

2016

Gunnison Basin

Gunnison Sage-Grouse Lek Count Summary

And

Population Estimate

Final Report

**22 March – 10 May Lek Season
Gunnison Basin, Colorado**

Colorado Parks and Wildlife



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Summary

In 2016, 82 leks were visited, resulting in a high male count (HMC) of 928, a decrease of 46 from the 974 males counted in 2015. The high female count (HFC) was 235, an increase of 60 birds from the 175 birds counted in 2015 and the third highest female count since 1998. Population estimates for the Gunnison Basin were calculated using formulas presented in the Gunnison Basin local conservation plan (1997) and the Gunnison Sage-grouse Rangeland Conservation Plan (RCP 2005). Based on the local conservation plan formula, the minimum population estimate for the Gunnison Basin population is 3,711, a decrease of 186 birds from 2015. Based on the RCP 2005 formula, the minimum population estimate for the Gunnison Basin is 4,553 birds, a decrease of 226 birds from 2015.

The three-year HMC moving average for 2014–2016 is 904, a 2.96% increase from the 2013–2015 HMC moving average of 878. Total number of active Lek Areas in 2016 was 25 with an average of 37.1 males per active Lek Area, down from 39.0 males per active Lek Area in 2015. Male lek attendance peaked during the second count period (11-20 April). Female lek attendance peaked during the first count period (1–10 April). Two of the five Lek Zones increased (Lost Canyon and Ohio Creek) in total number of males compared to 2015. Four zones (Gold Basin, Lost Canyon, Ohio Creek, and Sapinero) increased in total number of females compared to 2015. In 2016, HMCs increased on 23 individual leks, 32 leks had the same number of males, and 27 leks decreased in the number of males observed compared to 2015. Overall the Gunnison Basin population trend continues to increase slightly.

Four leks at Pine Creek Mesa were not counted due to access issues. Their status is unknown for 2016 and ensure that population estimates are conservative. McCabe Lane, Sapinero Ridge and Waterbar leks status became annually and officially unknown as none had two count periods with either two or zero males to determine active or inactive status. The Chance Gulch E lek went from unknown to active status after one year of inactivity. 7MB and Sapinero Corral leks went from inactive to active status after two years and five years of inactivity. North Parlin North went from active to annually inactive/officially unknown status in 2016. After five years of annually inactive status, three leks (Lost Canyon 2, Sapinero 10 Mile Spring, and Teachout 1 & 2) became officially inactive. After ten years of annually inactive status, one lek (North Parlin West) became officially historic.

Acknowledgements

The 2016 Gunnison sage-grouse lek counting season was made possible because of the combined efforts of numerous individuals (Appendix A). We would like to thank all of you who dedicated your time, energy, and early mornings to count grouse. At least 50 people were directly involved in the 2016 Gunnison sage-grouse lek counts. Colorado Parks and Wildlife coordinated the effort and received help from the Bureau of Land Management (BLM), U.S. Forest Service (USFS), Natural Resources Conservation Service (NRCS), National Park Service (NPS), Western State Colorado University (WSCU), and numerous landowners who counted leks or allowed access on their lands. Thank you for your continued support and contribution to Gunnison sage-grouse conservation!



“The physics of beauty is one department of natural science still in the Dark Ages. Not even the manipulators of bent space have tried to solve its equations. Everyone knows, for example, that the autumn landscape in the north woods is the land, plus a red maple, plus a ruffed grouse. In terms of conventional physics, the grouse represents only a millionth of either the mass or the energy of an acre. Yet subtract the grouse and the whole thing is dead. An enormous amount of some kind of motive power has been lost.” Aldo Leopold

Introduction

The Gunnison sage-grouse (*Centrocercus minimus*) is a unique species of sage-grouse found only in portions of southwestern Colorado and southeastern Utah (Young et al. 2000). There are nine distinct sub-populations occurring within their range, with the largest inhabiting the Gunnison Basin (Gunnison sage-grouse Rangewide Conservation Plan 2005). The Gunnison sage-grouse received species status in January of 2000 from the American Ornithologist's Union based on long-term studies by grouse researchers Jessica Young and Clait Braun, among others. Shortly thereafter, a coalition of environmental groups petitioned the U.S. Fish and Wildlife Service (FWS) to emergency list the Gunnison sage-grouse under the Endangered Species Act (ESA). After review, the FWS designated the bird as a "priority 5" candidate species under the ESA, and precluded listing at that time. However, after re-evaluation in 2004, the FWS designated the species as a "priority 2" candidate species, which shifted the grouse into a higher priority status for listing. Principal areas of concern for Gunnison sage-grouse include overall population declines and reductions in the quantity and quality of their sagebrush habitats. On April 18, 2006, the FWS posted their final listing determination for the Gunnison sage-grouse. In the ruling, the FWS determined that based on the best scientific and commercial information, that listing under the ESA was not warranted. This ruling has since been revisited. On September 27, 2010, the FWS determined that the Gunnison sage-grouse warrants protection under the ESA, but that proposing the species for protection will be delayed while the Service addresses the needs of other higher priority species. On February 11, 2014, the Service announced a six-week extension of its final decision to protect the Gunnison sage-grouse under the ESA and to designate critical habitat for the species. A final determination on both proposals was expected on May 12, 2014, however on May 6, the FWS announced that the District Court granted a six-month extension of the deadline making the final listing decision due November 12, 2014. On November 12, 2014, the FWS announced that it determined the Gunnison sage-grouse required federal protection under the ESA as a threatened species.

Annual Gunnison sage-grouse lek surveys provide key information used by officials and interested parties for decisions pertaining to land management practices and regulations, population management actions, and federal ESA listing actions. Lek counts have been standardized over the past nineteen years and represent an objective method of projecting annual spring population size and assessing population trends. This report details the results of the 2016 lek count season, including counts of total number of males and females, estimated population size, changes in lek status, average number of males per active Lek Area, number of active Lek Areas, and changes throughout recent years. Included is information on projects that were conducted during the 2016 lek season and recommendations for future counting efforts.

Lek Counts as an index to population trend

Lek count data often generates considerable discussion and sometimes controversy. Lek count methodologies were developed many years ago, based on the premise that counts could aid in assessing grouse population trends. Research has demonstrated that male sage-grouse do not attend leks every day, and male attendance is variable depending on many factors including weather, social dynamics (such as male dominance or the presence of a receptive hen), time of day, predator disturbance, etc. From a lek counter standpoint, the number of birds observed may vary depending on factors such as observer experience, optic quality/distance to lek, access, snow cover, vegetation composition, and vantage point.

Changes in the number of grouse counted should not be interpreted as an exact measurement of annual population variability, nor should they be construed as the actual number of grouse in the population. Standardized lek counts should allow managers to evaluate population trends over time. Lek counts presently provide the most efficient, low-impact means for acquiring meaningful data on local grouse population trends.

Methods

Definitions

Active Lek: To be considered Active for a given season, a lek must have at least two males in attendance during two count periods. Active leks need to be counted at least once each 10-day count period.

Inactive Lek: To be considered Inactive for a given season, a lek must have zero males in attendance for at least two count periods (i.e., not meet the active definition). If, however, birds are observed during either count period, at least one additional count period should be counted. For the official status of a lek to be considered Inactive, a lek needs to be seasonally Inactive for five consecutive years.

Unknown Lek: A lek is considered Unknown for a given season if it did not meet the requirements for Active or Inactive during a given season or was not counted the appropriate number of count periods to determine its status. For example, a lek that had five males on one count and only one male on the other counts would be Unknown, as would a lek that was only counted once with no males observed, or an Active lek that was only counted twice with 0 birds observed. A lek that is Active in one season and Inactive during the next season would have an official status of Unknown.

Historic Lek: A Historic Lek is one that has been Inactive for 10 consecutive years.

Official Status: The Official Status of a lek is given as a cumulative status and designated as Active, Historic, Inactive, or Unknown. To be Officially Active, a lek only needs to be designated as Active in the current year. A lek cannot be considered Officially Inactive unless it has been seasonally Inactive for five consecutive years. Thus, a lek might not have any birds for a given season, but its official status may be Unknown because the lek had not been Inactive all of the past five years. Historical lek status is not given until a lek has been Inactive for 10 consecutive years.

Lek Area: A lek area can be a single lek or a group of leks. The designation is loosely based on proximity to other leks and the potential for birds to move between multiple leks. For example, a lek that is far away from any other lek would be its own Lek Area. Three leks in close proximity to each other but spatially separated from any other leks would be grouped as one Lek Area.

Active Lek Area: An Active Lek Area must have at least one lek within its boundary that was designated as Active for that season.

Coordinated Count: Coordinated Counts are used to avoid double counting when there is evidence that grouse potentially fly between multiple leks on a given day. One day is scheduled during each count period when observers are positioned throughout the group of leks to count the birds and watch for movement among leks.

High Male Count (HMC): The high male count is the sum of individual male grouse observed on each lek on a given day used both on an individual basis and to describe the total number of males observed during the season. All leks, including those in coordinated count areas, are evaluated on an individual count basis when determining HMC numbers.

High Female Count (HFC): The high female count is determined the same as the high male count, but for the female portion of the population.

Count Methodology

Gunnison sage-grouse leks were counted using a slightly modified version of the protocol established in 1996. Each lek that was Active last season in the Gunnison Basin was counted once during each of four 10-day periods (1 April–10 April, 11 April–20 April, 21 April–30 April, 1 May–10 May). Inactive and Unknown leks were visited once during each of the first two count periods and then counted in later periods if grouse were observed. Coordinated counts were used where grouse were suspected to move frequently between multiple leks on a daily basis. All counts were conducted around sunrise. All lek count personnel used a standardized data form and were asked to count the number of males, females, and unknown Gunnison sage-grouse present at the lek at five minute intervals. If grouse were inadvertently flushed off of a lek, the total number of birds in flight were recorded as “unknown”, and not used to calculate high counts. Counters also recorded weather conditions, disturbances to grouse, grouse behavior, and movements to and from the lek. Lek counters were also asked to indicate any activity on brush-beats or other use areas associated with their lek. For a more detailed explanation, see the count procedure (Appendix B). In the Gunnison Basin, grouse typically begin displaying earlier than the first official count period. Nine leks are annually counted during March 22–31 to gauge the level of early breeding activity.

Data Analysis

The information from each data sheet was entered into a database. Subsequent analyses provided the total number of individual males and females observed for each lek, the estimated male and female populations, the population estimate based on known leks counted, peak dates of attendance, revised status of leks and lek areas, the average number of males per Lek Area, and a three-year moving average of HMCs.

Population Estimate: In 2005, the Rangewide Steering Committee (RSC) completed the Gunnison Sage-grouse RCP, which in many ways is a continuation of the local Conservation Plans adopted throughout the species’ range. As the title implies, this plan attempts to offer a broader, rangewide perspective and is intended to supplement local plans, “so as to ensure that the cumulative result of conserving local populations is conservation of the species” (Gunnison Sage-grouse Rangewide Conservation Plan 2005). With regard to this annual report, it is important to mention that the RCP addresses various issues surrounding population estimation for Gunnison sage-grouse. After review of the most current Gunnison sage-grouse research and scientific literature, the RCP recommends using an updated formula for calculating a population estimate based on lek count data. For comparison, population estimates are presented in this report using the traditional formula recommended in the local Gunnison sage-grouse Conservation Plan (1997), as well as the calculations recommended in the RCP. The key assumptions for each formula are outlined below:

Local Conservation Plan:

Male high count represents 75% of the male sage-grouse in the population

There are 2 females in the population for every 1 male

Rangewide Conservation Plan:

Male high count represents 53% of the male sage-grouse in the population

There are 1.6 females in the population for every 1 male

Peak Lek Attendance: The peak period of lek attendance was determined by comparing the four periods to determine when individual leks had their highest count of males and females. Whichever period had the highest number of leks with high counts was deemed the peak period of attendance (the peak in attendance is separated into male and female peaks). It also determined which period had the highest total number of males/females observed regardless of gender specific lek peaks.

Lek Status: The revised status for each lek and lek area was determined based on the standard definitions, both for the 2016 season as well as the cumulative status.

Average Number Males/Lek Area: The high male count was divided by the number of Active lek areas.

3-Year Moving Average: The three-year moving average was calculated by averaging the HMC from the current season with the HMCs from the previous two seasons.

Results

Weather and Access

The Gunnison Basin had a colder than average winter (November - April) during 2015/16 based on temperatures recorded at the National Oceanic and Atmospheric Administration (NOAA) weather station, site 053662 Gunnison 1 N Colorado. The average high temperatures were below average in November, December, January, and February and above average for March, and April. The average low temperature was above average for all months except January and February (Table 1).

Table 1: Gunnison 122-year average monthly temperatures (°F) versus Winter 2015/16 monthly average temperatures, courtesy of National Oceanic and Atmospheric Administration weather station, site 053662 Gunnison 1 N Colorado.

Month	High 24 Hr. Temperature °F	Low 24 Hr. Temperature °F
November 2015	44.8	12.4
122 yr. avg.*	45.3	10.4
December 2015	28.8	-1.7
122 yr. avg.	29.6	-2.6
January 2016	17.8	-12.8
122 yr. avg.	25.7	-7.4
February 2016	27.7	-5.3
122 yr. avg.	31.1	-1.8
March 2016	48.0	16.7
122 yr. avg.	42.1	11.5
April 2016	56.0	25.0
122 yr. avg.	55.9	22.3

*monthly data from winter 1893/94 – 2015/16

Weather data compiled from the 053662 weather station run by the NOAA, recorded 42.5 inches of snowfall for October 2015 through April 2016 (Oct. = 2.1", Nov. = 4.4", Dec. = 18.2", Jan. = 6.4", Feb = 7.0", March = 3.1", April = 1.3"). There was a trace of snow during the May 1–10 count period. These snowfall amounts are from an in-town location, snowfall amounts varied around the basin with greater snowfall occurring in some areas depending on elevation.

The 122-year average snowfall recorded at NOAA site 053662 is 49.8". Snow accumulations have been below average from winter 1997/98 – 2015/16 except for the winters of 2000/01 (53"), 2007/08 (99") and 2008/09 (67.7"). The highest winter snowfall recorded at NOAA site 053662 from October through April was in 1955/56 with 101.3". The following two tables summarize snowfall amounts and temperature by month for years of interest

Table 2: Temperature Averages & Snowfall for 1983/84, 1996/97, and years 2004/05–2015/16 from National Oceanic and Atmospheric Administration weather station, site 053662 Gunnison 1 N Colorado.

	November			December			January			February			March			April		
YEAR	High	Low	Snow	High	Low	Snow	High	Low	Snow	High	Low	Snow	High	Low	Snow	High	Low	Snow
15/16	44.8	12.4	4.4	28.8	-1.7	18.2	17.8	-12.8	6.4	27.7	-5.3	7.0	48.0	16.7	3.1	56.0	25.0	1.3
14/15	43.1	8.3	7.9	32.5	4.6	13.0	23.6	-5.2	5.3	39.3	6.7	7.8	49.8	16.1	3.9	58.7	23.0	5.3
13/14	42.5	13.7	1.6	22.5	-7.7	8.6	28.1	-6.0	3.5	31.9	4.9	15.6	41.4	12.6	4.5	54.5	22.1	1.4
12/13	49.3	8.6	0.2	28.7	-2.6	7.4	17.8	-15.4	3.6	27.6	-5.5	3.6	42.6	10.9	5.5	59.0	23.0	7.0
11/12	44.0	9.7	0.0	33.3	-1.7	2.4	35.2	-1.9	6.5	33.7	2.3	7.2	51.2	13.4	0.5	62.5	22.6	0.1
10/11	41.8	8.4	3.9	36.7	12.9	13.5	23.1	-8.9	2.6	26.7	-4.6	6.27	42.9	16.0	7.5	53.6	24.4	1.1
09/10	45.8	7.8	0	23.1	-10.9	6.3	27.2	-4.8	3.8	28.5	-4.0	9.6	41.9	10.7	3.43	54.5	23.1	1.92
08/09	45.8	11.2	3.7	25.8	-1.4	27.3	23.9	-5.5	5.5	30.4	-0.9	8.0	42.7	13.2	5.9	52.4	20.9	16.7
07/08	50.2	7.7	T	19.8	-5	27.1	12.7	-17.6	31.9	24.1	-5.9	25.6	33.2	0.8	9.9	50.8	17.5	3.5
06/07	42.2	9.0	8.0	32.1	3.1	6.0	27.4	-9.4	4.5	39.1	9.25	6.0	49.8	14.2	2.25	56.8	23.8	1.0
05/06	45.4	13.7	4.5	19.8	-10.7	20	20.8	-12.2	10	23.5	-10.0	4.5	40.4	14.8	4.5	59.4	22.3	2.0
04/05	39.0	14.5	14	22.7	-6.4	2	27.3	1.4	18.5	30.3	2.8	6	41.8	14.7	4.8	56.5	21.6	2.7
96/97	45.5	16.2	7.1	26.4	-2.7	22.6	24.2	-2.4	19	22.2	-3.25	9.3	40.6	8.4	0.7	52.1	23.3	2.7
83/84	41.7	13.1	14.8	28.5	5.0	37.8	8.1	-17.7	2.5	18.9	-12.1	9.0	32.2	7.9	9.0	46.0	18.2	7.5

Average temperatures for 04/05 thru 14/15 averaged directly from NOAA site 053662 weather sheets for Nov. thru April.

Snow depth in inches, temperature in °F

Table 3: Snowfall in inches per month for 1955/56, 1983/84, 1996/97, and years 2005/06–2015/16.

YEAR	Oct	Nov	Dec	Cum. Total	Jan	Cum. Total	Feb	Cum. Total	March	Cum. Total	April	Cum. Total
2015/16	2.1	4.4	18.2	24.7	6.4	31.1	7.0	38.1	3.1	41.2	1.3	42.5
2014/15	0.0	7.9	13.0	20.9	5.3	26.2	7.8	34.0	3.9	37.9	5.3	43.2
2013/14	1.6	4.1	8.6	14.3	3.5	17.8	15.6	33.4	4.5	37.9	1.4	39.3
2012/13	0.0	0.2	7.4	7.6	3.6	11.2	3.6	14.8	5.5	20.3	7.0	27.3
2011/12	0.0	0.0	2.4	2.4	6.5	8.9	7.2	16.1	0.5	16.6	0.1	16.7
2010/11	0.6	3.9	13.5	18.0	2.61	20.61	6.27	26.88	7.5	34.38	1.1	35.38
2009/10	0.8	0	6.3	7.1	3.8	10.9	9.6	20.5	3.43	23.93	1.92	25.85
2008/09	0.6	3.7	27.3	31.6	5.5	37.1	8.0	45.1	5.9	51.0	16.7	67.7
2007/08	1.0	T	27.1	28.1	31.9	60	25.6	85.6	9.9	95.5	3.5	99.0
2006/07	0.0	8	6	14	4.5	18.5	6.0	24.5	1.0	25.5	1.0	26.5
2005/06	0.0	4.5	20	24.5	10	34.5	4.5	39.0	4.5	43.5	2.0	45.5
1996/97	4.0	7.1	22.6	33.7	19	52.7	9.3	62.0	0.7	62.7	2.7	65.4
1983/84	0.0	14.8	37.8	52.6	2.5	55.1	9.0	64.1	9.0	73.1	7.5	80.6
1955/56	1.8	15.0	18.2	35.0	45.1	80.1	13.8	93.9	4.4	98.3	3.0	101.3

Snow, rain, low clouds, wind, and fog reduced visibility and impacted counts during all count periods. Weather was identified as a factor impacting counts on 31 occasions during the four count periods. Snowpack at the beginning of June was above average for the Gunnison basin at 209% of the median according to the Natural Resources Conservation Service in a news release on June 8, 2016.

Table 4. Weather summary from 22 March–10 May 2016 for the town of Gunnison, CO, courtesy of the National Oceanic and Atmospheric Administration weather station, site 053662 Gunnison 1 N Colorado.

	March 22–31		April 1–10		April 11–20		April 21–30		May 1–10	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
Avg. High (°F)	58.9	48.5	59.9	57.3	54.1	54.2	60.2	57.9	62.5	61.0
Avg. Low (°F)	19.9	16.8	21.5	19.4	22.5	21.0	26.4	27.8	34.7	31.5
# Nights < 32°F	10	10	10	9	10	10	10	6	0	5
# Nights < 0°F	0	0	0	0	0	0	0	0	0	0
# Days w/ Precipitation	0	5	0	1	4	6	1	4	4	3
Total Water (in.)	0	.17	0	T	0.61	0.44	0.12	0.19	1.02	0.30
Total Snow (in.)	0	2.0	0	T	5.3	0.2	0	1.1	0	T

Snow or rain events occurred on March 23, 24, 26, 30, 31, April 8, 11, 13, 15, 18-21, 26, 27, 29, and May 2, 9, 10, impacting counts and sometimes access, likely resulting in fewer birds observed those mornings.

Behavior

Colorado Parks and Wildlife personnel observed 635 grouse during annual big game classification flights. Gunnison sage-grouse were observed from January 6 through January 13, 2016. Areas of observations included Alder Creek, Bead Creek, Beaver Creek, Cabin Creek, Camp Kettle Gulch, Dry Gulch, Flattop, Goose Creek, Grafflin, Horne Gulch, Hot Springs Gulch, Kezar Basin, Leaps Gulch, Lost Canyon, Lower Sheeps Gulch, Sewell Gulch, Signal Peak, Stubbs Gulch, Sugar Creek, Watertank Gulch, and Woods Gulch. Number of grouse observed on winter range was higher (more than double) in 2016 compared to 2015 (301 birds).

Nine active leks have been traditionally counted during the last 10 days in March prior to the official count season. South Parlin 1 was added in 2011 due to reports of grouse being present early in the season. Male and female numbers were lower in 2016 (HMC=51, HFC=14) compared to 2015 (HMC=115, HFC=30) (Table 5 and 6). Weather undoubtedly impacted numbers of grouse during the early counts. Lower highs and lows during the early count period, five days of precipitation, and snow cover on many of the early count leks, apparently kept grouse off the leks as compared to 2015 (see Table 4).

Table 5. Early lek counts (March 22–31) with high male and female data.

Lek	Date	Males	Females
Almont	3/28/16	4	0
Hartman Gulch	3/24/16	10	0
Miller	3/31/16	3	1
N. Parlin South	3/25/16	4	4
N. Parlin North	3/25/16	1	0
Razor Creek	3/22/16	1	0
Razor Creek Divide	3/25/16	7	0
South Parlin 1	3/30/16	0	0

Lek	Date	Males	Females
Stevens Creek East	3/24/16	6	7
Woods Gulch	3/26/16	15	2
Total		51	14

Area Use by Zone

Doyleville Zone:

No birds were observed during any of the four official count periods on **Double D, Needle Creek, Razor Creek 1 & 2, South Parlin 1, or South Parlin #3** leks this season. One male was observed at **Monson Gulch** and two males were seen at **Monson Gulch East Ridge** during the second count period. No other grouse were seen at either lek this year. Two sheep dogs ran through both leks during the first count. Males and females were observed at **Razor Creek** lek during the first and second count periods. Males were seen during all other count periods including the early count. Two coyotes were on the lek during the first count scattering, but not flushing the grouse. A badger on the pond dike during the fourth count had no impact on the grouse. Males were observed on **Razor Creek Divide** lek during the early count and first, second, and fourth official count periods. Females were observed only during the second count period. Coyotes moved the birds into sage brush cover during the first count. **Razor Dome 1&2** was active during all four counts. Females were observed during the first two counts. A raven on the lek during the first count and a coyote on the lek during the fourth count elicited no response by grouse. A breeding event was observed during the second count. **South Parlin** (Lower and Upper) leks were counted all four periods. Males and females were observed during all counts at both **South Parlin Lower (#1)** and **Upper (#2)**. A hen was bred on South Parlin Lower during the second count. A coyote heard during the fourth count had no apparent impact. Two coyotes, a raven, and a Cooper's hawk seen during the fourth count at South Parlin Upper had no apparent impact on the grouse. **Vito** lek was counted all four count periods with males observed during the first and fourth counts. No females were observed this year. Snow on the lek during the second and third counts apparently impacted grouse use of the lek. **Waunita** was counted all periods with males present all counts and females in attendance during the first, second, and fourth counts. A red fox hunting on the lek during the first, third, and fourth counts apparently did not disturb the grouse. A coyote hunting during the second count flushed one male. **Waunita Northwest** was counted all four count periods with males present all counts and females present during the first count. A coyote on lek during the fourth count resulted in no response from grouse. **Woods Gulch** lek was counted all four official count periods and the early count. Males were observed during all counts. Females were observed during the early, first and second counts. A raven landing on the lek during the first count stopped males displaying. A coyote near the lek during the third count had no apparent impact on the grouse.

Gold Basin Zone:

No birds were observed at **Chance Gulch B, Chance Gulch C, Gold Basin 1&2, Ridgeline, South Six Mile Hupp, or Tyler's** leks. **Big Mesa** was counted all four count periods with males seen during each count. Females were seen during all except the third count this year. Four pronghorn on the lek during the first count had no impact on the birds. **Chance Gulch** lek was counted all four counts with males present during all counts and females present all except the first count. A breeding event was observed during the second count. **Chance Gulch E** was counted four times with males in attendance during all counts. Females were present during the third and fourth counts. The lek now meets the criteria for "active" status in 2016, lek status changes to annually/officially "active". Antelope, raven flyovers, airplane flyovers, a coyote near the lek, and dogs barking during the first count had no apparent impact. A raven landing on the lek had one male disappear into sage brush. Antelope, elk, raven, hawk, and airplane flyovers, and howling coyotes had no apparent impact on grouse during the second, third, and fourth counts. **Dutch Gulch** was counted four times with males in attendance during all counts and a single female was observed during the first count. Wind may have impacted the count during the third count period. **Meyer's** lek was counted four times with males present all four counts and females present during the first three counts. Birds

continue to use an area south of **Meyer's** lek, as noted in the past years counts. Count sheet was updated in 2014. **McCabe Lane** lek was counted all four count periods. Males were observed during the first, third, and fourth counts. Females were seen during the first and third counts. Since the lek does not meet status protocols for active or inactive status, lek status changes to annually and officially "unknown" for 2016. **South Beaver Creek** lek was counted all four periods with males and females in attendance for all counts. Snow and fog affected observations during the second count and wind may have impacted numbers counted during the third count. **South Six Mile Meadow** lek was counted all four count periods with males present during all counts and females present for the first and fourth counts. A pronghorn buck on the lek during the first count had no apparent impact. **South Six Mile Ridge** had males on the lek during all except the third count period. Females were not present during any count. Wind during the first count and snow during the third count may have impacted count numbers. **Sugar Creek** was counted during three count periods with males observed during the first, second, and fourth counts and females were present the first count. Snow and wind made a count impossible during the third count period. Rain and wind undoubtedly impacted count numbers during the fourth count. **Waterbar** and **Tyler's** leks were counted two count periods with no birds observed at Tyler's and one male observed at Waterbar during the first count. Since Waterbar does not meet status protocols for active or inactive status, 2016 status is annually and officially "unknown".

Lost Canyon Zone:

Esty, Lost Canyon 1, Lost Canyon 2, North Parlin Hupp, North Parlin West, Signal Peak, Tomichi Village, and Waycamp had zero birds observed during all count periods. **Hippie Knob**, counted all four counts, had males present the first, second and fourth count periods. Females were observed during the second and fourth counts. Grouse were present during the third count, however, all birds flushed before they could be identified. **North Parlin North** and **North Parlin South** were counted during the early count and all four count periods. Both leks had birds present during the early count. **North Parlin North** had one male present during the first count and three male present during the second count. Status becomes annually "inactive", officially "unknown". **North Parlin South** had males present only during the second count. Lek status is "active" for 2015. Lek status for both leks remains annually "inactive". **North Parlin West** was counted during all four counts without any birds observed. As this is the tenth year of inactive status, 2016 official status becomes "historic". **Scout** lek was counted all four count periods this year with males present each count and females only during the first count. Snow and fog made access and viewing difficult. **Sewell Gulch**, counted four times, had males present for the first, second, and fourth counts with one female present during the second and fourth counts. An "army" of deer through the lek during the first count had no apparent impact on the grouse. Ravens harassed and a golden eagle flushed grouse during the second count. **Signal Peak West** lek was counted four count periods with males present the first and second counts and females present during the second and fourth counts. It was snowing hard during the third count, no birds were seen, although two coyotes and several deer were observed on or near the lek. Rain and fog impacted viewing during the fourth count.

Ohio Creek Zone:

No birds were observed at **Almont West, Antelope South Substation 1&2, Flattop, Haystack, Ohio Creek East A & C, Stevens Creek West, and Teachout 1&2**. **7MB** was counted all four count periods. Two males were observed during the first and second count periods and one male was observed during the third. No females were seen. Since two males were seen for two count periods, annual status for 7 MB is "active". Four counts were completed at **7MB Eagle Ridge** lek with males present all but the third count and females in attendance during the first two counts. Snow and strong winds during the third count kept birds away from the lek. A golden eagle flushed the lek during the first count. Two coyotes on the lek during the second count had no apparent impact on grouse. **7MB Hupp** was counted four times with males and females seen during all counts. Elk near the lek during the first count had no apparent impact on grouse. A golden eagle flyover had the grouse hiding in the sagebrush during the third count. Deer through the lek during the fourth count had no apparent impact. **Allen Lane** was counted five times with males and females in attendance all but the third count period. Coyotes on the lek during the second count flushed birds twice. Fresh snow and poor viewing conditions resulted in no birds observed during the third count. **Almont** was counted all four count periods plus the early count; grouse were present during all counts.

Females were observed only during the second count. A hen was bred during the second count period. **Antelope North Blinberry Gulch**, counted five times, was active with males and females all four count periods. A raven flyover stopped displaying birds and snow impacted access during the first count. **Antelope Ridge** was counted four times with males present during all counts and females present only during the first count. A deer on the lek during the first count had no impact. The lek counter noted relatively heavy vehicle use out of the nearby subdivision. **Campbell** lek was counted four times. Males were in attendance each count period. Females were present the first and third counts. Fresh snow during the second count probably reduced hen attendance and male activity. Coyotes were actively hunting grouse during the third count, flushing all birds. Poor weather during the fourth count kept grouse away from the lek. **Flattop Section 31** was counted twice with males and females present. Poor weather with heavy rains affected access and ability to count during the second and fourth count periods. **Hartman Gulch** was counted all four official count periods plus the early count. Males were observed during all counts, females were present during the first and second counts. A northern harrier pushed birds off the lek during the early count. Ravens and coyotes during the first and second and vehicle drivebys during all counts had no apparent impact on grouse. **Henkel Road** lek was counted four times with males present during the first three counts. Females were observed during the first, second, and fourth counts. Deer on the lek during the first and third counts had no apparent impact. A golden eagle flying to the west had grouse disappear into the sagebrush during the third count. **Iola 2** was counted five times with three males and one male on the lek during the first and second counts, respectively. Since the lek does not meet status protocols for active status, status remains annually “inactive” and officially “unknown”. **Miller** lek was counted seven times, including the early count. Males were observed during all counts. Females were seen during the second, third, and fourth counts. A hawk and golden eagle flyover during the first count, coyotes howling, a hawk perched near the lek, and an airplane flyover during the third count, and coyotes on the lek during the fourth count had no apparent impact. A hen was bred during the second count. Deer and/or elk were present during all counts with no apparent disturbance to the grouse. **Ochs/Redden/Teachout 4** had males present during all four count periods, but females were present only during the fourth count. Snow on the ground during the third count may have affected grouse numbers. A golden eagle near the lek during the fourth count likely impacted grouse numbers. **Stevens Creek East** was counted five times, including the early count. Males were counted each of the count periods. Females were seen only during the early count. **Taila’s** lek was counted four count periods with males and females seen all counts except no females the fourth count period. A cow elk on the lek during the second count period and four deer during the fourth count had no apparent impact on grouse. **Teachout 3, 5, & 6** had males and females in attendance all four counts. A HMC of 109 during the second count period and a HFC of 45 during the first count period were the high counts of the season among all leks. Snow and cold during the third count likely impacted grouse numbers.

Sapinero Zone:

Pine Creek Mesa (PCM) East, PCM South, PCM Powerline, and PCM Ute Ranch were not counted due to private land access issues. These four leks are not used in the current data analysis since these leks could not be observed, and have not been counted for several years. No birds were observed at **Ninemile, Sapinero 10 Mile Spring (2), and Willow Creek Mesa. Big Springs and Ninemile** were counted twice this year. No males were seen. A female was seen near **Big Springs** during the first count. **Kezar Basin North & Hupp** was counted three count periods with males present each count and one females present during the second count. Snow during the third count blocked access to the lek. No count was completed. Deer on the lek during the first count and a pronghorn near the lek during the second count had no apparent impact. **Kezar Basin South** was counted all four count periods with one male present during the first count. **Sapinero Corral (3)** was counted three times in 2016. Males were present during all counts. Females were present during the first count. Since at least 2 males were seen during two counts, status for 2016 is annually and officially “active”. **Sapinero 10 Mile Spring (2)** was counted four times with no males or females present. **Sapinero Powerline (1)** and **Sapinero South** were each counted four times with males in attendance each time. Females were present during all counts at **Sapinero South** and only during the first count at **Sapinero Powerline**. Coyotes howling and on or near the lek during the first and second counts, and pronghorn and deer on the lek during the third and fourth counts at Sapinero Powerline resulted in no

response by grouse. A coyote grabbed a grouse off the lek during the second count, flushing grouse in its vicinity. **Sapinero Ridge** was counted all four counts with males present all but the third count. Females were not present. Six elk during the first count and mule deer presence during fourth count had no impact on grouse. Only one male was observed during two of the three counts with males present. Since the lek does not meet status protocols for either active or inactive status, annual and official status for 2016 is “unknown”. **Willow Creek Mesa** lek is officially “historic” and was visited once with no birds observed.

Peak Lek Attendance

The total number of males observed on all leks visited peaked during the second count period at 742 (Table 6). A total of 42 leks were determined “active.” The peak male attendance per individual lek occurred during the second count period with 27 leks having their highest male counts (Table 7). Fifteen leks peaked during the first count period, 5 during the third count period, and 10 during the fourth count period. Four leks had multiple periods when the same HMC was observed. Female lek attendance peaked in the first count period with 173 individuals (Table 6). Four leks had multiple periods with the same peak female attendance. Of leks determined “active,” 35 were counted all four count periods, six were counted three count periods, and one was counted in two count periods. Thirteen leks with males had no females observed. Two leks had a female with no males observed.

Table 6. Number of individual Gunnison sage-grouse observed on leks in the Gunnison Basin from 22 March to 10 May 2016, compared to 2015 counts.

	22 – 31 March		1 – 10 April		11 – 20 April		21 – 30 April		1 – 10 May	
Year	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
Males	115	51	821	687	632	742	782	476	651	584
Females	30	14	161	173	52	110	46	34	19	34

Table 7. Number of Gunnison sage-grouse leks that peaked per count period in the Gunnison Basin from 1 April to 10 May 2016

	1 – 10 April	11 – 20 April	21 – 30 April	1 – 10 May
Males	15	27	5	10
Females	23	19	2	4

Copulations

Eight copulations were observed this season during regular designated counts. No copulations were observed during the early count. In comparison, fifteen copulations were observed in 2015.

Mortalities

A single, probable mortality was documented in 2016. A coyote was observed grabbing a male grouse at the Sapinero Powerline lek during the second count period. It is assumed that the grouse was consumed.

Count Data by Zone (Appendix D)

Doyleville Zone:

The Doyleville Zone consists of 16 leks that make up nine Lek Areas. This year, nine leks were active, five inactive, and two historic. The Official Status of the leks within this zone is nine active, two inactive, four unknown, and two historic. Five leks saw an increase in the number of males observed this year in comparison with last year, six leks had a decrease in the number of males, and five leks were the same.

Seven of the nine Lek Areas are “active” this year with two lek areas “inactive”. The total number of males observed in this zone was 204, down from the 228 males observed in 2015. The high female count was 42, down from 63 observed in 2015.

Gold Basin Zone:

The Gold Basin Zone consists of 17 leks that make up five Lek Areas. This year there were nine active leks, three inactive leks, two unknown leks, and three historic leks. The Official Status of the leks within the zone is nine active leks, one inactive lek, four unknown leks, and three historic leks. Four leks increased in the number of males observed this year compared with last year, six leks decreased, and seven leks had no change. All five of the Lek Areas are officially “active”. The total number of males observed in this zone was 161, down from 174 observed last year. The high female count was 37, up from 25 females observed in 2015.

Lost Canyon Zone:

The Lost Canyon Zone consists of 14 leks that make up four Lek Areas. There were four active leks, five inactive leks, and five historic leks this season. The Official Status of the leks within this zone are: four active leks, three inactive leks, one unknown lek, and six historic leks. Two leks increased in the number of males observed, four leks decreased, and eight had no change. All four Lek Areas are officially “active” this year. The total number of males observed in this zone was 53, up from 46 males in 2015. Eight females were observed this year, up from five observed in 2015.

Ohio Creek Zone:

The Ohio Creek Zone consists of 26 leks that make up six Lek Areas. This year there were 16 active leks, five inactive leks, no unknown, and five historic leks. The Official Status of the leks within the zone are 16 active leks, three inactive leks, two unknown leks, and five historic. Ten leks increased in the number of males observed compared with 2015, seven leks decreased, and nine leks had no change. All six Lek Areas are officially “active” this year. The total number of males observed in this zone was 412, a slight increase from the 408 males observed in 2015. The high female count was 106, a sizeable increase from 63 observed in 2015.

Sapinero Zone:

The Sapinero Zone consists of 10 leks that make up five Lek Areas. The Pine Creek Mesa North and Pine Creek Mesa South Lek Areas are not included in this analysis. This year there were four active leks, four inactive leks, one unknown lek, and one historic lek that constitutes its own Lek Area. The Official Status of leks within the zone are four active leks, four unknown leks, one inactive lek, and one historic lek. Two leks increased in the number of males observed this year compared with last year, four leks decreased, and four leks had no change. Three Lek Areas are officially “active” this year. The total number of males observed in this zone is 98, down from 118 males observed in 2015. Forty-two females were observed this year, also a sizeable increase from 18 observed in 2015.

Population Estimate

1997 Conservation Plan Model

The high male count in 2016 is 928. The estimated minimum male population of Gunnison sage-grouse for the known leks is 1,237. The estimated minimum female population of Gunnison sage-grouse is 2,474 (double the number of estimated males). The population estimate for the minimum total number of Gunnison sage-grouse is 3,711 birds, down 186 birds from 2015 (Table 8). A target level of 867 is the minimum spring male population goal established in the Gunnison Sage-grouse Conservation Plan 1997.

Table 8. 1997 Gunnison Sage-grouse Conservation Plan - Summary of population data from Gunnison sage-grouse lek counts in the Gunnison Basin, 1995–2016. HMC = high male count, HFC = high female count, male population estimate = HMC/.75, female population estimate = (male population estimate) x (2), population estimate = male + female population estimates.

Year	HMC	% Δ in Males	Est. Male Population*	Relationship to Target Level (867)**	HFC	Est. Female Population	Population Estimate
1995	449	n/a	599	below	n/a	1,198	1,797
1996	587	30.7	783	below	n/a	1,565	2,348
1997	645	9.88	860	below	n/a	1,720	2,580
1998	706	n/a	941	above	203	1,883	2,824
1999	723	2.4	964	above	230	1,928	2,892
2000	636	-12	848	below	179	1,696	2,544
2001	712	11.9	949	above	154	1,899	2,848
2002	617	-13.3	823	below	216	1,645	2,468
2003	500	-19	667	below	156	1,333	2,000
2004	498	-0.4	664	below	66	1,328	1,992
2005	971***	92.4	1,295	above	193	2,555	3,885
2006	1061	9.3	1,415	above	165	2,830	4,245
2007	941	-11.3	1255	above	148	2,510	3,765
2008	748	-20.5	997	above	197	1,994	2,991
2009	778	4.0	1037	above	215	2,074	3,111
2010	745	-4.2	993	above	227	1,986	2,980
2011	763	2.4	1,017	above	233	2,034	3,051
2012	832	9.0	1,109	above	138	2,218	3,327
2013	848	1.9	1,131	above	236	2,262	3,393
2014	811	-4.4	1,081	above	239	2,163	3,244
2015	974	20.1	1,299	above	175	2,598	3,897
2016	928	-4.7	1,237	above	235	2,474	3,711

*Rounded prior to determining female population estimate

**Target level is minimum spring male population determined by the Gunnison Basin LWG in the Gunnison Sage-grouse Conservation Plan (1997) needed to sustain a viable Gunnison sage-grouse population

***includes count for Big Mesa lek in 2005 to present

2005 Rangewide Conservation Plan Model

The high male count in 2016 is 928. The Basin-wide estimate of male Gunnison sage-grouse based on counted leks is 1,751 (number of males observed divided by 53%). The target level (836) is modeled population capability for males in occupied, vacant, and potential sage-grouse habitat in the Gunnison Basin. The estimated female population for the Gunnison Basin is 2,802 (multiply the estimated male population by 1.6). The population estimate for the entire Gunnison Basin, calculated using known lek counts, is 4,553 birds, down by 226 birds from 2015 (Table 9). The population target for the Gunnison Basin identified in the 2005 Gunnison Sage-grouse RCP is set at a long-term (10-year) average of 3,000 birds. The current 10-year average (2007–2016) population estimate is 4,105 birds, well above the 3,000 target.

Table 9. 2005 Gunnison Sage-grouse Rangewide Conservation Plan - Summary of population data from Gunnison sage-grouse lek counts in the Gunnison Basin, 1995–2016. HMC = high male count, HFC = high female count, male population estimate = HMC/.53, female population estimate = (male population estimate) x (1.6), population estimate = male + female population estimates.

Year	HMC	% Δ in Males	Est. Male Population*	Relationship to Target Level(836)**	HFC	Est. Female Population	Population Estimate
1995	449	n/a	847	above	n/a	1,355	2,202
1996	587	30.7	1,108	above	n/a	1,773	2,881
1997	645	9.88	1,217	above	n/a	1,947	3,164
1998	706	n/a	1,332	above	203	2,131	3,463
1999	723	2.4	1,364	above	230	2,183	3,547
2000	636	-12	1,200	above	179	1,920	3,120
2001	712	11.9	1,343	above	154	2,149	3,492
2002	617	-13.3	1,164	above	216	1,863	3,027
2003	500	-19	943	above	156	1,509	2,452
2004	498	-0.4	940	above	66	1,503	2,443
2005***	971	92.4	1,832	above	193	2,931	4,763
2006	1,061	9.3	2,002	above	165	3,203	5,205
2007	941	-11.3	1,775	above	148	2,840	4,615
2008	748	-20.5	1,411	above	197	2,258	3,669
2009	778	4.0	1,468	above	215	2,349	3,817
2010	745	-4.2	1,406	above	227	2,250	3,656
2011	763	2.4	1,440	above	233	2,304	3,744
2012	832	9.0	1,570	above	138	2,512	4,082
2013	848	1.9	1,600	above	236	2,560	4,160
2014	811	-4.4	1,530	above	239	2,448	3,978
2015	974	20.1	1,838	above	175	2,941	4,779
2016	928	-4.7	1,751	above	235	2,802	4,553

*Rounded prior to determining female population estimate

**Target level is modeled population capability for males in occupied, vacant, and potential sage-grouse habitat in the Gunnison basin from the 2005 Gunnison Sage-grouse Rangewide Conservation Plan

*** includes count for Big Mesa lek in 2005 to present

Figure 1. High male and Female Counts for the Gunnison Basin from 1996 – 2016.

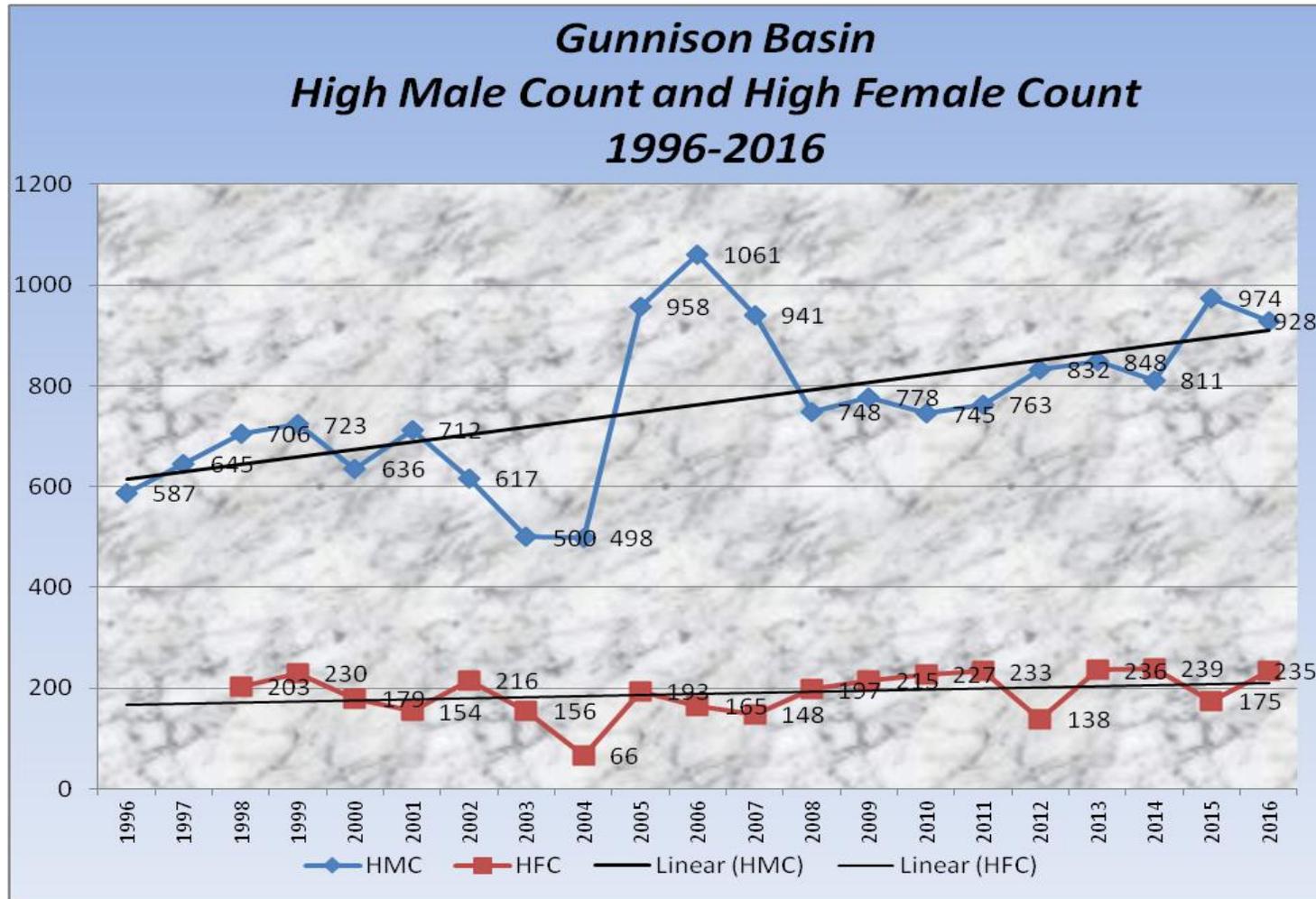
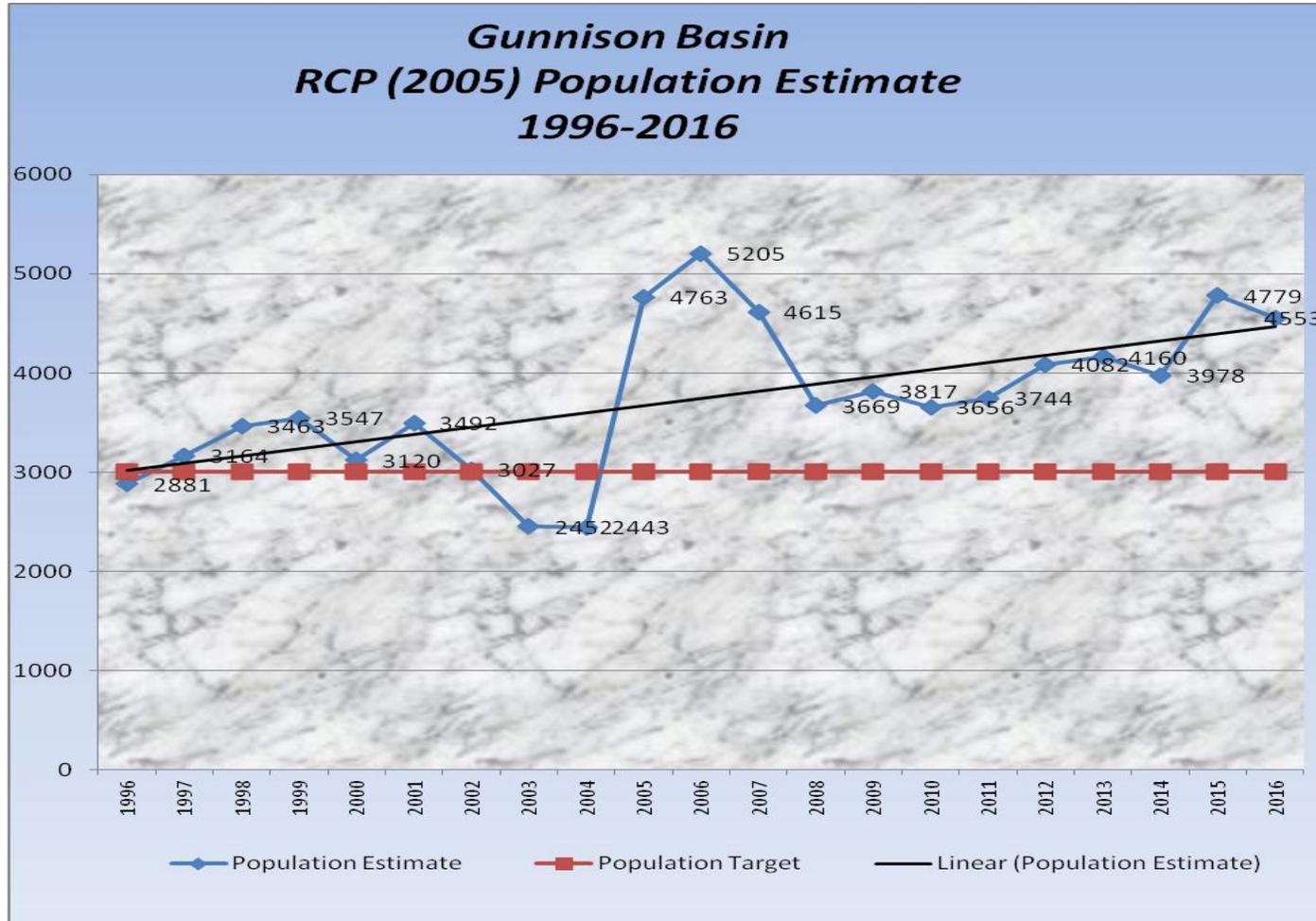


Figure 2. RCP (2005) Population Estimates for the Gunnison Basin from 1996– 2016.



Three-Year Moving Averages

Three-year moving averages of HMCs are used to assess the sustainability of Gunnison sage-grouse in the Gunnison Basin. The three-year average for 2014–2016 is 904 males, which represents a 3.0% increase from the 878 males moving average calculated for 2013–2015 (Table 10).

Table 10. Three-year moving averages of male Gunnison sage-grouse based on spring lek counts from 1996–2016*. Also calculated is the percent change between yearly averages.

Year	HMC	1996-1998	1997-1999	1998-2000	1999-2001	2000-2002	2001-2003	2002-2004	2003-2005	2004-2006	2005-2007	2006-2008
1996	587	avg = 646 % Δ = 15.3	avg = 691 % Δ = 7	avg = 688 % Δ = -0.4	avg = 690 % Δ = 0.3	avg = 655 % Δ = -5.1	avg = 610 % Δ = -6.9	avg = 538 % Δ = -12	avg = 652 % Δ = 21.1	avg = 839 % Δ = 28.7	avg = 987 % Δ = 17.6	avg = 916 % = -7.2
1997	645											
1998	706											
1999	723											
2000	636											
2001	712											
2002	617											
2003	500											
2004	498											
2005	958**											
2006	1061											
2007	941											
2008	748											

*continued on next page

**HMC does not include count for newly discovered Big Mesa lek

Table 10 (continued). Three-year moving averages of male Gunnison sage-grouse based on spring lek counts from 2007–2016.

Year	HMC	2007-2009	2008-2010	2009-2011	2010-2012	2011-2013	2012-2014	2013-2015	2014-2016		
2007	941	avg = 822									
2008	748		avg = 757								
2009	778	% Δ = -10.3			avg = 762						
2010	745		% Δ = -7.9		avg = 780						
2011	763			% Δ = 0.7		avg = 814					
2012	832				% Δ = 2.4		avg = 830				
2013	848					% Δ = 4.4		avg = 878			
2014	811						% Δ = 1.9		avg = 904		
2015	974							% Δ = 5.8			
2016	928								% Δ = 3.0		

Conservation Plan Objectives

Males/Lek Area

According to the 1997 Gunnison Sage-Grouse Conservation Plan, a minimum of 25 Lek Areas should be active with a minimum of 26 males per area in order to meet the minimum male population goal of 867. This year, 25 Lek Areas are active, which meets the plan objective of 25, with an average of 37.1 males/Lek Area (928 total males divided by 25 Active Lek Areas). The average number of males per area is down from the 39.0 males per Lek Area calculated in 2015, but still above the minimum population goal of 26 males per lek area.

Ungulate/Avian/Predator Disturbances

Ungulates were observed 56 times on or near leks. Antelope were recorded on or near leks nineteen times. Ten times there were antelope, but no birds. Nine times the antelope had no effect on strutting birds. Pronghorn did not flush or disturb grouse on any occasion. Deer were recorded twenty-one times. Deer were on the lek with no birds in attendance on three occasions. Deer did not flush or disturb grouse on any occasion. Eighteen times deer had no impact on the birds. Elk were documented sixteen times. Elk had no impact on grouse on thirteen occasions. Grouse were not present on the lek on three occasions.

Birds other than grouse which were noted over, on, or near leks included: geese (1x), sandhill crane (1x) golden eagles (10x), northern harrier (2x), red-tail hawk (2x), rough legged hawk (1x), Cooper's hawk (1x), great horned owl (1x), unknown raptors (2x), and ravens (16x). Golden eagles flushed or disturbed grouse seven times, had no impact two times, and no grouse were present once. Ravens flushed or disturbed a lek six times. Ravens had no impact on grouse at the lek seven times and on three occasions no grouse were present. The northern harrier and red-tail hawk flushed grouse once and had no impact once. The Cooper's hawk, great horned owl, and rough-legged hawks had no impact on grouse. The unknown raptors flushed grouse once, had no impact once, and no grouse were present once. The geese and sandhill cranes had no impact on grouse.

Coyotes on or near leks were documented 36 times. Those observations yielded twelve instances of birds flushing, moving away from the lek, or stopping displaying, seventeen times with no apparent impact, and seven times the coyote(s) were on a lek with no birds in attendance. A red fox was observed on or near a lek twice, a badger once, and dogs on five different occasions. No impacts to grouse were noted.

Vehicle activities were recorded nine times, disrupting birds once. Airplane flyovers were recorded five times. No impact to grouse was noted. Cattle were reported on a lek once, blocking the observer's view of the grouse.

Research and Monitoring

Colorado Parks and Wildlife continued an analysis of demographic and movement patterns of radio-collared Gunnison sage-grouse in the Gunnison Basin. Resource selection models based on seasonal habitats are being developed based on Dr. Mike Phillips's research conducted between 2005–2011. Colorado Parks and Wildlife researchers, Drs. Tony Apa and Mindy Rice, are working on this effort after the departure of Dr. Mike Phillips. No translocation of Gunnison sage-grouse from the Gunnison Basin to outlying populations occurred in the spring of 2016.

Photography

The Gunnison Basin Sage-grouse Strategic Committee accepted applications from wildlife photographers wanting original photos of Gunnison sage-grouse for conservation projects (i.e., books, brochures, presentations) during the winter of 2015/16. Applications were due February 1st 2016. Two applications were approved for the spring of 2016. Photographers selected for this unique opportunity included Gary Kramer and Bob Gres with Birds in Focus.com. Colorado Parks and Wildlife would like to thank landowners that have participated in the program in the past by granting permission for guides and photographers to access leks on private lands. A sub-set of grouse images are available for educational purposes by contacting Nathan Seward at (970) 641-7060 or at Nathan.Seward@state.co.us.

Wildlife photographers interested in applying for access to a Gunnison sage-grouse lek in the spring of 2017 should contact Nathan Seward.

Searches/New Leks

In April and May of 2016, lek searches were conducted in areas previously suspected of having sage-grouse strutting activity. Areas checked were south of Camp Kettle including the Section 9 area, west and south of Razor Dome, and Cochetopa SWA – Los Pinos Creek. All potential leks were checked early morning for strutting activity. The Section 9 area was counted three times in 2016 as a follow up to grouse observations in 2015. However, no grouse were observed in 2016.

Historic Leks (where birds were observed)

In 2016, one male grouse was observed at Iola 1 (0, 1, 0, 0)*, an officially historic lek. The lek remains officially historic as it fails to meet the definition of active as outlined in the status protocols.

* - number of males counted in each count period, nc = no count

Inactive Leks (where birds were observed)

Each year several leks receive an “inactive” designation, despite having male sage-grouse present during one or more of the four count periods. For example, if one male was observed displaying on a lek during the first count period and none observed in subsequent count periods, the lek would not be deemed “active” because it fails to meet the definition outlined in the status protocols.

In 2016, grouse were observed on the following “inactive” leks: North Parlin South (0, 2, 0, 0) and Waterbar (1, 0, nc, nc). North Parlin South’s annual and official status remains “inactive”. Annual and official status for Waterbar is “unknown” as it does not meet status protocols for either inactive or active.

Unknown Leks (where birds were observed)

If a lek had >2 males observed during a count period and zero or one male counted during consecutive counts, the lek would be classified as “unknown” if it did not meet the “inactive” or “active” criteria. Additionally, if some leks couldn’t be counted every count period (i.e. - bad weather days), their status became “unknown”. Data from the Waunita lek, counted everyday by both Sis-ka-dee and Jim Mendonca over the past several years has shown that inclement weather affects male attendance. For example in 2007 the HMC recorded by Jim Mendonca was 42. However, on inclement weather days the count dropped down between zero and two 2 males (April 10 = two males, April 24 = one male, April 28 = zero males). A lek could also be classified as “unknown” if it is not counted the appropriate number of times to determine its status.

In 2016, grouse were observed on eight leks with an "unknown" status. Iola 2 (3, 1, 0, 0), Kezar Basin South (1, 0, nc, 0), Monson Gulch East Ridge (0, 1, 0, 0), and South Parlin 1 (0, 1female, nc, nc). Their annual status becomes "inactive", official status remains "unknown". McCabe Lane (3, 0, 1, 1) does not meet the status protocols for either active or inactive, it becomes annually and officially "unknown". North Parlin South (2, 0, 1, 0) with five years of inactive status becomes officially "inactive". 7MB (2, 2, 1, 0) and Chance Gulch E (2, 6, 1, 7) had birds observed with at least 2 males seen during two counts, their status for 2016 becomes "active".

Active Leks (where an insufficient number of birds were observed)

In 2016, two "active" leks had an insufficient number of males counted to maintain an "active" status. North Parlin North (1, 3, 0, 0) and Sapinero Ridge (3, 1, 0, 1) were counted four times but males counted were insufficient for active status. Since zero males were observed at North Parlin North during two count periods and the lek does not meet the criteria for "active" status (2 counts with at least 2 males each), this previously "active" lek changes to "inactive" in 2016. The official status will be "unknown". Sapinero Ridge had zero males observed during only one count period and the lek does not meet the criteria for "active" status, annual and official status will be "unknown".

Inactive and Historic Leks

Three leks, Lost Canyon 2, North Parlin South, and Sapinero 10 Mile Spring went from official status "unknown" to "inactive" because 2016 represents their fifth year of seasonally inactive status. North Parlin West had ten years of annually inactive status in 2016. The official status is now "historic".

Recommendations

Trapping will only occur in the fall to avoid potentially impacting lek counts. Trapping in the spring should only occur if research and the Trap and Transplant effort are prioritized by the Trap and Transplant Subcommittee.

In 2016, coordinated counts continued as modified in 2013. No additional changes were identified as needed. Coordinated counts should be reviewed annually as to whether they are advantageous and provide usable information.

The potential new lek known as Section 9 should be counted again in 2017 during all four count periods to determine if it is a new lek.

Discussion

Gunnison sage-grouse breeding activity may have started earlier in 2016. Although not as early as was observed in 2015, the number of females observed (the third highest count since 1998) in 2016, were seen early in the count season which would indicate much of the breeding activity occurred in late March and early April. This was likely attributed to above average temperatures in March and April. Little to no snow cover early in the count season provided good access to leks. Grouse distribution among leks was good with some higher elevation leks that are typically snow covered during the first count period having good grouse attendance. Distribution of birds on leks appeared more widespread, possibly because of younger, less dominant birds participating around the periphery of the lek. This may be an indicator that the relatively high number of grouse seen in 2015 resulted in enhanced chick recruitment and greater survival. Other indices, such as the number of Gunnison sage-grouse observed during big game

classification flights conducted in January of 2016 (more than double that seen in 2015) demonstrated that grouse numbers may be increasing. Although the 2016 count was lower than 2015, it is plausible that weather impacted counts this year. Snow and rain, especially in the late count periods, hindered our ability to access or accurately count some of our traditionally higher count leks, likely reducing the high male count for 2016. This inclement weather added to the snowpack in the Gunnison Basin (209% of the median at the beginning of June) likely resulting in improved range conditions and early brood-rearing habitat for Gunnison sage-grouse. Overall, the population trend of Gunnison sage-grouse in the Gunnison Basin is increasing slightly.

Literature Cited

Gunnison Sage-Grouse Conservation Plan. 1997. Gunnison Sage-Grouse Working Group. Gunnison, Co. 108 pp.

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Young, J. R., C. E. Braun, S. J. Oyler-McCance, J. W. Hupp, and T. W. Quinn. 2000. A new species of Sage-grouse (Phasianidae: *Centrocercus*) from Southwestern Colorado. *Wilson Bulletin* 112(4): 445–453.

Appendices

Appendix A: Individuals involved with Gunnison sage-grouse counts in the Gunnison Basin during 2016.

Name	Affiliation	Contribution
Curtis Allen	Landowner	Access
John Alves	CPW	Lek Counter
Arden Anderson	CPW Volunteer	Lek Counter
Gay Austin	BLM	Lek Counter
Kevin Blecha	CPW	Lek Counter
Andrew Breibart	BLM	Lek Counter
Brian Brown	BLM	Lek Counter
Theresa Childers	NPS	Lek Counter
Jim and Pam Christian	Landowners	Access
Ronald Crist	WSCU	Lek Counter
Tara deValois	BLM	Lek Counter
Brandon Diamond	CPW	Lek Counter
C. Dickinson	NPS	Lek Counter
Kathaleen Dixon	CPW	Office Support/ Lek Counter
Jeff Ewert	Volunteer	Lek Counter
Marcella Fremgen	Bird Conservancy of the Rockies	Lek Counter
Jessica Frey	NPS	Lek Counter
Nick Gallowich	CPW	Lek Counter
Bob Gress	Photographer	Lek Counter
Aaron Groves	CPW	Lek Counter
Burt and Sandy Guerrieri	Landowners	Lek Counters/Access
Lowell Inman	Castleton Ranch Manager	Lek Counter/Access
Mike Jackson	CPW	Lek Counter/Coordinator
Russ Japuntich	BLM	BLM Count Coordination/Gate Codes
Paul Jones	CPW	Lek Counter
Corey Kanuckel	USFWS	Lek Counter
Pamela King	NPS	Lek Counter
Gary Kramer	Photographer	Lek Counter
Pat Magee	Sisk-a-dee, WSCU	Lek Counter
Tony Maldarella	Landowner	Lek Counter/Access
Blane Mazzuca	Gunnison County	Keys/Gate Codes
Marnie Medina	BLM	Lek Counter
Sara Miller	USFS	Lek Counter
Melissa McKenna	BLM	Lek Counter
Julia Nave	Volunteer	Lek Counter
Bruce Noble	NPS	Lek Counter
Val Organek	CPW	Lek Counter
Suzie Parker	USFS	Lek Counter
Chris Parmeter	CPW	Lek Counter
Greg Peterson	Landowner	Access
Heidi Powers	CPW	Lek Counter
Hunter Powers	Volunteer	Lek Counter
Ryan Pringle	Landowner	Access
Brett Redden	Landowner	Access
Scott Redden	Mill Creek Ranch	Lek Counter
Dan Schneider	WSCU	Lek Counter
Sabrina Rocksund	CPW	Lek Counter
John Scott	NRCS	Lek Counter
Nathan Seward	CPW	Lek Counter/Lead Biologist
Reilly Seward	Volunteer	Lek Counter
Ben South	Volunteer	Lek Counter
Justin Stone	USFS	Lek Counter
Bill Trampe	Landowner	Access
Brooke Vasquez	NRCS	Lek Counter
Gavin Vasquez	Volunteer	Lek Counter
Matt Vasquez	USFS	Lek Counter/Gate Codes

Name	Affiliation	Contribution
J Wenum	CPW	Lek Counter
Nicole Weprin	NPS	Lek Counter
Liz With	NRCS	Lek Counter
Danny Zadra	CPW	Lek Counter

Appendix B: Gunnison Sage-Grouse Lek Count Procedures 2016

I would like to thank everyone for their cooperation in assisting with the Gunnison Sage-Grouse lek counts this year. The following is a reminder of the lek count procedures and survey instructions for 2016.

1. Visit your leks prior to your count date to insure that you know exactly where you need to go and what equipment (4 wheeler, snowmobile, spotting scope, binoculars) you will need.
2. Attempt to arrive at the lek 1/2 hour before sunrise and stay until all birds have left.
3. If your lek(s) requires a gate code or key to access, please check with me or the appropriate agency and **make sure that you lock the gate behind you.**
4. Attempt to use the observation point notated on the map/datasheet and notify me if you change it.
5. Limit the amount of disturbance created by your presence – minimal noise, movement, etc.
6. Counts should be taken **and documented** approximately every 5-10 minutes, differentiating between males, females, and unknowns. **Please note arrival time, count start and finish time, and time you leave site.**
7. Please take note of weather, bird disturbances including predators, and bird movement (direction and time) off/on the lek. If the weather is bad (windy, rainy, snowy, etc) or if the birds flush due to disturbance before you get an accurate count, try to conduct a second count for that count period.
8. Record on the datasheets exactly what you saw as accurately as possible, especially if you were counting multiple leks simultaneously and combining them on the sheet. For example, if you count leks A and B at the same time and you are using the same datasheet for both, make note of the high counts and abnormalities for each separately on the sheet. This includes “use” areas close to the lek.
9. If your birds have shifted from their “traditional” lek site, please note on the map where you actually saw the birds.
10. A schedule and listing of leks and their observers will be posted in the CPW office copy room with a tray to hand in datasheets.
11. Please look on the schedule or check your datasheets to see the “official” cumulative status of your leks (I will attempt to pencil in the status on data sheets this year) – this will help you determine how many times to count the lek:

Active leks need to be counted at least once **each** 10-day count period starting April 1. The count periods are: 4/1-10, 4/11-20, 4/21-30, 5/1-10

Unknown leks must be counted once during each of the **first two** count periods starting April 1. If you don't have any birds on both counts, you are finished. However, if you find birds during only one count, you need to go out at least a third time. If there are not at least two counts with at least two males, we cannot say that the lek is active.

Inactive leks need to be counted once during each of the **first two** count periods starting April 1st. If you don't have any birds on both counts, you are finished. However, if you find birds during only one count, you need to go out at least a third time. If there are not at least two counts with at least two males, we cannot say that the lek is active.*

Historic leks need to be counted once during either of the first two count periods starting April 1. If you find birds at that count, please count at least two additional periods so that we can get an official designation.*

* The official protocol is that a lek must be inactive (<2 males for 2 count periods) for 5 consecutive years before we can officially say that the lek is cumulatively Inactive. Therefore, if we only count a lek once, we have to say that it was "Unknown" and the leks cumulative status has to start over again at 0 years Inactive. A lek must be Inactive for 10 consecutive years before we can officially say that the lek is Historic.

12. If you are responsible for a **Coordinated** lek, please follow the posted schedule, birds from these leks potentially travel between leks and we don't want to double count them (this is why you need to note bird movement (direction and time)). The same rules that we use for the uncoordinated leks (number and timing) also apply to the coordinated leks. An Inactive or Unknown coordinated lek only need to be counted on the first two dates listed on the schedule unless you find birds. **Please note**, some leks have been dropped from the coordinated counts because of a lack of movement observed between nearby leks. Please check your count sheet envelope, the count schedule, or call me to verify if your lek is part of a coordinated count.
13. **Please try to bring in the datasheets and mark off the lek on the schedule as soon as possible after you have completed the count.**
14. If, for any reason, you will not be able to complete a count for a given period, please let me know as soon as possible and I will try to find someone to cover that count.

If you have any questions, comments, or suggestions, please feel free to contact me.

Michael Jackson
Lek Count Coordinator
Work: 641-7060
Cell: 970-275-5595
mdjacks1@yahoo.com
mike.jackson@state.co.us

Appendix C: Weather summary from 22 March–10 May, 2016 for the town of Gunnison, CO, courtesy of the National Oceanic and Atmospheric Administration weather station, site 053662. Note: As weather data is for the town of Gunnison, differences exist for actual lek sites (typically more precipitation and lower temperatures). Also, measurements begin 24hrs before the date of collection at 8am, so data is realistically one day off. M = missing data; S = snow; T = trace amounts

Month	Date	Max (°F)	Min (°F)	Water (in.)	Snow (in.)
March	22	64	19	0	0
	23	58	23	0.04	0.5
	24	40	19	T	T
	25	46	19	0	0
	26	42	21	0.01	0.2
	27	36	10	0	0
	28	48	14	0	0
	29	58	20	0	0
	30	56	10	0.08	0.9
	31	37	13	0.04	0.4
April	1	42	12	0	0
	2	45	12	0	0
	3	56	16	0	0
	4	59	17	0	0
	5	64	21	0	0
	6	57	14	0	0
	7	59	18	0	0
	8	66	26	T	T
	9	68	32	0	0
	10	57	26	0	0
	11	61	26	T	T
	12	60	21	0	0
	13	61	26	T	0
	14	65	27	0	0
	15	67	28	T	0
	16	54	30	M	M
	17	36	26	M	M
	18	46	27	0.33	0.1
	19	46	30	0.07	T
	20	46	31	0.04	0.1
	21	55	22	T	0
	22	64	25	M	M
	23	72	32	M	M
	24	68	23	M	M
	25	59	24	0	M
	26	63	24	0.09	0.1
	27	47	29	T	0
	28	54	35	0	0
	29	59	32	0.10	1.0
	30	38	32	M	M
May	1	53	32	M	M
	2	44	31	0.17	T
	3	56	23	0	0
	4	65	25	0	0
	5	72	28	0	0
	6	73	40	M	M
	7	73	38	M	M
	8	58	28	M	M
	9	58	33	0.02	0
	10	58	37	0.11	0

Appendix D: Gunnison sage-grouse lek count data in the Gunnison Basin in 2015 and 2016, organized by zone. HMC=High Male Count, HFC=High Female Count

Zone	Lek Area	Lek Area Total Males / Females		Lek Site	2015 Annual Status	2015 HMC	2016 # Counts	2016 HMC	2016 HFC	2016 Annual Status	Official Status	High Count Date (Males / Females)
Doyleville	Cochetopa Dome	0	0	Double D	I	1	4	0	0	I	U	no birds
	Needle Creek	0	0	Needle Creek	H	0	1	0	0	H	H	no birds
	Razor Creek	20	8	Razor Creek	A	28	5	20	8	A	A	April 3, April 14/April 3
				Razor Creek 1&2	H	0	1	0	0	H	H	no birds
	Razor Creek Divide	19	10	Razor Creek Divide	A	27	10	19	10	A	A	April 12/April 12
	Razor Dome	21	4	Razor Dome 1 & 2	A	31	4	21	4	A	A	April 27/April 19
	South Parlin	43	12	South Parlin Lower (#1)	A	18	6	23	6	A	A	May 5/April 6
				South Parlin Upper (#2)	A	40	4	20	5	A	A	April 13/April 7
				South Parlin 1	I	0	2	0	1	I	U	no males/April 14
	South Parlin	43	12	South Parlin (#3)	I	0	2	0	0	I	I	no birds
				Monson Gulch	I	0	4	2	0	I	I	April 12/no females
				Monson Gulch on East Ridge	I	0	4	1	0	I	U	April 12/no females
	Monson Gulch	19	0	Vito	A	16	4	16	0	A	A	April 9/no females
				Waunita	A	24	4	27	2	A	A	April 19/April 7, 14
Waunita	59	3	Waunita Northwest	A	19	4	32	1	A	A	April 15/April 7	
			Woods Gulch	A	24	5	23	5	A	A	April 15/April 6	
Gold Basin	Chance Gulch	58	18	Chance Gulch	A	24	4	31	7	A	A	May 2/April 13
				Chance Gulch B	I	1	2	0	0	I	U	April 16/no females
				Chance Gulch C	I	0	2	0	0	H	H	no birds
				Chance Gulch E	U	4	4	7	4	A	A*	May 3/April 26
				Tylers	I	0	2	0	0	H	H	no birds
				Meyers	A	10	4	19	7	A	A	April 14/April 14
	Gold Basin	17	4	Waterbar	I	1	2	1	0	U	U*	April 5/no females
				South Beaver Creek	A	37	4	17	4	A	A	April 7/May 4
	McCabe Lane	10	6	Gold Basin 1&2	H	0	1	0	0	H	H	no birds
				Big Mesa	A	7	4	7	3	A	A	May 5/April 12
McCabe Lane				I	3	4	3	3	I	U	April 8/April 21	
				Ridgeline	I	2	4	0	0	I	U	no birds

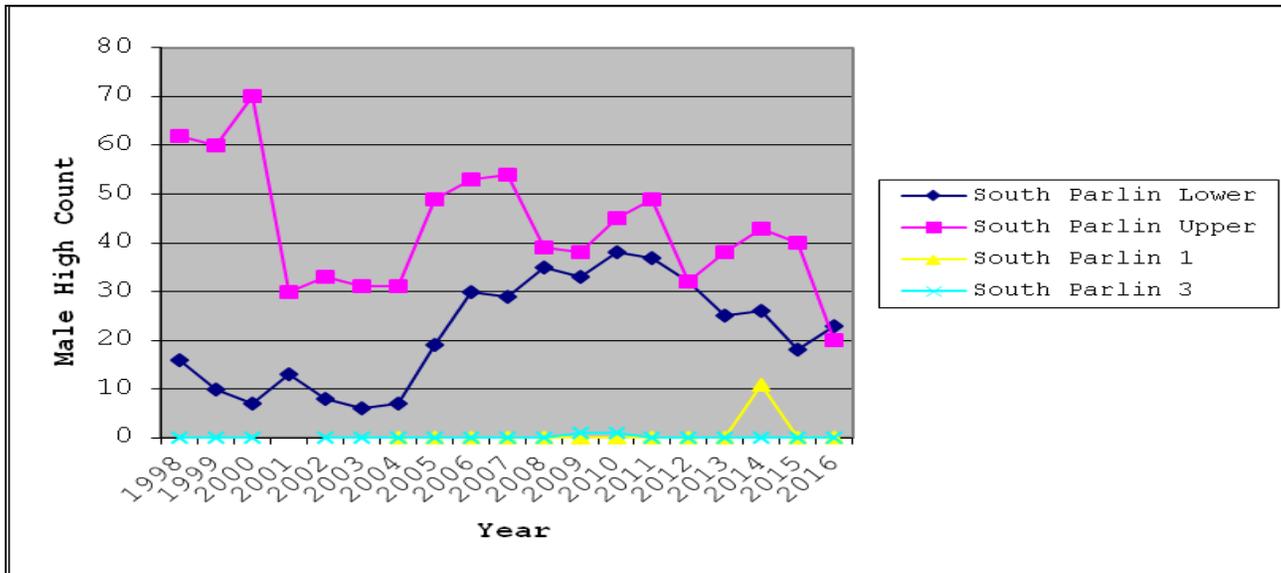
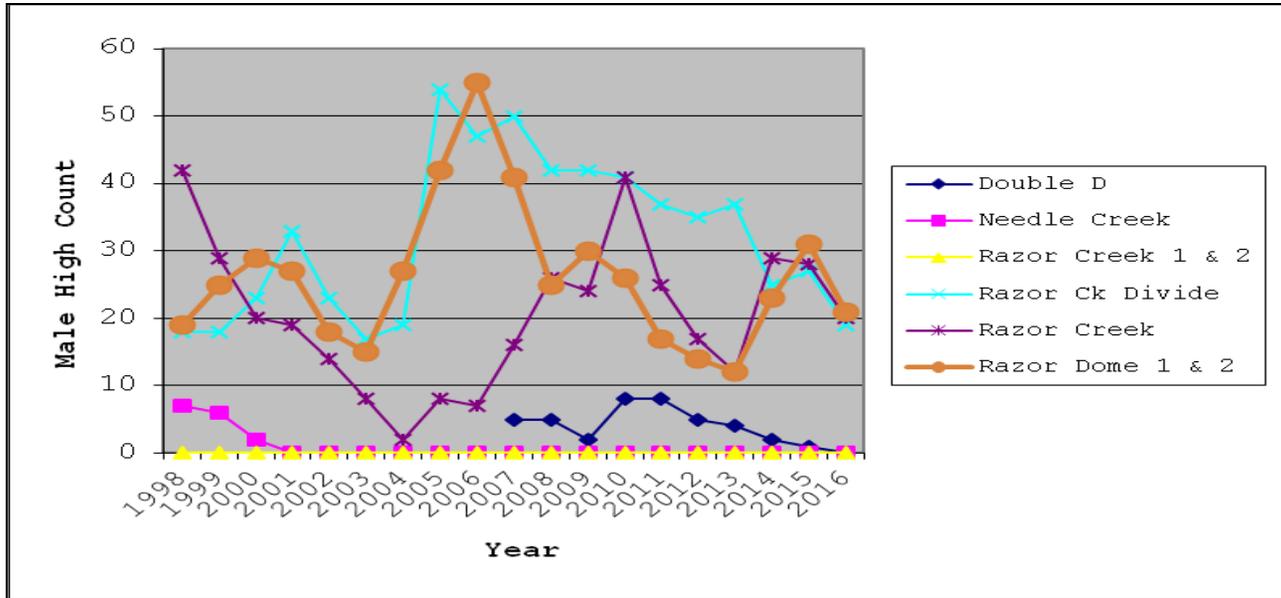
Zone	Lek Area	Lek Area Total Males / Females		Lek Site	2015 Annual Status	2015 HMC	2016 # Counts	2016 HMC	2016 HFC	2016 Annual Status	Official Status	High Count Date (Males / Females)
Gold Basin (cont.)	Six Mile	31	5	Dutch Gulch	A	5	4	17	1	A	A	April 5/April 5
				South Six Mile Hupp	I	0	4	0	0	I	I	no birds
				South Six Mile Meadow	A	11	4	5	4	A	A	April 6/April 6
				South Six Mile Ridge	A	17	4	9	0	A	A	May 6/no females
	Sugar Creek	45	4	Sugar Creek	A	52	3	45	4	A	A	April 8/April 8
Lost Canyon	Sewell Gulch/Hippie Knob	20	5	Hippie Knob	A	5	4	13	4	A	A	May 5/April 12
				Sewell Gulch	A	7	4	7	1	A	A	April 12/April 12, May 5
	Lost Canyon	25	2	Esty	H	0	1	0	0	H	H	no birds
				Scout	A	21	4	25	2	A	A	May 4/April 9
				Waycamp	I	0	2	0	0	I	I	no birds
				Lost Canyon 1	H	0	2	0	0	H	H	no birds
				Lost Canyon 2	I	0	2	0	0	I	I*	no birds
	North Parlin	5	0	North Parlin Hupp	I	0	4	0	0	H	H	no birds
				North Parlin North	A	4	5	3	0	I	U*	April 12/no females
				North Parlin South	I	2	5	2	0	I	I	April 12/no females
				North Parlin West	I	1	4	0	0	I	H*	no birds
	Tomichi Village	3	1	Signal Peak	I	2	2	0	0	H	H	April 9/no females
				Signal Peak West	A	4	4	3	1	A	A	April 15/April 15, May 10
				Tomichi Village	H	0	2	0	0	H	H	no birds
	Ohio Creek	Ohio Creek	198	62	Allen Lane	A	12	3	15	7	A	A
Flattop					H	0	2	0	0	H	H	no birds
Flattop Section 31					A	25	2	39	9	A	A	April 9/April 25
Ochs/Redden/Teachout 4					A	29	5	35	1	A	A	April 14/May 5
Ohio Creek East A & C					I	0	3	0	0	I	I	no birds
Teachout 1 & 2					I	0	3	0	0	I	I*	no birds
Teachout 3, 5, & 6					A	142	10	109	45	A	A	April 13/April 2
Eagle Ridge		105	29	Campbell	A	16	3	14	4	A	A	April 3/April 3
				Henkel Rd	A	10	4	7	2	A	A	April 12/April 12
				Miller	A	22	6	17	12	A	A	April 11/April 11
				Taila's	A	8	4	10	3	A	A	May 3/April 5, 12
				Triangle	H	nc	0	nc	nc	H	H	nc
				7MB	I	3	4	2	0	A	A*	April 5, 11/no females
				7MB Eagle Ridge	A	44	4	47	5	A	A	April 14/April 14
				7MB Hupp	A	10	5	8	3	A	A	May 3/April 5, 12
Almont		7	2	Almont	A	8	5	7	2	A	A	May 5/April 17
				Almont West	I	0	2	0	0	H	H	no birds

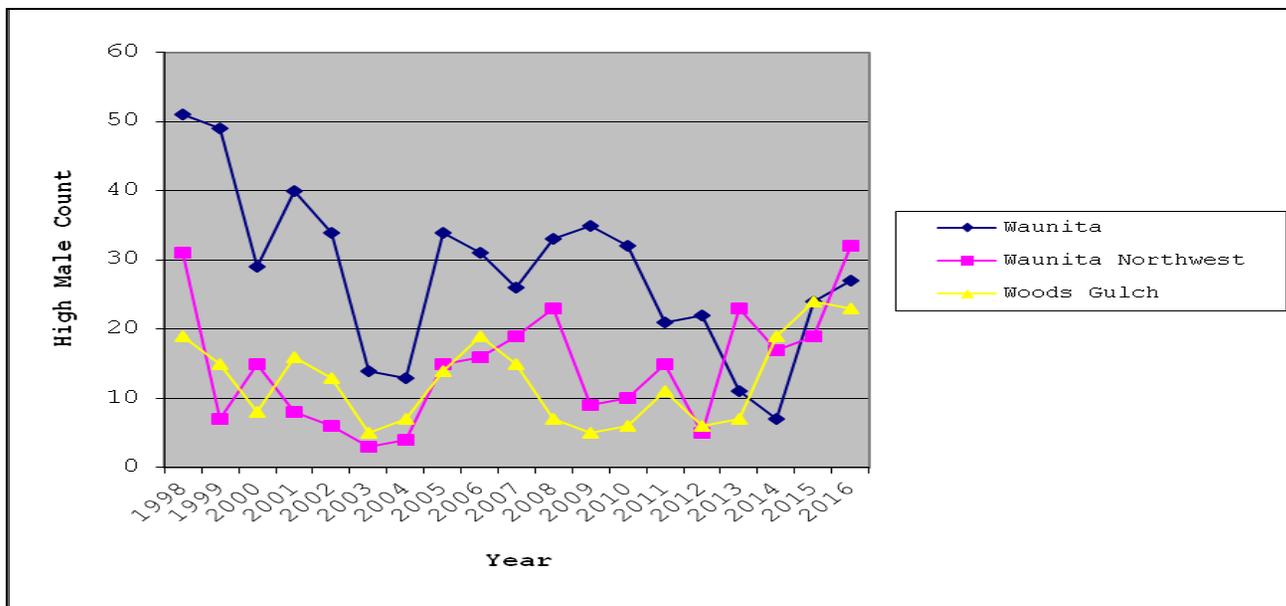
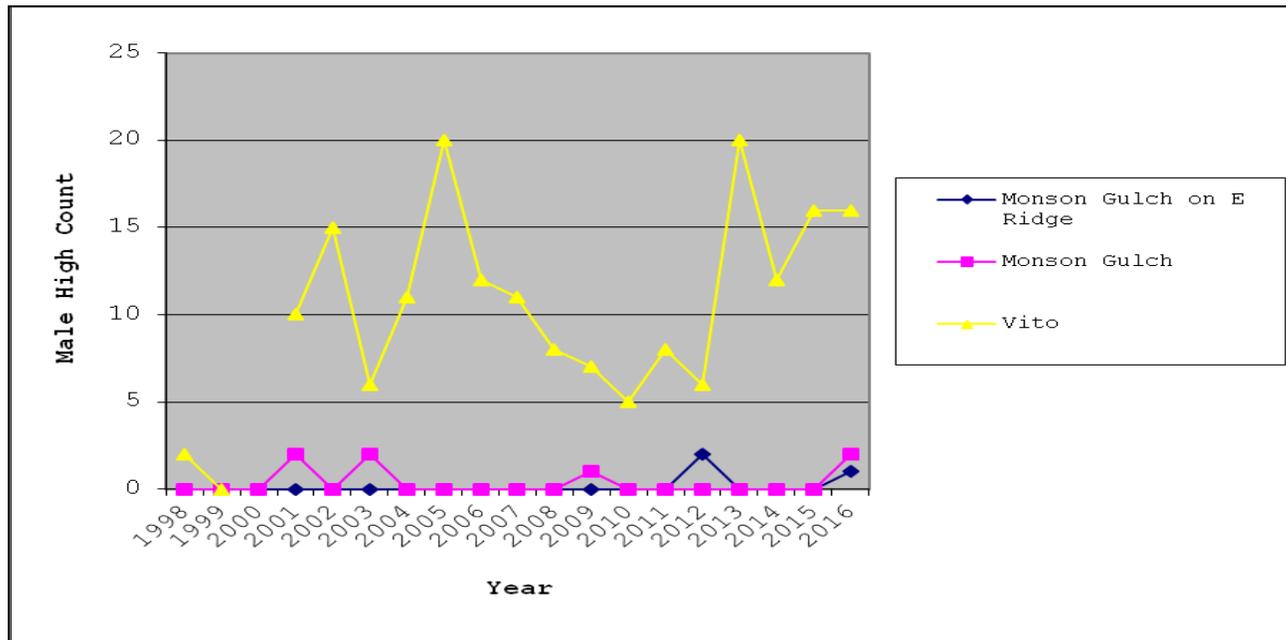
Zone	Lek Area	Lek Area Total Males / Females		Lek Site	2015 Annual Status	2015 HMC	2016 # Counts	2016 HMC	2016 HFC	2016 Annual Status	Official Status	High Count Date (Males / Females)
Ohio Creek (cont.)	Antelope	49	5	Antelope South Substation, 1, & 2	I	0	2	0	0	I	I	no birds
				Antelope North Blinberry Gulch (3)	A	27	5	38	2	A	A	April 30/April 7, May 6
				Antelope Ridge	A	4	3	11	3	A	A	April 6, 17, 28/April 6
	Hartman Gulch	38	8	Hartman Gulch	A	36	5	38	8	A	A	April 8/April 8
	Iola	15	0	Iola 1	I	0	4	1	0	H	H	April 6/no females
				Iola 2	I	1	4	3	0	I	U	April 6/no females
				Haystack	I	0	2	0	0	I	U	no birds
				Steven's Creek East	A	11	5	11	0	A	A	May 3/no females
				Steven's Creek West	H	0	1	0	0	H	H	no birds
				Kezar Basin North/Hupp	A	38	3	28	1	A	A	April 15/April 15
Sapinero	Kezar Basin	29	1	Kezar Basin South	I	4	3	1	0	I	U	April 8/no females
				Big Springs	U	0	2	0	1	I	U	no males/April 6
	Ninemile	0	1	Ninemile	U	0	2	0	0	I	U	no birds
				Pine Creek Mesa East (2)	U	NA	0	NA	NA	U	U	NA
	Pine Creek Mesa North	nc	nc	Pine Creek Mesa Powerline (1&3)	U	NA	0	NA	NA	U	U	NA
				Pine Creek Mesa South (5)	U	NA	0	NA	NA	U	U	NA
	Pine Creek Mesa South	nc	nc	Pine Creek Mesa Ute Ranch (4)	U	NA	0	NA	NA	U	U	NA
				Willow Creek	0	0	Willow Creek Mesa	H	0	1	0	0
	Sapinero South	58	37	Sapinero 10 Mile Spring (2)	I	0	4	0	0	I	I*	no birds
				Sapinero Corral (3)	I	0	3	10	3	A	A*	April 27/April 8
Sapinero Ridge (4)				A	5	4	3	0	U	U*	April 7/no females	
Sapinero South				A	63	4	45	34	A	A	April 19/April 7	
Sapinero North				11	3	Sapinero Powerline (1)	A	8	4	11	3	A

Shaded leks: These leks are not counted due to lack of private land access, and have not been used in data analysis since 2006

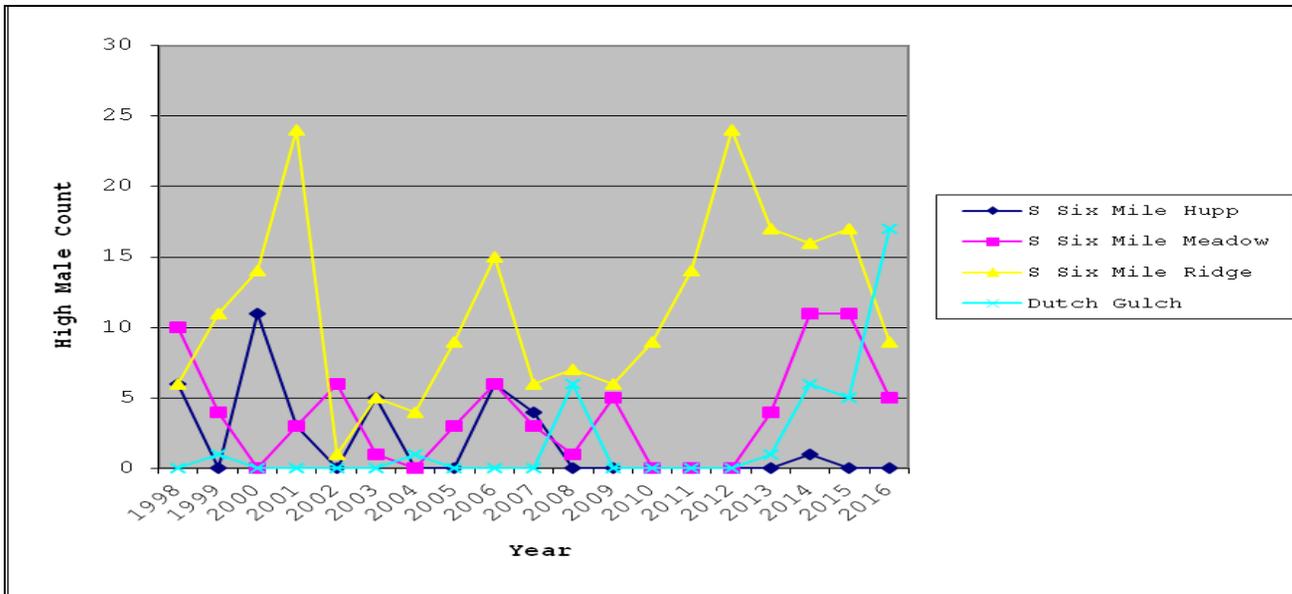
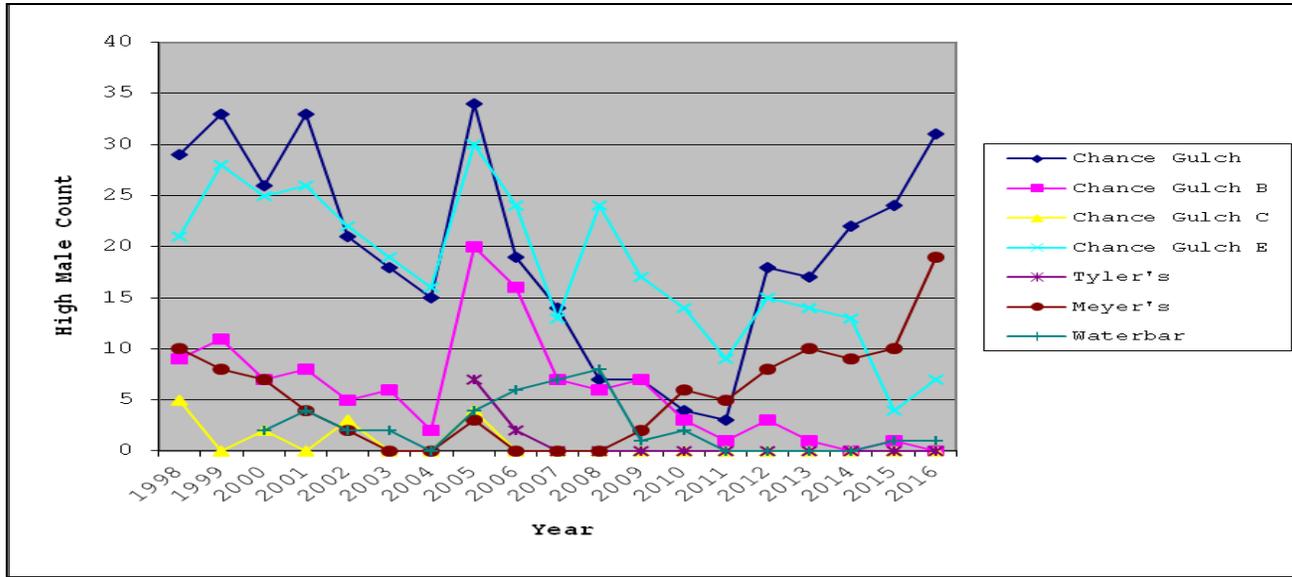
* - indicates a change in official status

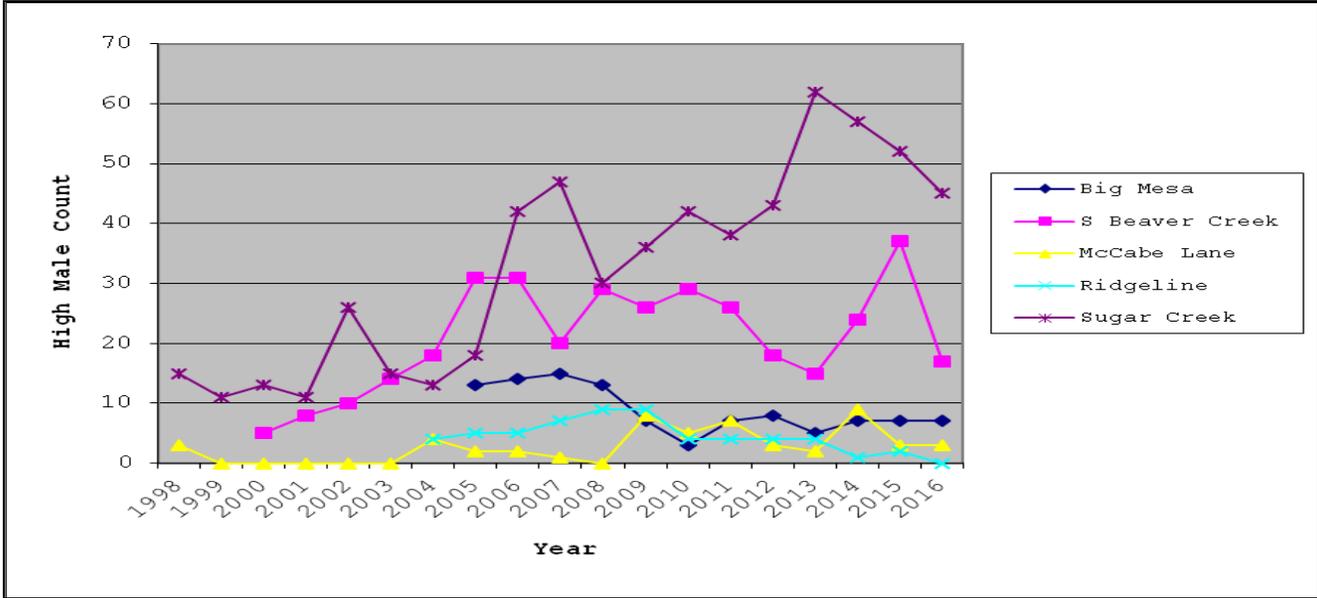
Appendix E: Gunnison sage-grouse high male counts on leks in the Doyleville Zone of the Gunnison Basin from 1998–2016.



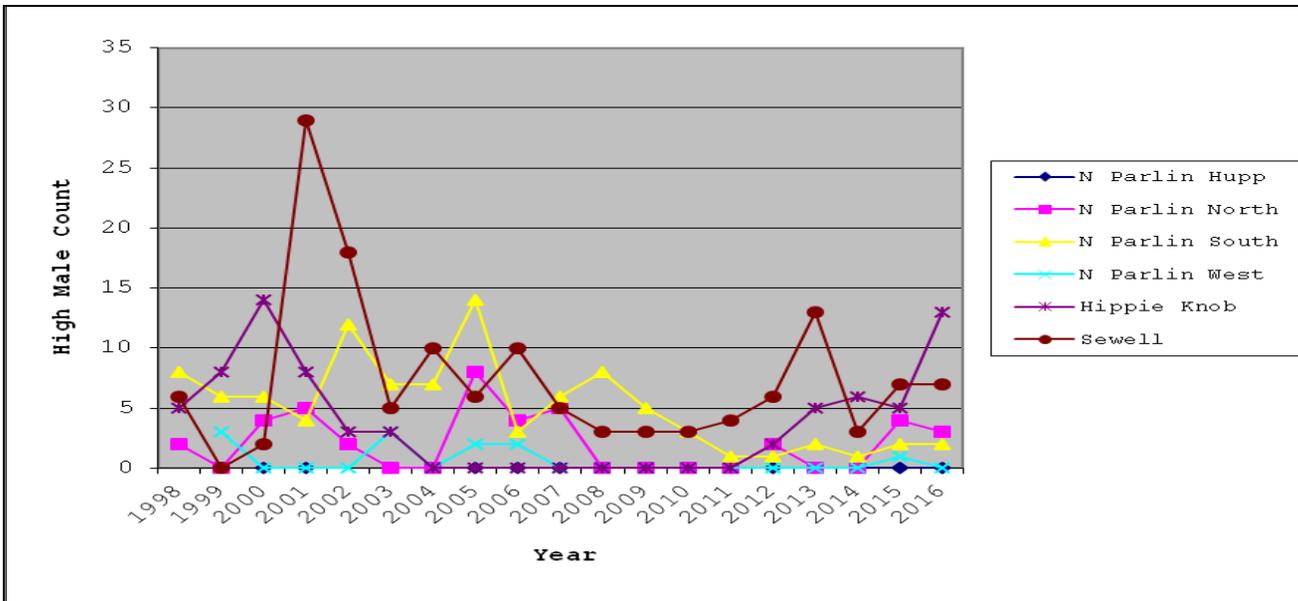
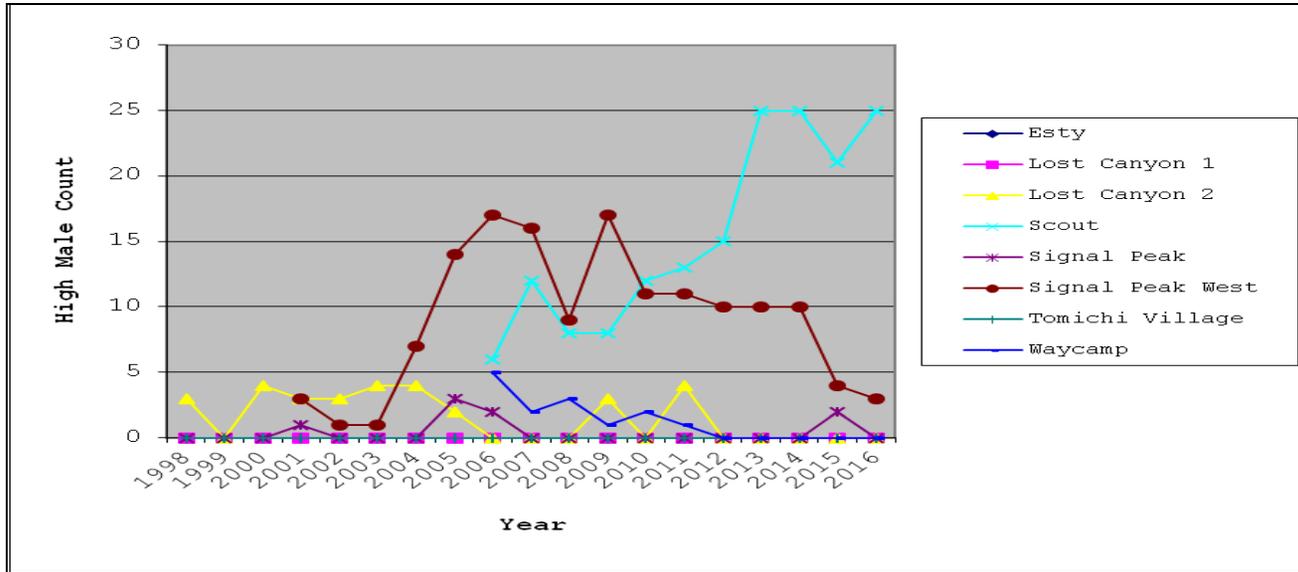


Appendix F: Gunnison sage-grouse high male counts on leks in the Gold Basin Zone of the Gunnison Basin from 1998–2016.

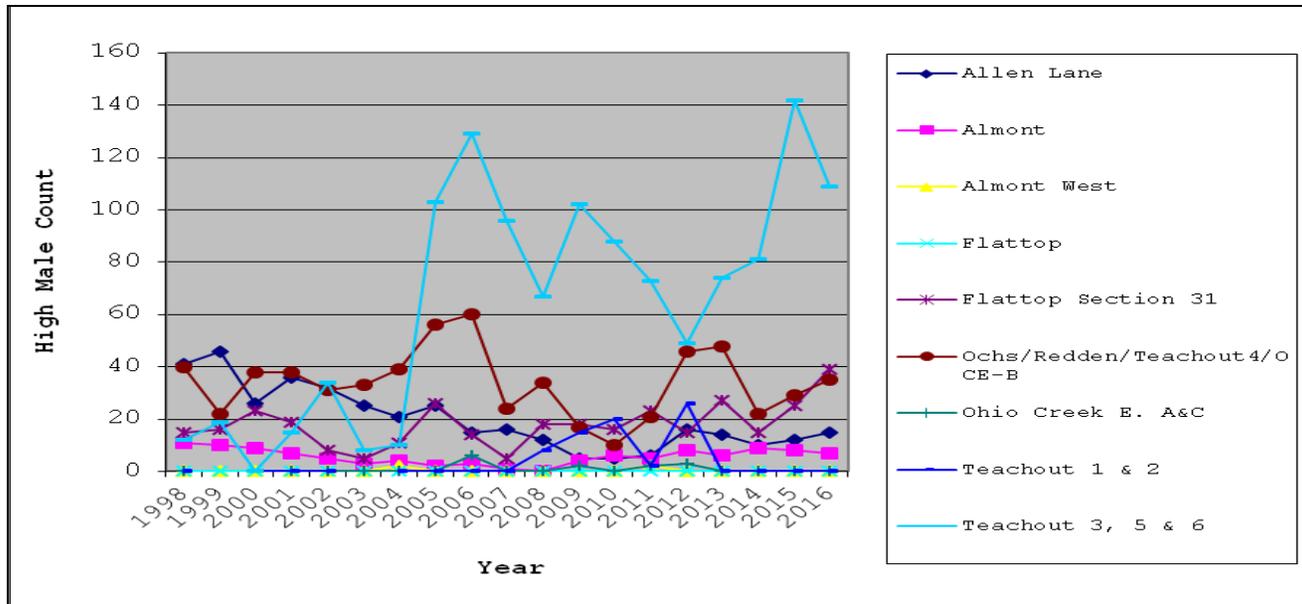
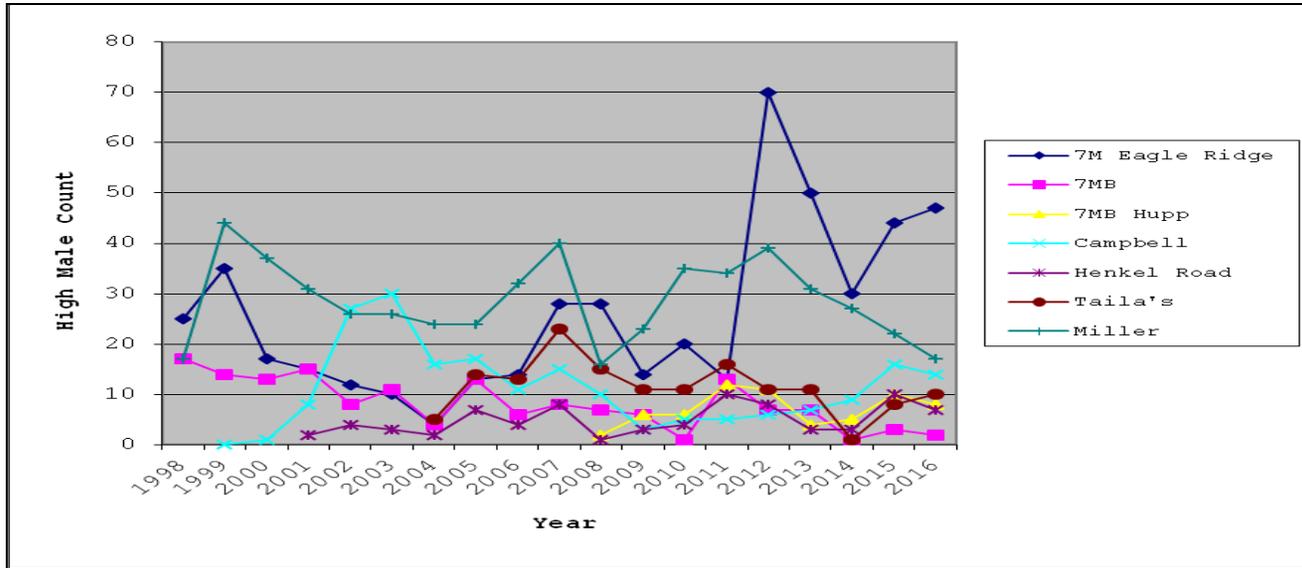




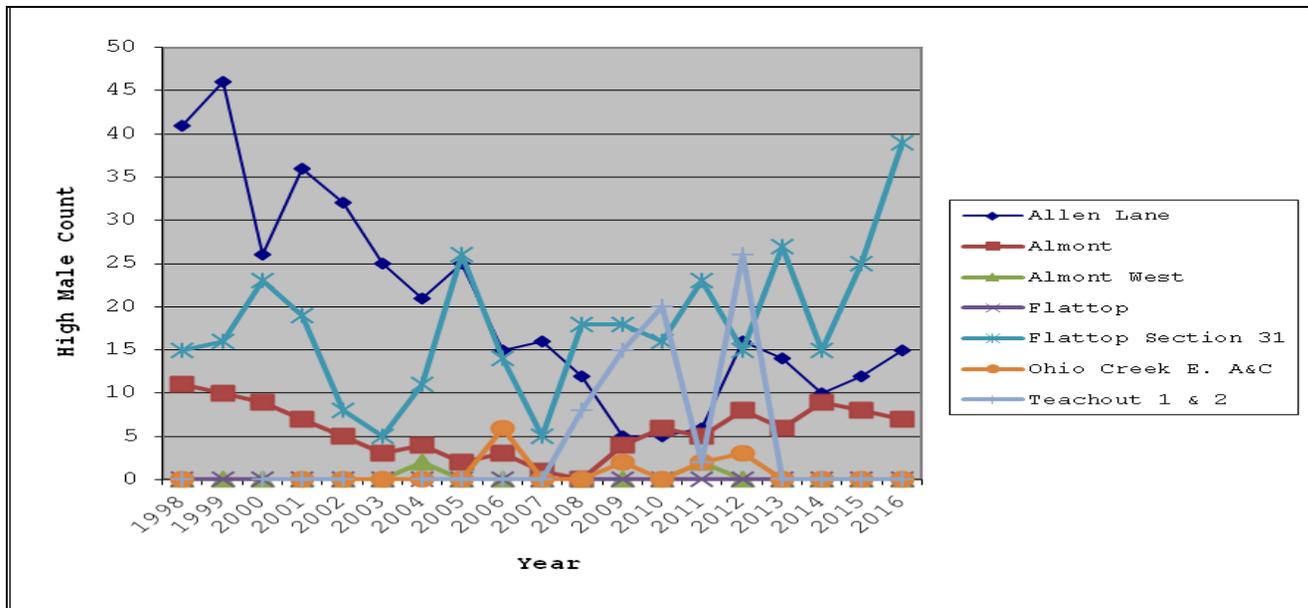
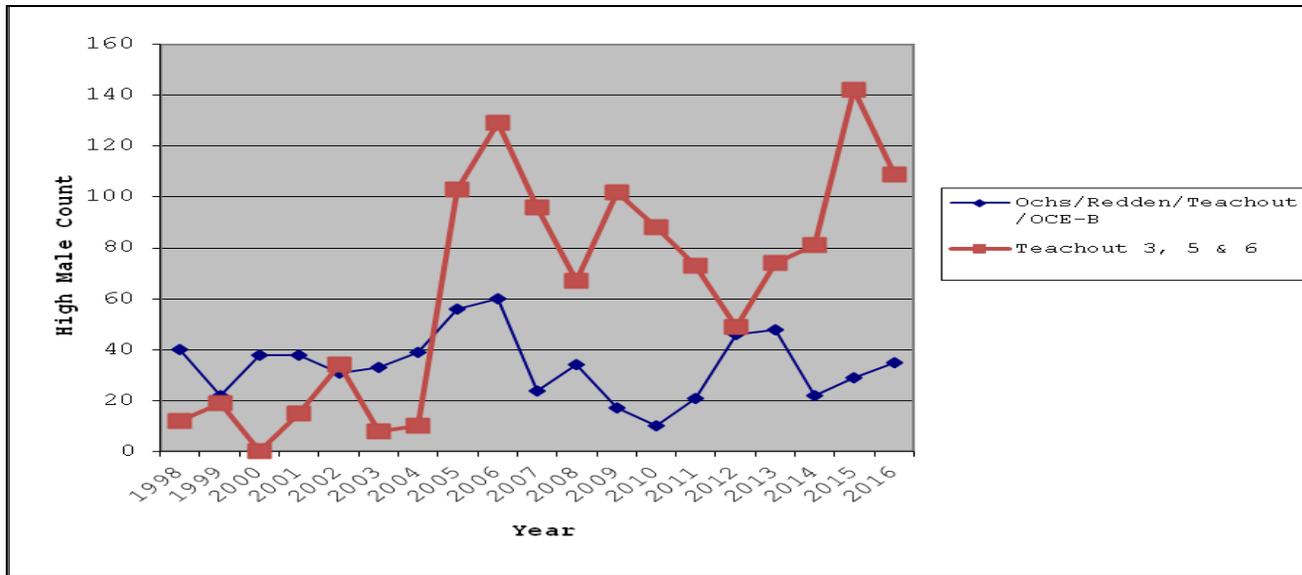
Appendix G: Gunnison sage-grouse high male counts on leks in the Lost Canyon Zone of the Gunnison Basin from 1998–2016.

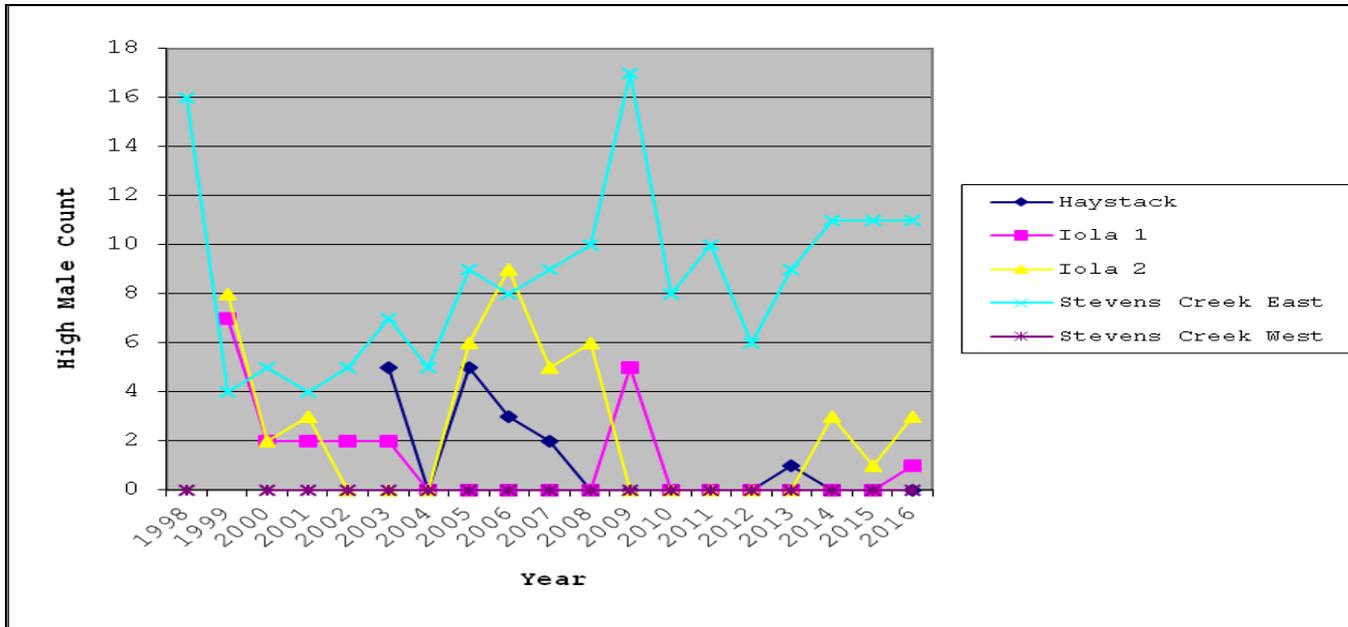
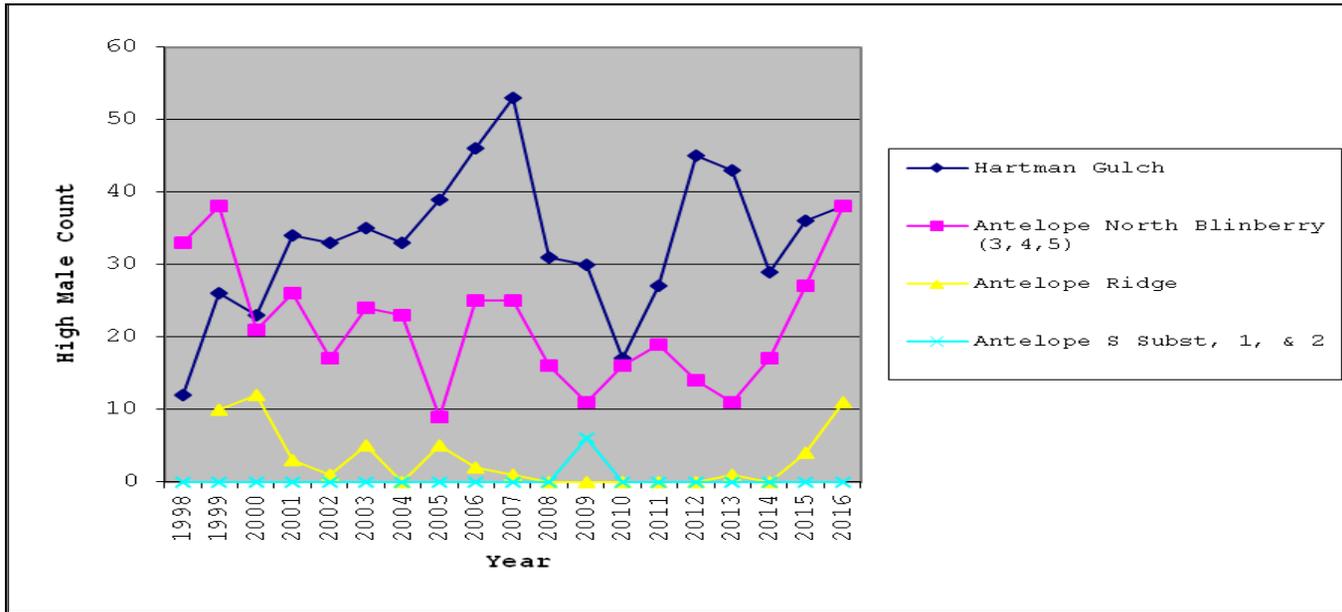


Appendix H: Gunnison sage-grouse high male counts on leks in the Ohio Creek Zone of the Gunnison Basin from 1998–2016.

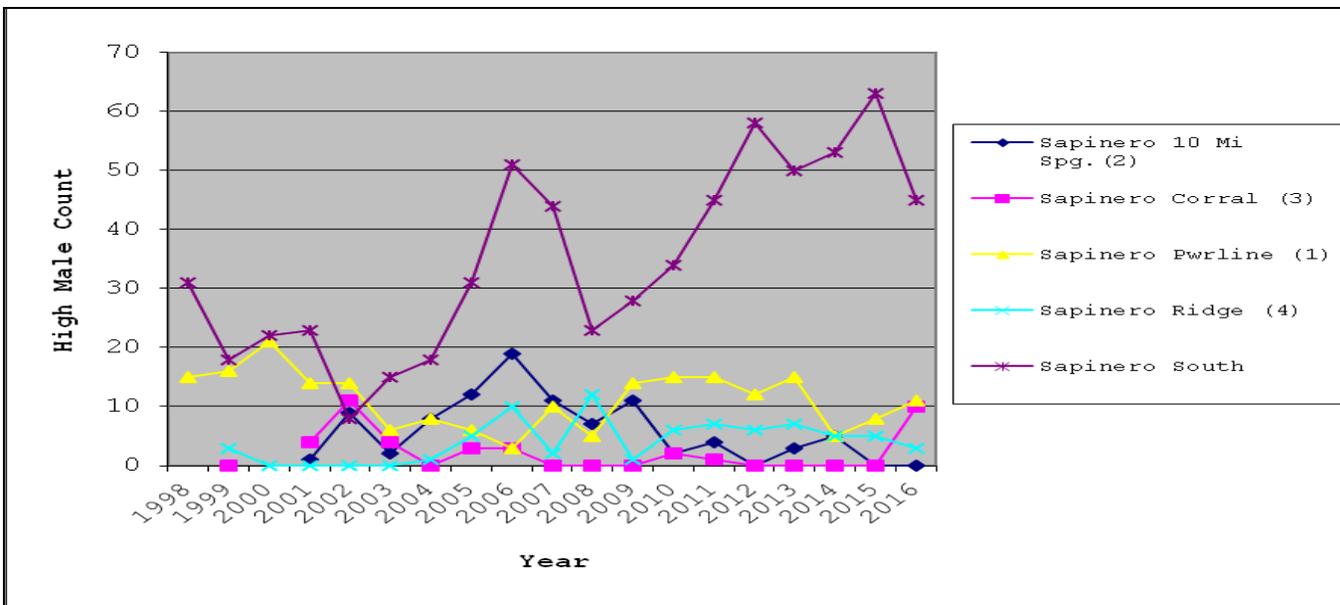
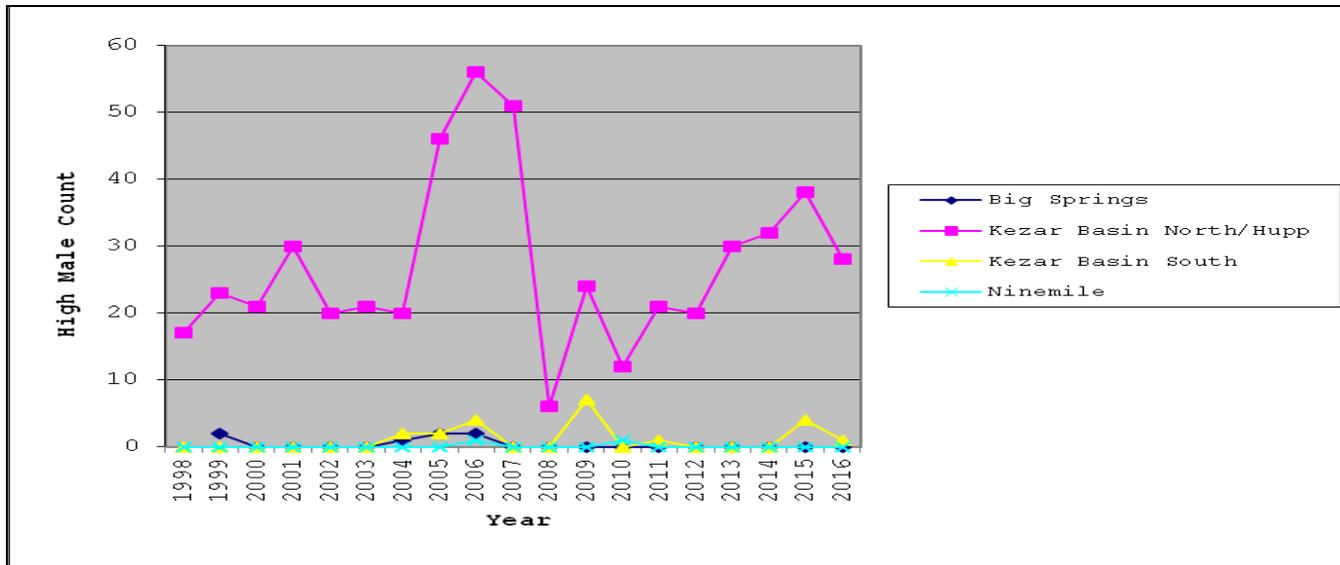


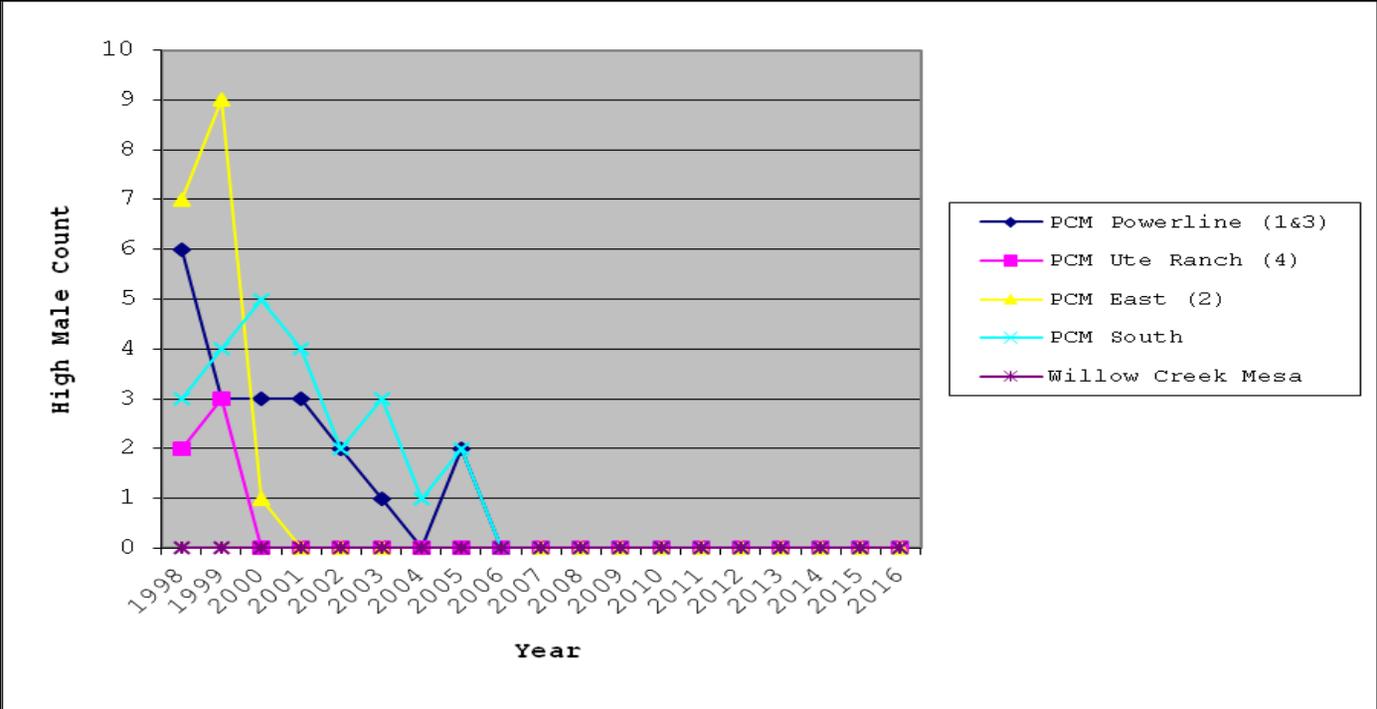
The following two graphs are a further breakdown of the previous graph:





Appendix I: Gunnison sage-grouse high male counts on leks in the Sapinero Zone of the Gunnison Basin from 1998–2016.





Willow Creek Mesa is Historic and PCM leks cannot be counted due to landowner access issues.