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Mule Deer Monitoring Report For Fiscal Year 2013



Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

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P.O. Box 650
Richland, Washington 99352

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M. Sackschewsky, J. Nugent, J. Wilde, C. Lindsey
Mission Support Alliance

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P.O. Box 650
Richland, Washington 99352

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Contents

1.0	INTRODUCTION	1
2.0	METHODS.....	2
3.0	RESULTS AND DISCUSSION	4
3.1	Mule Deer	4
3.2	Elk Populations.....	6
4.0	SUMMARY.....	9
5.0	REFERENCES	9

Figures

Figure 1.	Driving Route used for FY 2013 Hanford Site Mule Deer Surveys.	3
Figure 2.	Maximum number of deer observed in each region FY 1995 to FY 2013.....	6
Figure 3.	Distribution of Observed Mule Deer Herds during FY 2013.	7
Figure 4.	Ratio of Fawns to does, FY 1995 through FY 2013.....	8
Figure 5.	Percentage of Bucks with Abnormal Antler Growth, FY 1995 through FY 2013.....	8

Tables

Table 1.	Matrix of Survey Times and Travel Directions by Half-Transect and Survey Date.....	4
Table 2.	Mule Deer Survey Results for FY 2013.....	5

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1.0 Introduction

Population characteristics of mule deer (*Odocoileus hemionus*) on the Hanford Site have been monitored since 1994. Roadside surveys have been conducted during the post-hunting period from November to January to assess age and sex ratios, and the frequency of testicular atrophy in males. Because the mule deer have been largely protected from hunting on the Hanford Site for 50 years, the herd has developed unique population characteristics, including a large proportion of older males ([Tiller et al. 1997](#)).

Prior to 2003, variable numbers of surveys were performed each year. Between 2003 and 2009, five surveys were conducted during each post-hunt period. In 2010 this was reduced to three surveys. No surveys were conducted in 2011. During each survey, individual animals were identified according to sex and age class (fawn or adult). For male deer, the presence of misshapen, velvet-covered antlers was used as an indicator of testicular atrophy.

Trends in the ratios of fawns to does over time can be used to monitor changes in mule deer population size and health. Mule deer populations provide a rough indication of overall habitat quality. Additionally, mule deer are a trust resource of interest and importance to wildlife resource agencies and local tribes.

In 2010, the last time data were collected, the fawn-to-doe mean estimate was 35.3 fawns per 100 does for the northern region and 23.7 for the southern region. For both regions, these ratios were similar to both the previous year and the 10-year average. The 10-year average has remained steady, ranging between 31.9 and 36.2 fawns per 100 does in the northern region and between 28.0 and 34.0 in the southern region. The fairly steady trend in fawn-to-doe ratios indicates a stable mule deer population ([Poston et al. 2011](#)). Hanford Site fawn-to-doe ratios for all survey years (1994 through 2010) are weighted averages, using the total number of fawns and does seen per survey as the weighting factor.

In the early 1990s, testicular atrophy and sterility were observed in some male mule deer on the Hanford Site ([Tiller et al. 1997](#)). Extensive investigation found no relationships between the presence of testicular atrophy and contaminant levels, diet, disease, or natural conditions such as aging or genetics ([Tiller et al. 1997](#)). Testicular atrophy in male mule deer is associated with abnormal antler growth manifested as misshapen, velvet-covered antlers, which can be observed in field surveys. The observed frequency of misshapen antlers in mule deer has ranged from a high of 17% in the southern region in 1998 to a low of 0% in both regions in 2003. Recently, the 10-year averages have shown steady (northern region) or declining (southern region) trends at 6% or less. In 2010, observations of affected male deer were low; the observed frequency of antler abnormality was 3.9% in the northern region and no bucks with abnormal antlers were seen in the southern region. These frequencies need to be interpreted with caution because the small sample sizes may not fully reflect population conditions. In general, recent data indicate the health of the male mule deer on the Hanford Site has not changed substantially over the last decade.

2.0 Methods

The FY 2013 driving surveys were conducted four times during the post-hunting period in December 2012 and January 2013. Survey dates were December 4, 2012, and January 2, 3, 16, and 30, 2013. Although there is no hunting on the Hanford Site, individuals from Hanford site populations that stray into adjacent non-DOE lands may be taken by hunters.

Surveys were conducted from a vehicle along a specified route (Figure 1). Surveys begin at dawn or mid-afternoon and are driven alternatively from north to south and south to north. The route is approximately 37 miles (60 kilometers) long; the northern end of the route is near 100-B/C, the southern end is just north of the 300 Area (Figure 1). The survey route is divided into a northern half and a southern half, with the break occurring at the north end of the Hanford townsite. Tiller and Poston ([1999](#)) found little overlap in the home ranges of deer occupying these two regions.

Two people conducted each survey - the driver and a second observer. Survey speed was 5 to 35 miles per hour (56 kilometers per hour) with higher speeds on the Hanford primary roads, and slower speeds on the secondary and dirt roads. When deer were spotted, the driver stopped and/or pulled off the road. The odometer reading was recorded, a global positioning system (GPS) position was collected, and the distance and direction from the observation point were collected with a laser range finder and compass. Specific data collected about the herd included the number of deer, their sex and age class, and the presence of misshapen antlers on any of the bucks. Care was taken to avoid duplicate counts of the same deer. Similar data were collected for all herds of elk (*Cervus elaphus*) observed along the driving transects.

Deer and elk are most active during early morning and late evening periods. Therefore, to attain maximum sample sizes and help attain representative estimates for these population characteristics, surveys were performed when deer and elk were most likely to be active, i.e. within four hours of twilight and dusk.

Over the four sample dates, surveys were conducted such that each half-transect was surveyed during both the morning and afternoon, and travelled in both directions, as described in Table 1. To the extent possible, this should have reduced bias that may occur because of time of day.

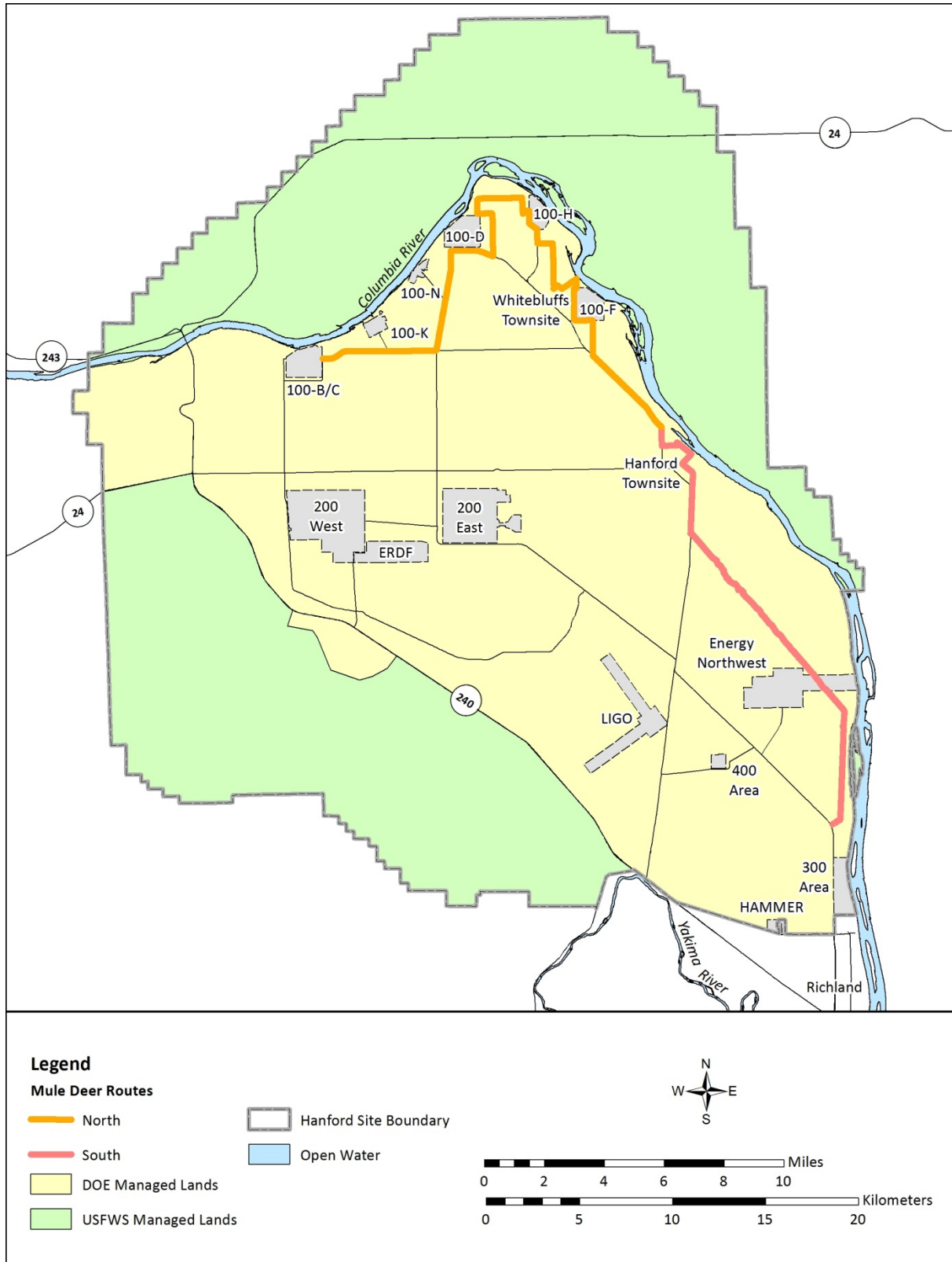


Figure 1. Driving Route used for FY 2013 Hanford Site Mule Deer Surveys.

Table 1. Matrix of Survey Times and Travel Directions by Half-Transect and Survey Date.

Date	Region	Survey Period	Survey Direction
December 4, 2012	S	Morning	S → N
December 4, 2012	N	Afternoon	S → N
January 2, 2013	N	Afternoon	N → S
January 3, 2013	S	Morning	N → S
January 16, 2013	N	Morning	S → N
January 16, 2013	S	Afternoon	S → N
January 30, 2013	N	Morning	N → S
January 30, 2013	S	Afternoon	N → S

3.0 Results and Discussion

3.1 Mule Deer

A total of 288 mule deer were observed over the four survey dates (Table 2). Two-thirds of the total observations occurred in the northern region, and one-third in the southern region. Bucks represented 18% of the northern population and 22% of the southern population. Undoubtedly, these numbers include repeated observations of at least some of the same animals on multiple survey dates. The survey results for the southern region were likely influenced by work conducted by Bonneville Power Administration (BPA) to replace wooden-tower transmission lines north and east of the Energy Northwest Facilities, as the survey route was being used to support the pole-replacement project. The increased noise and human presence likely deterred mule deer from near the survey route.

The maximum number observed in the north region (73 deer) occurred on December 4, 2012. The maximum number observed in the southern region (50 deer) occurred on January 3, 2013. The highest combined count was 90 deer on January 16, 2013 (Table 2). The running 10-year average for maximum count in the southern region has remained steady at about 60 deer, although the yearly maximum over the last 10 years has varied greatly from 31 in 2003 to 101 in 2005 (Figure 2). The northern region maximum count had been steadily increasing from around 40 deer in the mid-1990s to a maximum of 99 in 2008, since 2008, the northern population has remained steady or has slightly declined (Figure 2).

Table 2. Mule Deer Survey Results for FY 2013

Region / Date	Bucks	Does	Fawns	Antlerless*	Total
North Region:					
December 4, 2012	17	37	19	0	73
January 2, 2013	4	23	9	2	38
January 16, 2013	6	36	13	0	55
January 30, 2013	7	15	4	0	26
Total - North	34	111	45	2	192
South Region:					
December 4, 2012	5	3	0	0	8
January 3, 2013	13	20	4	13	50
January 16, 2013	3	21	11	0	35
January 30, 2013	0	2	1	0	3
Total - South	21	46	16	13	96
Combined:					
December 4, 2012	22	40	19	0	81
January 2-3, 2013	17	43	13	15	88
January 16, 2013	9	57	24	0	90
January 30, 2013	7	17	5	0	29
Total Combined	55	157	61	15	288

*Antlerless are either fawns or does, but age could not be accurately determined.

The largest concentrations of mule deer were observed in the vicinity of the Hanford townsite and the region between 100-F and 100-H Areas, including the White Bluffs townsite (Figure 3). No deer were observed west of the hills on the west side of 100-D Area along the northern route, and none were observed during the 4 surveys between the central sand dunes north of Energy Northwest and the area south of the Benton Substation along the southern route. As mentioned above, active construction work on transmission line replacement may have affected the number of mule deer near the southern survey route. There were no discernible shifts in population locations through the season.

The number of fawns per 100 does in FY 2013 was estimated to be 41.1 (± 5.1) in the northern region and 37.2 (± 12.6) in the southern region. These values are slightly higher than observed over the last 5 to 6 years, and slightly higher than the 10-year average, but the values are within the overall range of ratios found since monitoring began in 1994 (Figure 4).

No bucks with abnormal antler growth were observed in the northern region in FY 2013, and one affected bull was observed in the southern region – representing 4.8% of the observed bucks in the southern region. These values are well below the maximum affected rates seen, but are similar to the current 10-Year average (Figure 5).

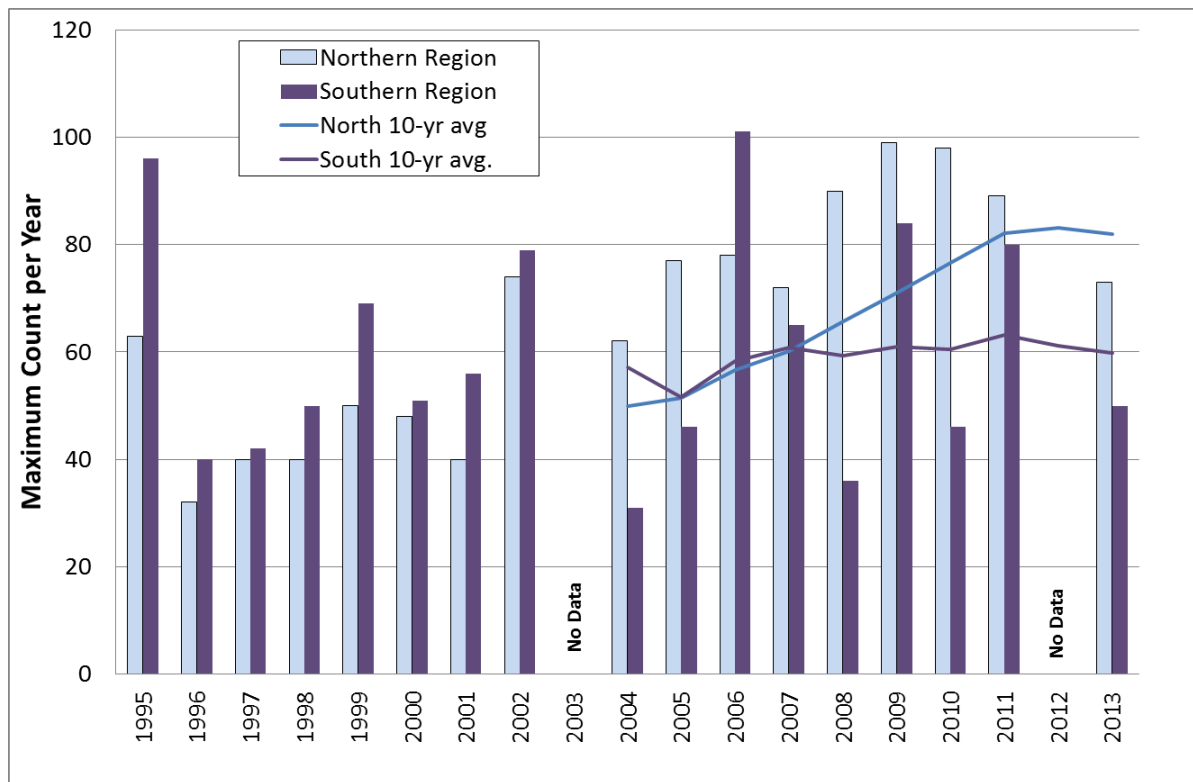


Figure 2. Maximum number of deer observed in each region FY 1995 to FY 2013.

3.2 Elk Populations

Elk herds were observed during the January 2, 3, and 16 surveys. In early January, two bulls were observed between 100-D and 100-H Areas, and two herds were observed near the Hanford townsite: a small one with one bull and three cows, and a larger herd with one bull and thirty-eight cows. On January 16, a herd with two bulls and thirty-seven cows was observed just south of 100-F Area. Both of the large-herd observations were likely of the same herd. A similar-sized herd was observed in the same general area on several other occasions during the winter of FY 2013. Further monitoring information for the Hanford Site elk herd is located in Mission Support Alliance’s [Elk Monitoring Report for Calendar Year 2012](#) (Lindsey et al. 2013).

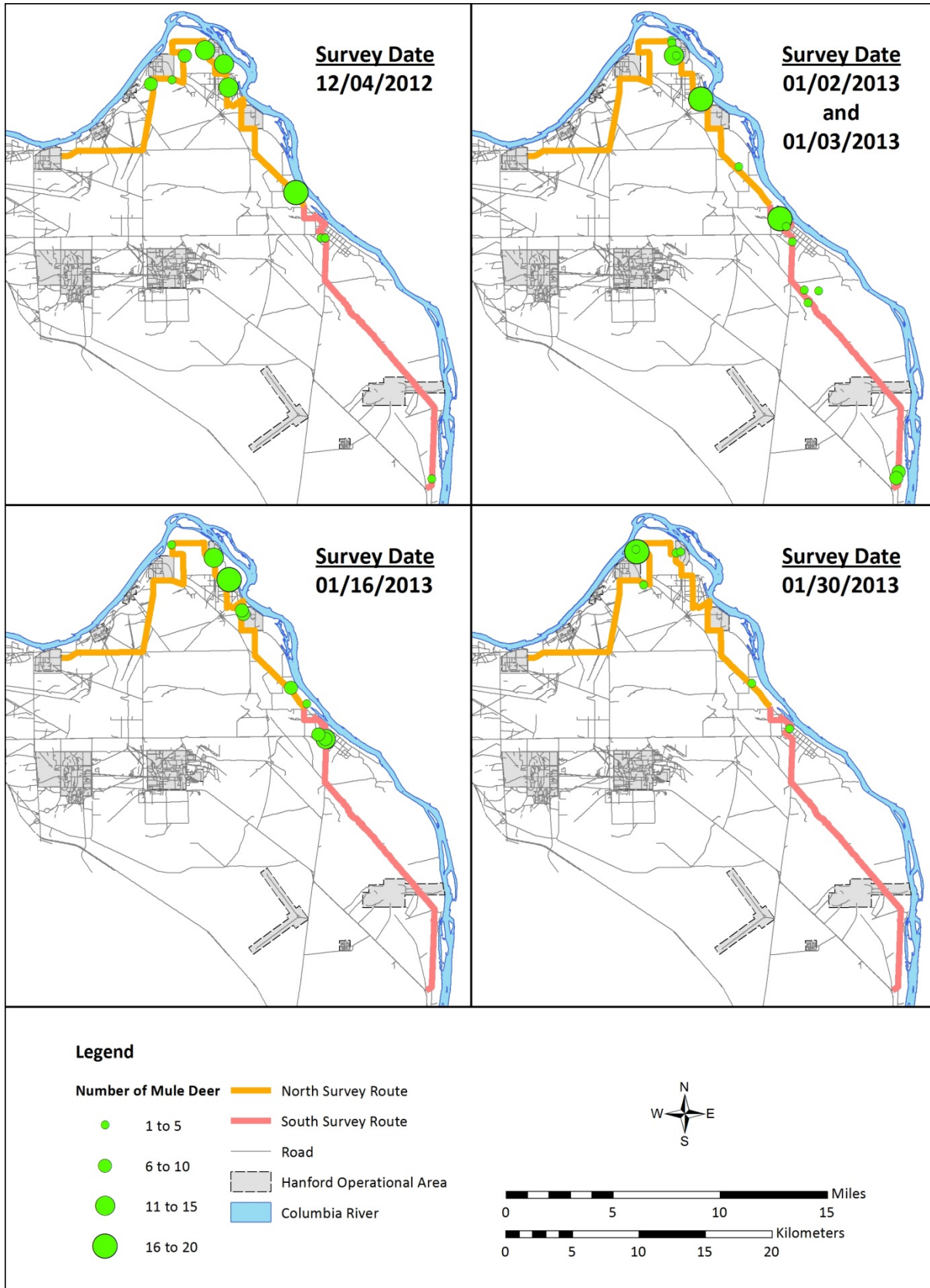


Figure 3. Distribution of Observed Mule Deer Herds during FY 2013.

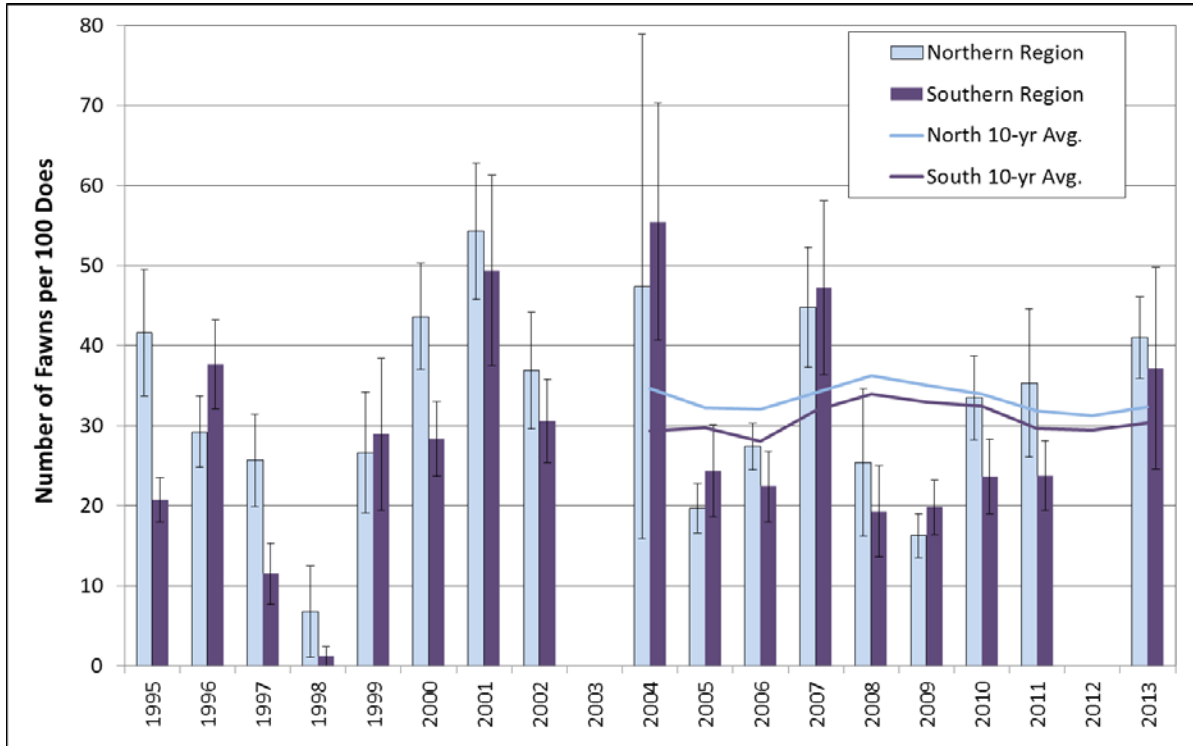


Figure 4. Ratio of Fawns to does, FY 1995 through FY 2013.

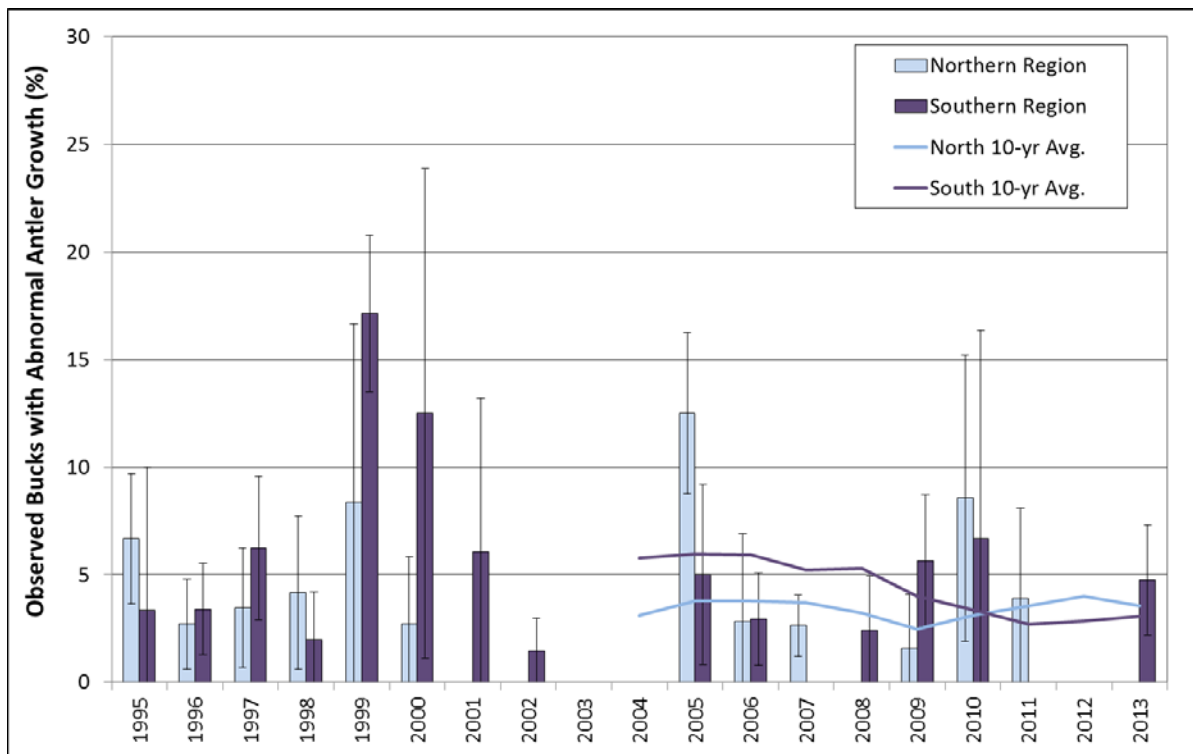


Figure 5. Percentage of Bucks with Abnormal Antler Growth, FY 1995 through FY 2013.

4.0 SUMMARY

The monitoring conducted during the winter of 2012 and 2013 found lower population sizes along both the southern and northern routes compared to the previous survey conducted in 2010 and 2011. However, the overall population appears to have increased over the last decade along the northern portion of the survey route while the population along the southern route has remained relatively steady. Population counts along the southern route may have been adversely affected by ongoing power line replacement work occurring during the monitoring period. The rates of gonadal atrophy and the fawn to doe ratio have remained relatively steady over the last 10 years. Monitoring will continue in future years to detect changes that may occur in the Hanford population as clean up along the Columbia River corridor is completed and there is less human presence.

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