2020 Utah Greater Sage-grouse Lek Count Report

Lek Counts
Aerial Search
Adaptive Management Triggers

Utah Division of Wildlife Resources.
18 August 2020

Abstract:

Greater Sage-grouse (Centrocercus urophasianus) lek counts are conducted annually within Utah with a goal of counting the peak number of males on all known leks in the state. Statewide lek counts within Sage-grouse Management Areas (SGMAs) were up 8.2% from 2019 counts, with 2266 male sage-grouse counted on 202 leks within SGMAs. The increase is consistent with expected population cycles, however population increases are inconsistent across the state with 4 SGMAs showing increases in counts and 7 showing decreases in counts. An additional 231 male sage-grouse were counted outside of SGMAs for total of 2497 male sage-grouse counted state-wide. Statewide 390 leks were counted at least once with males being detected on 217 leks.

Systematic greater sage-grouse aerial lek are conducted annually to document new or previously unknown leks. Surveys are conducted by a contractor using infrared imaging from a fixed wing aircraft. Four mornings in 2020 were spent searching the Hamlin Valley and Parker Mountain-Emery Sage-grouse Management Areas (SGMA) for sage-grouse leks using IR fixed wing surveys. Surveys were conducted in low density areas. Only previously known leks were detected, with no new leks found.

The Utah Bureau of Land Management changes management actions based on a set of adaptive management triggers developed in conjunction with the Utah Division of Wildlife Resources. 2020 lek counts tripped soft triggers in the Parker and Emery federal population areas.

Background:

Sage-grouse life history is tightly woven around leks and leks are a visible center of important sage-grouse habitats. Leks are associated with critical nesting and early brood rearing habitats, and generally located within nesting habitat used by nesting sage-grouse hens, with the majority of nesting within 3.1 miles of a lek. Annual counts of male sage-grouse on leks has been shown to accurately reflect population changes (Dahlgren et al. 2016). The effectiveness of lek counts as population index and relative ease of data collection leads to lek counts forming the basis of most sage-grouse management and population monitoring.

Greater Sage-grouse (*Centrocercus urophasianus*) leks have been counted in Utah for over half a century, and the Utah Division of Wildlife Resources (UDWR) maintains lek records extending back to 1959. The UDWR focused tremendous energy and resources into locating sage-grouse leks and defining populations during the 1960s and 1970s. Records of lek locations and counts form one of the most extensive and continuous monitoring systems for this species across its range. While ground searching for new leks continues, the majority of work is directed toward monitoring known leks.

Over the time period for which data is available there is a consistent cyclic behavior with a peak and trough every 8 to 10 years. Since 1959 we have seen an increase in the

number of sage-grouse counted in Utah, however the raw counts are confounded by increasing levels of effort put into counting known leks and searching for unknown leks. To compensate for additional effort increasing raw counts, average males per lek is also calculated and provides an index of population change less impacted by counting effort.

Range wide loss of sagebrush habitat and concomitant decreases in populations has led to a number of petitions for listing under the Endangered Species Act. Greater sage-grouse were found warranted but precluded from listing in March of 2010, then in in October of 2015 were found not warranted for listing. However, they are still vulnerable to habitat loss and other factors and remain a Wildlife Species of Concern in Utah. As a Species of Concern considerable management time, effort and funding is dedicated to conservation of sage-grouse.

Although of tremendous effort has been invested in lek searches, there are many areas of the state that remain relatively poorly surveyed for the existence of sage-grouse leks. Leks also have the potential to shift locations over time in response to vegetation and population changes making continued lek searches necessary for ongoing monitoring of sage-grouse populations. Ground searches are conducted by Division employees, researchers, agency partners, private landowners, and others. New leks found via ground based searches are incorporated into the state lek database as an active lek once reported and verified in a second year

In addition to ground based searches aerial lek searches have enabled a more systematic search for leks in remote and poorly accessible throughout the state. Aerial searches allow leks to be found in remote areas, in areas with impassable roads, or areas that are otherwise inaccessible. Aerial searches also allow a large area to be surveyed more thoroughly than is possible via ground based searches. Aerial surveys also eliminates the time necessary to obtain permission to access private lands or other limited access areas.

Goals and Objectives:
The goal of this project is to maintain monitoring continuity of sage-grouse leks in Utah, and to inventory sage-grouse habitat in the state to expand the lek database and mapping record.

The Utah Greater Sage-grouse Management Plan 2009 states as one of its objectives and strategies the following, which is directly applicable to this work:

Objective A-1: Monitor, protect, and maintain current population numbers.

A-1.1 Population Monitoring

A. Lek Surveys.

1. Annual lek surveys will form the base metric to determine and assess both annual and long term population status and trend.
2. Strive to survey all known, occupied and active, leks annually utilizing standard UDWR protocol.

3. Conduct planned and systematic surveys and searches for new and unidentified leks in all potential habitats. Document, map, and file all search areas with GPS tracks.

Methods:

Greater Sage-grouse Lek Counts:

Greater sage-grouse lek counts are conducted in accordance with the protocol outlined in the 2009 Management Plan for Greater Sage-grouse in Utah. The methods specify that a minimum of three counts at approximate weekly intervals be conducted at each known lek between March 20 and May 7. First counts are conducted in March or early April depending on conditions to capture maximum male attendance which generally occurs mid April. Counts are conducted from ½ hour before sunrise up to 1 ½ hours after sunrise. At a site sage-grouse are counted from a vehicle 3 times in succession using binoculars or a spotting scope. For each count the time and number of male, female and unknown sex are recorded. Additional data on weather conditions and count location is recorded for each visit. Data is recorded digitally using an ArcGIS Survey123 app on a smart phone or tablet. See the 2009 Management Plan for Greater Sage-grouse in Utah for detailed protocol and data forms.

At the close of the lek counting season, data is compiled at the DWR state office where the counts are incorporated into the long-term sage-grouse database.

Undetermined leks have had displaying males observed, but they were either discovered this year, seen in previous years without males being documented in subsequent years, or had only one male observed. Undetermined leks are included in 2020 summary statistics.

The 2019 Utah Conservation Plan for Greater Sage-grouse in Utah specifies that populations areas are evaluated using the slope of a linear regression line fitted to the most recent 20 years of data. The slope of the regression line represents the number of male sage-grouse added or lost from counts per year over the 20 year period. Results in this report are also presented as an annual percent population change over the 20 year evaluation period. Percent change is calculated as the slope of the regression line divided by the average number of male sage-grouse counted over the same period, multiplied by 100.

Fixed Wing Infrared Lek Search:

Flight areas are prioritized based on known populations, past flight paths, state and regional priorities, data needs for state sage-grouse conservation efforts and flight cost.

Transects were flown by Owyhee Air Research using a cryogenically cooled thermal imager mounted in stabilized gimbal mounts on fixed wing aircraft. Flights were conducted during morning periods from ½ hours before sunrise to 1 ½ hours past sunrise with weather conditions as specified in the Utah Lek Count Protocol. Polygons of the search area was provided to Owyhee Air Research and they developed the flight plan and aircraft paths within the specified polygon. Transects are flown at approximately 450m

above ground level with and camera angle set to a predetermined tilt and zoom allowing for an approximately 500m swath of video coverage per pass. The pilot is responsible for flying pre-determined transects with a separate thermography specialist responsible for analyzing the video feed and operating the camera. Once detected along the transect the aircraft orbits the detected grouse to view the potential lek from all angles, identify grouse to species, count number of birds, identify sex, and record the lek location. Flight data was entered into an excel spreadsheet and probable leks added to the internal DWR sage-grouse databases.

Results: Greater Sage-grouse Lek Counts

In Utah's Sage-grouse Management Areas 360 greater sage-grouse leks were visited and 202 of those leks had at least one male counted. Across all leks counted within SGMAs there was a high count of 2266 males, for an average of 11.2 males per lek.

Statewide a total of 390 greater sage-grouse leks were visited. Of the leks visited 217 had at least one male counted. Across all counted leks where sage-grouse were detected there was a high count of 2497 males, for an average of 11.5 males per lek.

Within SGMAs 15 of the leks counted were classified as undetermined. These undetermined leks contributed 43 males to the total count. There were not any undetermined leks counted outside of SGMAs.

Overall counts on SGMAs were up 8.2% from 2019. This is the first year of increasing counts following four years of declining counts from 2016-2019. If future patterns match past cyclic behavior of Utah populations we can expect increasing populations over the next 3 to 4 years as the population rebounds.

Although populations have increased over 2019 counts, high snow levels and cool weather in the spring made access to some leks very difficult, and reduced the number of leks that were visited and counted. In 2019 305 leks were counted in SGMAs with 184 of those have males counted. The limited counts last year likely contributed to a low bias in the count, and there for a year over year increase this year when me may have otherwise seen a continued decrease.

The peak years and low continue to decrease with each cycle of the populations – the low years are lower and the high years do not reach the previous peaks. Previous low years in 2002, 2011 and 2019 had 3,034, 2,710 and 2,094 males counted respectively. At the same time, Utah increased counting effort visiting 192 leks in 2002, 266 leks in 2011, and 305 in 2019. Effort is increasing each year, with accompanying decrease in males per lek and total males; with equal effort across years we would likely see a steeper decline in long term sage-grouse counts.

Individual SGMA populations are more variable than the state-wide aggregation of counts (Table 1). Populations declined in 7 SGMAs and increased in 4 SGMAs. Population trajectories for individual SGMAs are below.

Figure 1. Total high count for all Sage-grouse Management Areas within Utah over the past 20 years and males counted per lek for leks with males present. The trend line is fitted to total males counted and represents an overall annual change across two population cycles.

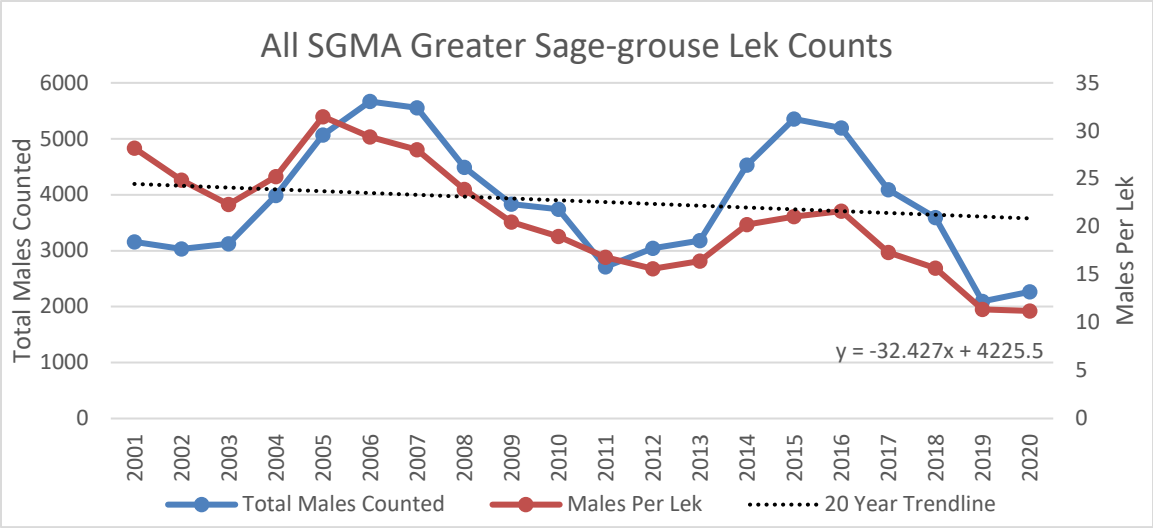
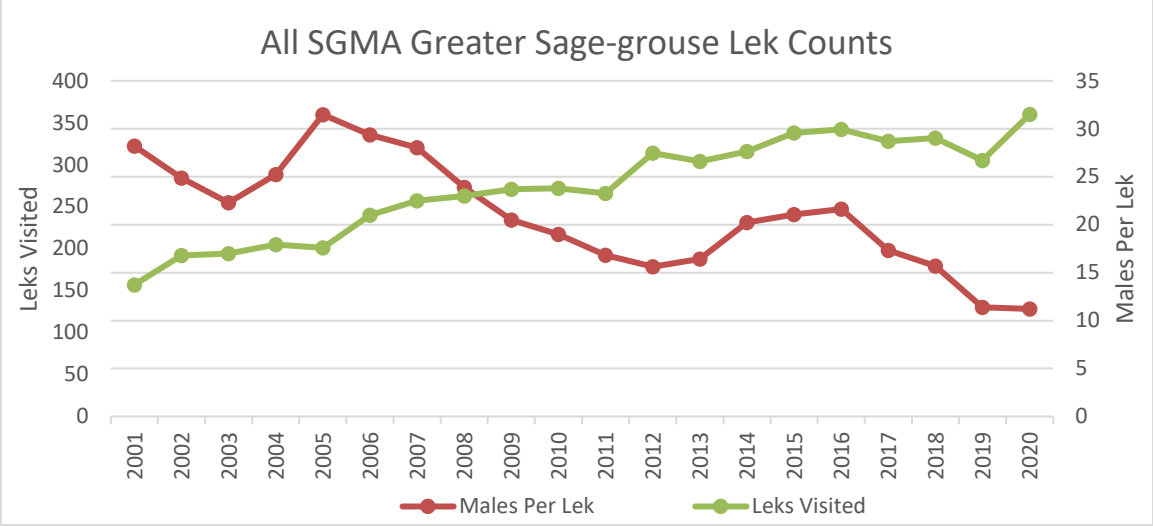


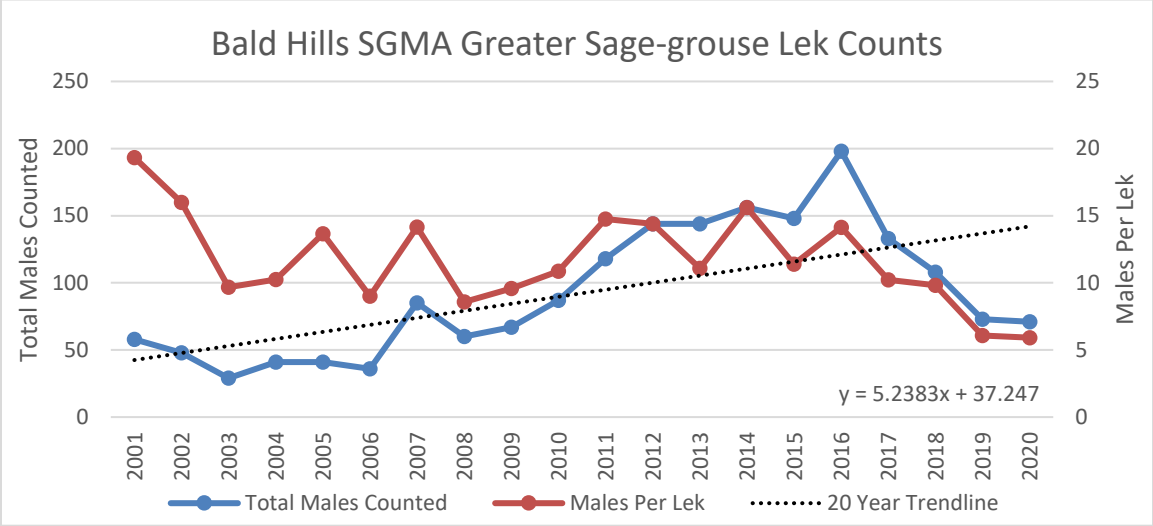
Figure 2. Individual leks visited over the course of a lekking season in Utah relative to the average males per lek. More leks are being counted to maintain the same overall total male counts.



Bald Hills

In the Bald Hills SGMA 17 leks were visited, of those male sage-grouse were detected on 12. A total of 71 male sage-grouse were counted, for an average of 5.9 males per lek. From 2019 to 2020 the Bald Hills SGMA counts decreased by 2.7%. This annual decrease fits within expected population cycles, however if counts do not increase next year there may be cause for concern. Counts in the Bald Hills SMGA have trended up over the past 20 years, increasing at an average annual rate of 5.6% per year.

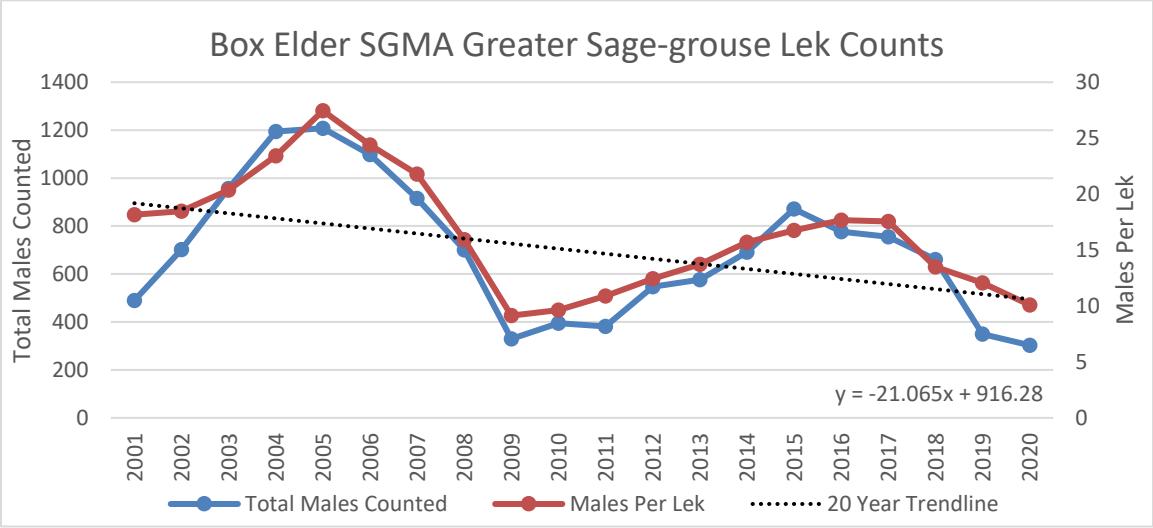
Figure 3. Average males per lek for all leks with at least one male counted and total number of males counted within the Bald Hills Sage-grouse Management Area. Trend line represents a linear regression for total males counts from 2001 to 2020.



Box Elder

In the Box Elder SGMA 67 leks were visited, of those male sage-grouse were detected on 30. A total of 303 male sage-grouse were counted, for an average of 10.1 males per lek. From 2019 to 2020 the Box Elder SGMA counts decreased by 13.4%. This annual decrease fits within expected population cycles and if past patterns hold, counts are likely to increase next year. However this year's low count is below the last low in 2009 (329 males), and the recent high in 2015 (871 males) was below the previous high in 2005 (1208 males). Counts have trended down over the past 20 years, decreasing at an average annual rate of 3.0% per year. There has been significant expansion of conifer cover into sagebrush habitat within the SGMA, however large areas of habitat have been restored in the SGMA in recent years. As restoration projects are completed in the area we expect to see an increase in population and a shift to a positive long term trend. No new leks were found.

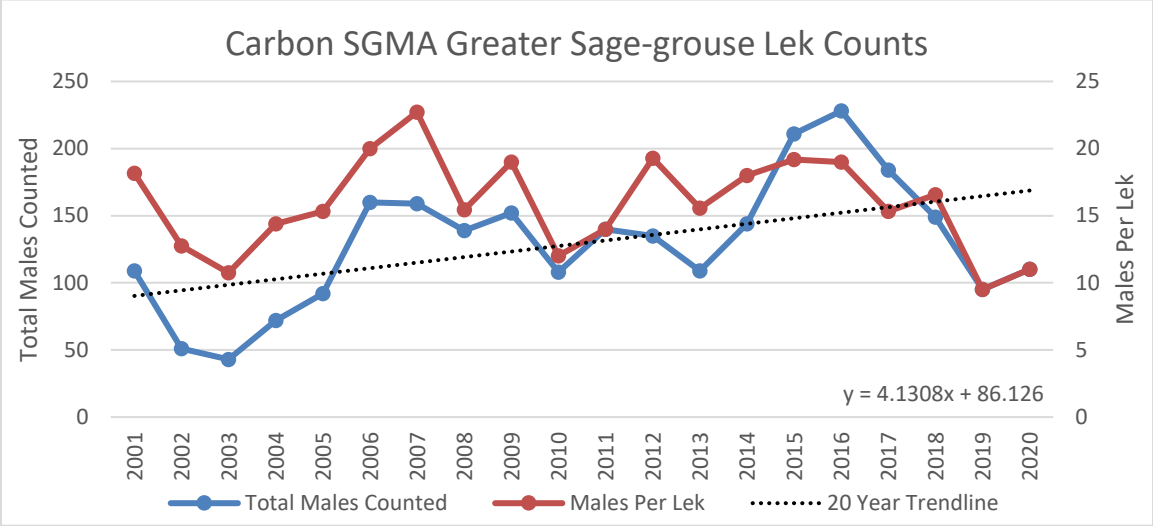
Figure 4. Average males per lek for all leks with at least one male counted and total number of males counted within the Box Elder Sage-grouse Management Area. Trend line represents a linear regression for total males counts from 2001 to 2020.



Carbon

In the Carbon SGMA 15 leks were visited, of those male sage-grouse were detected on 10. A total of 110 male sage-grouse were counted, for an average of 11.0 males per lek. From 2019 to 2020 the Carbon SGMA counts increased by 15.8%. This annual increase fits within expected variation within normal population cycles. Counts in the SMGA have trended up over the past 20 years, increasing at an average annual rate of 3.2% per year. No new leks were found.

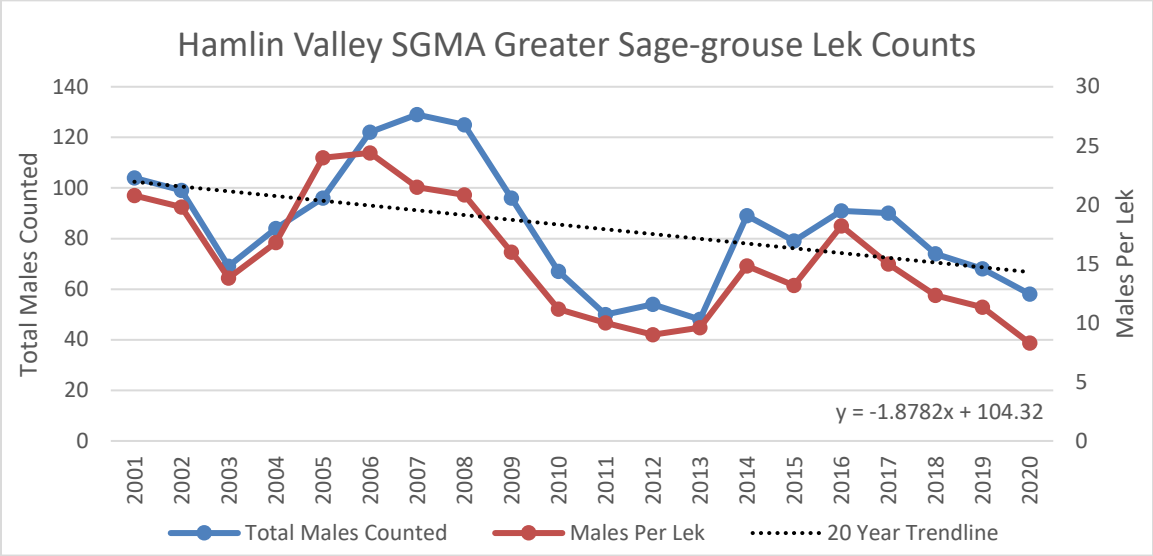
Figure 5. Average males per lek for all leks with at least one male counted and total number of males counted within the Carbon Sage-grouse Management Area. Trend line represents a linear regression for total males counts from 2001 to 2020.



Hamlin Valley

In the Hamlin Valley SGMA 12 leks were visited, of those male sage-grouse were detected on 7. A total of 58 male sage-grouse were counted, for an average of 8.3 males per lek. From 2019 to 2020 the Hamlin Valley SGMA counts decreased by 14.7%. This annual decrease fits within expected variation within normal population cycles. However we saw lower than expected recovery after the last low in 2013. Counts in the SMGA have trended down over the past 20 years, decreasing at an average annual rate of 2.1% per year.

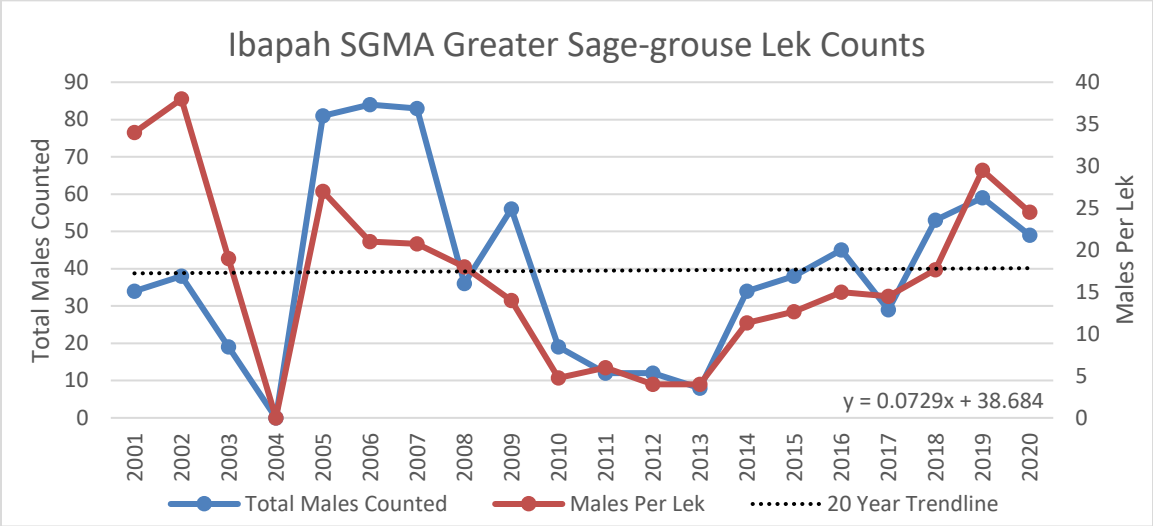
Figure 6. Average males per lek for all leks with at least one male counted and total number of males counted within the Hamlin Valley Sage-grouse Management Area. Trend line represents a linear regression for total males counts from 2001 to 2020.



Ibapah

In the Ibapah SGMA 4 leks were visited, of those male sage-grouse were detected on 2. A total of 49 male sage-grouse were counted, for an average of 24.5 males per lek. From 2019 to 2020 the Ibapah SGMA counts decreased by 16.9%. Annual counts in this area are variable due to limited number of leks in the area. This population is connected to populations in Nevada and counts may be influenced by population variation in Nevada. Counts were essentially flat over 20 years with an average annual increase of 0.18% per year. No new leks were found.

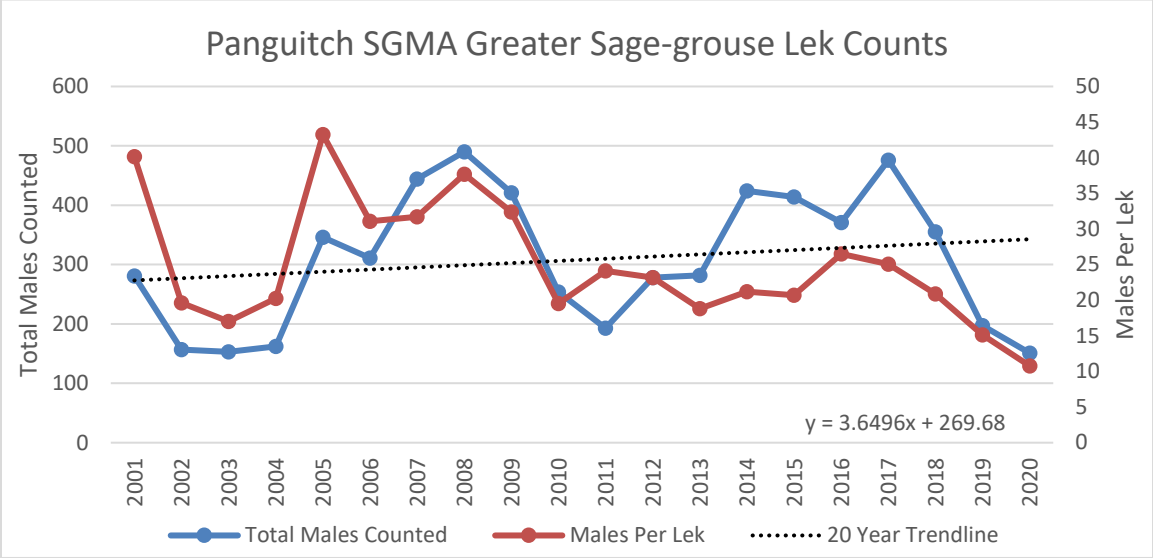
Figure 7. Average males per lek for all leks with at least one male counted and total number of males counted within the Ibapah Sage-grouse Management Area. Trend line represents a linear regression for total males counts from 2001 to 2020.



Panguitch

In the Panguitch SGMA 27 leks were visited, of those male sage-grouse were detected on 14. A total of 151 male sage-grouse were counted, for an average of 10.8 males per lek. From 2019 to 2020 the Panguitch SGMA counts decreased by 23.4%. This annual decrease fits within expected variation within normal population cycles. However, the relatively low males per lek is notable. Counts trended up over the past 20 years, increasing at an average annual rate of 1.28% per year. No new leks were found.

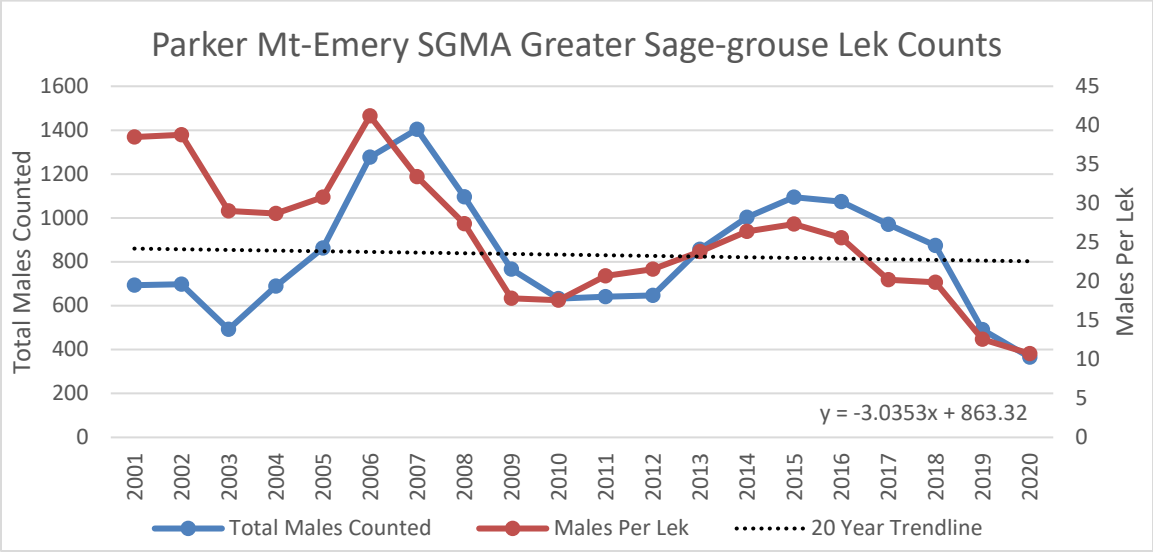
Figure 8. Average males per lek for all leks with at least one male counted and total number of males counted within the Panguitch Sage-grouse Management Area. Trend line represents a linear regression for total males counts from 2001 to 2020.



Parker Mountain-Emery

In the Parker Mountain-Emery SGMA 68 leks were visited, of those male sage-grouse were detected on 34. A total of 365 male sage-grouse were counted, for an average of 10.7 males per lek. From 2019 to 2020 the Parker Mountain-Emery SGMA counts decreased by 25.6%. This annual decrease fits within expected timelines for normal population cycles, with additional stressors of exceptionally dry conditions in 2018, followed by a severe winter and wet, late spring in 2019-20. Males per lek is roughly one third of the males per lek at a similar low count in 2003. In 2003 overall totals were similar, however only 27 leks were visited relative to 65 leks that were visited in 2020 to count the same number of males. Overall counts were slightly down, but essentially flat over the past 20 years, decreasing at an average annual rate of 0.28% per year. One new lek was found.

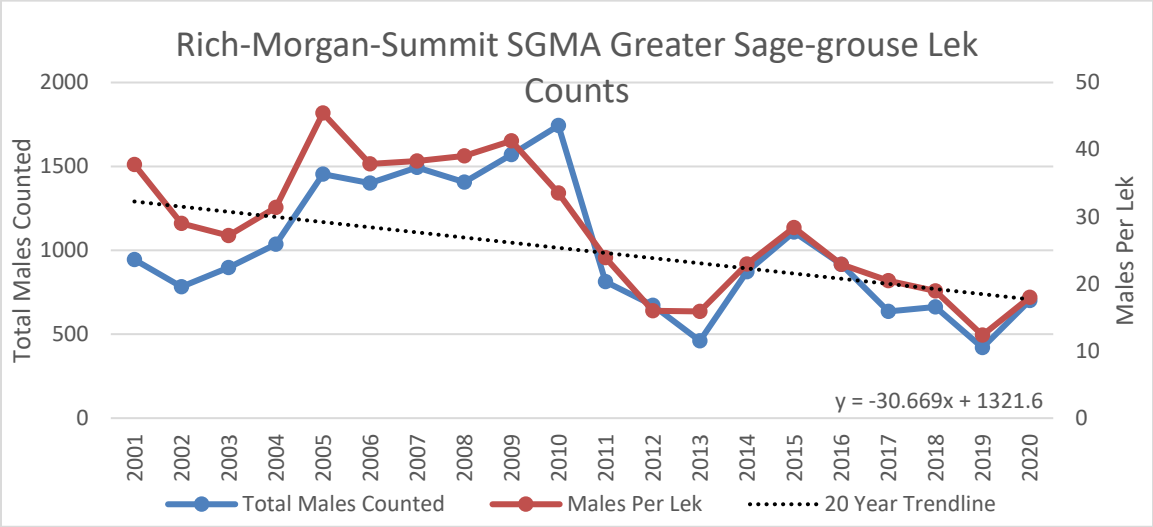
Figure 9. Average males per lek for all leks with at least one male counted and total number of males counted within the Parker Mountain-Emery Sage-grouse Management Area. Trend line represents a linear regression for total males counts from 2001 to 2020.



Rich-Morgan-Summit

In the Rich-Morgan-Summit SGMA 62 leks were visited, of those male sage-grouse were detected on 39. A total of 701 male sage-grouse were counted, for an average of 17.9 males per lek. From 2019 to 2020 the Rich-Morgan-Summit SGMA counts increased by 66.9%. This annual increase fits within expected population cycles. Counts were down over the past 20 years, decreasing at an average annual rate of 3.0% per year and may be related to losses of winter habitat. One new lek was found.

Figure 10. Average males per lek for all leks with at least one male counted and total number of males counted within the Rich-Morgan-Summit Sage-grouse Management Area in 2020. Trend line represents a linear regression for total males counts from 2001 to 2020.

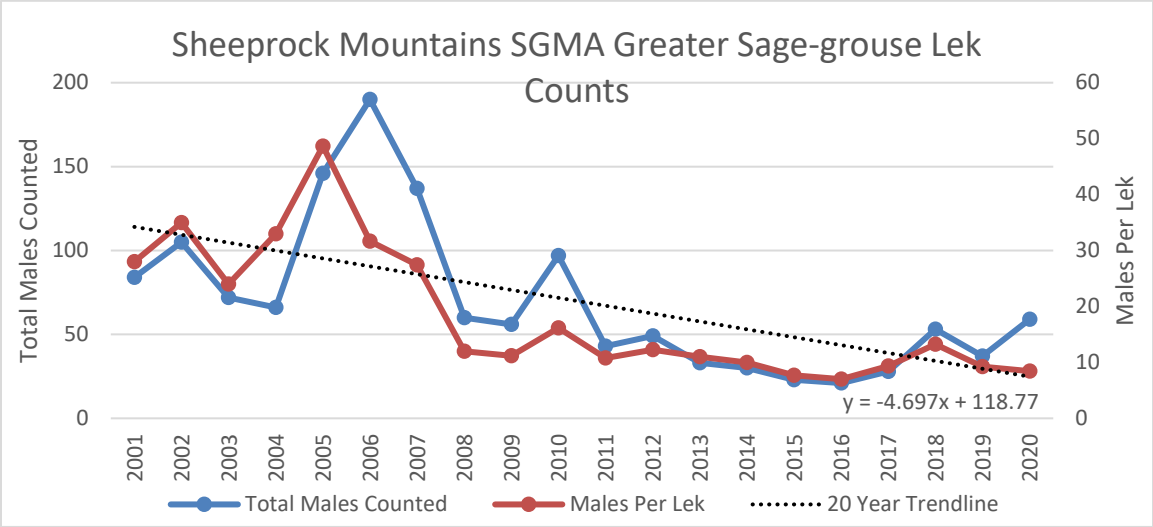


Sheeprock Mountains

The Sheeprock Mountains SGMA has had long term declines in population and counts are down over the past 20 years, decreasing at an average annual rate of 6.8% per year. The SGMA has been the focus of intense conservation effort, with habitat restoration, predator control and population augmentation. In 2016, 2017, 2018, and 2019 106 female and 40 male sage-grouse, for a total of 146, were released on active leks in the SGMA.

In the Sheeprock Mountains SGMA 9 leks were visited, of those male sage-grouse were detected on 7. A total of 59 male sage-grouse were counted, for an average of 8.4 males per lek. From 2019 to 2020 the Sheeprock Mountains SGMA counts increased by 59.5%. The increase in counts can be partially attributed to direct additions of males to leks, however the increase is larger than the number of males released indicating an increase in production within the SGMA. Two new leks were found in contributing 9 males to the overall count, in addition to a new lek found in 2018. Without the new leks the total male counts would be 33.

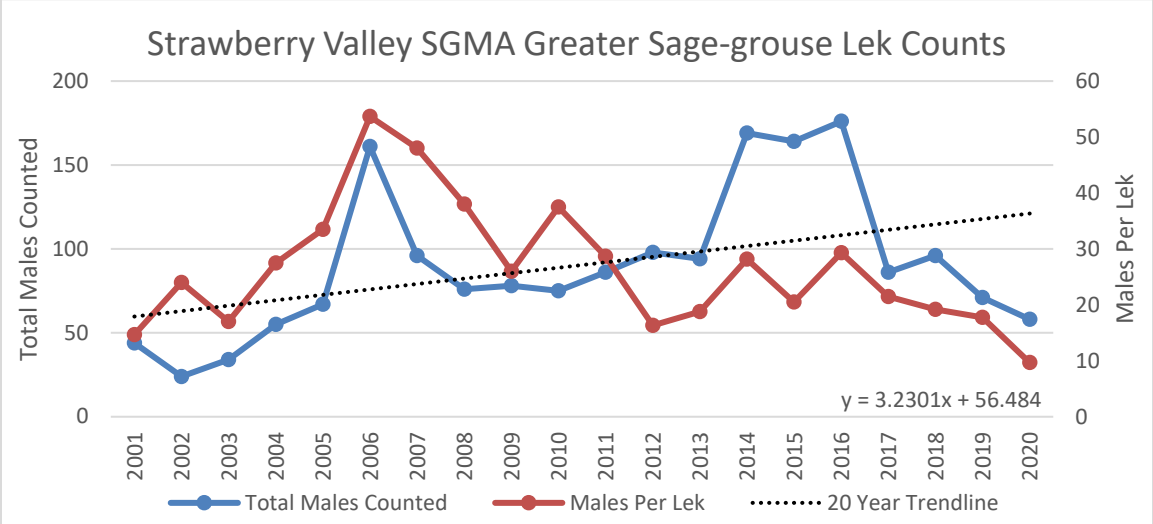
Figure 11. Average males per lek for all leks with at least one male counted and total number of males counted within the Sheeprock Mountains Sage-grouse Management Area. Trend line represents a linear regression for total males counts from 2001 to 2020.



Strawberry Valley

In the Strawberry Valley SGMA 10 leks were visited, of those male sage-grouse were detected on 6. A total of 58 male sage-grouse were counted, for an average of 9.7 males per lek. From 2019 to 2020 the Strawberry Valley SGMA counts decreased by 18.3%. This annual decrease is concerning considering limited access resulting in lower than normal count effort in 2019. With normal access in 2020 significantly higher counts relative to 2019 were expected. Generally, counts were up over the past 20 years, increasing at an average annual rate of 3.54% per year.

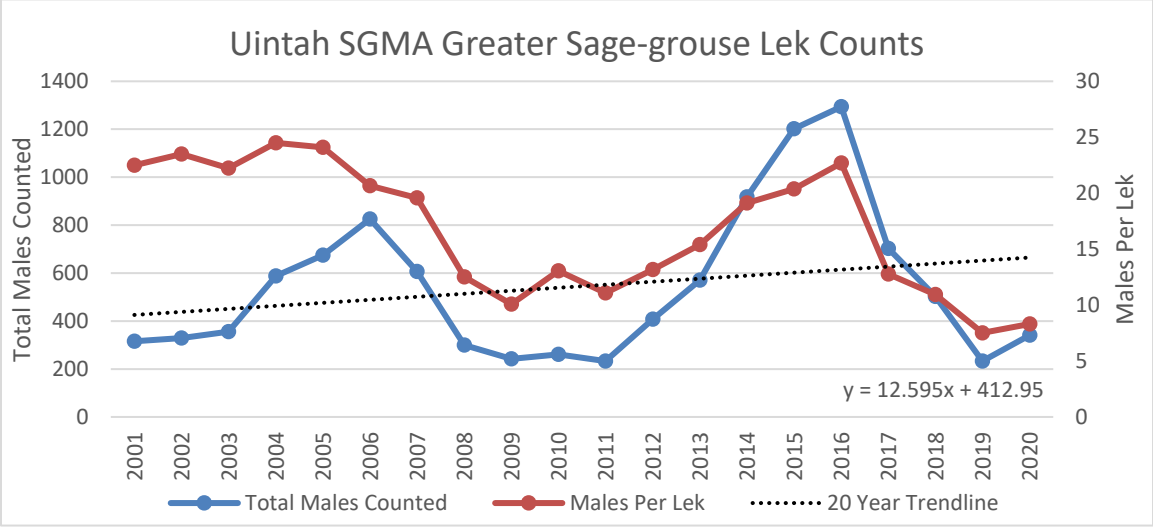
Figure 12. Average males per lek for all leks with at least one male counted and total number of males counted within the Strawberry Valley Sage-grouse Management Area. Trend line represents a linear regression for total males counts from 2001 to 2020.



Uintah

In the Uintah SGMA 69 leks were visited, of those male sage-grouse were detected on 41. A total of 341 male sage-grouse were counted, for an average of 8.3 males per lek. From 2019 to 2020 the Uintah SGMA counts increased by 46.4%. This annual increase was expected and fits within expected variation within normal population cycles. However, the number of males per lek is lower than at the last low in 2009 when 10.1 males per lek were counted. Counts were up over the past 20 years, increasing at an average annual rate of 2.31% per year.

Figure 13. Average males per lek for all leks with at least one male counted and total number of males counted within the Uintah Sage-grouse Management Area. Trend line represents a linear regression for total males counts from 2001 to 2020.



Non-SGMA

Outside of designated SGMAs 30 leks were visited, of those male sage-grouse were detected on 15. A total of 231 male sage-grouse were counted, for an average of 15.4 males per lek. From 2019 to 2020 the Non-SGMA counts increased by 32.8%. This annual increase was expected and fits within expected variation within normal population cycles. Counts were up over the past 20 years, increasing at an average annual rate of 2.6% per year.

Figure 14. Average males per lek for all leks with at least one male counted and total number of males counted outside of Sage-grouse Management Areas. Trend line represents a linear regression for total males counts from 2001 to 2020.

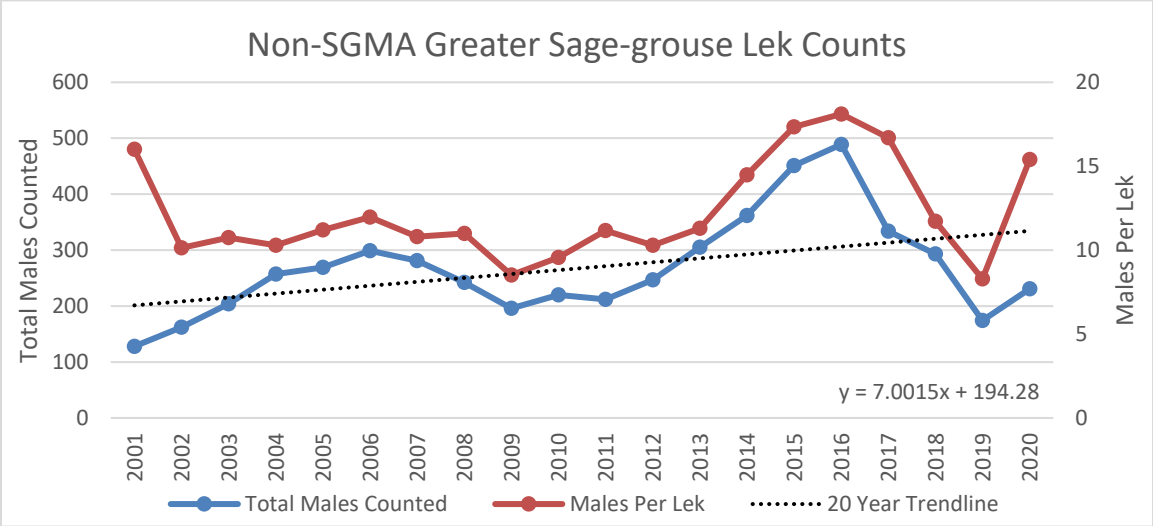


Table 1. Summary data for male greater sage-grouse high counts within each of Utah's Sage-grouse Management Areas and statewide for the 2020 lek counting season. See methods for definitions of fields.

	Leks with Males	Total Leks Visited	Total Males Counted	Average Males per Lek	Percent Change 2019 to 2020	20 Year Regression Slope	20 Year Average Count	% Change Per Year over 20 Years	Undetermined Leks Found	Percent of UT Population
Bald Hills	12	17	71	5.9	-2.7	5.2	92.3	5.6	0	2.8
Box Elder	30	67	303	10.1	-13.4	-21.1	695.1	-3.0	0	12.1
Carbon	15	10	110	11.0	15.8	4.1	129.5	3.2	0	4.4
Hamlin Valley	7	12	58	8.3	-14.7	-1.8	84.6	-2.1	1	2.3
Ibapah	2	4	49	24.5	-16.9	0.1	39.5	0.2	0	2.0
Panguitch	14	26	151	10.8	-23.4	3.9	305.7	1.3	0	6.0
Parker Mountain-Emery	34	68	365	10.7	-25.6	-2.3	827.3	-0.3	1	14.6
Rich-Morgan-Summit	39	62	701	17.9	66.9	-30.3	997.0	-3.0	1	28.1
Sheeprock Mountains	7	9	59	8.4	59.5	-4.7	69.5	-6.8	2	2.4
Strawberry Valley	6	10	58	9.7	-18.3	3.2	90.4	3.5	0	2.3
Uintah	41	69	341	8.3	46.4	12.6	545.2	2.3	0	13.7
Non-SGMA	15	30	231	15.4	32.8	7.0	267.8	2.6	0	9.3
All SGMA	202	360	2266	11.2	**8.2**	-32.4	3885.0	-0.8	5	90.7
All Leks	217	390	2497	11.5	**10.1**	-25.4	4152.8	-0.6	5	100.0

Results: Fixed Wing Infrared Lek Search

Fixed wing infrared lek searches were conducted on the mornings of April 8-11 by Owyhee Air Research in the Southern Region. The survey covered approximately 82,500 acres made up of approximately 57,500 acres in Pine Valley, 15,000 acres in the Tidwell area and 10,000 acres in the Mytoge area. The area consisted of low density sage-grouse habitat. Previously known leks were detected; however no unknown leks were detected.

This was the fourth year the UDWR has utilized aerial infrared surveys to search for greater sage-grouse. Previous searches have been successful in detecting a new leks that DWR staff, university researches and previous helicopter lek searches were not able to locate.

The cost of the aerial lek search was $22,885.55, which is comparable to the amount budgeted for helicopter lek searches in previous years. Detection rates will vary significantly based on the area survey, with areas of low density sage-grouse populations having few detections. The areas in the Hamlin Valley and Parker Mountain-Emery SGMAs are low density areas and lack of detection this year is likely due to low overall population levels coupled with searches in areas with few leks historically.

Management Implications:

Results from previous year's aerial IR lek searches in comparison to previous years helicopter lek searches indicates that aerial IR methods are more effective in thoroughly covering an area and detecting more new leks per area. Helicopter lek searches have the additional expense of three biologist observers, and the significant safety risk of low level helicopter flight. We recommend using aerial lek search funding for fixed wing IR aerial lek searches in the future as a more cost effective and safer alternative to helicopter lek search flights. Newly detected leks need to be visited to confirm locations and counts next season. Locations off all leks, including undetermined leks are available to DWR employees and other partners involved in lek counts via the ArcCollector Utah Sage-grouse Lek Count app and through the lek database distributed prior to the beginning of annual lek counts.

Greater sage-grouse lek counts remain a critical tool for tracking sage-grouse populations within the state and must continue into the future for successful management of the species.

Figure 15: Flight path of 2020 aerial infrared fixed wing lek searches in Pine Valley in the Hamlin Valley SGMA with previous helicopter lek searches. Note the area covered with IR lek searches relative to helicopter based visual searches.

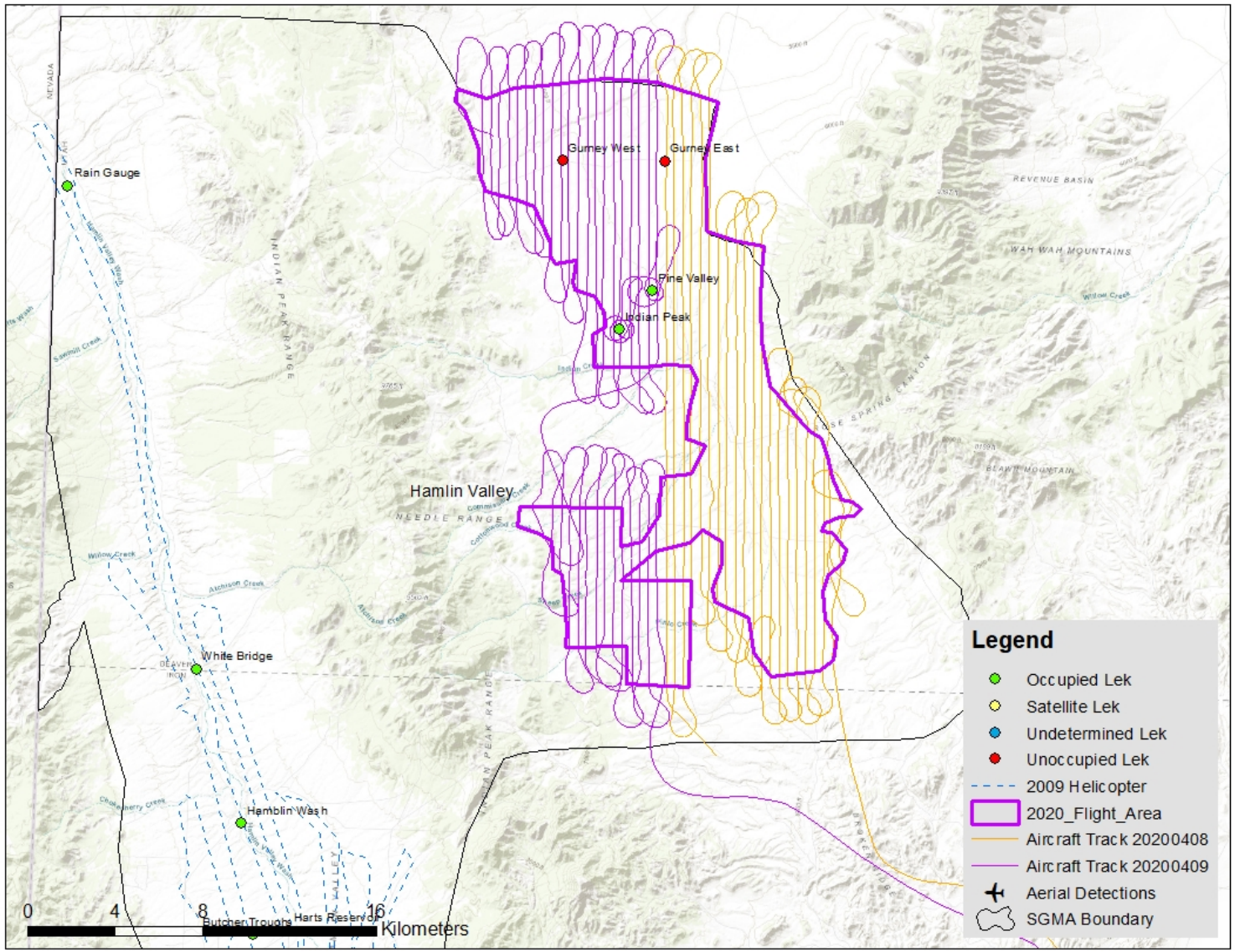
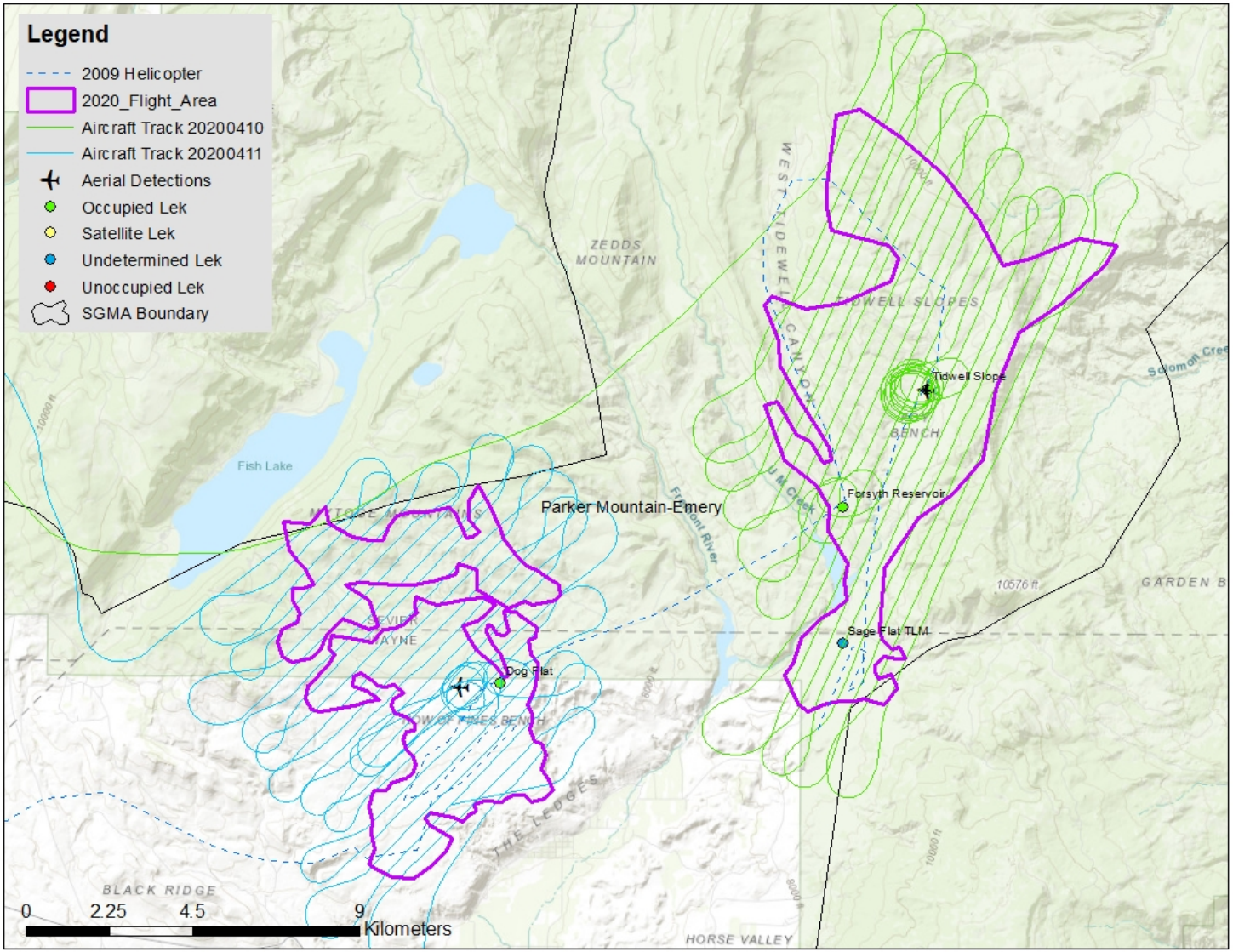


Figure 16: Flight path of 2020 aerial infrared fixed wing lek searches the Tidwell Slopes and Dog Flat area in the Parker Mountain-Emery SGMA with previous helicopter lek searches. Note the area covered with IR lek searches relative to helicopter based visual searches.



BLM Adaptive Management Triggers

The Utah Bureau of Land Management changes management actions based on a set of adaptive management triggers developed in conjunction with the Utah Division of Wildlife Resources. These adaptive management triggers are based on metrics of males per lek on *trend leks* (MPL) in each federal population area and overall population change (lambda) for all leks within federal Priority Habitat Management Area in each federal population area. It is important to note that the BLM population areas are similar to DWR Sage-grouse Management Areas; however there are differences in area and leks included.

Triggers are defined as:

<u>Soft Triggers</u>

1a) 4 consecutive years of 10% or greater annual decline in average males per lek in each year, based on "trend leks"

OR

1b) 6 consecutive years of declining average males per lek in each year, based on "trend leks"

OR

1c) 40% or greater decline in average males per lek in any single year, based on "trend leks" for the 4 years covered by lambda values in soft trigger question 2

OR

1d) 50% or greater decline in average males per lek in a 4 consecutive year period, based on "trend leks"

AND

2) Lambda of less than 1 in 4 consecutive years, based on all leks in the PHMA.

<u>Hard Triggers</u>

a) 4 consecutive years of 20% or greater annual decline in average males per lek in each year, based on "trend leks"

OR

b) average males per lek, based on trend leks, drops 75% below the 10-year rolling average males per lek in any single year (not a 75% decrease, but a decline under 75% of the 10-year rolling average)

OR

c) Lambda of less than 1 in 6 consecutive years, based on all leks within the PHMA

OR

d) Lambda of less than 1 in 8 years of a 10 year window, based on all leks within the PHMA

Table 2. BLM populations areas and trigger status for 2020 lek counts. MPL is average males per lek for trend leks within a population area. Lambda is calculated on all leks in PHMA within each population area.

Bureau of Land Management Population Area	Soft Trigger	Hard Trigger	Note
Uintah	No	No	Greater than 40% decline in MPL in 2017 and 2019 (S1c). Greater than 50% decline in MPL over a four-year period (S1d).
Panguitch	No	No	Greater than 40% decline in MPL in 2019 and 2020 (S1c). Greater than 50% decline in MPL over a four-year period (S1d).
Bald Hills	No	No	Four years of lambda less than 1 for all leks (S2).
Box Elder	No	No	Four years of lambda less than 1 for all leks (S2).
Carbon	No	No	Greater than 40% decline in trend leks MPL in 2019 (S1c).
Rich	No	No	No notable declines.
Parker	Yes	No	Six consecutive years of declining MPL (S1b). Greater than 50% decline in average MPL over a four-year period (S1d). Four years of lambda less than 1 for all leks (S2).
Emery	Yes	No	Four consecutive years of 10% or greater decline in MPL (S1a). Greater than 40% decline in MPL in 2019 (S1c). Greater than 50% decline in MPL over a four-year period (S1d). Four years of lambda less than 1 for all leks (S2).
Sheeprock Mountains	No	No	No notable declines.
Strawberry Valley	No	No	Greater than 40% decline in MPL in 2017 and 2019 (S1c).
Hamlin Valley	No	No	Four years of lambda less than 1 for all leks (S2).
Ibapah	No	No	No notable declines.

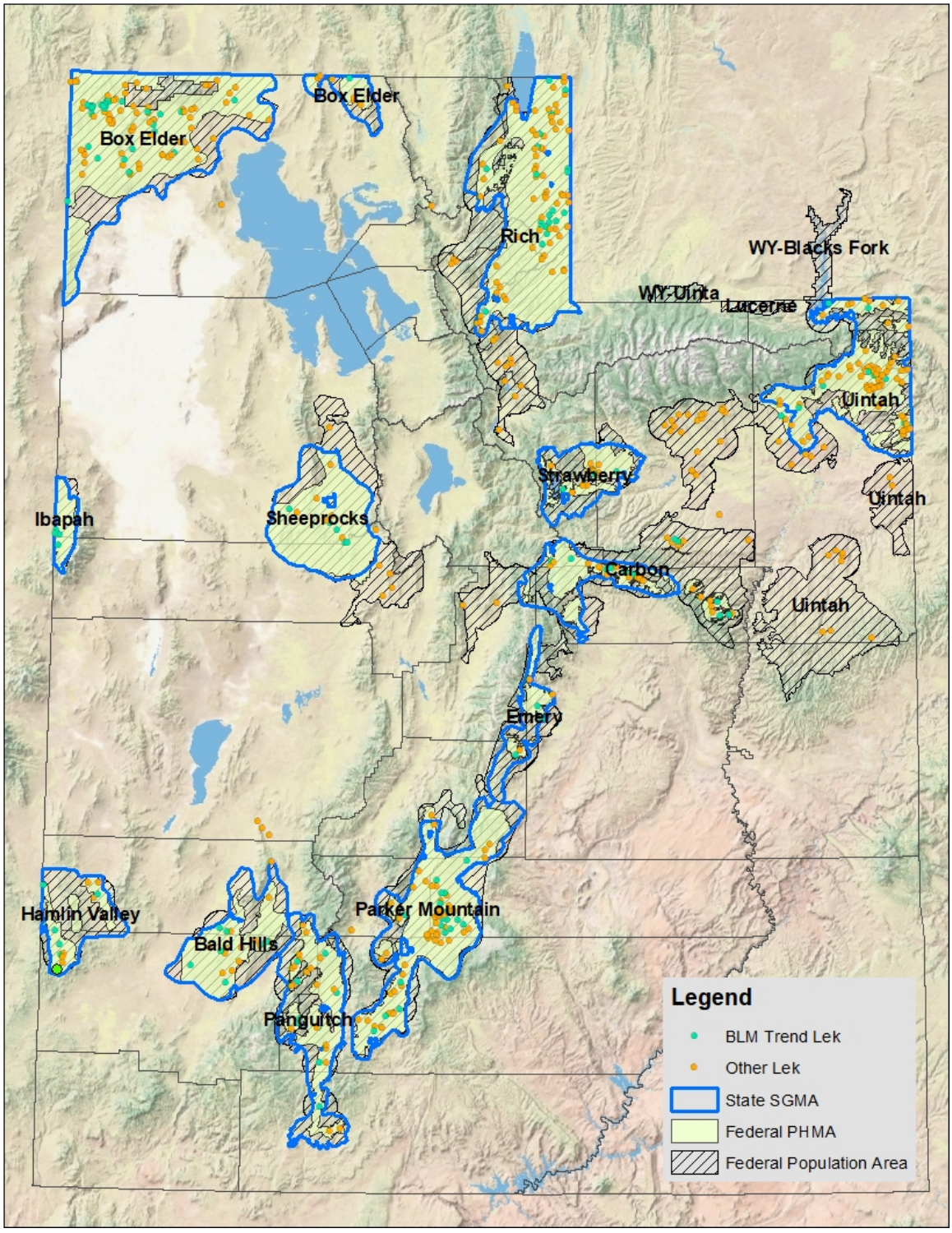



Figure 17: State of Utah Sage-grouse Management Areas relative to Federal Priority Habitat Management Areas and Federal Greater Sage-grouse Population Areas with federal trend leks and other leks.