had a positive influence on elk. Mild fall temperatures and lack of persistent snow allowed elk to stay longer in spring, summer, and fall ranges providing additional relief for winter ranges that have historically been over utilized. Snow accumulation began mid December and persisted in lower elevation winter ranges through February. For specific meteorological information for the Shirley Mountain herd unit the reviewer is referred to: http://www.ncdc.noaa.gov/cag/

Habitat
Positive trends in habitat conditions were observed in bio-year 2015 due to timely and adequate amounts of precipitation received in this herd unit. The limited number of habitat transects that have been established within this herd unit do not provide sufficient data to make reliable inferences about habitat quantity or quality. The vast majority of shrub habitats in this herd unit are in need of treatments which would result in improved nutritive content and increased production for shrubs.

Field Data
Postseason sex and age classifications were conducted in conjunction with a mid-winter trend survey in March of 2016. The results were a total of 45 bull and 40 calves per 100 cows, from a sample of 1,759 elk. Figure 1 illustrates how the 2015 postseason ratios compared to previous classification results during the past 10-years. In previous years, the collection of classification data varied annually in methodology, primarily due to no dedicated survey flight budget for this herd. With the change in management objective type from a postseason population objective, to a mid-winter trend count objective, a dedicated budget for helicopter surveys has been established. This should result in more consistent sampling for sex and age data collection.
Figure 1. Shirley Mountain elk herd unit bull and calf ratio trend, 2006-2015, Wyoming.

Harvest Data
Preliminary elk harvest survey data indicated 620 active licensed hunters harvested 348 elk in 2015, with an overall success rate of 56%. 2015 had the fifth greatest number of elk harvested and the second greatest number of active licensed hunters ever recorded. The 2015 harvest success decreased 2% from 2014 harvest. 2014 bull harvest (n=133) was a 1% decrease from 2014. Antlerless harvest (n=217) decreased 13% in 2015.

Population
In 2015, we reviewed the management objective and converted from a population management objective of 800 elk postseason, to a mid-winter trend count objective of 800 elk postseason (Appendix I). The spreadsheet model which was previously used to develop the annual population estimate for elk in this herd unit did not function adequately enough to provide managers with a reliable estimate. This was the primary reason for changing from a population based management objective to a mid-winter trend count objective. Maintaining sustainable numbers of elk in the Shirley Mountain herd unit, while also maintaining bulls ratios within the special management parameters, is the ultimate management objective. Improving our monitoring techniques is keystone to insuring we are meeting these management objectives. Replacing the spreadsheet model derived population estimate with the mid-winter trend count as our management benchmark will provide for a more accurate assessment of annual elk numbers in the is herd unit.
A mid-winter trend count survey was completed in March of 2016 (Figure 2). A total of 1,759 elk were observed in the herd unit. This is was a significant increase in the survey sample size when compared to previous helicopter surveys, covering relatively the same area in the herd unit. In 2010 we observed 691 elk and in 2013 we observed 672 elk during helicopter classification surveys. Two (2) large groups of elk (n=255 and n=535) were observed in the northeast portion of the herd unit. These 2 groups were suspected to have migrated into the Shirley Mountain herd unit from the adjacent Laramie Peak herd unit.

Figure 2. 2015 Mid-winter trend count and helicopter coverage and observations in the Shirley Mountain elk herd unit, Wyoming.
Management Summary
The 2016 hunting season recommendations were prescribed with the continued objectives of maintaining bull ratios within the special management parameters and maintaining approximately 800 elk postseason. The December and January seasons for the Beer Mug Mountain Hunter Management Area were discontinued at the request of the landowners. We retained the same number of licenses for the 2016 hunting season as were allocated in the previous 2 hunting seasons. Allowing Type 1 and Type 2 hunters to hunt for antlerless elk in December and January will assist in maintaining a sustainable population level.

Literature Cited
None

Bibliography of Herd Specific Studies
None
The Shirley Mountain elk herd unit consists of elk Hunt Area 16, and generally lies north of U.S. Highway 30, west of Wyoming Highway 487 and the Little Medicine Bow River, and south and east of the North Platte River, in south-central Wyoming (Figure 1). The herd unit contains the Shirley, Chalk, Bennett (Seminoe), Freezeout, and Pedro Mountains. Elevation ranges from approximately 1,798 meters to over 2,438 meters above sea level. Habitats include montane forests (primarily lodgepole pine), aspen, mountain shrub, sagebrush-grasslands, grasslands, riparian, agricultural lands, and reclaimed coal mines. Topographic relief can be dramatic and can offer quality hiding or escape terrain for elk.

Figure 1. Map of the Shirley Mountain elk herd unit, Hunt Area 16, located in south-central Wyoming.
The Shirley Mountain Herd Unit encompasses 4,548 km$^2$ of occupied elk habitat. Land ownership consists of 55% mixed federal lands, primarily Bureau of Land Management, 35% private ownership, and 10% Wyoming Office of State Land and Investments land. The southern half of the herd unit is mostly a checkerboard of private, state, and BLM lands as a result of land grants to railroads in the 19th century. The northern half contains more single owner blocks of land with large areas of accessible public land. In recent years, one ranch has acquired a substantial amount of private land in and around the Shirley Mountains, and it controls access to a substantial amount of private and public elk habitat.

**CURRENT POPULATION OBJECTIVE REVIEW**

Wyoming Game and Fish Department (WGFD) traditionally has used postseason population objectives as a guide for elk management at the herd unit level. The postseason population objective is the desired number of elk remaining in the herd unit after the annual hunting season has been completed. Generally, if the population estimate is above the population objective, WGFD will propose changes to the herd unit’s next hunting seasons which will increase harvest and reduce the number of elk toward the population objective. Conversely, if the population estimate is below the population objective, WGFD will propose changes to the herd unit’s next hunting seasons which will decrease harvest and increase the number of elk toward the population objective.

In 1978, WGFD adopted the first postseason population objective of 800 (±20%) elk for the Shirley Mountain herd unit. Subsequently, the objective was reviewed in 1997 and retained at 800 (±20%) elk. The Shirley Mountain herd unit population objective of 800 (±20%) elk has not been reviewed since 1997.

Computer based population models have been used by WGFD to simulate elk population dynamics since the mid 1980s. These models use annual harvest and postseason age/sex classification survey data in conjunction with standardized parameters for population indices such as reproduction, survival, etc. to simulate the dynamics for the population. Annual population estimates from the model are then compared to the population objective to determine the appropriate management direction and harvest prescription. Shirley Mountain herd unit hunter-harvest survey sample sizes have been adequate (80% confidence interval) for use in the population model. However, postseason elk sex and age classification survey sample sizes have been less than adequate and may be a source of bias in the herd unit’s population estimates. This has been an issue when the surveys were completed from the ground. Elk can be difficult to locate and accurately survey postseason from the ground in this herd unit due to inaccessibility caused by winter weather and topography. Helicopters have been employed sporadically in recent years to conduct the postseason classification surveys unit due to flight budget prioritization but these surveys produced adequate sample sizes. Annual population estimates for the Shirley Mountain herd unit are currently produced using a computer-based, spreadsheet population model adopted by WGFD in 2012 (Morrison 2012). This spreadsheet model currently used WGFD may not accurately simulate elk population dynamics, particularly with relatively smaller populations (Andrew Holland, Colorado Division of Parks & Wildlife, personal communication).
The 2014 postseason population estimate from the spreadsheet model was 703 elk (Figure 2). The 2014 estimate was considered to be biologically plausible, despite the limitations of the current spreadsheet model described earlier in this section. However, the historic population levels calculated by the model, along with the current precipitously decreasing trajectory do not appear to be a reasonable representation of the elk population dynamics for this herd unit.

Figure 2. 1993-2014 Shirley Mountain herd unit postseason elk population estimates, Wyoming.

Another factor which has made modeling this elk population difficult has been interchange of elk with adjacent herd units. Although the exact rate of interchange is unknown, interchange has been documented anecdotally by radio-collared elk. By WGFD definition, a big game herd unit assumes the interchange rate to be less than 10% of the estimated population. Although the rate of actual interchange for the Shirley Mountain herd unit is unknown, it is speculated it may violate the 10% threshold.

CURRENT MANAGEMENT STRATEGY

Shirley Mountain herd unit is entirely contained in elk Hunt Area 16 and is managed under the recreational management strategy. This strategy directs managers to optimize recreational opportunity, while managing harvest rates to maintain 15-29 bulls/100 cows postseason in the herd unit. However, since 2006, bull ratios in this herd unit have exceeded the parameters for recreational management (Figure 3). This is due to a lack of consistent public hunting access in areas inhabited by bulls during the hunting season. Currently, elk hunting in this herd unit is
permitted by a limited quota elk license. In recent years, WGFD has recommended liberal seasons for this herd unit with extended season lengths and additional cow or calf licenses in an attempt to maintain or decrease the numbers of elk in this herd unit.

Figure 3. 1990-2013 Shirley Mountain elk herd unit postseason bulls/100 cows ratio, Wyoming.

**RECOMMENDED HERD UNIT OBJECTIVE AND MANAGEMENT STRATEGY**

WGFD recommends the postseason population objective of 800 (±20%) elk, derived from the spreadsheet model be converted to a mid-winter trend count objective of 800 (±20%) elk. This type of management objective would provide a quantifiable population goal yet eliminate issues associated with developing annual spreadsheet model estimates for this herd unit. This management objective is considered both biologically achievable, and sustainable.

WGFD also recommend converting from a recreational management strategy to the special management strategy in the Shirley Mountain elk herd unit. Adopting the special management strategy will align our ability to effectively manage bull ratios through harvest with hunter access to bull elk in this herd unit. WGFD believes the mid-winter trend count and a special management strategy to be realistic objectives to manage elk in this herd unit towards.

**LANDOWNER AND PUBLIC INVOLVEMENT**

WGFD made a concerted effort to provide stakeholders with an opportunity to be involved in the review of the Shirley Mountain elk herd unit population objective, and to provide comment on
the recommendations. Elk are a species of great concern for many of the stakeholders who participated in the review process.

**Landowner Involvement**

In February of 2015, a letter describing the objective review process and a survey were sent to all landowners (n=67) who owned at least 160 acres in the Shirley Mountain herd unit (ATTACHMENT A). WGFD received 25 survey responses from landowners for a return rate of 37%. Of the 21 landowners who responded to Question 1 about how satisfied they were with current elk numbers, 62% indicated they were somewhat satisfied or very satisfied with the current elk population, and 38% were somewhat dissatisfied or very dissatisfied with the current elk population (ATTACHMENT B). Most landowners who were dissatisfied were so because they thought there were too many elk in the herd unit. When asked what landowners thought about the current objective of 800 (±20%) elk in Question 3, 10% of the 21 landowners who responded indicated the objective needed to be increased, 14% thought it should be decreased, and 76% percent thought the current objective was acceptable. The herd unit objective was also reviewed at the Leo area landowner meeting. Comments from this meeting were similar to the landowner survey responses received by WGFD.

**Public Involvement**

In January of 2015, population objective review meetings were held in conjunction with post-season public information gathering meetings (PIGM) in Cheyenne, Hanna, and Laramie. We received only one (1) written comment on the Shirley Mountain elk objective review (ATTACHMENT C).

In March of 2015, population objective recommendations were presented in conjunction with season-setting public information gathering meetings in Casper, Cheyenne, Laramie, Saratoga, and Wheatland. These meetings were attended by a total of 75 people. We received 7 written comments on the Shirley Mountain elk objective recommendation (ATTACHMENT D). All 7 (100%) written comments supported the recommendation.

In summary, most landowners and sportsmen would like to see about the same or less elk than what is currently in the herd unit. All of the written comments WGFD received at the March PIGMs were in support of the recommendation to convert the management objective from a post-season management objective of 800 (±20%) elk to a mid-winter trend count objective of 800 (±20%) elk. These written comments also supported the recommendation to change from a recreational management strategy (15-29 bulls/100 cows postseason) to a special management strategy (30-40 bulls/100 cows postseason) in the Shirley Mountain elk herd unit.

**LITERATURE CITED**

20 February 2015

Dear Landowner,

The Wyoming Game and Fish Department (Department) is seeking your assistance in the future management of big game wildlife in your area. During the spring of 2015, the Department will review the herd unit management objectives for several big game herd units including the Shirley Mountain mule deer and Shirley Mountain elk herd units. Enclosed in this letter you will find a short survey for the herd unit your property is located within and postage-paid return envelope. Please complete the survey questions, provide additional comments if you desire, and mail the survey in the enclosed return envelope.

The herd unit management objective is the “goal” which the Department manages big game wildlife towards. For most big game herd units in Wyoming, the Department manages big game wildlife towards a numeric management objective, usually identified as a postseason population estimate.

Many of Wyoming’s big game wildlife rely on habitat located on private lands. Therefore, landowner opinions on herd unit management objectives are important to Department. The comments we receive from your completed surveys will be used in part to formulate Department recommendations for the future herd unit management objectives. Changes in the herd unit management objective could result in increasing harvest opportunities to decrease the number of big game animals, or conversely, changes could result in reducing harvest opportunities in order to increase the number of big game animals. For planning purposes, the Department would like to identify management objectives which are considered biologically achievable within the next five years.

Thank you for taking the time to share your thoughts and opinions with us. If you have any questions please contact Will Schultz at 307-326-3020. We look forward to receiving your survey and working with you on the future management of Wyoming’s Wildlife.

Sincerely,

Will Schultz
Saratoga Wildlife Biologist

WS/ws
Shirley Mountain Elk Herd Unit Objective Survey

1. How satisfied are you with the current Shirley Mountain elk population:
   - Very Satisfied
   - Somewhat Satisfied
   - Somewhat Dissatisfied
   - Very Dissatisfied

2. Please indicate why you selected the response you did for question 1.
   - There are too many elk in the population
   - There is the right amount of elk in the population
   - There are too few elk in the population
   - Other ________________________________

3. What do you think about the current post-season population objective of 800 (640-960) elk?
   - Current population objective needs to increase
   - Current population objective needs to decrease
   - Current population objective is acceptable

4. If you have additional comments, please share them in the space below:

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

If, in the future, you would like to be contacted through email please provide your email address below. ______________________________________

Please Mail To: WGFD, 528 South Adams, Laramie, WY 82070 By March 15th.
Elk Hunt Area 16 contains the entire Shirley Mountain Elk Herd Unit.
Shirley Mountain Elk
Landowner Survey
67 surveyed / 25 responses

Summary

1. How satisfied are you with the current Shirley Mountain elk population?

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<tr>
<th>Satisfied Level</th>
<th>Count</th>
<th>Percentage</th>
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</thead>
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<tr>
<td>Somewhat satisfied</td>
<td>8</td>
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</tr>
<tr>
<td>Very dissatisfied</td>
<td>3</td>
<td>14%</td>
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</table>

2. Please indicate why you selected the response you did for Question 1.:

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<tr>
<th>Reason</th>
<th>Count</th>
<th>Percentage</th>
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</thead>
<tbody>
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<td>7</td>
<td>28%</td>
</tr>
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<td>There is the right amount of elk in the population</td>
<td>9</td>
<td>38%</td>
</tr>
<tr>
<td>There are too few elk in the population</td>
<td>4</td>
<td>17%</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>17%</td>
</tr>
</tbody>
</table>
3. **What do you think about the current post-season population objective of 800 (640-960) elk?**

![Pie Chart]

Current population objective needs increased 2 10%
Current population objective needs decreased 3 14%
Current population objective is acceptable 16 76%

**Additional comments**

Hi Will- As I said no data from me. Red Desert elk come up to our Windy Hill I80-Reiner exit 196. Frank 530-219-4477

On the one section of pasture I own I haven't seen an elk on the place. I have seen a few antelope.

The herd needs to decrease to more traditional numbers, pre 1995 or so. The Game and Fish hands are tied because a large part of the area is not available for a proper harvest increasing animal use days on access available land during non-hunting dates. I was told a few years back we did not have a food source for wolves so we should not be concerned about them. With the elk population increasing and access being denied for hunting I think we are creating a food source the Game and Fish can not manage and most hunters and landowners don't want.

Elk in outfitting areas have become scarce. They end up concentrated on private land in or near the Shirley Mtns.

I think you are doing a great job. Thank you. -Ken Hunt

We seldom see many elk.

Despite popular belief the elk population woes are not entirely the fault of the Q Creek Ranch. The hunters are generally pathetic, as they have little idea of what it takes to stalk and kill an elk. The G&F needs to open up more types of tags. Perhaps they could work with the Q to open a late cow season on THE ENTIRE area.
Garrett Ranch is on the northern boundary of area 16. So the elk really don't get on us to much. What there is we can live with. Our main concern is all the antelope that come out of area 47 and 48 to winter down here. We winter between 1,500 and 4,000 head. They don't migrate any farther down. That is a rise in number in area 322, to damn many to winter.

We have state and federal leases with small amount of private land on the very eastern boundary by county road 2 and Little Med River. This pasture is used summer grazing only. Have never encountered elk on property. There is possibility of some winter use, but not witnessed. I feel unqualified to answer questions.

The elk herds have a good population in the area. But access to private land seems like it is getting harder in the area especially when the bow hunters have the elk run off to the private land prior to rifle season. Maybe if there was a week of non-hunting in between this might help some of the public land hunting.

Shut season off end of November-October-November only

I don't know enough about this herd to comment- Marvin Cronberg

Your Casper crew has done a nice job in responding to landowner concerns here on the Platte River. Without knowing what your population objective was 10 years ago, it is somewhat difficult to answer question 3. I can only use population numbers on our ranch to answer question 2.

I have property in the Pedro mountains. There was a small herd that stayed in the area at one time. Now they usually move through to join the larger herds. Better vegetation last year. have seen more activity over the winter. Larry Rubis- 307-259-2204
Shirley Mountain Elk Herd Unit Objective Review

1. How satisfied are you with the current Shirley Mountain elk population:
   □ Very Satisfied  ☒ Somewhat Satisfied  □ Somewhat Dissatisfied  □ Very Dissatisfied

2. Please indicate why you selected the response you did for question 1.
   ☒ There are too many animals in the population
   □ There is the right amount of animals in the population
   □ There are too few animals in the population
   □ Other

3. What do you think about the current post-season population objective of 800 (640-960) elk?
   □ Current Herd Objective Needs to Increase
   □ Current Herd Objective Needs to Decrease
   ☒ Current Herd Objective is Acceptable

4. If you have additional comments, please share them in the space below:
   [Handwritten comment]

If, in the future, you would like to be contacted through email please provide your email address below.

Please Mail To: WGFD, 528 South Adams, Laramie, WY 82070

THANK YOU for your participation!
Herd Unit Management Objective Proposal Meeting Saratoga
Town Hall – 6:00 PM, 23 March 2014

Shirley Mountain Mule Deer
Current population estimate = 4,909(±20%) mule deer
Management Strategy: Recreational
Propose to decrease the management objective from 10,000 to 7,500 (±20%) mule deer and maintain recreational management for the next 5-years.

☐ I support this proposal
☐ I do not support this proposal

Shirley Mountain Elk
Current population estimate = 800 elk
Management Strategy: Recreational
Propose to change the management objective from a postseason population estimate of 800 to a mid-winter trend count objective of 800 (±20%) elk, and to change from a Recreational management strategy (15-29 bulls:100 cows) to a Special management strategy (30-34 bulls:100 cows) for the next 5-years.

☐ I support this proposal
☐ I do not support this proposal

Comments:

If, in the future, you would like to be contacted through email please provide your email address below.

THANK YOU for your participation!
Herd Unit Management Objective Proposal Meeting Saratoga
Town Hall – 6:00 PM, 23 March 2014
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bulls:100 cows) for the next 5-years.

☐ I support this proposal
☐ I do not support this proposal

Comments:

If, in the future, you would like to be contacted through email please provide your email address
below.

THANK YOU for your participation!

[Signature]

"Conserving Wildlife - Saving People"
Herd Unit Management Objective Proposal Meeting Saratoga
Town Hall – 6:00 PM, 23 March 2014

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☐ I support this proposal
☐ I do not support this proposal

Comments:

[Handwritten text: I definitely support quality, maturity and this strategy]

If, in the future, you would like to be contacted through email please provide your email address below.

THANK YOU for your participation!
Herd Unit Management Objective Proposal Meeting Saratoga
Town Hall – 6:00 PM, 23 March 2014
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[ ] I support this proposal
[ ] I do not support this proposal

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[ ] I support this proposal
[ ] I do not support this proposal

Comments:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Herd Unit Management Objective Proposal Meeting Saratoga
Town Hall – 6:00 PM, 23 March 2014

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- [ ] I support this proposal
- [ ] I do not support this proposal

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- [ ] I support this proposal
- [ ] I do not support this proposal

Comments:

________________________________________
________________________________________
________________________________________
________________________________________
Herd Unit Management Objective Proposal Meeting Saratoga
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☐ I support this proposal
☐ I do not support this proposal

Comments:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
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I support this proposal
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I support this proposal
I do not support this proposal

Comments:
Elk - Maintain the quality

Our - Buck 10 was much better for deer year ago when it was a
Limited Quota area

31/3/15

"Conserving Wildlife - Serving People"
### 2015 - JCR Evaluation Form

**SPECIES:** Elk  
**PERIOD:** 6/1/2015 - 5/31/2016  
**HERD:** EL730 - RAWHIDE  
**HUNT AREAS:** 3  
**PREPARED BY:** MARTIN HICKS

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<th>2016 Proposed</th>
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<td>Percent population is above (+) or (-) objective:</td>
<td>-13%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of years population has been + or - objective in recent trend:</td>
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**EL730 Satisfaction Survey Percentages**

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<th>Hunter Percent</th>
<th>Landowner Percent</th>
<th>Objective - %</th>
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</tr>
<tr>
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<td>2013</td>
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<td>58</td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td>30</td>
<td>62</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>28</td>
<td>59</td>
<td>35</td>
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![EL730 Satisfaction Survey Percentages](chart.png)
RAWHIDE ELK HERD (730)
2016 HUNTING SEASONS

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<th>Quota</th>
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<td>3</td>
<td>Gen</td>
<td>Sept. 15</td>
<td>Oct. 14</td>
<td>General</td>
<td>Any elk</td>
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<td></td>
<td></td>
<td>Oct. 15</td>
<td>Jan. 31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>Aug. 15</td>
<td>Nov. 30</td>
<td>200</td>
<td>Cow or calf</td>
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<td>Jan. 31</td>
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<th>Special Archery Season Hunt Areas</th>
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<th>Limitations</th>
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<td>Sept. 1</td>
<td>Sept. 14</td>
<td>Refer to Section 2 of this Chapter</td>
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</table>

<table>
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<tr>
<th>Hunt Area</th>
<th>Type</th>
<th>Quota change from 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

**Management Evaluation**

**Current Hunter/Landowner Satisfaction Management Objective:** 60% landowner/hunter satisfaction: bull quality; Target goal: ≥ 61% branch antlered bulls in harvest survey

**Management Strategy:** Special

**2015 Hunter Satisfaction:** 60% Satisfied, 23% Neutral, 17% Dissatisfied

**2015 Landowner Satisfaction Estimate:** 35%

**Most Recent 3-year Running Average Hunter Satisfaction Estimate:** 59%

**Most Recent 3-year Running Average Landowner Satisfaction Estimate:** 31%

**2015 Bull Quality:** 82% branch antlered bulls in harvest survey

**Most Recent 3-year Running Average Bull Quality:** 92% branch antlered bulls in harvest survey

**Management Issues**

The management objective for this herd was changed in 2012 from a post-season population objective of 40 elk to a nonnumeric population objective based on landowner and hunter satisfaction and the percentage of branch antlered bulls in the harvest. The management strategy was changed from recreational to special. We will follow trends over time to make management decisions based on constituent satisfaction and bull harvest parameters. There is not a working model for this herd unit due to our inability to collect adequate population data.
This herd unit has been difficult to manage based on our inability to collect adequate herd composition data along with field harvest data. Based on field personnel and landowner observations we estimate there are over 400 elk in the Rawhide Elk Herd, with the population expanding south of the North Platte River into Goshen, Platte and Laramie Counties. There have been several public meetings to address the increasing population, and as a result the herd boundary was expanded south to the Colorado border for the 2012 season. Additionally the portion of Area 3 north of U.S. Highway 26 was changed to a general season for the 2014 season (the southern portion was changed to a general in 2011).

**Weather**

Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Rawhide herd unit the reviewer is referred to the following link: [http://www.ncdc.noaa.gov/cag/](http://www.ncdc.noaa.gov/cag/).

**Habitat**

Forage availability continued to improve in 2015 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. While early season growing conditions were optimal, late summer and fall precipitation were lacking.

Areas burned by wildfires within the last 10 years have responded mostly favorably due to reduction in conifers and enhancement of herbaceous plant communities. Cheatgrass continues to be a major threat to native rangelands and big game ranges in this herd unit. Some portions of burned areas are predominantly cheatgrass, and will likely remain in that state unless treated with herbicides.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species.

In Summer 2015, population biologists and habitat managers began working together to modify habitat monitoring techniques utilized statewide and to improve overall consistency among the regions. Identification of key herd units per big game species, assessing habitats through landscape scale inventory methods versus monitoring a handful of permanent monitoring sites, assessing habitats in all seasonal ranges (summer, transition, winter), and development of correlations to amounts of and timing of precipitation will help improve the overall value of data collected and result in our abilities to more strongly correlate management decisions for populations based off habitat conditions.
**Field/Harvest Data**

Harvest success and effort has fluctuated around 38% and 20 days per harvest. Harvest is driven by access and if hunters are limited to public land, success decreases and effort increases. Finding elk in this herd unit can be difficult due to landownership patterns. Access is restricted to the Broom Creek HMA north of US Hwy 26 and is dependent on crop damage south of US Hwy 26. A majority of landowners do not want elk south of the highway and are willing to allow access. In 2011 elk were plentiful and hunters were successful. In 2012 the severe drought displaced elk and they were not found in traditional places (i.e. alfalfa fields). In 2014 and 2015 above average spring and summer precipitation re-distributed elk which increased forage production and as a result elk were not dependent upon irrigated crops. Elk that were traditionally found within Whalen Canyon appear to have re-distributed to other areas of the herd unit. The percent of branched antlered bulls in the harvest survey was 82%, a decrease from 2014. Hunters and landowners have made the observations that there are fewer trophy quality bulls within the Rawhide Hills, Haystack Range, and Wildcat Hills. Our ability to manage this segment of the population is limited due to access and adult bulls within the harvest will likely remain high. The high percentage of branch antlered elk is indicative of the quality of bulls and the amount of private land that provides sanctuaries to allow bulls to reach maturity.

Licenses numbers have fluctuated from 50 to 200 over the years. Starting in 2011 that portion of Hunt Area 3 south of U.S. Highway 26 became a general season. After several public meetings over the past three years coupled with a landowner survey it was decided to convert that portion of Area 3 north of US Hwy 26 from a limited quota area to a general hunt area. However, in 2015 landowners north of U.S. Hwy 26 voiced their concern that elk were no longer in their traditional areas and therefore damage issues have decreased. Lack of elk and damage will prompt managers to propose to close the Type 6 season north of U.S. Hwy 26 on November 30. Since this herd unit changed to a satisfaction management evaluation and the percent of branch antlered bulls in the harvest we no longer collect classification data.

**Landowner/Hunter Satisfaction Survey Results**

The landowner satisfaction survey results (Appendix A) showed that 35% of the landowners were satisfied elk were at or about at desired levels, 17% indicated elk were above desired levels and 47% indicated the elk population was below desired levels. There were 23 surveys returned for a 35% return rate, slightly higher than 2014, which had a return rate of 30%. Return rate exceeded the 25% threshold required for the satisfaction survey. Based on the past three years of surveys landowners are still not pleased with the number of elk. Based on input from the field, meeting and survey comments, about half of the landowners want to reduce elk and the other half want to manage for trophy bulls. Bringing their satisfaction up to 60% will be a challenge. The hunter satisfaction survey indicated that 57% were satisfied with their hunt. This is similar to 2014 and given there have not been any management changes to the elk population the percent of satisfied hunters appears reasonable.

There was also some concern voiced by some landowners that the general firearm season was too early. Since the opening date for the general firearm coincides with the breeding season...
there was concern from some landowners in the northern portion of the hunt area that bull quality and quantity was decreasing since they were more susceptible to harvest. Survey results indicated that 57% of the landowners thought the opening date was just right. Based on the survey results a proposal to change the opening date will not be submitted.

Management Summary
In summary, the 2016 season is designed to reduce elk numbers particularly in the southern portion of the herd unit. The Type 6 license will decrease by 62 days north of U.S. Hwy 26. We hope to attain a harvest of 115 elk.
Appendix A

2015 Elk 730 Landowner Summary

Please indicate your satisfaction level with current elk population:

17.4% 47.8% 34.8%
1- Above Desired Levels 4
2- At or About at Desired Levels 8
3- Below Desired Levels 11
1- Above Desired Levels 4 17.4%
2- At or About at Desired Levels 8 34.8%
3- Below Desired Levels 11 47.8%

Elk 730 Landowner Survey
Results Elk Population

Elk 730 Landowner Survey
Results Season Opening Date
Do you think the general firearm season opening date (Sept 15) is:

57.1% 42.9%
1- Too Early 9
2- Just Right 12
3- Too Late 0
1- Too Early 9  42.9%
2- Just Right 12 57.1%
3- Too Late 0 0%

Additional Comments

The general license has created multiple problems for landowners. Poaching, tresspassing, trash. Landowners get no benefit. Locals run all over you, but can't sell out of states hunts because they are still a draw.
Do not want the elk!
Where I live here south of the Rawhide Buttes we haven't seen any elk for 6 or more years. Guess there is elk on the Glen Southwise Ranch, but he won't let any of his neighbors hunt as he wants to get Big Football Stars something like that to pay him 5 to 10 thousand dollars to get one. That's my opinion about the elk. We use to have elk down toward Gurnsey haven't seen any there for quite some time.

We have not seen signs of any elk in our vicinity and have only heard of any sightings of a few odd elk in several years. So as far as we are concerned there is not a Rawhide herd anymore. Don't know the reasons, but the overall elk population in this area is down from previous years. It was tough to even see an elk after 5 days of hunting. Hunting the elk during the rut (Sept 15) adds to the ability to locate elk.
Would like to see the bull season moved back away from the rut. Oct 15 or Nov 1 start would be great.
I really don't like the general license-Thanks
1 elk east of I-25 is too many!!
I liked having the longer season. It would be nice to have a tag that would allow one to harvest a bull or a cow for the first month and then cows only until January.

I see no need for an archery season here. All that does is get the elk wound up before rifle season and we need elk shot and less worry about recreation. Also closing the area north of highway 26 is a slap in the face to those of us that raised this herd for you.

What elk? And what regulations have you been looking at? The season opens as early as August and goes through January the following year? This relates to nearly a 6 month long season, not to mention a general season?

As a landowner in Goshen County I fought the G&F for years to keep Elk Area #3 a limited quota elk area only, however the G&F were very persistant and eventually got their way in making area 3 a general season elk area. Our ranch (Dave Stenson) in Goshen County went from having hundreds of elk with numerous trophy bulls to absolutely NO elk! Over the years we experienced some of the most fantastic elk hunting I have ever known. It was not uncommon to
see a herd of 300 head of elk with at least 100 head being bulls and at least 10 of those bulls being in the 350+ BL scoring range. Needless to say, we didn't even consider harvesting a bull that wasn't at least a 350 class! Yes you, the G&F took a premier elk area with numerous trophy bulls, some even world class and destroyed it by making it a general elk area and extending the damn season to nearly 6 months! Do you really want my honest opinion about the elk hunting in general hunt area #3? There are none! Congratulations, you accomplished what you set out to do, get rid of the elk! David A Stenson

the elk population is non-existent in the area north of highway 26
I am not involved in this hunt area. I feel just the land owners in the area should be involved. I appreciate your concerns for managing different areas to get the best hunting for everyone involved.
No elk found after start of deer season.
2015 - JCR Evaluation Form

SPECIES: Moose
HERD: MO545 - SNOWY RANGE
PREPARED BY: WILL SCHULTZ

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<tr>
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<th>2010 - 2014 Average</th>
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<th>2016 Proposed</th>
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<td>N/A</td>
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<td>Recreation Days:</td>
<td>441</td>
<td>311</td>
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<td>9</td>
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<td>8.8</td>
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<tr>
<td>Males per 100 Females</td>
<td>97</td>
<td>212</td>
<td></td>
</tr>
<tr>
<td>Juveniles per 100 Females</td>
<td>49</td>
<td>62</td>
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</tr>
</tbody>
</table>

Population Objective (± 20%) : 100 (80 - 120)
Management Strategy: Special
Percent population is above (+) or below (-) objective: N/A%
Number of years population has been + or - objective in recent trend: 20
Model Date: None

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

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<td>Females ≥ 1 year old:</td>
<td>NA%</td>
<td>NA%</td>
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<tr>
<td>Males ≥ 1 year old:</td>
<td>NA%</td>
<td>NA%</td>
</tr>
<tr>
<td>Juveniles (&lt; 1 year old):</td>
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<td>NA%</td>
</tr>
<tr>
<td>Total:</td>
<td>NA%</td>
<td>NA%</td>
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Proposed change in post-season population: NA%
### 2010 - 2015 Postseason Classification Summary

**for Moose Herd MO545 - SNOWY RANGE**

<table>
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<tr>
<th>Year</th>
<th>Post Pop</th>
<th>Ylg</th>
<th>Adult</th>
<th>Total</th>
<th>%</th>
<th>MALES</th>
<th>FEMALES</th>
<th>JUVENILES</th>
<th>Males to 100 Females</th>
<th>Young to</th>
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<tbody>
<tr>
<td></td>
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<td>100 Fem</td>
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<td>48%</td>
<td>15 20%</td>
<td>75 0</td>
<td>19 47 67</td>
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<td>41%</td>
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<td>9 22%</td>
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<td>77 0</td>
<td>19 100 119</td>
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<td>2</td>
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<td>22</td>
<td>42%</td>
<td>8 15%</td>
<td>52 254</td>
<td>9 91 100</td>
</tr>
<tr>
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<td>0</td>
<td>17</td>
<td>17</td>
<td>57%</td>
<td>8</td>
<td>27%</td>
<td>5 17%</td>
<td>30 246</td>
<td>0 212 212</td>
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2016 HUNTING SEASONS
SNOWY RANGE MOOSE (MO545)

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<th>Quota</th>
<th>License</th>
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<td>Nov. 14</td>
<td>20</td>
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<tr>
<td>4</td>
<td></td>
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<td>Nov. 14</td>
<td>20</td>
<td>Limited quota</td>
</tr>
<tr>
<td>Archery</td>
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<td>Sep. 30</td>
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<table>
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Management Evaluation
Current Postseason Population Management Objective: 100 (80 – 120)
Management Strategy: Special
2015 Postseason Population Estimate: NA
2016 Proposed Postseason Population Estimate: NA

Moose in the Snowy Range herd unit are managed toward a numeric objective of 100. A moose population model has not been developed for this herd unit. The herd is managed under a special management strategy. The management objective was last reviewed in 1997. We plan to review the management objective in 2016.

Herd Unit Issues
The Snowy Range herd unit stretches across southern Wyoming, along the Colorado border, from Baggs to Cheyenne. Moose are found year-round in areas on Pole Mountain, Sierra Madre Mountains, and most notably, the Snowy Range Mountains. These moose descended from moose transplanted in Colorado and historically were not native to this area. Challenges for managing moose in this herd unit include a rapidly changing forest ecosystem, high infestation rates for parasites, and human conflict/safety. Limited population monitoring for moose has been an issue in this herd unit.
Weather
Precipitation during the growing season (April thru June 2015) across all seasonal ranges, and growing season precipitation in higher elevation spring/summer/fall ranges (May thru July 2015) was notably higher than the 30-year average. As is consistent with most prominent mountain ranges in Wyoming, the majority of precipitation accumulated during the period outside of the primary growing season, primarily in the form of snow. From August – October, conditions were very mild and dry. Winter 2015 - 2016, as of mid-February, has been fairly mild, with upper elevations in the Snowy Range near 100% of normal for snowpack (Figure 1), but lower elevations lacking in persistent snow through most of the winter.

Figure 1. Snotel Site within Snowy Range Moose Herd Unit, Wyoming (October 2015 – February 2016).

Habitat
Growing season precipitation was above normal in 2015, resulting in excellent growth of grasses, forbs, and shrubs across all seasonal ranges. Exceptional fall precipitation in 2014 resulted in green-up of forages. High soil moisture levels from fall 2014 precipitation events and normal snowpack in winter 2015 likely positively impacted vegetation growth in spring 2015. However, despite favorable precipitation levels, many important shrub habitats continue to underperform due to maturity and decadence, caused by a lack of disturbance. Moose fecal pellets were collected in winter 2015 in the southernmost portions of the herd unit, south of Woods Landing, to determine winter dietary preferences within the herd unit. In summary, fecal collections were comprised of 73% *Salix spp* and 20% *Betula spp*. It will be important to monitor these riparian plant communities in the future knowing these dietary preferences.
Moose habitat conditions were monitored 2012-2014 across Wyoming and in the North Park, Colorado area through a University of Wyoming project. Preliminary results published in a recent annual report for this project indicated the Snowy Range’s willow habitat quality and moose fitness were relatively low when compared to the other areas (Jesmer, et. al. 2014).

Habitat conditions improved in 2015 with an increase in timely seasonal precipitation. However, much of the transition and winter ranges were severely impacted by the drought conditions experienced in bio-year 2012. No WGFD moose habitat production/utilization data was available for this herd unit. However, annual production rates were assumed to have improved from the previous year, while utilization rates on winter ranges were assumed to have continued to be high.

**Field Data**
Traditionally there has been little allocation of funding in this herd unit to collect moose classification data. Moose classification data in the Snowy Range herd unit has been collected incidentally during annual mule deer and elk classification surveys. A classification sample of 30 moose was collected in December of 2015 in conjunction with mule deer and elk surveys. Although moose were known to be present in Hunt Area 41, no moose were observed there during the classification flight. The 2015 classification ratios were 212 bulls/100 cows and 62 calves/100 cows. Although no yearling bulls were observed during the classification survey, total bull ratios were considered to be inflated substantially for this less than adequate classification sample.

**Harvest Data**
A total of 20 bulls were harvested by 23 hunters in 2015, for a harvest success rate of 87%. In addition to the hunters who drew licenses in the regular drawing, there were 4 nonresidents who harvested in the Snowy Range herd unit with Wyoming Governor’s licenses, and the 2015 Wyoming Super Trifecta Tag winner also harvested in the Snowy Range herd unit. Overall antlerless harvest was 16 moose by 23 hunters for a success rate of 70%. As is typically the case in this herd unit, many of the antlerless moose hunters struggled to locate a cow without calves at side, and influenced the overall antlerless success rate. A bull moose was illegally harvested by an elk hunter in Hunt Area 41, on the west slope of the Sierra Madres.

The Snowy Range herd unit has a reputation for producing trophy quality bulls, and this continued again in 2015. Median age for tooth samples (n=17) from harvested bulls remained at 5-years of age in 2015 (Figure 1). The 3-year running average for median age of harvested bulls decreased slightly to 4.7 years of age (Figure 2). The proportion of bulls in the harvest which were 5-years or older increased to 70% (Figure 3). Overall, the bull harvest continued to be within the Department’s parameters for “prime-age bulls.”

The age of antlerless moose in 2015 harvest was similar to the 2014 results (Figure 4). The proportion of antlerless harvest ≤ 2 years in age (60%) was considered acceptable.
Figure 1. Median age of bulls harvested for the Snowy Range moose herd unit, from lab aged teeth (n=17), Wyoming.

![Graph showing annual median age of harvested bulls.]

Figure 2. Average (3-year running) median age of bulls harvested for the Snowy Range moose herd unit, from lab aged teeth (n=17), Wyoming.

![Graph showing median age of harvested bulls (3-Yr Running Average).]
Figure 3. Annual Percentages of the bull harvest ≥ 5-years in age from Snowy Range Moose Herd Unit, from lab aged teeth (n=17), Wyoming.

Figure 4. Age class distribution for antlerless moose harvested from Snowy Range moose herd unit, Wyoming, 2015.
**Population**
A population model has not been developed for this herd unit. A moose abundance survey was completed in the Snowy Range herd unit in March 2015. Results of this bio-year 2014 survey were a mid-winter total abundance estimate of $266 \pm 56$ (90% CI) ($SE = 34$) moose. These results provided managers with the first plausible abundance estimate for moose wintering in the Snowy Range herd unit. The abundance estimate will be useful in constructing a population model and making future harvest recommendations for moose in this herd unit. The management objective of 100 moose postseason will be reviewed later in 2016.

**Management Summary**
In 2016, hunting season lengths remained the same as in 2015. Type 1 license numbers remained at 20 licenses. Type 4 antlerless moose licenses were decreased from 25 to 20 because of concern for over harvest. This decrease was completed in part to keep the Snowy Range moose population from reaching a less than acceptable population level.

**Current Herd Specific Studies**
A current study initiated in fall 2014 by the Wyoming Cooperative Fish and Wildlife Research Unit and the Wyoming Game and Fish Department presents an excellent opportunity to examine the relationship between moose habitat use and seral changes brought about by bark beetles (Appendix I). By making use of an existing GPS dataset collected prior to extensive beetle damage (Baigas 2008), comparing it to new GPS data, and examining current individual movement strategies through the lens of body condition, this project will provide new information on the status of moose in the Snowy Range and their response to its beetle-killed forests.

The project began its field component in March 2015. Thirty (30) female moose (29 adults and one yearling) were captured via helicopter darting on winter habitats within and surrounding the Medicine Bow National Forest. Moose were fitted with GPS store-on-board collars set to collect 90-minute fixes. The fix-rate is identical to that used in the previous study, which will allow us to compare movement strategies and space use of moose prior to and following the extensive bark beetle damage. Collars will remain deployed until the spring of 2017; during which study animals will be recaptured twice per year to gather longitudinal data on demography and body condition (measured via ultrasonography). Monitoring body condition in the context of pregnancy (during winter) and lactation costs (in summer) will allow the project to critically examine the habitat quality of the Snowy Range, with the goal of understanding where the herd sits relative to nutritional carrying capacity.

**Bibliography of Herd Specific Studies**

**Literature Cited**


Project Description

Shiras moose have seen declines in recent decades across much of their statewide range due to a multitude of factors. The Snowy Range herd, which colonized the area following an introduction into North Park Colorado in the 1970s, is thought to be robust to these changes. Relatively new, lacking wolves or grizzly bears, and with liberal human harvest, the Snowy Range herd may be free of density-dependent pressures and existing as a small but highly productive population. Despite the impressions of stable population performance, the landscape of the Snowy Range has been altered dramatically by the mountain pine beetle, and the moose herd has not been studied since 2006. Moreover, effects of pine beetle outbreak on large mammals are almost entirely unknown. A collaborative study initiated in fall 2014 by the Wyoming Cooperative Fish and Wildlife Research Unit and the Wyoming Game and Fish Department presents an excellent opportunity to examine the relationship between moose habitat use and seral changes brought about by bark beetles. By making use of an existing GPS dataset collected prior to extensive beetle damage (Baigas 2008), comparing it to new GPS data, and examining current individual movement strategies through the lens of body condition, this project will provide new information on the status of moose in the Snowy Range and their response to its beetle-killed forests. The project began its field component in March 2015; 30 female moose (29 adults and one yearling) were captured via helicopter darting on winter habitats within and surrounding the Medicine Bow National Forest. Moose were fitted with GPS store-on-board collars set to collect 90-minute fixes, which will allow us to compare movement strategies and space use of moose prior to and following the extensive bark beetle damage. Collars will remain deployed for a period of two years, during which study animals will be recaptured twice per year to gather longitudinal data on demography and body condition (measured via ultrasonography). Monitoring body condition in the context of pregnancy (during winter) and lactation costs (in summer) will allow the project to critically examine the habitat quality of the Snowy Range, with the goal of understanding where the herd sits relative to nutritional carrying capacity.

Project Update

A summer field season has been completed and the first recapture was executed in early December. Calf survival was monitored during two ground survey efforts (one at the beginning of July and the other at the end of August) and calves with collared females were noted during December recaptures. Willow communities were sampled by Philip Baigas and Brett Jesmer in 2007 and 2013 respectively; a selection of survey locations were re-visited this summer for long term habitat quality monitoring. Vegetation sampling was conducted in pine forests in an effort to quantify differences in thermal cover and forb communities across a gradient of tree canopy losses attributed to bark beetle mortality. Four collared moose died since initial collaring, although no deaths were attributed to capture mortality. 25 of the remaining 26 moose were recaptured in December, and three recovered collars were deployed on new moose, bringing the current sample size up to 29. One collar suffered minor damage that prohibited immediate redeployment; this collar is being repaired and will be deployed in March. One moose slated for recapture was in terrain inaccessible to the helicopter; we expect to recapture her in March. The March recapture will be followed by an expanded second summer field season.
Figure 1: Most recent pertinent locations of all moose collared for the project. Calf status current as of December 2015.
Summer Calf Surveys

Collared moose that were found to be pregnant in March (n=22) were re-sighted in early July and late August/early September to determine calf survival. One pair of twins was seen during the summer surveys. Two moose that were pregnant in March failed to produce a calf that survived to July. Two calves were lost between the July and September survey. An additional calf was lost between the last calf survey and the recapture earlier this month. All told, 16 moose calves have been produced from the 30 moose initially collared in March.

Habitat Quality and Vegetation Monitoring

Willow communities are extremely important food sources for moose in the Rocky Mountains. A metric of browsing pressure developed by Richard Keigley was employed by two other University of Wyoming students working in the area in 2007 and 2013. Previously established transects (n=20) were revisited this past summer with the intention of quantifying habitat quality trends for moose. Vegetation sampling and habitat monitoring efforts will continue in an expanded capacity next summer.

Plots were established in conifer patches within the National Forest in an effort to evaluate how the bark beetle epidemic has potentially modified moose habitat. Tree death and resulting canopy loss may affect moose forage availability and the ability of a pine stand to provide thermal cover and snow refuges. Canopy closure, visual obstruction, and forb/shrub cover was measured within each plot (n=23). Percent tree death will be calculated for each surveyed plot by remote sensing to examine whether heavily affected areas are different in these respects compared to less affected stands.
Assessing longitudinal trends in body condition as a function of habitat selection and reproduction is a crucial component of this project. Measuring percent ingesta–free body fat (IFBFat) through ultrasonography is an informative method to determine nutritional condition. The majority of moose with calves lost fat reserves between captures, which likely reflects the costs associated with lactation and associated behavioral sacrifices related to calf rearing. Some females who raised calves were able to gain fat reserves (indicated by blue dashed lines in Figure 2) and some lone cows lost fat reserves (red dashed lines in Figure 2). Overall, median IFBFat was lower among all females in December than in March (Figure 2, 7.08 and 7.35, respectively). Mean IFBFat was somewhat higher (7.12 in December and 6.84 in March), which was likely attributable to large fat gains in a few individuals.

Ear-cropping (a clinical presentation of *Elaeophora schneideri* infection) was unchanged between the two captures; moose with cropped ears did not display additional cropping, and moose without cropping in March did not lose ear tissue between captures. Tick monitoring continued during the December capture, though most ticks existed as nymphs in December and were very difficult to detect. Comparisons in the upcoming March capture should be more interesting.
Acknowledgments

Research is funded by the Wyoming Game and Fish Department and the Wyoming Governor’s Big Game License Coalition. We are grateful to Laramie Region WGFD personnel for their extensive summer field support, landowner contacts, and for facilitating capture operations this December. We are deeply indebted to private landowners around the Medicine Bow National Forest; many project moose resided on private lands throughout the summer and into the December capture. Their willingness to provide access to project personnel for field surveys and recaptures has been critical to the success of this project. Moose were also captured on public lands administered by the USFS, BLM, and State of Wyoming.

Hunter Samples

WGFD personnel facilitated collection of kidney, tooth, and blood samples from moose harvested in units 38 and 41. 22 out of 45 tag holders submitted at least one sample for study. Teeth were obtained from 19 moose, which will help expand age structure sample size for females and add valuable information about males. At least 8 pairs of kidneys were contributed in analyzable condition; kidneys from hunter harvested moose will develop our understanding of moose body condition in the Snowies beyond those already radio-collared.
2015 - JCR Evaluation Form

**SPECIES:** Mule Deer

**PERIOD:** 6/1/2015 - 5/31/2016

**HERD:** MD534 - GOSHEN RIM

**HUNT AREAS:** 15

**PREPARED BY:** MARTIN HICKS

<table>
<thead>
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<td>55%</td>
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<td>Juveniles per 100 Females</td>
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Population Objective (± 20%) : 20000 (16000 - 24000)

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: -42%

Number of years population has been + or - objective in recent trend: 5

Model Date: 02/18/2016

**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

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<tr>
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<td>.3%</td>
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<td>Total:</td>
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Proposed change in post-season population: -1% +5%

---

Population Size - Postseason

![Diagram](image)
## 2010 - 2015 Postseason Classification Summary

for Mule Deer Herd MD534 - GOSHEN RIM

<table>
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<th>Year</th>
<th>Post Pop</th>
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<th>FEMALES</th>
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<td>93</td>
<td>53</td>
<td>67</td>
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<td>13% 876 48% 706 39%</td>
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<td>144</td>
<td>64</td>
<td>19 13 421</td>
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2016 HUNTING SEASONS
GOSHEN RIM MULE DEER HERD UNIT (MD534)

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<td>Gen</td>
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<td>6</td>
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Region T

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<td>Sept. 30</td>
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<table>
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Management Evaluation
Current Management Objective: 20,000 (16,000-24,000)
Management Strategy: Recreational
2015 Postseason Population Estimate: ~11,600
2016 Proposed Postseason Population Estimate: ~12,300
2015 Hunter Satisfaction: 70% Satisfied, 19% Neutral, 11% Dissatisfied

Herd Unit Issues
The management objective for the Goshen Rim Mule Deer Herd Unit was changed from 25,000 to 20,000 and Hunt Areas 15,16,55,57 were combined into Hunt Area 15 as a result of internal recommendations and public input during the 2013 herd objective review process. The management strategy is recreational management with a post-season buck ratio range of 20-29 bucks:100 does.

The 2015 post-season population estimate was approximately 11,600 mule deer with a stable population. Restricted access makes it difficult to manage this herd. Access is driven by isolated private land experiencing damage and small parcels of state, BLM lands, and private lands enrolled into the Department’s PLPW program.

Without paying a trespass/trophy fee or hiring an outfitter, hunters have a difficult time harvesting a mature mule deer buck. Landowners and hunters would like to see an increase in mule deer, but without major habitat revitalization (for part of the year mule deer are dependent on irrigated and dryland agriculture fields) this herd unit will most likely remain around 12,000 mule deer. Buck ratios are anticipated to remain on the higher end of the recreational management strategy due to private land (92% of the occupied habitat). Public land hunters will
continue to have a difficult time finding a mature buck due to the majority of land being held in private ownership.

Major landscape changes have been occurring in the southern portion of the herd unit. Urban sprawl continues to increase north and east of Cheyenne as well as industrial (methane production) development in Laramie County. The USDA’s Conservation Reserve Program (CRP) has experienced a decline in productivity and quality of perennial forage throughout the herd unit. The conversion of dryland (wheat fields) cropland to CRP in the past provided favorable fawning and winter cover for mule deer. These stands are now monotypic stands of unfavorable perennial grass (i.e. smooth brome and crested wheatgrass) and no legume component, providing little if any habitat benefits.

**Weather**

Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Goshen Rim herd unit the reviewer is referred to the following link: [http://www.ncdc.noaa.gov/cag/](http://www.ncdc.noaa.gov/cag/).

**Habitat**

Forage availability continued to improve in 2015 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs.

Cheatgrass continues to be a major threat to native rangelands and big game ranges, particularly at all elevations below 6,500’. Its presence ties the hands of habitat managers limiting habitat enhancement options, and may result in reduced carrying capacities of rangelands if the predominant species. This herd unit is comprised of a mix of native rangelands, CRP, dryland and irrigated croplands. Because of the availability of croplands throughout the herd unit, native rangeland habitat conditions are likely not as important to mule deer. Shrub habitats monitored in the past along the Goshen Rim have shown a high proportion of shrub in the decadent age class, with little to no natural regeneration occurring.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species.

In Summer 2015, population biologists and habitat managers began working together to modify habitat monitoring techniques utilized statewide and to improve overall consistency among the regions. Identification of key herd units per big game species, assessing habitats through landscape scale inventory methods versus monitoring a handful of permanent monitoring sites, assessing habitats in all seasonal ranges (summer, transition, winter), and development of
correlations to amounts of and timing of precipitation will help improve the overall value of data collected and result in our abilities to more strongly correlate management decisions for populations based off habitat conditions.

Field Data
This herd experienced a sharp decline in 2012 following the worst drought recorded since the 1930’s and since then has been fluctuating around 12,000 mule deer. General licenses have focused harvest on the male segment of the population with little effort to remove females. There were 350 Type 6 licenses available for the 2015 season for some doe harvest opportunity and address damage situations. On average less than 1 percent of the female population is harvested. Chronic wasting disease is not as prevalent in this herd when compared to the Laramie Mountains Mule Deer and the South Converse Mule Deer Herd Units, but the long-term prevalence rate average of 11% is most likely impacting population performance to an unknown extent.

Fawn ratios in 2015 (64 fawns:100 does) significantly decreased compared to 2014 (81 fawns:100 bucks) to a level that is the same as the five-year average. This ratio is slightly below 66 fawns:100 bucks which is the level needed to increase a population (Unsworth et al. 1999). Above average fawn ratios in 2014 helped to bolster buck ratios in 2015 (37 bucks:100). Yearling buck ratios (16 yearling bucks:100 does) were well above the five-year average of 10 bucks:100 does. However, even with the spike in buck ratios, based on personnel and hunter observation’s the buck ratios on accessible lands are more likely to remain on the lower end of the recreation management strategy.

In 2015, 32% of the field harvest data was comprised of yearling bucks, which was slightly higher than 2014 but with only half the sample size. The majority of yearling mule deer that are aged in the field typically come from public land where hunters are usually less selective, so the 32% is not surprising. Yearling buck harvest data in 2015 correlated well with post-season fawn ratios from 2014 (81 fawns:100 does) and 2015 post-season classifications (16 yearling bucks:100 does), supporting the validity in 2014 fawn ratios and 2015 yearling buck ratios. On public land the majority of mature male deer are typically 2-3+ years old, however on private land where access is controlled, the average age is usually 4-6+ years old. Based on field observations and field harvest data, public land hunters typically harvest younger deer, lending credibility to a lower buck:doe ratio on the limited amount of public lands.

Since 2012 antler class data has been collected from harvested mule deer, then in 2013 data was collected from classified mule deer to gauge buck quality. Antler class data is broken down into three classes: 1) Class I- ≤19”, 2) Class II- 20-25”, Class III- ≥26”. Typically harvest class data is similar to classification class data (see tables from JCR). There was a 50% decrease in sample size for harvest antler data in 2015 compared to 2014; therefore any comparisons need to be interpreted with precaution. The sample size for post-season classifications was met in 2015 lending credibility to that data set. The percent of Class I bucks observed during post-season classifications was by far the majority of bucks (78%) observed in 2015, where in the past it is typically a more even split. The small sample size for field check data is most likely a factor in the disparities. The only similarities between field harvest and composition data was few Class III bucks were observed, both were around 10% of the respected data set. Based on these observations it appears there will be a significant increase in 2+ bucks for the 2016 season. The
hunter satisfaction rate of 70% was higher than the 2014 rate of 64%. This increase is most likely a result of an increase in success, harvest and a decrease in effort.

**Harvest Data**
Hunter success (56%) was higher than the five-year average of 48%, and hunter effort (7.3 days/harvest) decreased compared to the five-year average of 8.0 days per harvest. Access continues to be an issue in this herd unit with 92% of the occupied habitat consisting of private land. The only major access is the PLPW’s Hunter Management Program on the Guernsey Guard Camp, walk-in areas, and the various Wildlife Habitat Management Areas. Access for the most part is driven by damage, which is the reason for the Type 6 licenses. Access for buck harvest is extremely difficult unless a hunter is willing to pay a trespass fee or hire an outfitter. Private land ratios inflate overall buck ratios to the higher end of the recreational management strategy. With that said, it is interesting that harvest data improved compared to the 5-year average. The number of hunters that went to the field was just slightly higher than last year and the five-year average. Weather conditions were similar to the 2014 season; except there was a major snowstorm event in 2014 that possibly resulted in the slight decline in hunter participation and perhaps affected hunter’s ability to harvest a mule deer.

**Population**
The “Time-Specific Juvenile and Constant Adult Survival” (TSJ,CA) spreadsheet model was chosen to use for the post-season population estimate of this herd. The model has a slightly higher AIC value but did have the best fit compared to the other two models. Given the better fit of data and perceived population trend by personnel, landowners and hunters this seemed like the most plausible model. Juvenile survival ranges varied from a high of 90% to a low of 40% with an average of 60%. Hunters and landowners would like to see a continued increase in the population, however, given poor fawn production CWD, and poor shrub conditions an increase is not likely in the near future. This models ranks poor, the only data available is classification and harvest data.

**Management Summary**
Hunting seasons in this herd unit have traditionally started on October 1 and run for 11 to 14 days for the general season with limited doe/fawn harvest opportunity running later. The same season structure in 2015 will remain the same for 2016; general season October 1-14 and 350 Type 6 licenses. Department personnel will work with landowners and hunters to distribute harvest as damage issues arise. The Region T licenses will remain at 400. In 2015 94% of the licenses were active, similar to the number of hunters that went to the field in 2014 when 500 Region T licenses were available. Based on license sales and available access opportunities the current number of Region T licenses seems adequate.

If we attain the projected harvest of 905 mule deer and observe normal fawn production the predicated mule deer population of 12,300 will continue to remain well below the objective of 20,000.

Literature cited:

2015 - JCR Evaluation Form

SPECIES: Mule Deer

HERD: MD537 - LARAMIE MOUNTAINS
PREPARED BY: MARTIN HICKS

HUNT AREAS: 59-60, 64

<table>
<thead>
<tr>
<th></th>
<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
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<tr>
<td>Population</td>
<td>16,800</td>
<td>18,300</td>
<td>18,200</td>
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<tr>
<td>Harvest</td>
<td>1,093</td>
<td>1,065</td>
<td>1,000</td>
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<td>Hunters</td>
<td>2,068</td>
<td>1,839</td>
<td>1,840</td>
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<tr>
<td>Hunter Success</td>
<td>53%</td>
<td>58%</td>
<td>54 %</td>
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<td>Active Licenses</td>
<td>2,143</td>
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<td>Active License Success</td>
<td>51%</td>
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<td>Recreation Days</td>
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<td>Days Per Animal</td>
<td>8.8</td>
<td>6.7</td>
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<tr>
<td>Males per 100 Females</td>
<td>38</td>
<td>52</td>
<td></td>
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<tr>
<td>Juveniles per 100 Females</td>
<td>64</td>
<td>73</td>
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Population Objective (± 20%) : 20000 (16000 - 24000)

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: -8.5%

Number of years population has been + or - objective in recent trend: 1

Model Date: 02/18/2016

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

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<thead>
<tr>
<th>JCR Year</th>
<th>Proposed</th>
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<tr>
<td>Females ≥ 1 year old:</td>
<td>1.2%</td>
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<tr>
<td>Males ≥ 1 year old:</td>
<td>22.5%</td>
</tr>
<tr>
<td>Juveniles (&lt; 1 year old):</td>
<td>.2%</td>
</tr>
<tr>
<td>Total:</td>
<td>5%</td>
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Proposed change in post-season population: -9% -1%
## 2010 - 2015 Postseason Classification Summary

for Mule Deer Herd MD537 - LARAMIE MOUNTAINS

<table>
<thead>
<tr>
<th>Year</th>
<th>Post Pop</th>
<th>MALES</th>
<th>FEMALES</th>
<th>JUVENILES</th>
<th>Males to 100 Females</th>
<th>Young to 100 Fem</th>
<th>Young to 100 Adult</th>
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<tr>
<td></td>
<td></td>
<td>2+</td>
<td>2+</td>
<td>2+</td>
<td>2+</td>
<td>Total</td>
<td>%</td>
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<tr>
<td>2010</td>
<td>18,900</td>
<td>205</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>425</td>
<td>630</td>
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<tr>
<td>2011</td>
<td>16,300</td>
<td>102</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>296</td>
<td>398</td>
</tr>
<tr>
<td>2012</td>
<td>15,600</td>
<td>83</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>162</td>
<td>245</td>
</tr>
<tr>
<td>2013</td>
<td>15,800</td>
<td>23</td>
<td>101</td>
<td>104</td>
<td>9</td>
<td>2</td>
<td>239</td>
</tr>
<tr>
<td>2014</td>
<td>17,400</td>
<td>147</td>
<td>177</td>
<td>161</td>
<td>36</td>
<td>0</td>
<td>521</td>
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<tr>
<td>2015</td>
<td>18,300</td>
<td>290</td>
<td>203</td>
<td>97</td>
<td>16</td>
<td>0</td>
<td>606</td>
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</table>
# 2016 Hunting Seasons

**Laramie Mountains Mule Deer Herd (MD537)**

<table>
<thead>
<tr>
<th>Hunt Area</th>
<th>Type</th>
<th>Season Dates</th>
<th>Quota</th>
<th>License</th>
<th>Limitations</th>
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<tr>
<td>59</td>
<td>Gen</td>
<td>Oct. 15</td>
<td>Oct. 25</td>
<td>General</td>
<td>Antlered mule deer or any white-tailed deer, except the Wyoming Game and Fish Commission’s Tom Thorne/Beth Williams Wildlife Research Center at Sybille shall be closed</td>
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<tr>
<td>59,64</td>
<td>6</td>
<td>Oct. 15</td>
<td>Oct. 31</td>
<td>Limited quota</td>
<td>Doe or fawn, valid on private land</td>
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<tr>
<td>59,64</td>
<td>6</td>
<td>Nov. 1</td>
<td>Dec. 31</td>
<td></td>
<td>Doe or fawn white-tailed deer</td>
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<tr>
<td>60</td>
<td>1</td>
<td>Oct. 20</td>
<td>Nov. 5</td>
<td>Limited quota</td>
<td>Antlered deer on national forest, any deer valid off national forest; All lands within Curt Gowdy State Park, archery only</td>
</tr>
<tr>
<td>60</td>
<td>1</td>
<td>Nov. 6</td>
<td>Nov. 30</td>
<td></td>
<td>Doe or fawn white-tailed deer valid off national forest; all lands within Curt Gowdy State Park, archery only</td>
</tr>
<tr>
<td>60</td>
<td>2</td>
<td>Oct. 20</td>
<td>Nov. 5</td>
<td>Limited quota</td>
<td>Any deer valid off national forest; all lands within Curt Gowdy State Park, archery only</td>
</tr>
<tr>
<td>60</td>
<td></td>
<td>Nov. 6</td>
<td>Nov. 30</td>
<td></td>
<td>Doe or fawn white-tailed deer valid off national forest; all lands within Curt Gowdy State Park, archery only</td>
</tr>
<tr>
<td>60</td>
<td>6</td>
<td>Oct. 20</td>
<td>Nov. 30</td>
<td>Limited quota</td>
<td>Doe or fawn; all lands within Curt Gowdy State Park, archery only</td>
</tr>
<tr>
<td>64</td>
<td>Gen</td>
<td>Oct. 15</td>
<td>Oct. 25</td>
<td>General</td>
<td>Antlered mule deer or any white-tailed deer, except the Wyoming Game and Fish Commission’s Tom Thorne/Beth Williams Wildlife Habitat Management Area and the Laramie Peak Wildlife Habitat Management Area north of the Tunnel Road (Albany County Rd 727), shall be closed</td>
</tr>
<tr>
<td>64</td>
<td>2</td>
<td>Oct. 15</td>
<td>Oct. 25</td>
<td>Limited quota</td>
<td>Antlered mule deer or any white-tailed deer</td>
</tr>
<tr>
<td>59,60,61,64,65</td>
<td>J</td>
<td></td>
<td>900</td>
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### Summary of Change

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<tr>
<th>Hunt Area</th>
<th>License Type</th>
<th>Quota Change from 2015</th>
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<tbody>
<tr>
<td>62,63,64</td>
<td>T6</td>
<td>0</td>
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<td>60</td>
<td>T1</td>
<td>0</td>
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<tr>
<td>60</td>
<td>T2</td>
<td>0</td>
</tr>
<tr>
<td>60</td>
<td>T6</td>
<td>0</td>
</tr>
<tr>
<td>64</td>
<td>T2</td>
<td>0</td>
</tr>
<tr>
<td>59,60,61,64,65</td>
<td>Region J</td>
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</tr>
</tbody>
</table>

### Management Evaluation

**Current Post-season Population Objective:** 20,000 (16,000-24,000)

**Management Strategy:** Recreational

**2015 Postseason Population Estimate:** ~18,300

**2016 Proposed Postseason Population Estimate:** ~18,200

**2015 Hunter Satisfaction:** 71% Satisfied, 16% Neutral, 13% Dissatisfied

### Herd Unit Issues

The management objective for the Laramie Mountains Mule Deer Herd Unit was reviewed in 2014 and as a result of internal and public involvement the objective was decreased to 20,000 mule deer and Hunt Areas 59,62,63 were combined into Hunt Area 59 and Hunt Areas 64,73 were combined into Hunt Area 64. The recreational management strategy will remain in place with a post-season buck ratio range of 20-29 bucks:100 does.

The 2015 post-season population estimate was about 18,300 with the population fluctuating around 17,000. Chronic wasting disease (CWD) has been detected in this herd for well over two decades. The average prevalence rate since 1997 is 23%, contributing towards the suppression of this herd. Management strategy has been very conservative with little doe harvest to try and increase the herd. Approximately 50% of the herd unit is private lands which affects our ability to provide opportunity.

The Arapahoe wild fire in 2012 will have habitat effects for years to come. In some areas perennial vegetation is responding. In other places the ground appears sterile with little to no vegetation growth. Mule deer have been harvested in the burned areas since. Mule deer occupation in burned areas was also documented during the winter of 2013. In the long run this major fire will be a positive event for ungulate habitat. It will take time to see the major re-vegetation events. A major snowstorm event that dropped 2-3’ of snow followed by 60+mph
winds in February, 2016 could possibly have had a negative impact on mule deer survival. Managers will know more this spring if there was a high mortality loss.

Landowners and sportsmen would like to see more mule deer. To address this desire the Type 6 license are proposed to stay at a conservative number.

**Weather**
Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Laramie Mountains herd unit the reviewer is referred to the following link: http://www.ncdc.noaa.gov/cag/.

**Habitat**
Forage availability continued to improve in 2015 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs.

Cheatgrass continues to be a major threat to native rangelands and big game ranges, particularly at all elevations below 6,500’. Its presence ties the hands of habitat managers limiting habitat enhancement options, and may result in reduced carrying capacities of rangelands if the predominant species. In Summer 2015, Colorado State University natural resource program scientists worked cooperatively with WGFD and USFS personnel to map cheatgrass infestations via satellite imagery and on-the-ground vegetation sampling efforts. This data showing cheatgrass prevalence will be available for habitat managers to utilize in 2016. Future herbicide applications to control cheatgrass will likely be largely based off of this data. With recent completion of an Environmental Assessment by the USFS, options have expanded greatly to control cheatgrass, including aerial application of herbicides.

Areas burned by the Arapaho Wildfire of 2012 continue to rebound. Aspen regeneration has been excellent, and appears that in areas assessed that browsing is within acceptable limits that will allow for full recovery of aspen habitats in many places. Significant erosion occurred throughout burned areas in Spring 2015, associated with moisture events. Canada thistle, leafy spurge, and knapweed spp. are present throughout the burn in varying degrees and efforts need to be undertaken to map infestations and implement biological and chemical methods of control. A significant die-off of sagebrush and antelope bitterbrush did occur in portions of the Laramie Range due to a rapid freeze event that occurred in November 2014. The die-off was widespread, from the Front Range of Colorado to the Eastern Plains of Montana. The severity of the die-off
is unknown at this time, and whether or not the shrubs will recover. Affected shrubs did not show any significant signs of re-sprouting in Summer 2015.

A prescribed burn was completed on the Iron Mountain Ranch in late March 2015, impacting 2,500 acres of mixed mountain shrub habitats. Initial herbaceous and woody plant response following treatment was excellent, as expected with the above average precipitation that fell in Spring 2015. Previous prescribed burns completed within the Iron Mountain herd unit continue to outperform untreated habitats, particularly in shrub annual leader production. A second prescribed burn encompassing 1,700 acres of mixed conifer/aspen habitats was completed on the Mule Creek Ranch in September 2015. Monitoring of the site will occur in 2016 to measure aspen, mixed mountain shrub, and herbaceous response to treatment, as well as utilization levels by big game.

The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species.

In Summer 2015, population biologists and habitat managers began working together to modify habitat monitoring techniques utilized statewide and to improve overall consistency among the regions. Identification of key herd units per big game species, assessing habitats through landscape scale inventory methods versus monitoring a handful of permanent monitoring sites, assessing habitats in all seasonal ranges (summer, transition, winter), and development of correlations to amounts of and timing of precipitation will help improve the overall value of data collected and result in our abilities to more strongly correlate management decisions for populations based off habitat conditions.

**Field Data**

Fawn ratios of 73 fawns:100 does in 2015 were lower than 2014, which was the highest observed in over ten years (81 fawns:100 does), but were still well above the 5-year average (62 fawn:100 does) allowing for population growth. According to Unsworth et al. (1999) populations increase when fawn ratios are above 66 fawn: 100 does. Buck ratios of 52 bucks:100 does were the highest observed in 34 years, well above the recreational management strategy. The majority of the bucks are yearlings (25 yearling bucks:100 does) and 2 year olds. Finding a mature buck on public land is still difficult; very few were recorded in field harvest checks and 2015 classifications. The 2015 sample size was well above the adequate sample size, lending credibility to herd composition data.

Since 2012 antler class data has been collected from harvested mule deer and then starting in 2013 from classified mule deer to gauge buck quality. Antler class data is broken down into three classes: 1) Class I- ≤19”, 2) Class II- 20-25”, Class III- >26”.

Yearling buck harvest in 2015 was similar to 2014 but the majority (48%) of the deer checked in the field were Class I bucks. It was expected that more yearling bucks would be harvested with the all time high yearling buck ratio, but it appears hunters were more selective for 2-3 year old deer, which is interesting since fawn production 2-3 years ago was average. It appears adult
survival was better than average from 2013-2015. This is somewhat plausible given improved habitat conditions as a result of spring moisture.

The majority of mule deer bucks harvested in 2015 were Class I bucks (75%), which is similar to 2012 and 2013. In 2014 the majority of bucks classified during field checks were class II. Mild winter conditions coupled with excellent forage conditions from 2012-2014 most likely contributed to above average survival for male mule deer in order to see a spike in Class II harvest. There are very few class III buck in the harvest and classification data. Lack of access, CWD and lower survival rates most likely contributed to fewer older age class bucks in the field. Based on harvest and classification data there will be a surplus number of bucks available for harvest opportunities in 2016.

Deer were in good condition going into the winter given premium habitat conditions in 2015. The average body score taken from 35 mule deer was 17 out of 20, similar to 2014. According to the 2015 satisfaction survey, 71% of the hunters were satisfied with their quality of hunt. This is significantly higher than 2014 (59%). Harvest statistics indicate that hunters had more success and it took fewer days to harvest a mule deer compared to the five-year average, which is a likely reason for the improved satisfaction level.

### Harvest Data
Hunter success in 2015 (58%) was slightly higher than the five-year average of 53% and hunter effort of 6.7 days per harvest was significantly lower than the five-year average of 8.8 days per harvest. These data support an increasing trend in population, which also supports model simulations, personnel, landowner, and sportsmen observations, which is a shift in population trends that is welcomed by the hunting community. The boost in fawn production should help to offset the higher rate of adult mortality due to CWD.

### Population
The “Time-Specific Juvenile and Constant Adult Survival” (TSJ,CA) spreadsheet model was chosen to use for the post-season population estimate of this herd. The AIC value was slightly higher but did have a better fit than the other two models. This model was chosen for the following reasons: 1) The model tracks juvenile variability in survival, which is more consistent with this herd unit based on the fluctuations in juvenile composition data, 2) There is a large number of years with classification and harvest data, indicative of the TSJ, CA model, 3) simulated population trends mimic perceived trends observed by local personnel, landowners and hunters. Adult survival was changed in years 2010-2013. Adult survival data from the South Converse Mule Deer Herd Unit CWD study was incorporated from those years since both herd units have high prevalence rates and the Laramie Mountains Herd Unit is adjacent to South Converse. This model is rated as fair to poor, there is not a abundance estimate but there is some survival data. There is not an annual population estimate with a standard error available to anchor the model to, but enough data to give the model a fair fit and results are biologically defensible. Adult survival was adjusted to .7-.8 instead of the recommended range of .7-.95 to account for chronic wasting disease prevalence rates in years that did not have adult survival data.
Management Summary
Hunting seasons in this herd unit have started on the 15\textsuperscript{th} of October for the past 9 years have closed on October 25. Late doe/fawn seasons have been used to address damage situations in lower elevations on private land, but the public has overwhelmingly indicated they would like to see more mule deer, so Type 6 licenses have remained conservatively prescribed. The season structure for the general season and Type 6 licenses will remain the same as 2015. Hunt Area 60 remains a sought after license for hunters since it gives hunters a chance to hunt into November when bucks are more susceptible to harvest. Region J licenses will remain at 900 to address low deer densities, especially on public lands. Nonresident licenses continue to decrease over the past few years. The 900 Region J quota will be consistent with recent license sales (2012=949, 2013=779, 2014=822, 2015=819) and hopefully improve harvest statistics and reduce hunting pressure. Despite all time high buck ratios the general firearm season length will not increase. This mule deer herd along with mule deer herds across the state is well below desired levels for not only the population but available bucks. It is our goal that by improving the odds of younger bucks making it to 4-5 years old hunter satisfaction will improve.

If we attain the projected harvest of 1,000 mule deer, maintain average fawn recruitment, and take into account CWD prevalence rates the mule deer population will remain around 18,000 mule deer and fall within the post-season objective range of 16,000-24,000 mule deer.

Literature Cited:

2015 - JCR Evaluation Form

SPECIES: Mule Deer
HERD: MD539 - SHEEP MOUNTAIN
HUNT AREAS: 61, 74-77
PREPARED BY: LEE KNOX

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<th>2016 Proposed</th>
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Population Objective (± 20%) : 10000 (8000 - 12000)
Management Strategy: Recreational
Percent population is above (+) or below (-) objective: -42.7%
Number of years population has been + or - objective in recent trend: 20
Model Date: 2/26/2016

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

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Proposed change in post-season population: 5%
### 2010 - 2015 Postseason Classification Summary

for Mule Deer Herd MD539 - SHEEP MOUNTAIN

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</table>

### Notes
- Total %: Percentage of total population
- Males to 100 Females: Males per 100 females
- Young to 100 Females: Young per 100 females

218
### 2016 HUNTING SEASONS
Sheep Mountain Mule Deer (MD539)

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<th>Hunt Area</th>
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Region D Nonresident Quota: 400

**Management Evaluation**

Current Postseason Population Management Objective: 10,000 (8,000-12,000)

Management Strategy: Recreational

2015 Postseason population Estimate: ~ 5,700

2016 Proposed Postseason Population Estimate: ~ 6,100

2015 Hunter Satisfaction: 64% Satisfied, 20% Neutral, 16% Dissatisfied

The management objective for the Sheep Mountain Mule Deer herd unit is a post-season population objective of 10,000 mule deer. The management strategy is recreational management...
with guidelines to maintain a post hunt buck ratio of 20 to 29:100 does. The objective and management strategy was reviewed in the spring of 2015.

**Herd Unit Issues**
The Sheep Mountain herd unit encompasses hunt areas 61, 74, 75, 76 and 77. Landownership varies from mostly private lands with limited public access, to large portions of public lands. The 2015 post-season population estimate is approximately 5,700 with the population trending up after a decline from 7,500 in 2009. The Sheep Mountain herd unit historically has one of the lowest hunter success rates in the state. Most of the herd’s summer range is in dense lodge pole or spruce forests that were once heavily logged in the 1960s and 1970s. There is a large scale forest die off from pine and spruce beetles, and though we think it will be beneficial, the effects are unknown. Winter and transition range is limited. In 2012 there was a large scale wildfire that is thought to be beneficial in the long run, but currently has caused displacement. Black bear and lion mortality limits were liberalized, and season lengths were increased. We finalized a three year predator removal project with the Albany County Predator Board focusing on key mule deer parturition areas in the Sheep Mountain herd unit to evaluate the effect of coyotes on fawn recruitment. We are currently beginning a mule deer initiative process with this herd unit. It has helped spark more discussions with the WGFD, federal agencies and non-government organizations that should turn into some good on the ground improvements that will be beneficial.

**Precipitation**

![Sheep Mountain Herd Unit Precipitation (inches)](chart.png)
Parameter-Elevation Relationships on Independent Slopes Model (PRISM) utilized to estimate to estimate precipitation by calculating a climate-elevation regression for each Digital Elevation Model grid cell (4 km resolution).

Precipitation from October 2014 – September 2015 was slightly higher than the 30 year average. Precipitation during the growing season (April thru June 2015) across all seasonal ranges, and growing season precipitation in higher elevation spring/summer/fall ranges (May – July 2015) was notably higher than the 30 year average. As is consistent with most prominent mountain ranges in Wyoming, the majority of precipitation fell during the period outside of the primary growing season, likely in the form of snow, particularly at higher elevations. From August – October, conditions were very mild and dry.

Winter Severity
Winter 2015 - 2016, as of mid-February, has been fairly mild, with upper elevations in the Snowy Range near 100% of normal for snowpack, but lower elevations lacking in persistent snow through most of the winter.

Snotel Site within Sheep Mountain Herd Unit (October 2015 – February 2016)

Habitat
Growing season precipitation was above normal in 2015, resulting in excellent growth of grasses, forbs, and shrubs across all seasonal ranges. Exceptional fall precipitation in 2014 resulted in green-up of forages, allowing mule deer to enter winter in above-average body condition. High soil moisture levels from fall 2014 precipitation events and normal snowpack in winter 2015 likely positively impacted vegetation growth in spring 2015. However, despite favorable precipitation levels, many important shrub habitats continue to underperform due to maturity and decadence, caused by a lack of disturbance.

Deer fecal pellets were collected across several locations in winter 2015 to determine winter dietary preferences within the herd unit. In summary, fecal collections from unburned habitats were comprised of 90% - 95% shrubs, with big sagebrush leaf material being the major dietary
component. In areas burned by wildfire, diets were diverse and included 15% forbs, 13% grasses, and 72% shrubs.

No permanent vegetative transects were read this year within this herd unit, but considerable effort was spent assessing habitats with new “Rapid Habitat Assessment” methodologies developed by the Department. Landscape scale assessments were completed in the Red Mountain, Jelm Mountain, Woods Landing, Squirrel Creek wildfire affected areas, Sheep Mountain, Wick WHMA and in high elevations in the Rock Creek drainage of the Snowy Range. Habitat types assessed included aspen in known parturition habitats, mixed mountain shrubs in transitional and winter ranges, and riparian habitats/willow complexes in high elevations. The local game warden, biologist, wildlife supervisor, and statewide habitat biologist assisted with assessments. Forage production of cool season grasses and forbs was excellent, and signs of herbivory (wild or domestic) were minimal in sites assessed in July. Aspen regeneration post-Squirrel Creek wildfire is excellent, with many stands of aspens already 4’–6’ in height three years post-fire, and exhibiting very little sign of excessive herbivory by wildlife or livestock. Cheatgrass on south-facing aspects and areas of higher fire severity is concerning, especially on the southern-most portions of the burn area, above Woods Landing. Plans are in place to aerially treat 3,000 acres of cheatgrass with herbicide in late summer 2016. Habitat assessment data will be collected for a period of five years and reported in the objective review for this herd.

Field Data
We classified 1,100 deer within the herd unit, meeting the classification objective of 1,100 deer. Fawn ratios remain at the desired level even though we saw a decline from 75:100 does in 2014 to 65:100 does in 2015. We expect the decline is due to a high fawn crop and fawn survival in 2014 leading to a large yearling age class in 2015 diluting the fawn ratio. 2015 was the third year an antler point restriction was implemented. We saw a large jump in the buck: doe ratio from 26:100 2014 to 39:100 does currently. We saw a large increase in both juvenile and adult buck ratios, with the adult buck ratio being the highest in 20 years. The three year average puts us at the top end of recreational management at 30 bucks:100 does. We implemented a new ranking system in our classification in 2013 that places bucks into 3 classes based on antler spread: class I is 19 inches or less, class II is 20-25 inches, and class III is 26 inches or greater. Of the total number of bucks classified, class I made up 67%, class II was 23%, and class III was 10%, which is comparable to 2014. Total hunters increased from 1,200 in 2014 to 1,400, but over the last decade we have lost 1,000 resident hunters. Hunter effort decreased for the second year to 20 days, and hunter success increased for the second year to 27%, indicating hunters are finding more mature bucks. However 27% hunter success is still far below the state wide average of 71% and is the second lowest herd unit success rates in the state.

Harvest Data
2015 was the fourth year of a weeklong season, and the third year of an antler point restriction. Harvest had been on a steady decline from a high of 980 deer in 2004 to 190 deer in 2013. We saw an increase from 2014 to 2015 at 290 to 370 respectively. Youth and archery hunters harvested 70 does and fawns in 2015, less than 1% of the total female population but an increase from previous years. Even though the female harvest makes up 19% of the total harvest, it is less than 1% of the total female population and is not substantial enough to affect the population, but it is perceived poorly by the public. The 2015 season structure was mostly well received; hunters
and landowners perceived it as the Department is addressing their concerns with this herd unit. Overall public comments are that the herd is increasing.

**Population**

Time-Specific Juvenile & Constant Adult Survival (TSJ, CA) spreadsheet model was chosen for this Herd Unit. This model has the lowest AIC score of 159 and a fit of 71, and estimates the population at 5,700. This model is ranked as fair; there is 15-20 years of data; ratio data available for all years in model; juvenile and adult survival estimate with standard errors obtained from adjacent or other similar herds; model aligns fairly well. We were able to get several years of fawn and adult survival rates from radio collared studies in Colorado that took place near the Wyoming border. With this information the model provides a more believable estimate considering the classification samples and fawn ratios. Field staff, landowners, and hunters all agree the population is down but growing and the herd should be managed conservatively.

**Management summary**

If we attain the projected harvest of 350 deer, and have a fawn ratio of 66:100 does or higher, the herd should continue to grow. Using 66:100 (Unsworth 1999) does as our predicted fawn ratio, we estimate a 2015 post-season population of about 6,100. Even though our current buck ratio is at a 20 year high at 39:100 does, the 3 year average of 30:100 is still within recreational management. Considering that even with a record high buck ratio, hunter success in the herd unit was still the second lowest state. We are hesitant to make any changes based off two good years, and will remain status quo for the 2016 season with a 7 day season with a 3 point or better antler point restriction (APR). The APR is well perceived by the public and removing it at this time could hurt public relations. We do not believe at this time the APR is causing any negative impacts to the buck population which is shown by the percentages of class Is IIs and IIs being more representative of a limited quota season structure than an APR. The nonresident quota for region D will remain at 400 licenses to address low deer populations in the region D herd units, and the change of 6 hunt areas from general to limited quota in the Platte Valley. This will maintain hunter opportunity that is in line with the current mule deer resource.

**Bibliography**

APENDIX A

SHEEP MOUNTAIN OBJECTIVE REVIEW
SHEEP MOUNTAIN MULE DEER HERD UNIT
AND OBJECTIVE REVIEW

Prepared by: Lee Knox, Laramie Senior Wildlife Biologist

The herd unit concept is based on distinct populations and minimal interchange (≤10%) with neighboring populations. The Sheep Mountain Mule Deer Herd Unit (SMMDHU) occupies an estimated 2,500 square miles in southeastern Wyoming, ranging from the city of Cheyenne west to the Snowy Range divide, and from the Colorado/Wyoming state line north to Highway 287/30 and Interstate 80 (Figure 1). The herd unit encompasses hunt areas 61, 74, 75, 76 and 77. Landownership varies from private lands with limited public access to public lands easily accessible. The current Postseason Population Management Objective was last reviewed in 1987 when it was increased from 10,000 to 15,000 mule deer. The herd unit is managed under recreational guidelines which prescribe to maintain a ratio of 20 to 29 bucks:100 does.

Figure 1. 2014 Wyoming mule deer herd units. The Sheep Mountain Mule Deer Herd Unit is highlighted.

POPULATION OBJECTIVE REVIEW

The postseason population objective for this herd unit is currently 15,000 mule deer. The 2014 post-season population estimate was approximately 5,600 mule deer with the population stabilizing after a decline from 7,500 mule deer in 2009 (Figure 2). The postseason population objective is based upon both biological and social factors, including, but not limited to: winter range carrying capacity, hunter needs, landowner needs and tolerance, land status, and competition with other wild and domestic animals. The postseason population estimate is determined by modeling herd dynamics using harvest data and preseason herd classification data.
The SMMDHU population model has been further refined by addition of both adult female and juvenile survival data from research projects conducted in neighboring herds.

Figure 2. Population estimates and objective for the Sheep Mountain Mule Deer Herd Unit, 1993-2014.

CURRENT HERD UNIT MANAGEMENT STRATEGIES

Hunt areas 61, 74, 75, 76, and 77 are managed through a general season structure and recreational guidelines. Although landownership and habitats differ between hunt areas, the same season structure has been maintained due to the overall population size being below objective which requires a conservative management strategy across all hunt areas in the herd unit.

LANDOWNER AND PUBLIC INVOLVEMENT

Surveys were mailed to 107 landowners that owned a minimum of 640 acres in the SMMDHU. Of the 107 letters mailed, 24 completed surveys were returned. At the postseason public meetings in Saratoga, Wheatland, Torrington, Laramie, and Cheyenne, questionnaires were provided to the public, similar to those mailed to the landowners. Only one questionnaire was returned.

Overall, 63% of the landowners that responded were dissatisfied with the current mule deer population (Figure 3). When asked why, 65% of dissatisfied landowners responded that there were too few mule deer, while 5% responded that there were too many mule deer (Figure 4).
Sixty-seven percent of the landowners surveyed believed that the current population objective of 15,000 mule deer was correct (Figure 5). Only 16% believed it should be lowered. Historically, the population was estimated to be near 15,000 mule deer for only a short period in the early 1990s. Using the current model, the population estimate has not been over 8,000 mule deer at any time during the past 20 years (Figure 2).
Harvest has been on a steady decline from 984 mule deer in 2004 to 197 mule deer in 2013. The 2014 harvest saw a slight increase to 290 mule deer (Figure 6). Hunter success has declined precipitously since 2004 (Figure 7). Overall hunter numbers have declined by more than 1,000 over the last decade, indicating low satisfaction with the SMMDHU (Figure 6).
Figure 7. Hunter success and effort, measured as days per harvest, from 2003 to 2014.

**RECOMMENDATION**

Through the Wyoming Mule Deer Initiative process, public meetings, and landowner meetings, the current population objective and whether it should be lowered to an achievable level has been discussed with the public. The current population objective of 15,000 mule deer is unrealistic considering the current population model estimates and current habitat conditions. Public meetings were held in Wheatland, Laramie, Cheyenne, Saratoga, and Casper to propose a new objective of 10,000 mule deer. A total of 80 members of the public attended the meetings. We received five surveys back, all in favor of reducing the current population objective from 15,000 to 10,000 mule deer. A postseason population objective of 10,000 deer may still be difficult to obtain in five years, especially considering past population trends, but it is more palatable to the landowners and the public. If after five years, the population objective is not attained, this objective should be reviewed again.
The Sheep Mtn. Mule Deer Recruitment Project consisted of a 3 yr. (01/01/2013- 12/31/2015) cooperative effort aimed at the removal of coyotes (*Canis latrans*) within Wyoming Hunt Areas 61, 74, 75, 76, 77 and adjacent lands. These removal efforts were aimed at increasing the viability of the mule deer (*Odocoileus hemionus*) herd that fawn in these areas. These areas lay Easterly adjacent to the Medicine Bow National Forest (USFS) and run generally North and South. This area is mainly used for cow/calf production, recreation, and grass cattle ranching. It is interspersed by Private, Bureau of Land Management (BLM), United States Forest Service, and State of Wyoming lands.

The work to remove coyotes from the hunt areas and adjacent lands began on 01/01/2013 and continued until the end of calendar year 2015. Coyote removal efforts (ground/aerial hunting) continued throughout the project timeframe as funding, weather, recreational hunting use of lands, and time demanded by other WS’/ACPMD duties allowed.
Sheep Mtn. fawning areas (black circles) and initially proposed coyote removal areas (orange areas). Please notice that the removal areas were extended considerably on the following yearly GPS coyote removal maps.
A total of 89 coyotes within 17 different agreements were removed from the project area. When GPS waypoints of coyotes taken within the project area could be obtained, they were plotted as GPS points (squares) on the following topographic map. Also, of the 89 coyotes, 24 were retrieved for comprehensive data collection.

Below is a series of operational, budget and coyote related to the data for year 1 of the project time period (01/01/2013-12/31/2013).

30.9 hrs.  ($6,573.00 ACPMD)*  Aerial hunting time only (fixed/rotor wing and assoc. costs).

96.0 hrs.  ($2,337.00 ACPMD, $51.62 WS’)*  Ground work time only.

26.0 hrs.  ($1,342.12 WS’)*  Administrative time only.

89  Coyotes removed from project area.

3  USDA/APHIS/WS personnel involved.

* (approximate costs incurred by ACPMD $8,910.00 and WS’ $1,393.74)

24 of 89 total (27%) coyotes taken verified for sampling and analysis below:

11  Adult male coyotes verified.

11  Adult female coyotes verified.*

1  Pup (female) coyote verified.

1  Pup (male) coyote verified.

* 1 adult female coyote showed evidence of 4 pups whelped.

Stomach content occurrences on 24 verified coyotes.

10 Rodent  2 Empty  14 Pronghorn  3 Deer
Coyote removal map 01/01/2013-12/31/2013

Square indicates location on map where individual coyote was taken.
A total of 116 coyotes and 1 den within 17 different agreements were removed from the project area. When GPS waypoints of coyotes taken within the project area could be obtained, they were plotted as GPS points (squares) on the following topographic map. Also, of the 116 coyotes, 29 were retrieved for comprehensive data collection.

Below is a series of operational, budget and coyote related to the data for year 2 of the project time period (01/01/2014-12/31/2014).

54.0 hrs. \((\$13,446.00 \text{ ACPMD})^*\) Aerial hunting time only (fixed/rotor wing and assoc. costs).

138.0 hrs. \((\$3,563.06 \text{ ACPMD}, \$200.72 \text{ WS'})^*\) Ground work time only.

39.0 hrs. \((\$1,957.02 \text{ WS'})^*\) Administrative time only.

116/1 den Coyotes removed from project area.

3 USDA/APHIS/WS personnel involved.

\(^*\) (approximate costs incurred by ACPMD \$17,009.08 and WS' \$2,157.74)

29 of 116 total (25%) coyotes taken verified for sampling and analysis below:

12 Adult male coyotes verified.\(^*\)

13 Adult female coyotes verified.\(^**\)

3 Pup (female) coyote verified.

1 Pup (male) coyote verified.

\(^*\) 1 adult male exhibited signs of mange mite. \(^**\) 1 adult female showed evidence of 3 pups whelped. 1 adult female showed evidence of 6 pups whelped.

Stomach content occurrences on 29 verified coyotes.

15 Rodent 3 Empty 14 Pronghorn 4 Deer 2 Bird
Coyote removal map 01/01/2014-12/31/2014

Square indicates location on map where individual coyote was removed.
A total of 148 coyotes and 1 den within 16 different agreements were removed from the project area. When GPS waypoints of coyotes taken within the project area could be obtained, they were plotted as GPS points (dots) on the following topographic map. Also, of the 148 coyotes, 18 were retrieved for comprehensive data collection.

Below is a series of operational, budget and coyote related to the data for the 3rd and final year of the project time period (01/01/2015-12/31/2016).

55.0 hrs. \((11,933.50 \text{ ACPMD})^*\) Aerial hunting time only (fixed/rotor wing and assoc. costs).

130.5 hrs. \((4,296.50 \text{ ACPMD, } 205.56 \text{ WS'})^*\) Ground work time only.

24.5 hrs. \((1,259.05 \text{ WS'})^*\) Administrative time only.

158/1 den Coyotes removed from project area.

3 USDA/APHIS/WS personnel involved.

* (approximate costs incurred by ACPMD $16,230.00 and WS' $1,464.56)

18 of 148 total (12%) coyotes taken verified for sampling and analysis below:

8 Adult male coyotes verified.

7 Adult female coyotes verified.**

1 Pup (female) coyote verified.

2 Pup (male) coyote verified.

1 adult female exhibited signs of mange mite. **1 adult female contained 5 unborn pups.

Stomach content occurrences on 18 verified coyotes.

8 Rodent 7 Empty 7 Pronghorn 1 Deer 1 grass 2 Livestock (cow)
Coyote Removal map 01/01/2015-12/31/2015

Dot indicates location on map where individual coyote was removed.
The Sheep Mountain Herd Unit encompasses Hunt Areas 61, 74, 75, 76 and 77. Fawn ratios have varied over the last 10 years but seem to be trending up. During the winters of 2007, 2009 and 2010 we experienced an increase in winter mortalities especially in younger age classes which may also have had an effect on fawn recruitment. The severe drought during the summer of 2012 was hard on wildlife and appears to have caused a poor fawn crop in 2013 as well. In 2014 and 2015 we saw an increase in the fawn crop possible due to the coyote removal project with the ADMB as well as good spring and fall habitat conditions. After the large successful fawn crop in 2014 we expected a slight decrease in fawn ratios in 2015 due to the abundance of yearling does in the population. Current fawn ratios indicate the herd is stable to increasing in population.
In conclusion of this 3 yr cooperative study, it is of opinion that the removal of coyotes, coupled with other favorable influencing conditions, can have a positive effect in the increase of mule deer fawn recruitment.

Special thanks to:

ACPMID Members, WGFD Lee Knox Senior Biologist, USDA/APHIS/WS Joel Modey (Wildlife Specialist) and Jerry Hyatt (WS Pilot), and Sky Aviation (Helicopter Services).

Please feel free to contact me if there are any questions or concerns.

Sincerely,

Craig Acres

USDA/APHIS/WS’ Staff Biologist (ret.)
Cc: Files
01/11/2016
## 2015 - JCR Evaluation Form

**SPECIES:** Mule Deer  
**PERIOD:** 6/1/2015 - 5/31/2016  
**HERD:** MD540 - SHIRLEY MOUNTAIN  
**HUNT AREAS:** 70  
**PREPARED BY:** WILL SCHULTZ

<table>
<thead>
<tr>
<th></th>
<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population:</strong></td>
<td>6,647</td>
<td>6,577</td>
<td>7,177</td>
</tr>
<tr>
<td><strong>Harvest:</strong></td>
<td>294</td>
<td>233</td>
<td>250</td>
</tr>
<tr>
<td><strong>Hunters:</strong></td>
<td>693</td>
<td>576</td>
<td>600</td>
</tr>
<tr>
<td><strong>Hunter Success:</strong></td>
<td>42%</td>
<td>40%</td>
<td>42%</td>
</tr>
<tr>
<td><strong>Active Licenses:</strong></td>
<td>699</td>
<td>583</td>
<td>600</td>
</tr>
<tr>
<td><strong>Active License Success:</strong></td>
<td>42%</td>
<td>40%</td>
<td>42%</td>
</tr>
<tr>
<td><strong>Recreation Days:</strong></td>
<td>2,793</td>
<td>2,590</td>
<td>2,600</td>
</tr>
<tr>
<td><strong>Days Per Animal:</strong></td>
<td>9.5</td>
<td>11.1</td>
<td>10.4</td>
</tr>
<tr>
<td><strong>Males per 100 Females</strong></td>
<td>30</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td><strong>Juveniles per 100 Females</strong></td>
<td>52</td>
<td>72</td>
<td></td>
</tr>
</tbody>
</table>

Population Objective (± 20%) :  
Management Strategy: Recreational  
Percent population is above (+) or below (-) objective: -12.3%  
Number of years population has been + or - objective in recent trend: 20  
Model Date: 02/23/2016

**Proposed harvest rates (percent of pre-season estimate for each sex/age group):**

<table>
<thead>
<tr>
<th>JCR Year</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females ≥ 1 year old</td>
<td>1%</td>
</tr>
<tr>
<td>Males ≥ 1 year old</td>
<td>17%</td>
</tr>
<tr>
<td>Juveniles (&lt; 1 year old)</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>4%</td>
</tr>
<tr>
<td>Proposed change in post-season population:</td>
<td>1%</td>
</tr>
</tbody>
</table>

### Population Size - Postseason

![Population Size - Postseason](image_url)
Active Licenses

Days per Animal Harvested

Postseason Animals per 100 Females
### 2010 - 2015 Postseason Classification Summary

#### for Mule Deer Herd MD540 - SHIRLEY MOUNTAIN

<table>
<thead>
<tr>
<th>Year</th>
<th>Post Pop</th>
<th>MALES</th>
<th>FEMALES</th>
<th>JUVENILES</th>
<th>Males to 100 Females</th>
<th>Young to 100 Females</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Ylg</td>
<td>2+ Cls 1</td>
<td>2+ Cls 2</td>
<td>2+ Cls 3</td>
<td>UnCls Total</td>
</tr>
<tr>
<td>2010</td>
<td>7,100</td>
<td>24</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>2011</td>
<td>7,500</td>
<td>29</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>37</td>
</tr>
<tr>
<td>2012</td>
<td>7,926</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>39</td>
</tr>
<tr>
<td>2013</td>
<td>5,798</td>
<td>26</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>32</td>
</tr>
<tr>
<td>2014</td>
<td>4,910</td>
<td>20</td>
<td>21</td>
<td>9</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2015</td>
<td>6,577</td>
<td>27</td>
<td>18</td>
<td>12</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
2016 HUNTING SEASONS
SHIRLEY MOUNTAIN MULE DEER (MD540)

<table>
<thead>
<tr>
<th>Hunt Area</th>
<th>Type</th>
<th>Season Dates</th>
<th>Quota</th>
<th>License</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td></td>
<td>Oct. 15</td>
<td>Oct. 21</td>
<td>General</td>
<td>Antlered mule deer three (3) points or more on either antler or any white-tailed deer</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Oct. 15</td>
<td>Nov. 30</td>
<td>Limited quota</td>
<td>Doe or fawn valid on private land</td>
</tr>
<tr>
<td>Archery</td>
<td>Sep. 1</td>
<td>Sep. 30</td>
<td>25</td>
<td>Limited quota</td>
<td>Refer to license type and limitations in Section 3 of Chapter 6</td>
</tr>
</tbody>
</table>

Region D Nonresident Quota: 400

<table>
<thead>
<tr>
<th>Hunt Area</th>
<th>License Type</th>
<th>Quota change from 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herd Unit Total</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Management Evaluation
Current Postseason Population Management Objective: 7,500 (6,000-9,000)
Management Strategy: Recreational
2015 Postseason Population Estimate: 6,600
2016 Proposed Postseason Population Estimate: 7,200
2015 Hunter Satisfaction: 56% Satisfied, 21% Neutral, 23% Dissatisfied

Mule deer in the Shirley Mountain herd unit are managed toward a population objective of 7,500. The population was estimated using a spreadsheet model developed in 2012 and updated in 2015. The herd unit is managed for recreational opportunity. The management objective was last reviewed in 2015 and reduced from 10,000 to 7,500 mule deer.

Herd Unit Issues
The Shirley Mountain herd unit is comprised of a mixture of habitat and landownership types. Hunter access to public lands containing mule deer habitat is considered good. Small groups of mule deer are considered nuisances and create damage in a localized area on the west side of Shirley Mountain, in the Lost Creek and Sage Creek drainages. Trends in mule deer numbers were in decline until this year; while interest from both
residents and nonresidents hunters in this herd unit has remained high. Expansion of wind farms in the eastern and southern portions of this herd unit is eminent.

**Weather**

Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were average, to slightly above average at all elevations throughout the herd unit. No significant prolonged periods of extreme heat or cold temperatures were observed. The timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. Weather patterns most likely had a positive influence on mule deer. Mild fall temperatures and lack of persistent snow allowed mule deer to stay longer in spring, summer, and fall ranges providing additional relief for winter ranges that have historically been over utilized. Snow accumulation began mid December and persisted in lower elevation winter ranges through February. For specific meteorological information for the Shirley Mountain herd unit the reviewer is referred to: [http://www.ncdc.noaa.gov/cag/](http://www.ncdc.noaa.gov/cag/)

**Habitat**

Positive trends in habitat conditions were observed in bio-year 2015 due to timely and adequate amounts of precipitation received in this herd unit. The limited number of habitat transects that have been established within this herd unit do not provide sufficient data to make reliable inferences about habitat quantity or quality. The vast majority of shrub habitats in this herd unit are in need of treatments which would result in improved nutritive content and increased production for shrubs.

**Field Data**

Postseason classifications were conducted from the ground in late November of 2015. A less than adequate sample size (n=294) was 4% lower than the 2014 sample size. Yearling buck ratios increased in 2015 by 40% to 20/100 does. This was the most significant increase in yearling buck ratios observed since the 3-points or more on either antler hunting season limitation had been implemented. It was presumed the increased yearling buck ratio was correlated more with the previous winter’s mild conditions and improved range conditions than the hunting season limitation. The adult buck ratio increased in 2015 to 23/100 does, for a 22% increase from 2014. The overall buck ratios increased from 30/100 does in 2014 to 42/100 does in 2015. This increase was also attributed to previous winter’s mild conditions and improved range conditions.

Fawn ratios increased significantly from 50/100 does in 2014, to 72/100 does in 2015, for a 31% increase. This increase was again attributed to mild winter conditions experienced by pregnant does and timely spring and summer precipitation which resulted in improved nutrition for lactating does.
Harvest Data
Overall, harvest and satisfaction rates increased in 2015. This marked the third year of the 3-points or more on either antler limitation in this herd unit. The antler point restriction was implemented as an additional protection specifically for yearling bucks. General season lengths had already been incrementally reduced to the current 7-day season during previous years to protect bucks from over exploitation. The final 2015 WGFD deer harvest survey report indicated 576 active general licensed hunters’ harvested 233 mule deer for an overall success rate of 41%. General season buck harvest increased 17% and hunter numbers increased 3%, as compared with the 2014 hunting season statistics. The percentage of hunters with harvest survey satisfaction ratings of satisfied, or very satisfied, increased 5% to 56% in 2015.

Population
In 2015, we selected to use the CJ,CA model. This model produced the highest Fit score and the lowest AICc score. The TSJ,CA model’s use was discontinued as it tended to simulate mule deer population dynamics with fawn survival rates alternating annually between the low and high parameters allowed for survival without correlating well with what managers observed annually for survival rates in fawns ratios and weather severity. We rated this model as poor, and not biologically defensible. This rating was based on criteria identified in the user’s guide for the WGFD spreadsheet model, and primarily due to less than adequate sample sizes for postseason classification counts (Morrison 2012).

We also incorporated 3 abundance estimates into this model (Strickland, et. al 1994) which assisted in reducing the model’s overall propensity to overestimate this population. This herd unit is considered to contain significantly less mule deer than the spreadsheet model estimates. Given the openness of the landscape, and well defined herd unit boundaries, we consider annual classification sample sizes were not representative of a population estimated at this magnitude. The trend depicted in the spreadsheet model’s population estimates does appear to be fairly representative of the observed mule deer abundance in this herd unit. Without other information such as a recent independent abundance estimate or long-term survival data to incorporate into the model, accuracy of estimates will continue to be unknown.

In 2015, we reviewed the management objective (Appendix I). The management objective was decreased from a population objective of 10,000 mule deer postseason to 7,500 mule deer postseason. This reduction was completed to better align the population objective with the population estimates generated by the spreadsheet model, and to provide managers with a more sustainable management goal.

Management Summary
A 7-day General season for antlered mule deer, 3 points or more on either antler or any white - tailed deer will continue in 2016. The point restriction continued to provide protection for yearling buck mule deer. Although a more liberal hunting season could have been prescribed for this herd unit, managers were concerned this would have increased hunting pressure and harvest beyond acceptable limits by attracting General
season deer hunters from the more conservative surrounding herd units. Type 6 private land doe or fawn licenses continued to be prescribed to reduce damage and nuisance deer issues in the Lost Creek and Sage Creek drainages.

The Region D nonresident quota was retained at 400 licenses to align hunter opportunity with the current mule deer resource. This will also improve hunter satisfaction for both nonresidents and resident hunters.

**Literature Cited**

**Bibliography of Herd Specific Studies**

The Shirley Mountain Mule Deer herd unit consists of deer Hunt Area 70, which lies north of U. S. Highway 30, west of Wyoming Highway 487, south of Bates Hole, and east of the North Platte River, in south-central Wyoming (Figure 1). The Herd Unit contains the Shirley, Bennett (Seminole), Freezeout, and Pedro Mountains. Elevation ranges from approximately 1,798 meters to over 2,438 meters above sea level. Habitats include montane forests (primarily lodgepole pine), aspen, mountain shrub, sagebrush-grasslands, grasslands, riparian, agricultural lands, and reclaimed coal mines. Topographic relief can be dramatic and can offer quality hiding or escape terrain for mule deer.

Figure 1. Map of the Shirley Mountain mule deer herd unit, Hunt Area 70, located in south-central Wyoming.
The Shirley Mountain Herd Unit encompasses 3,735 km² of occupied mule deer habitat. Land ownership consists of 48% private ownership, 43% mixed federal lands, primarily Bureau of Land Management, and 9% Wyoming Office of State Land and Investments. The southern half of the herd unit is mostly a checkerboard of private, state, and BLM lands as a result of land grants to railroads in the 19th century. The northern half contains more single owner blocks of land with large areas of accessible public land. In recent years, one ranch has acquired a substantial amount of private land in and around the Shirley Mountains, and it controls access to a substantial amount of private and public mule deer habitat.

CURRENT POPULATION OBJECTIVE REVIEW

Wyoming Game and Fish Department (WGFD) has traditionally used postseason population objectives as a guide for mule deer management at the herd unit level. The postseason population objective is the desired number of mule deer remaining in the herd unit after the annual hunting season has been completed. Generally, if the population estimate is above the population objective, WGFD will propose changes to the herd unit’s next hunting seasons which will increase harvest and reduce the number of mule deer toward the population objective. Conversely, if the population estimate is below the population objective, WGFD will propose changes to the herd unit’s next hunting seasons which will decrease harvest and increase the number of mule deer toward the population objective.

In 1978, WGFD adopted the first postseason population objective of 5,200 (±20%) mule deer for the Shirley Mountain herd unit. Subsequently, the objective was reviewed in 1987 and increased to 10,000 (±20%) mule deer due to changes in estimation techniques, sportsmen desires, and landowner desires/tolerances. The Shirley Mountain herd unit population objective of 10,000 (±20%) mule deer has not been reviewed since 1987.

An actual count of all mule deer in a herd unit would be, for all practical purposes, impossible to complete. Therefore, WGFD develops herd unit population estimates using a computer-based population model. Data collected annually through hunter-harvest surveys and postseason mule deer sex and age classification surveys are incorporated into the population model. The population estimate produced by the computer-based population model is used to determine where the herd unit’s mule deer population is at in relation to the established population objective.

Shirley Mountain herd unit hunter-harvest survey sample sizes have been adequate for producing estimates of harvest with an acceptable 80% confidence interval. However, postseason mule deer sex and age classification survey sample sizes have been less than adequate and may be a source of bias in the herd unit’s population estimates. Low sample sizes for annual classification surveys may be due in part to conducting these surveys from the ground instead of with the use of a helicopter. Annual population estimates for the Shirley Mountain herd unit are currently produced using a computer-based, spreadsheet population model adopted by WGFD in 2012 (Morrison 2012). Retrospective comparison between population estimates produced by the former POP-II model and the current spreadsheet model indicated the spreadsheet model produced lower annual estimates. Generally, the spreadsheet model’s estimates are considered
more accurate than the previous POP-II population model estimates for this herd unit. Additionally, 3 mule deer sightability surveys were conducted in the early 1990s in this herd unit (Strickland et.al 1994). Abundance estimates from these sightability surveys were incorporated into the current spreadsheet model to improve the population estimation accuracy.

The 2014 postseason population estimate was 4,909 mule deer (Figure 2). This estimate is considered to be biologically plausible. Like many of the mule deer herds in Wyoming, the Shirley Mountain herd unit experienced excellent population growth during the 1960s and 1970s. However since then this herd unit, like most of Wyoming’s herd units, has experienced a significant reduction in annual fawn recruitment. This in turn has led to the herd units either stabilizing at lower population levels than those previously observed, or they continue to decrease in trend. Although there are many factors contributing cumulatively to today’s reduced mule deer numbers, the direct and indirect impacts from severe winters and drought are considered to be the most significant factors.

Figure 2. 1991-2014 Shirley Mountain herd unit postseason mule deer population estimates, Wyoming.
CURRENT MANAGEMENT STRATEGY

Shirley Mountain herd unit is entirely contained in deer Hunt Area 70 and is managed under the recreational management strategy. This strategy directs WGFD to optimize recreational opportunity, while managing harvest to maintain 20-29 bucks/100 does postseason in the herd unit. Currently, mule deer hunting in this herd unit is permitted with a General deer license. In recent years, WGFD has recommended very conservative seasons for this herd unit with reduced season lengths and an antler point limitations because the population estimate is well below the management objective.

RECOMMENDED HERD UNIT OBJECTIVE AND MANAGEMENT STRATEGY

WGFD recommends the population objective for the Shirley Mountain herd unit be reduced to a level which is currently considered both biologically achievable, and sustainable. We recommend reducing the postseason population objective from 10,000 (±20%) mule deer to 7,500 (±20%) mule deer. We also recommend maintaining the recreational management strategy for the Shirley Mountain herd unit.

Three years ago, WGFD began the long overdue task of reviewing management objectives for all big game herd units in Wyoming, to be completed over the course of the next 5-years. At the root of this effort was a genuine need to update the objectives with goals which were both biologically achievable, and sustainable. Much has changed since many of these management herd unit objectives were last reviewed. Most notably, changes in the ability of the habitat to sustain the population levels which had been previously observed in many herd units.

An indicator of the habitat’s inability to continue to support mule deer population levels previously observed in many herd units has been reduced recruitment rates for mule deer. A declining trend in recruitment has been documented in almost every herd unit in Wyoming, as well as in many areas across the west. This declining trend has been primarily attributed to changes in the ability of habitat to provide the specific forage, cover, and security required by mule deer. Changes in seral stages of vegetative communities to less productive stages, severe drought which has reduced annual forage production, and the conversion of habitat to residential and energy development, all have cumulatively reduced habitat for mule deer.

The recommended population objective of 7,500 (±20%) mule deer is 33% greater than the current population estimate of 4,909 mule deer. WGFD believes this to be a realistic goal to manage towards. In an effort to halt the mule deer decline and reverse the population trend, WGFD has supported several efforts to enhance mule deer habitat in this herd unit. The WGFD has continued to recommend liberal elk seasons in this herd unit in an effort to reduce potential competition between elk and mule deer for resources. WGFD has also supported efforts to reduce large carnivore and predator populations in this herd unit in an attempt to increase mule deer recruitment. While the effect of these and other efforts may not be immediately realized, WGFD believes these efforts will provide a benefit to mule deer in the Shirley Mountain herd unit.
LANDOWNER AND PUBLIC INVOLVEMENT

WGFD made a concerted effort to provide stakeholders with an opportunity to be involved in the review of the Shirley Mountain mule deer herd unit population objective, and to provide comment on the recommendations. Mule deer are a species of great concern for many of the stakeholders who participated in the review process. There was almost a unanimous desire by all stakeholders during this process to see the current number of mule deer increased.

Landowner Involvement

In February of 2015, a letter describing the objective review process and a survey were sent to all landowners (n= 64) who owned at least 160 acres in the Shirley Mountain herd unit (ATTACHMENT A). WGFD received 20 survey responses from landowners for a return rate of 31%. Of the 17 landowners who responded to Question 1 about how satisfied they were with current mule deer numbers, 53% indicated they were somewhat satisfied or very satisfied with the current mule deer population and 47% were somewhat dissatisfied or very dissatisfied with the current mule deer population (ATTACHMENT B). Most landowners who were dissatisfied were so because there were too few mule deer in the herd unit. When asked what landowners thought about the current objective of 10,000 (±20%) mule deer in Question 3, 231 of the 16 landowners who responded indicated the objective needed to be increased, 6% thought it should be decreased, and 63% percent thought the current objective was acceptable. The herd unit objective was also reviewed at the Leo area landowner meeting. Comments from this meeting were similar to the landowner survey responses received by WGFD.

Public Involvement

In January of 2015, population objective review meetings were held in conjunction with post-season public information gathering (PIGM) meetings in Cheyenne, Hanna, and Laramie. We received only one (1) written comment on the Shirley Mountain mule deer objective review from these meetings (ATTACHMENT C).

In March of 2015, population objective recommendations were presented in conjunction with season-setting public information gathering meetings in Casper, Cheyenne, Laramie, Saratoga, and Wheatland. These meetings were attended by a total of 75 people. We received 7 written comments on the Shirley Mountain mule deer objective recommendation (ATTACHMENT D). All 7 (100%) written comments supported the recommendation to reduce the management objective from 10,000 (±20%) mule deer to 7,500 (±20%) mule deer.

In summary, most landowners and sportsmen would like to see more mule deer than what is currently in the herd unit. The WGFD recommendation will allow for increasing the mule deer population by approximately 33% over what is currently estimated for this herd unit. All of the written comments WGFD received at the PIGMs were in support of this recommendation to reduce the management objective from 10,000 (±20%) mule deer to 7,500 (±20%) mule deer.
LITERATURE CITED


20 February 2015

Dear Landowner,

The Wyoming Game and Fish Department (Department) is seeking your assistance in the future management of big game wildlife in your area. During the spring of 2015, the Department will review the herd unit management objectives for several big game herd units including the Shirley Mountain mule deer and Shirley Mountain elk herd units. Enclosed in this letter you will find a short survey for the herd unit your property is located within and postage-paid return envelope. Please complete the survey questions, provide additional comments if you desire, and mail the survey in the enclosed return envelope.

The herd unit management objective is the “goal” which the Department manages big game wildlife towards. For most big game herd units in Wyoming, the Department manages big game wildlife towards a numeric management objective, usually identified as a postseason population estimate.

Many of Wyoming’s big game wildlife rely on habitat located on private lands. Therefore, landowner opinions on herd unit management objectives are important to Department. The comments we receive from your completed surveys will be used in part to formulate Department recommendations for the future herd unit management objectives. Changes in the herd unit management objective could result in increasing harvest opportunities to decrease the number of big game animals, or conversely, changes could result in reducing harvest opportunities in order to increase the number of big game animals. For planning purposes, the Department would like to identify management objectives which are considered biologically achievable within the next five years.

Thank you for taking the time to share your thoughts and opinions with us. If you have any questions please contact Will Schultz at 307-326-3020. We look forward to receiving your survey and working with you on the future management of Wyoming’s Wildlife.

Sincerely,

Will Schultz
Saratoga Wildlife Biologist

WS/ws
Shirley Mountain Mule Deer Herd Unit Objective Survey

1. How satisfied are you with the current Shirley Mountain mule deer population:
   -  □ Very Satisfied
   -  □ Somewhat Satisfied
   -  □ Somewhat Dissatisfied
   -  □ Very Dissatisfied

2. Please indicate why you selected the response you did for question 1.
   -  □ There are too many mule deer in the population
   -  □ There is the right amount of mule deer in the population
   -  □ There are too few mule deer in the population
   -  □ Other ________________________________

3. What do you think about the current post-season population objective of 10,000 (8,000-12,000) mule deer?
   -  □ Current population objective needs to increase
   -  □ Current population objective needs to decrease
   -  □ Current population objective is acceptable

4. If you have additional comments, please share them in the space below:
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________
   ____________________________________________________________________________

If, in the future, you would like to be contacted through email please provide your email address below.
________________________________________________________________________

Please Mail To: WGFD, 528 South Adams, Laramie, WY 82070 By March 15th.
Deer Hunt Area 70 contains the entire Shirley Mountain Mule Deer Herd Unit.
Shirley Mountain Mule Deer
Landowner Survey
64 surveyed / 20 responses

Summary

1. How satisfied are you with the current Shirley Mountain mule deer population?

<table>
<thead>
<tr>
<th>Satisfied Level</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very satisfied</td>
<td>3</td>
<td>18%</td>
</tr>
<tr>
<td>Somewhat satisfied</td>
<td>6</td>
<td>35%</td>
</tr>
<tr>
<td>Somewhat dissatisfied</td>
<td>6</td>
<td>35%</td>
</tr>
<tr>
<td>Very dissatisfied</td>
<td>2</td>
<td>12%</td>
</tr>
</tbody>
</table>

2. Please indicate why you selected the response you did for Question 1.:

<table>
<thead>
<tr>
<th>Reason</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>There are too many mule deer in the population</td>
<td>1</td>
<td>6%</td>
</tr>
<tr>
<td>There is the right amount of mule deer in the population</td>
<td>8</td>
<td>44%</td>
</tr>
<tr>
<td>There are too few mule deer in the population</td>
<td>9</td>
<td>50%</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>
3. **What do you think about the current post-season population objective of 10,000 (8,000-12,000) mule deer?**

Current population objective needs to increase 5 31%
Current population objective needs to decrease 1 6%
Current population objective is acceptable 10 63%

**Additional Comments:**

The three points and better on the bucks is a good idea and should stay in place until the deer herds come back.

Hi Will- as I said no data from me. Mule deer are on the property. (Windy Hill I80- exit 196).
Frank-530-219-4477
On the one section of pasture I own I haven't seen a deer on the place. I have seen a few antelope.

The three point or better is a good program. I wouldn’t be opposed to making this area a special permit area.

How are we supposed to answer if we don’t know if that objective is an increase or a decrease?

Deer on our property have steadily decreased over the last 10-15 years. This area should be 4 points or better and SPECIAL PERMIT ONLY! We used to have a decent whitetail population as well as mule deer but they are completely gone at this point.

We control only about 2800 acres of BLM lease on west side of 487 in Shirley Basin. We use this as summer pasture only and never seen a deer on property, only antelope. I don't feel qualified to answer questions.

I see no need for 10,000 mule deer. The population base in conjunction with area 161 is more than adequate if not over populated. I do not believe there is any reason to increase the existing population for fear of hurting the habitats.

Limited Quota, 4 point of better
Deer populations in this part of the area are adequate for now. It will be interesting to see which way they go in the next 5 years. I am concerned that predators (wolf and lion) will play a large part in the population in the near future.
Shirley Mountain Mule Deer Herd Unit Objective Review

1. How satisfied are you with the current Shirley Mountain mule deer population:
   □ Very Satisfied  □ Somewhat Satisfied  □ Somewhat Dissatisfied  □ Very Dissatisfied

2. Please indicate why you selected the response you did for question 1.
   □ There are too many animals in the population
   □ There is the right amount of animals in the population
   X There are too few animals in the population
   □ Other ______________________

3. What do you think about the current post-season population objective of 10,000 (8,000-12,000) mule deer?
   □ Current Herd Objective Needs to Increase
   □ Current Herd Objective Needs to Decrease
   X Current Herd Objective is Acceptable

4. If you have additional comments, please share them in the space below:
   I would really like to see it be limited

If, in the future, you would like to be contacted through email please provide your email address below.

Please Mail To: WGFD, 528 South Adams, Laramie, WY 82070

THANK YOU for your participation!
Herd Unit Management Objective Proposal Meeting Saratoga
Town Hall – 6:00 PM, 23 March 2014

Shirley Mountain Mule Deer
Current population estimate = 4,909 (=20%) mule deer
Management Strategy: Recreational
Propose to decrease the management objective from 10,000 to 7,500 (=±20%) mule deer and maintain recreational management for the next 5-years.

X I support this proposal
☐ I do not support this proposal

Shirley Mountain Elk
Current population estimate = 800 elk
Management Strategy: Recreational
Propose to change the management objective from a postseason population estimate of 800 to a mid-winter trend count objective of 800 (=±20%) elk, and to change from a Recreational management strategy (15-29 bulls:100 cows) to a Special management strategy (30-34 bulls:100 cows) for the next 5-years.

X I support this proposal
☐ I do not support this proposal

Comments:
I'm in favor of increasing quality for deer & elk in the strategy.

Rick Temple

If, in the future, you would like to be contacted through email please provide your email address below.

THANK YOU for your participation!
Herd Unit Management Objective Proposal Meeting Saratoga
Town Hall – 6:00 PM, 23 March 2014

Shirley Mountain Mule Deer
Current population estimate = 4,909 (±20%) mule deer
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☐ I support this proposal
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Shirley Mountain Elk
Current population estimate = 800 elk
Management Strategy: Recreational
Propose to change the management objective from a postseason population estimate of 800 to a mid-winter trend count objective of 800 (±20%) elk, and to change from a Recreational management strategy (15-29 bulls:100 cows) to a Special management strategy (30-34 bulls:100 cows) for the next 5-years.

☐ I support this proposal
☐ I do not support this proposal

Comments:

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

If, in the future, you would like to be contacted through email please provide your email address below.

THANK YOU for your participation!

Randy Morrison

"Conserving Wildlife - Savoring Packed"
Herd Unit Management Objective Proposal Meeting Saratoga
Town Hall – 6:00 PM, 23 March 2014

Shirley Mountain Mule Deer
Current population estimate = 4,909 (±20%) mule deer
Management Strategy: Recreational
Propose to decrease the management objective from 10,000 to 7,500 (±20%) mule deer and maintain recreational management for the next 5-years.

[ ] I support this proposal
[ ] I do not support this proposal

Shirley Mountain Elk
Current population estimate = 800 elk
Management Strategy: Recreational
Propose to change the management objective from a postseason population estimate of 800 to a mid-winter trend count objective of 800 (±20%) elk, and to change from a Recreational management strategy (15-29 bulls:100 cows) to a Special management strategy (30-34 bulls:100 cows) for the next 5-years.

[ ] I support this proposal
[ ] I do not support this proposal

Comments:
[ ] I definitely support quality maturity and this strategy

If, in the future, you would like to be contacted through email please provide your email address below.

THANK YOU for your participation!
Herd Unit Management Objective Proposal Meeting Saratoga
Town Hall – 6:00 PM, 23 March 2014

Shirley Mountain Mule Deer
*Current population estimate = 4,909(±20%) mule deer*
*Management Strategy: Recreational*
Propose to decrease the management objective from 10,000 to 7,500 (±20%) mule deer and maintain recreational management for the next 5-years.

[ ] I support this proposal
[ ] I do not support this proposal

Shirley Mountain Elk
*Current population estimate = 800 elk*
*Management Strategy: Recreational*
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[ ] I support this proposal
[ ] I do not support this proposal

Comments:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Herd Unit Management Objective Proposal Meeting Saratoga
Town Hall – 6:00 PM, 23 March 2014

Shirley Mountain Mule Deer
- Current population estimate = 4,909 (±20%) mule deer
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Propose to decrease the management objective from 10,000 to 7,500 (±20%) mule deer and maintain recreational management for the next 5-years.

- [ ] I support this proposal
- [ ] I do not support this proposal

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- [ ] I support this proposal
- [ ] I do not support this proposal

Comments:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Herd Unit Management Objective Proposal Meeting Saratoga
Town Hall – 6:00 PM, 23 March 2014

Shirley Mountain Mule Deer
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- [ ] I support this proposal
- [ ] I do not support this proposal

Shirley Mountain Elk
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Propose to change the management objective from a postseason population estimate of 800 to a mid-winter trend count objective of 800 (±20%) elk, and to change from a Recreational management strategy (15-29 bulls:100 cows) to a Special management strategy (30-34 bulls:100 cows) for the next 5-years.

- [ ] I support this proposal
- [ ] I do not support this proposal

Comments:

________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
________________________________________________________________________________________
Herd Unit Management Objective Proposal Meeting Saratoga
Town Hall – 6:00 PM, 23 March 2014

Shirley Mountain Mule Deer
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☒ I support this proposal
☐ I do not support this proposal

---

Shirley Mountain Elk
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*Management Strategy: Recreational*
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☒ I support this proposal
☐ I do not support this proposal

Comments:
Elk – maintain the quality

Our – back 10 years much better for deer years ago when it was a Limited Quota area.

3/26/15

"Conserving Wildlife - Serving People"
2015 - JCR Evaluation Form

SPECIES: Mule Deer

HERD: MD541 - PLATTE VALLEY

HUNT AREAS: 78-81, 83, 161


PREPARED BY: WILL SCHULTZ

<table>
<thead>
<tr>
<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population:</td>
<td>10,775</td>
<td>13,185</td>
</tr>
<tr>
<td>Harvest:</td>
<td>540</td>
<td>523</td>
</tr>
<tr>
<td>Hunters:</td>
<td>1,898</td>
<td>894</td>
</tr>
<tr>
<td>Hunter Success:</td>
<td>28%</td>
<td>59%</td>
</tr>
<tr>
<td>Active Licenses:</td>
<td>1,918</td>
<td>894</td>
</tr>
<tr>
<td>Active License Success:</td>
<td>28%</td>
<td>59%</td>
</tr>
<tr>
<td>Recreation Days:</td>
<td>10,193</td>
<td>4,852</td>
</tr>
<tr>
<td>Days Per Animal:</td>
<td>18.9</td>
<td>9.3</td>
</tr>
<tr>
<td>Males per 100 Females</td>
<td>29</td>
<td>44</td>
</tr>
<tr>
<td>Juveniles per 100 Females</td>
<td>54</td>
<td>72</td>
</tr>
</tbody>
</table>

Population Objective (± 20%): 16000 (12800 - 19200)

Management Strategy: Recreational

Percent population is above (+) or below (-) objective: -17.6%

Number of years population has been + or - objective in recent trend: 9

Model Date: 02/18/2016

Proposed harvest rates (percent of pre-season estimate for each sex/age group):

<table>
<thead>
<tr>
<th>JCR Year</th>
<th>Proposed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females ≥ 1 year old:</td>
<td>0.1%</td>
</tr>
<tr>
<td>Males ≥ 1 year old:</td>
<td>19%</td>
</tr>
<tr>
<td>Juveniles (&lt; 1 year old):</td>
<td>0%</td>
</tr>
<tr>
<td>Total:</td>
<td>5%</td>
</tr>
</tbody>
</table>

Proposed change in post-season population: 0.03% 3.0%
## 2010 - 2015 Postseason Classification Summary

for Mule Deer Herd MD541 - PLATTE VALLEY

<table>
<thead>
<tr>
<th>Year</th>
<th>Post Pop</th>
<th>MALES</th>
<th>FEMALES</th>
<th>JUVENILES</th>
<th>Males to 100 Females</th>
<th>Young to 100 Fem</th>
<th>Conf</th>
<th>Int</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Ylg</td>
<td>2+ Cls 1</td>
<td>2+ Cls 2</td>
<td>2+ Cls 3</td>
<td>2+ UnCls Total</td>
<td>%</td>
<td>Total</td>
</tr>
<tr>
<td>2010</td>
<td>12,700</td>
<td>111</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>222</td>
<td>333</td>
<td>14%</td>
</tr>
<tr>
<td>2011</td>
<td>11,100</td>
<td>125</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>392</td>
<td>517</td>
<td>15%</td>
</tr>
<tr>
<td>2012</td>
<td>10,450</td>
<td>70</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>143</td>
<td>213</td>
<td>15%</td>
</tr>
<tr>
<td>2013</td>
<td>8,672</td>
<td>136</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>209</td>
<td>345</td>
<td>17%</td>
</tr>
<tr>
<td>2014</td>
<td>10,951</td>
<td>85</td>
<td>549</td>
<td>448</td>
<td>151</td>
<td>0</td>
<td>319</td>
<td>18%</td>
</tr>
<tr>
<td>2015</td>
<td>13,185</td>
<td>143</td>
<td>82</td>
<td>130</td>
<td>19</td>
<td>0</td>
<td>374</td>
<td>21%</td>
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### 2016 HUNTING SEASONS

**PLATTE VALLEY MULE DEER (MD541)**

<table>
<thead>
<tr>
<th>Hunt Area</th>
<th>Type</th>
<th>Season Dates</th>
<th>Quota</th>
<th>License</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>78</td>
<td>1</td>
<td>Oct. 1 - Oct. 14</td>
<td>300</td>
<td>Limited quota</td>
<td>Antlered mule deer or any white-tailed deer</td>
</tr>
<tr>
<td>79</td>
<td>1</td>
<td>Oct. 1 - Oct. 14</td>
<td>300</td>
<td>Limited quota</td>
<td>Antlered mule deer or any white-tailed deer</td>
</tr>
<tr>
<td>80, 83</td>
<td>1</td>
<td>Oct. 1 - Oct. 14</td>
<td>200</td>
<td>Limited quota</td>
<td>Antlered mule deer or any white-tailed deer</td>
</tr>
<tr>
<td>81</td>
<td>1</td>
<td>Oct. 1 - Oct. 14</td>
<td>200</td>
<td>Limited quota</td>
<td>Antlered mule deer or any white-tailed deer</td>
</tr>
<tr>
<td>161</td>
<td>1</td>
<td>Oct. 1 - Oct. 14</td>
<td>25</td>
<td>Limited quota</td>
<td>Antlered mule deer or any white-tailed deer</td>
</tr>
<tr>
<td>Archery</td>
<td>Sep. 1 - Sep. 30</td>
<td>Refer to license type and limitations in Section 3 of Chapter 6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hunt Area</th>
<th>License Type</th>
<th>Quota change from 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herd Unit Total</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

**Management Evaluation**

Current Postseason Population Management Objective: 16,000 (12,800 – 19,200)

**Management Strategy:** Recreational

2015 Postseason Population Estimate: 13,200

2016 Proposed Postseason Population Estimate: 13,600

2015 Hunter Satisfaction: 74% Satisfied, 13% Neutral, 13% Dissatisfied

Mule deer in the Platte Valley herd unit are managed toward a numeric objective of 16,000. The population was estimated using a spreadsheet model developed in 2012 and is updated annually. The herd is managed for recreation opportunity. The objective was reviewed in 2014 and reduced from a postseason population management objective of 20,000 mule deer to 16,000 mule deer.
**Herd Unit Issues**

Fieldwork for several Platte Valley Habitat Partnership projects has been initiated during this past 2 years but progress on large scale projects has been delayed by the NEPA constraints associated with working on federally managed lands. A large proportion of the mule deer that reside in this herd unit during winter actually spend the summer and early fall in Colorado. The Platte Valley Mule Deer Initiative and Platte Valley Habitat Partnership continue to work on improving mule deer management and habitat. Efforts to reduce predators of mule deer in the Platte Valley were continued during this period. Carbon County Predator Management District completed the final year of a 3-year coyote removal project (Appendix I).

**Weather**

- Compiled by WGFD Terrestrial Habitat Biologist, Katie Cheesbrough

Annual bio-year precipitation from October 2014 through September 2015 was slightly higher than the 30 year average. Growing season precipitation (April-June 2015) and precipitation in high elevation spring/summer/fall ranges (May-July 2015) was notably higher than the 30 year average. As illustrated by Figure 1, most of the precipitation occurred outside of the primary growing season, likely in the form of snow. There was significant spring moisture in 2015 from both early spring snows and significant late spring rain events. Although August was fairly dry, there was some early fall moisture in September.

Figure 1. Parameter-Elevation Relationships on Independent Slopes Model (PRISM) was utilized to estimate precipitation by calculating a climate-elevation regression for each Digital Elevation Model grid cell (4 km resolution), Platte Valley mule deer herd unit, Wyoming.
As of mid-February the Platte Valley mule deer herd unit has seen fairly average winter conditions across elevations with the exception of particularly high wind speeds in February. At lower elevations, as reported by the South Brush Creek Snotel Site (Figure 2), snowpack (snow water equivalent) is at 95% of normal. Higher elevations are seeing similar winter snowpack with the North French Creek Snotel Site (Figure 3) reporting a snowpack that is 93% of normal.

Figure 2. October-February bio-year 2015 South Brush Creek Snotel Site precipitation data, Wyoming.

![South Brush Creek Snotel Site - 8,440 ft](image)

Figure 3. October-February bio-year 2015 North French Creek Snotel Site precipitation data, Wyoming.

![North French Creek Snotel Site - 10,130 ft](image)
**Habitat**  
- Compiled by WGFD Terrestrial Habitat Biologist, Katie Cheesbrough

Exceptional fall precipitation in 2014 and mild 2014-2015 winter conditions allowed to deer enter winter with above average body condition. Growing season precipitation was higher than the 30 year average in 2015, resulting in excellent production of grasses, forbs, and shrubs across all seasonal ranges providing for ample forage during early parturition. However, despite favorable early season precipitation, many important shrub habitats continue to underperform due to maturity and decadence caused by a lack of disturbance. Early season precipitation over the past 2 years has also created a flush of cheatgrass across the Platte Valley which is starting to degrade mule deer habitat by outcompeting native grasses and forbs and can create conditions that are favorable to catastrophic wildfires.

Terrestrial Habitat Biologists began forage production monitoring on the Pennock Wildlife Habitat Management Area (WHMA) in 2014 to determine forage capacity for both wildlife and livestock. Plot sites were selected to capture the different vegetation types that exist within elevational ranges as well as on the irrigated meadow.

Above average precipitation was experienced in the Platte Valley in both 2014 and 2015 which influenced production values found on the Pennock WHMA. The total average production across the WHMA, based on total acres in each elevational range, was approximately 514 lbs/acre for 2015. Due to extremely wet spring weather and inaccessible roads, utilization sampling was not conducted in 2015 but will be collected in 2016.

Besides the Pennock WHMA forage production clipping, no permanent vegetative transects were analyzed this year within the herd unit, but the new Rapid Habitat Assessment developed by the WGFD were initiated in the Platte Valley herd unit. Landscape assessments were completed in July 2015 in the Savage Creek, Cedar Breaks, School Creek, and Prospect areas. Initial assessment areas were selected using local knowledge, mule deer collar data, and GIS maps and imagery. Habitat types assessed included aspen in known parturition habitats and mixed mountain shrubs in transitional and winter ranges. The assessments were conducted by the Saratoga Game Warden, Wildlife Biologist, Habitat Biologist, and Statewide Habitat Biologist. From the seven assessments completed it appears that much of the component is either in a mature or decadent age class, indicating the need for disturbance in order to increase nutritive content in these shrubs. Shrub hedging classes were mostly moderate with severe hedging found on heavily used winter range. The one aspen assessment that was conducted in 2015 indicated a conifer encroachment issue which is consistent with observations in aspen stands across the herd unit.

**Field Data**  
The 2015 Platte Valley Herd Unit postseason classification ratios were 44 bucks and 72 fawns per 100 does; based on an adequate sample of 1,820 mule deer. The buck ratio
increased 18% in 2015. This increase was attributed to the combination of both a conservative limited quota hunting season and greater over winter survival than in recent years. The observed fawn ratio at 72 fawns/100 does was 12% greater than the previous year and 24% than the previous 5-year average. A mild winter and timely precipitation contributed to providing improved habitat conditions and increased nutrition for mule deer. Rodent and rabbit populations appeared to be at higher levels than in previous years and may have provided alternative food sources for many mule deer predators, resulting in lower predation rates on fawns in 2015.

**Harvest Data**

2015 marked the third year for limited quota hunting in the Platte Valley herd unit. Each hunt area was prescribed a license quota specific to the hunt area. The same quotas from the 2013 and 2014 were retained in 2015 as they had permitted harvest success to attain the PVMDI Mule Deer Plan goal of at least 40%. A total of 894 active licensed hunters harvested 523 bucks and 0 does. Overall harvest success increased from 57% in 2014 to 59% in 2015. Similar to the 2014 harvest rate, the 2015 harvest rate was attributed to the recent increase in fawn survival rates, a season length of 14-days, and perhaps most importantly, a reasonable alignment of hunter numbers with the current mule deer resource. The increased harvest success rate translated into an increase in the number hunters who selected a harvest survey satisfaction rating of satisfied, or very satisfied. Hunter satisfaction increased from 62% in 2014, to 74% in 2015.

Harvest rates of yearling bucks decreased in 2015. Yearling bucks made up 13% (n = 6) of the field checked sample for buck harvest. This was a decrease of 13% from 2014. Field checked harvest data from years previous to the implementation of limited quota hunting seasons indicated on average, greater than 25% of the buck harvest consisted of yearling bucks. The decreased number of yearling bucks observed in 2015 harvest was attributed to more 2-year and older age class bucks being conspicuously available.

**Population**

We continued the use of the TSJ,CA spreadsheet model in 2015. This model provided the balance of allowing juvenile survival rates to be optimized for alignment with observed population dynamics, while maintaining a constant survival rate for adult mule deer in model simulations. The TSJ,CA model produced a 2015 postseason population estimate of 13,185 mule deer for the Platte Valley herd unit. This was 9% increase in the population estimate from 2014. TSJ,CA model aligned very well with abundance estimates for this herd unit and corroborated with the observations from field managers and the public. The TSJ,CA model also offered the best AICc score of the suite of spreadsheet models. We rated this model as fair, and biologically defensible in our evaluation. This rating was based on criteria identified in the user’s guide for the WGFD spreadsheet model (Morrison 2012).

In February of 2016, we completed a sightability survey to develop the 4th annual abundance estimate for mule deer in this herd unit. A stratified, random sample survey
design was employed, based on previous sightability survey results. A total of 11,594 mule deer were observed in 1,399 groups. A corrected abundance estimate of 16,600 mule deer (SE = 947, CI = ±1,856) was produced using the Hiller 12-E, Idaho (Spring), mule deer model in the Aerial Survey program (Unsworth, et. al. 1999)(Appendix II).

The Wyoming Cooperative Fish and Wildlife Research Unit completed the final report for the Platte Valley mule deer radio-collar movement project which began in 2011 (Kauffman, et.al. 2015). Results from this project included the delineation of migration corridors, migration bottlenecks and stopover habitats. WGFD will use this data to assess current and potential threats to maintaining connectivity for important mule deer habitat within this herd unit.

Management Summary
In 2016, the limited quota license quotas and season length will remain the same as in 2015. This hunting season framework will continue to support the goals identified in the Platte Valley Mule Deer Plan. Overall, hunters and other stakeholders appear to be very satisfied with the improvements we have made in mule deer management in this herd unit. Predator management and habitat improvement projects will also continue in 2016 as means to improve and sustain mule deer and their habitat in the Platte Valley herd unit. In 2016, we will conduct an in depth collaborative review and analysis of the Platte Valley Mule Deer Plan, including the limited quota hunting season framework.

Literature Cited


Bibliography of Herd Specific Studies


The Platte Valley Mule Deer Recruitment Project (PVMDRP) consisted of a 3 yr. cooperative effort aimed at the removal of coyotes (*Canis latrans*) within the *Platte Valley Mule Deer Initiative (PVMDI)* area. Specifically, removal efforts took place within Wyoming Hunt Areas 78, 79, and 81. These efforts were aimed at increasing the viability of the mule deer (*Odocoileus hemionus*) herd fawning in these areas. The goal of the PVMDRP was to provide enhanced coyote removal to benefit mule deer fawn recruitment.


Photo courtesy WGFD.
Work commenced in the removal area on 03/01/2013 and continued until 06/30/2013. Efforts will continue annually through 2014 and 2015 as ADMB funding permits.

Specific ADMB funds received for the PVMDRP (2013) consisted of $10,000.00. These funds were spent on 4.6 hrs. rotor wing time, per diem and hazard duty ($3,793.80 Sky Aviation) and 37.3 hrs. fixed wing time and hazard duty ($6,206.20 WS) aerial hunting.

Additionally, $19,841.35 was spent on the project for ground work, administrative/ground work activities, and helicopter deer classification. This funding came cooperatively from CCPMD operational funds ($4,548.30), WS ($4,093.05) and WGFD ($11,200.00).

A total of 85 coyotes and 2 dens within 14 different WS cooperative agreements were taken from the project area. Of the 85 coyotes taken, 19 coyotes (22%) were retrieved for comprehensive data collection. 5 WS/1 WGFD personnel were involved in project activities.

Comprehensive data from 19 coyotes verified for sampling and analysis below:

10  Adult Male Coyotes*
8   Adult Female Coyotes**
1   Juvenile Female Coyote

* 3 of the adult male coyotes exhibited the presence of Sarcoptic mange (*Sarcoptes scabiei*) mites.

**3 of the adult female coyotes exhibited signs of having whelped (7, 5, and 3 pups. (5 avg.). 1 of the adult female coyotes contained 3 unborn whelps.

Stomach content occurrences of 19 coyotes verified for sampling and analysis below:

7  pronghorn  9  rabbit/rodent  8  Livestock  1  bird
3  grass
Year 2 of 3 (03/01/2014 – 06/30/2014)

Work commenced in the removal area on 03/01/2014 and continued until 06/30/2014. Efforts will continue annually through 2015 as ADMB funding permits.

Specific ADMB funds received for the PVMDRP (2014) consisted of $15,000.00. These funds were spent on 9.55 hrs. rotor wing time, per diem and hazard duty ($8,078.98 Sky Aviation) and 40 hrs. fixed wing time and hazard duty ($6,921.02 WS) aerial hunting.

Additionally, $18,383.82 was spent on the project for ground work, administrative/ground work activities, and helicopter deer classification. This funding came cooperatively from CCPMD operational funds ($5,109.76), WS ($2,074.06) and WGFD ($11,200.00 approx.).

A total of 78 coyotes and 6 dens within 14 different WS cooperative agreements were taken from the project area. Of the 78 coyotes taken, 45 coyotes (58%) were retrieved for comprehensive data collection. 6 WS/1WGFD personnel were involved in project activities.

Comprehensive data from 45 coyotes verified for sampling and analysis below:

15 Adult Male Coyotes*
15 Adult Female Coyotes **
2 Juvenile Female Coyote
13 pups

* 2 of the adult male coyotes exhibited the presence of Sarcoptic mange (Sarcoptes scabiei) mites.

**11 of the adult female coyotes exhibited signs of having whelped (7, 7, 8, 6, 2, 6, ?, 6, 8, 6, 5 (? 1 Female was showing that she has nursed pups but placental scars were not counted)) for an average of 5.5 pups.

Stomach content occurrences of 45 coyotes verified for sampling and analysis below:

<table>
<thead>
<tr>
<th>Item</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>pronghorn</td>
<td>1</td>
</tr>
<tr>
<td>rabbit/rodent</td>
<td>21</td>
</tr>
<tr>
<td>Livestock</td>
<td>9</td>
</tr>
<tr>
<td>deer</td>
<td></td>
</tr>
<tr>
<td>grass</td>
<td>1</td>
</tr>
<tr>
<td>frog</td>
<td>1</td>
</tr>
<tr>
<td>empty</td>
<td>13</td>
</tr>
</tbody>
</table>
Year 3 of 3 (03/01/2015 – 06/30/2015)

Work commenced in the removal area on 03/01/2015 and continued until 06/30/2015. The data below is the last year of data of the 3 yr. project.

Specific ADMB funds received for the PVMDRP (2015) consisted of $21,500.00. These funds were expended on 14.7 hrs. rotor wing time, per diem and hazard duty ($12,561.33 Sky Aviation) and 50.8 hrs. fixed wing time and hazard duty ($8,938.67 WS) aerial hunting.

Additionally, $19,660.20 has been spent on the project for ground work, administrative/ground work and helicopter deer classification. This funding came cooperatively from CCPMD operational funds ($4,374.69), WS ($4,085.51) and WGFD ($11,200.00 approx.).

A total of 118 coyotes and 2 dens within 13 different WS cooperative agreements were taken from the project area. Of the 118 coyotes taken, 36 (32%) were retrieved for comprehensive data collection. 5 WS/1WGFD personnel were involved in project activities.

Comprehensive data from 36 coyotes verified for sampling and analysis below:

18 Adult Male Coyotes*
17 Adult Female Coyotes*,**
1 Juvenile male Coyote

* 2 of the adult males and 1 adult female coyote exhibited the presence of Sarcoptic Mange (Sarcoptes scabiei) mites.

**4 of the adult female coyotes exhibited signs of having whelped (7, 10, 7, ? (1 Female was showing that she has nursed pups but placental scars were not counted) for an average of 8 pups. 2 of the adult female coyotes contained unborn whelps (8, and 5).

Stomach content occurrences of 36 coyotes verified for sampling and analysis below:

2 pronghorn 29 rabbit/rodent 2 empty 2 deer
3 stomachs not sampled
## Summary of PVMDRP

<table>
<thead>
<tr>
<th>Coyote Removal</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>3-Yr. Total</th>
</tr>
</thead>
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<tr>
<td>Coyotes Removed*</td>
<td>85</td>
<td>78</td>
<td>118</td>
<td>281</td>
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<tr>
<td>Dens Removed</td>
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<td>6</td>
<td>2</td>
<td>10</td>
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<tr>
<td>Coyotes Necropsies</td>
<td>28</td>
<td>49</td>
<td>35</td>
<td>112</td>
</tr>
<tr>
<td>Stomach Contents:</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Rabbit/Rodent</td>
<td>9</td>
<td>21</td>
<td>29</td>
<td>59</td>
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<tr>
<td>Livestock</td>
<td>8</td>
<td>9</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>Empty</td>
<td>13</td>
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<td>15</td>
</tr>
<tr>
<td>Pronghorn</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Deer</td>
<td>3</td>
<td>2</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Grass</td>
<td>3</td>
<td>1</td>
<td></td>
<td>4</td>
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<tr>
<td>Bird</td>
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<tr>
<td>Frog</td>
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## Expenditures

<table>
<thead>
<tr>
<th>Expenditure</th>
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<th>2014</th>
<th>2015</th>
<th>3-Yr. Total</th>
</tr>
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<tr>
<td>Helicopter Hours</td>
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<tr>
<td>Sky Aviation</td>
<td>4.6</td>
<td>9.6</td>
<td>14.7</td>
<td>28.9</td>
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<tr>
<td>Helicopter Cost</td>
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<td>$8,079</td>
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<tr>
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<td>Groundwork Cost</td>
<td>WS'</td>
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<td></td>
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<tr>
<td>WS'</td>
<td>$4,093</td>
<td>$2,074</td>
<td>$4,086</td>
<td>$10,253</td>
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<tr>
<td>Groundwork Cost</td>
<td>CCPMD</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>CCPMD</td>
<td>$4,548</td>
<td>$5,110</td>
<td>$4,375</td>
<td>$14,033</td>
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Annual Project Costs: $18,641 $22,184 $29,960 $70,785

### Project Funding

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<tr>
<th>Special Project Grants Received</th>
<th>ADMB</th>
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### Mule Deer Recruitment Monitoring

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<th>Mule Deer Helicopter Classification Cost</th>
<th>WGFD</th>
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<td></td>
<td>$11,200</td>
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<table>
<thead>
<tr>
<th>Platte Valley Mule Deer Population Est.</th>
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<tr>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Mule Deer Ratio (Fawns:100 Does)</th>
<th>WGFD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>52:100</td>
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</tbody>
</table>

* It is worthy to note, that there were 14 coyotes taken by WS after 07/01/2013 within the PVMDRP due to continued efforts on the last year of the southerly overlapping 3 year Big Creek Pronghorn Antelope Recruitment Project. Additionally, 31 coyotes for calendar year 2013, 30 coyotes for calendar year 2014 and 5 coyotes for calendar year 2015 were taken by WS within the PVMDRP before and after the specific project dates in relation to livestock protection. These additional coyotes were not included in the PVMDRP data/report.

### Discussion

Coyotes were removed in the vicinity of areas considered to contain important mule deer parturition habitat (Figure 1). Removal efforts occurred between March 1 and June 30, annually. By focusing removal efforts in parturition habitat...
Figure 1. 2013-2015 Coyote Removal locations in the Platte Valley Mule Deer Herd Unit, Wyoming.
during this time period, it was assumed coyotes which were removed were predominantly resident, and potential predators of fawns during the parturition season.

Wyoming Game and Fish Department conducted postseason helicopter surveys for the Platte Valley mule deer herd unit annually in December for the duration of the PVMDRP. Annual fawn to doe ratios were determined from these survey’s results. Generally, mule deer populations are considered to require a fawn ratio of at least 66 fawns per 100 does in order to maintain population size. During the past ten years, the fawn ratio for the Platte Valley mule deer herd unit has only met or exceeded the 65 fawn per 100 does ratio during 2 years, including 2015 (Figure 2). A multitude of environmental factors are assumed to contribute the less than adequate ratios observed during most past years, including poor fawn recruitment due to predation.

Figure 2. 2006-2015 Annual mule deer ratios for the Platte Valley Herd Unit, Wyoming.

During the PVMDRP 3-year time period, average fawn ratios improved 15% when compared to the average for fawn ratios during the 3-year period prior to the PVMDRP. The mule deer population estimate for Platte Valley herd unit also began to increase during the PVMDRP time period (Figure 3).
In addition to predation by coyotes, other predators such as mountain lion and black bear can negatively impact fawn recruitment. During the same time period as the PVMDRP, WGFD increased both mountain lion and black bear hunting season mortality limits. WGFD also increased the mountain lion hunting season from a September 1 – March 31 season to a year round season. The liberalization of mountain lion and black bear hunting seasons contributed to increased harvest (mountain lion n=83 and black bear n=33) during the PVMDRP time period (Figure 4). This may have also contributed to an increase in fawn recruitment.

As mentioned earlier a multitude of environmental factors are assumed to influence fawn recruitment. Good weather conditions, increased forage due to timely precipitation, and increases in alternative prey species such as rodents were all observed during the PVMDRP time period. Additionally, there was antidotal evidence the local coyote population could have been somewhat depressed by disease (Sarcoptic Mange). All of these factors may have cumulatively influenced the observed increase in fawn ratios during the PVMDRP.
Figure 4. 2013-2015 Mountain Lion and black bear harvest locations in the Platte Valley Mule Deer Herd Unit, Wyoming.
Conclusion

The PVMDRP was considered successful in that an increase in mule deer fawn ratios were observed. This is in correlation with the direct control of coyotes, coupled with other favorable influencing conditions during the period of time the project was undertaken.

The Projects such as the PVMDRP demonstrate the positive contributions predator control efforts can have towards potentially sustaining and increasing big game and other wildlife populations. The PVMDRP also demonstrates that government entities, and most importantly landowners (without whom the PVMDRP could have not taken place) can work cooperatively to successfully address predator, wildlife, and access issues.

Special Thanks To:

PVMDRP Participating Landowners
CCPMD Members
WGFD Will Shultz (District Biologist).
ADMB
Sky Aviation (WS Contract Helicopter Services)

Craig S. Acres

USDA/APHIS/WS
Staff Biologist (ret.)
Cc: Files

1/25/2016
## Section 1: Summary of Raw Counts

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<tr>
<th>Units</th>
<th>Stratum Sampled</th>
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<tr>
<td></td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>11594</td>
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## Section 2: Summary of Raw Counts for Perfect Visibility Model

This table projects the number of animals that would have been counted if every unit had been flown and visibility had been perfect (no animals obscured by vegetation, etc.)

<table>
<thead>
<tr>
<th>No of Units</th>
<th>Strat Popn Sample Total</th>
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<tbody>
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<td></td>
<td>1</td>
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<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>87</td>
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</table>

## Section 3: Estimates for Total Number

<table>
<thead>
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<th>Total</th>
<th>Number of Units</th>
<th>Estimate</th>
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<td>Sampling</td>
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</tr>
<tr>
<td>Total</td>
<td>87</td>
<td>40</td>
<td>16600</td>
<td>846246</td>
</tr>
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</table>
SPECIES: White tailed Deer  
HERD: WD504 - SOUTHEAST WYOMING  
HUNT AREAS: 15, 59-64, 70, 73-81, 83, 161  
PREPARED BY: MARTIN HICKS

<table>
<thead>
<tr>
<th>2010 - 2014 Average</th>
<th>2015</th>
<th>2016 Proposed</th>
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<td>Hunter Satisfaction Percent</td>
<td>64%</td>
<td>69%</td>
</tr>
<tr>
<td>Landowner Satisfaction Percent</td>
<td>0%</td>
<td>0%</td>
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<td>Harvest:</td>
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<td>798</td>
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<tr>
<td>Hunters:</td>
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<td>1,851</td>
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<tr>
<td>Hunter Success:</td>
<td>39%</td>
<td>43%</td>
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<tr>
<td>Active Licenses:</td>
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<td>Active License Success:</td>
<td>35%</td>
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<td>Males per 100 Females:</td>
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<tr>
<td>Juveniles per 100 Females</td>
<td>68</td>
<td>0</td>
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<td>Satisfaction Based Objective</td>
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<td>Management Strategy:</td>
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<td>Recreational</td>
</tr>
<tr>
<td>Percent population is above (+) or (-) objective:</td>
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<tr>
<td>Number of years population has been + or - objective in recent trend:</td>
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</table>

![WD504 Satisfaction Survey Percentages](image)
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<thead>
<tr>
<th>Hunt Area</th>
<th>Type</th>
<th>Season Dates</th>
<th>Quota</th>
<th>License</th>
<th>Limitations</th>
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<tbody>
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<td>15</td>
<td>3</td>
<td>Oct. 1</td>
<td>Nov. 30</td>
<td>400</td>
<td>Limited quota</td>
</tr>
<tr>
<td>15</td>
<td>3</td>
<td>Dec. 1</td>
<td>Dec. 31</td>
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<td></td>
</tr>
<tr>
<td>15</td>
<td>8</td>
<td>Oct. 1</td>
<td>Dec. 31</td>
<td>300</td>
<td>Limited quota</td>
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<table>
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<th>Quota</th>
<th>License</th>
<th>Limitations</th>
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<tbody>
<tr>
<td>59,60,64</td>
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<td>Nov. 30</td>
<td>150</td>
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<tr>
<td>59,60,64</td>
<td>3</td>
<td>Dec. 1</td>
<td>Dec. 31</td>
<td></td>
<td>Doe or fawn white-tailed deer valid in Area 59 and Area 64</td>
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<th>Season Dates</th>
<th>Quota</th>
<th>License</th>
<th>Limitations</th>
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<td>59,60,64</td>
<td>8</td>
<td>Nov. 1</td>
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<td>70,74</td>
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<td>70,74</td>
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<td>75,76,77</td>
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<td>Oct. 1</td>
<td>Dec. 31</td>
<td>50</td>
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<tr>
<td>75,76,77</td>
<td>8</td>
<td>Oct. 1</td>
<td>Dec. 31</td>
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<tr>
<td>78,79,80,81,161</td>
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<td>78,79,80,81,161</td>
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<td>Sept. 1</td>
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<td>25</td>
<td>Limited quota</td>
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</tbody>
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**Management Evaluation**

**Current Hunter Satisfaction Management Objective:** Hunter satisfaction; Target goal: ≥ 60%

**Management Strategy:** Private Land

**2015 Hunter Satisfaction:** 68% Satisfied, 18% Neutral, 14% Dissatisfied

**Most Recent 3-year Running Average Hunter Satisfaction Estimate:** 62%

The management objective for the Southeast Wyoming Herd Unit was reviewed in 2015 through the public objective review process. It was determined to abandon the numeric objective of 4,000 white-tailed deer and go with a sportsmen satisfaction survey with a satisfaction goal of ≥ 60% and a private land management strategy. A landowner satisfaction survey will not be used in conjunction with the sportsmen survey. The sample size would be very low and the majority of occupied white-tailed deer habitat is on private land, which complicates management since there is little access opportunities.

There is not a reliable post-season population estimate. This is an open herd with Colorado and Nebraska so trying to model this herd would violate the assumption that it is closed. Seasons are designed to provide opportunity during the mating period when male deer are more vulnerable to harvest. Management is driven primarily by local Department personnel perception of population trend and landowner tolerance for this species.

**Weather**

Weather in this herd unit was relatively normal during the past bio-year. Precipitation amounts were above average at all elevations throughout southeast Wyoming. No significant prolonged periods of extreme heat or cold temperatures were observed, or extreme or prolonged periods of snow loading in lower elevation winter ranges. Timing of precipitation and amounts received during key growth periods for cool season grasses and preferred transitional range and winter range shrub species was excellent. While early season growing conditions were optimal, late summer and fall precipitation were lacking. Weather patterns most likely had a positive influence on all big game species. For specific meteorological information for the Platte Valley herd unit the reviewer is referred to the following link: [http://www.ncdc.noaa.gov/cag/](http://www.ncdc.noaa.gov/cag/).
Habitat
Forage availability continued to improve in 2015 with an increase in amounts of precipitation received and the timeliness of when it was received. Precipitation received in April, May, and early June resulted in excellent growth of cool season grasses and forbs, and above average leader growth on preferred key shrubs. The limited number of habitat transects that have been established throughout the Laramie Region have not provided sufficient data to make reliable assumptions of habitat quantity or quality and consequently heavily influence population management for any particular big game species.

Many riparian areas within the herd unit experienced some level of springtime flooding in 2015. With favorable land management post-flooding, the potential does exist for cottonwood and willow regeneration in many stream systems. Establishment of these species may aid in reversing negative trends in woody species composition and age classes of important understory browse species and woody species that provide thermal and hiding cover values. White-tailed deer inhabit areas that are supported by agriculture, including dryland and irrigated croplands.

Field/Harvest Data
This herd will grow rapidly until densities become too high, then seasons are adjusted to try and bring the population down or an EHD outbreak occurs that reduces densities. Hunter success is typically around 35% with hunter effort running about 11 days per harvest. Hunting opportunity is limited to private land. Low success and high effort rates were contributed to hunters trying to find a white-tailed deer on public land or trying to harvest a deer during the general season when they are less vulnerable to harvest. Chronic wasting disease is found throughout the herd unit but to what extent it has on this herd unit is unknown. The long-term prevalence rate average is around 20%, but with a small sample size. There are a limited number of tooth samples so a reliable inference into population performance is not available.

The hunter satisfaction level was 69% for the 2015 season, which was higher than the five-year average of 64%. White-tailed deer appear to be rebounding from the 2012 EHD outbreak which could explain a slightly higher satisfaction level.

Population
There is not a reliable post-season population estimate. This is an open herd with Colorado and Nebraska so trying to model this herd would violate the assumption that it is closed. Seasons are designed to provide opportunity during the mating period when male deer are more vulnerable to harvest. Management is driven primarily by local Department personnel perception of population trend and landowner tolerance for this species. There is not enough tooth samples collected in the field to infer any population dynamics.

Management Summary
Population trend varies on weather conditions and disease outbreaks. As densities become too high, the population will typically crash from an EHD outbreak. Severe winter conditions will also reduce white-tailed deer numbers if they go into the winter in poor condition. There have been no reports of winter mortalities. There was an EHD outbreak in 2012 that prompted a decrease in Type 8 licenses for hunt areas in southeast Wyoming. It does appear white-tailed deer are recovering from the 2012 outbreak in hunt area 15 so for the 2016 season the Type 3 licenses will increase by 125 and move the opening date back from November 1 to October 1. In addition there will be 25 Type 8 licenses in Hunt Areas 75-77 and 25 Type 8 licenses in Hunt Areas 70,74. Type 1 licenses in Hunt Areas 75 will increase by 25.
For the 2016 season we will try to attain a harvest of around 850 white-tailed deer. Our objective is to provide opportunity and minimize damage and maintain a hunter satisfaction level greater than 60%.
Prepared by: Martin Hicks, Wheatland Wildlife Biologist

The Southeast Wyoming White-Tailed Deer Herd Unit contains Hunt Areas 15,59,60,64,70,73-81,161 is located in southeastern Wyoming (Figure 1.). The management objective for the Southeast Wyoming Herd Unit is a post-season population objective of 4,000 white-tailed deer. The management strategy is recreational management with a post-season male:female range of 20-29 bucks:100 does. The objective and management strategy were last revisited in 1998.

Figure 1. Map of SE WY White-tailed Deer Herd Unit highlighted

Population Objective Review:
The post-season population objective is developed based upon both biological and social factors, including, but not limited to: winter range carrying capacity, hunter desires, landowner desires and tolerance, land status, and competition with other wild and domestic animals. From 1976-1996 this herd unit was labeled the Laramie River White-tailed Deer Herd Unit, comprised of Hunt Areas 70-81,83,161 with an initial objective of 200, then increased to 1,000 in 1986. In 1998 Hunt Areas 15,16,55,57 (combined into Hunt Area 15 in 2014) 59-64 were added to create the SE WY WTD Herd Unit with a new objective of 4,000.

Current Management Strategy:
There is not a reliable post-season population estimate. This is an open herd with Colorado and Nebraska so trying to model this herd would violate the assumption that it is closed. Seasons are designed to provide opportunity during the mating period when male deer are more vulnerable to harvest. Management is driven primarily by local Department personnel perception of population trend and landowner tolerance for this species.

Recommended Hunt Unit Objective and Management Strategies by Herd Unit:
Due to our inability to manage this herd unit and lack of adequate population data to derive a post-season population objective we recommend to abandon the numeric objective of 4,000 white-tailed deer and use a sportsmen/landowner survey with a target goal of 60% or greater satisfaction level.

**Landowner, Agency, and Public Involvement:**
A power point presentation was prepared on the background of the Southeast Wyoming White-tailed Deer Herd Unit and presented at the following public meetings: Wheatland, Torrington, Laramie and Cheyenne in January 2015. In addition a survey requesting input on the future management of this herd was handed out to the attendees. There were a total of 17 people in attendance at the four public meetings. There was very little interest or concern in the future management of the SE WY WTD Herd Unit gathered from the crowd at the meetings and no surveys were returned. At these meetings the public was informed about herd objectives and the alternative and secondary objectives available as provided by Wildlife Administration. Department personnel preferred to abandon the current objective of 4,000 white-tailed deer and adopt an alternative objective of sportsmen/landowner satisfaction survey. No federal or state agencies were involved because the majority of occupied habitat is on private land. A copy of comments, public meeting attendants and the survey can be found in Appendix A.

**Landowner/Sportsmen Survey:**
A public service announcement was sent to all local newspapers along with posters distributed throughout the different communities inviting the public to attend one of four public meetings that were held in January. No surveys were returned.

**Recommendation:**
In summary we propose to eliminate the numeric objective of 4,000 white-tailed deer and go with an alternative objective of a landowner/sportsmen survey. Surveys will be mailed to landowners that have larger acres (>160 acres) of contiguous white-tailed deer habitat in Platte, Goshen, Laramie, Albany and Carbon counties.

This recommendation is based upon the department’s inability to collect adequate population data to derive a population estimation. Based on the outreach effort and past comments from landowners and sportsmen there is less interest/concern placed on white-tailed deer compared to other big game species in southeast Wyoming.