



Wyoming Game and Fish Department

BLACK BEAR MORTALITY SUMMARY

Harvest Year - 2019



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INTRODUCTION

This document contains a summary of Wyoming's black bear mortalities for 2017 through spring 2019 black bear hunting seasons. Mortalities are categorized by cause, including: legal and illegal harvest, damage removals, road-kills, and other miscellaneous causes of death (i.e., natural mortalities). Throughout this document the term "total mortalities" refers to a combination of all causes of death while the term "harvest", when not prefaced by "legal" or "illegal," refers to legal and illegal kills combined.

Since 1994, the Wyoming Game and Fish Department (WGFD) has used a female mortality limit system to regulate black bear harvest. Mortality limits and hunting seasons are assigned to either individual or grouped hunt areas (Appendix I). Bear Management Unit (BMU) or hunt area harvest levels are monitored and regulated by requiring all successful black bear hunters to present the skull and pelt of their harvested bear to WGFD personnel within 72 hours of taking the animal. Harvested female bears are counted against the female mortality limit for the hunt area(s) in which they were killed. Upon meeting its seasonal female mortality limit, a hunt area is closed to harvest for the remainder of that season. To more effectively distribute hunting pressure and allocate harvest opportunities among spring and fall seasons, female mortality limits are split into spring and fall components. Harvest in excess of a spring mortality limit is subtracted from the fall mortality limit for the same BMU/hunt area. Conversely, the remainder of unfilled spring mortality limits is transferred to the area's fall mortality limit. An up-to-date, running tally of harvested female black bears and BMU/hunt area closures is maintained by WGFD and made available to hunters via a telephone hotline and Department website.

The Large Carnivore Section of the WGFD reviews Wyoming's black bear harvest and other causes of black bear mortality. Mortality statistics are compiled and compared to past trends and established management criteria. Hunting seasons and mortality limits are set for 3-year periods to better determine effects of the mortality limit on the black bear population in that area. At the end of the 3-year period, adjustments may be made to more effectively manage local bear populations. Throughout this process, changes have been made to WGFD's black bear management. BMU/hunt area boundaries have been revised and new hunt areas have been created. Additionally, changes have been made to hunting season opening and closing dates, female mortality limits, and total season length. These changes are made through analysis and interpretation of harvest data and the public input process in an adaptive management framework.

Mortality data for this report are reported through the spring 2019 season. Some harvest data have not been received by the Large Carnivore Section as of this date, therefore Fall 2019 data are not included in this report to provide relevant comparisons to previous years. Likewise, annual mortality data are analyzed through 2018. Mortality data for years prior to 2019 may vary from previous reports. These differences reflect mortalities reported too late to be included in the previous annual report. The figures in this document supersede those presented in previously published annual mortality reports.

BLACK BEAR MORTALITY ANALYSIS

2019 Statewide Mortality

This report will evaluate the effects of harvest and other mortality sources on Wyoming black bear populations by BMU and grouped hunt areas for the 3-year harvest cycle 2017-2019 (Figure 1). Annual data are presented and compared to past data to provide perspective on longer-term mortality and harvest criteria trends.

Total statewide mortalities for the 2017-2018 cycle were very similar to the previous three years, 2014-2016 (Figure 2). Total mortalities for 2019 were not available due to the timing of this report. Mean total mortality for 2017-2018 increased 7% to 495 from the 2014-2016 average of 462. As is typical, spring mortalities for the years 2017-2019 were higher than fall mortalities (Figure 3). Non-harvest mortalities were in line with previous years, although 2019 data were compiled through September 30, and thus could increase before season end (Figure 4).

Due to geographic separation of black bear populations, variations in habitat quality bear density, and an uneven distribution of hunting pressure, caution is warranted when interpreting statewide harvest statistics. Therefore, more specific harvest criteria are presented by BMU and by groups of hunt areas with shared female mortality limits in each of the following sections of this report. In BMUs or hunt areas with low harvest, interpreting harvest statistics based on subsets of sex, age class, or season can result in extremely variable results that are difficult to interpret due to small sample sizes.

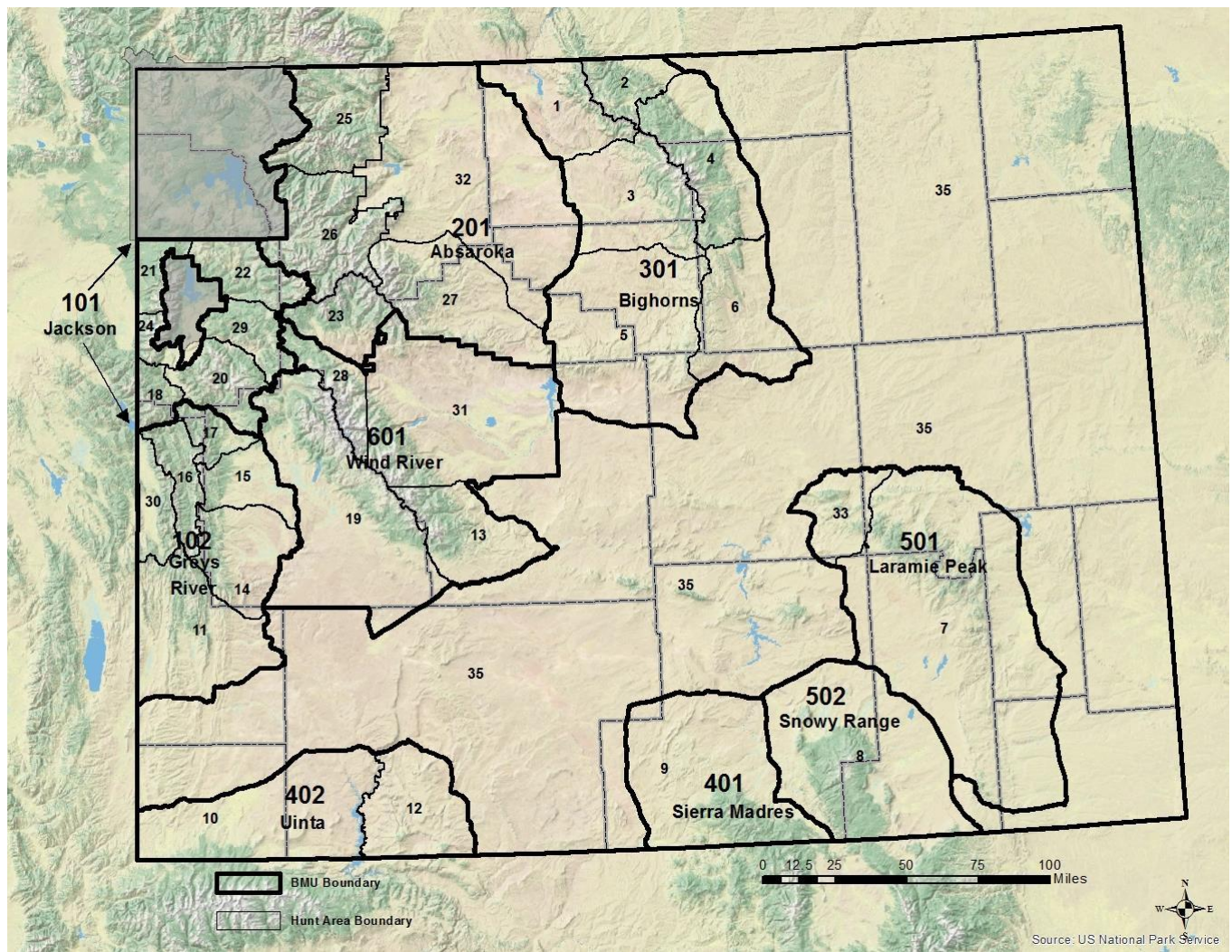
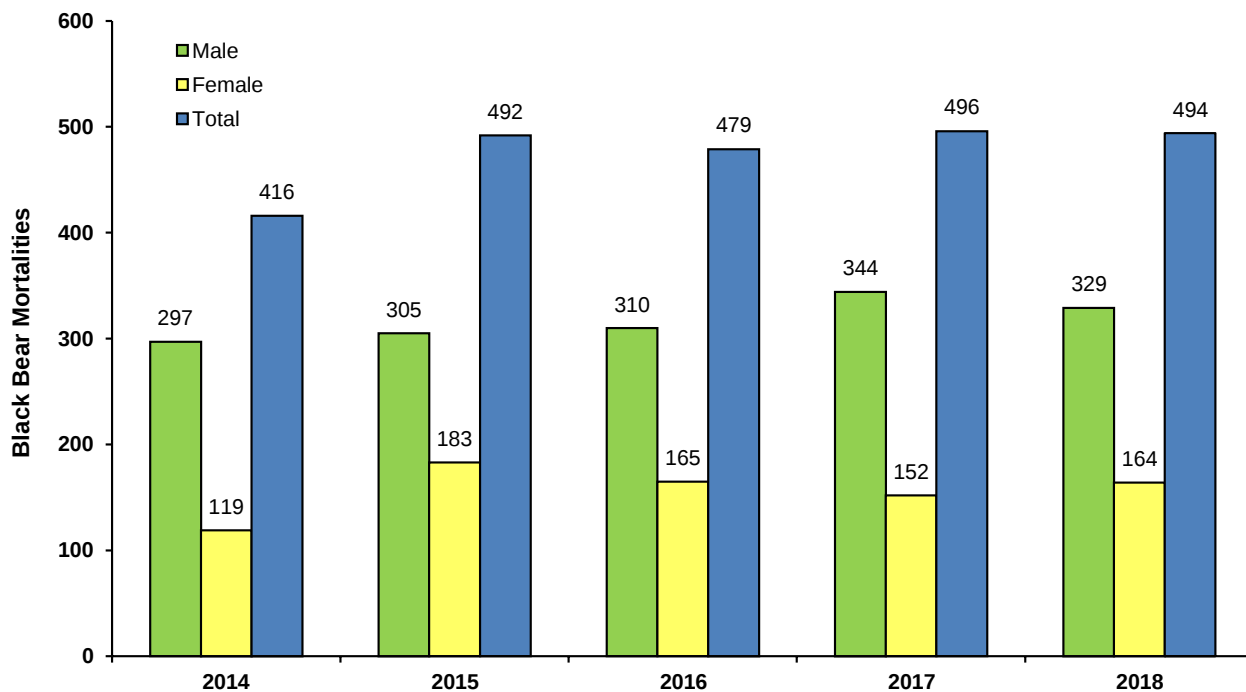


Figure 1. Wyoming black bear management units (BMUs) and hunt areas, 2019.



*There were 4 natural mortalities of unknown sex in 2015 and 2016, and 1 in 2018.

Figure 2. Annual statewide black bear mortalities (all causes) by sex, 2014-2018.

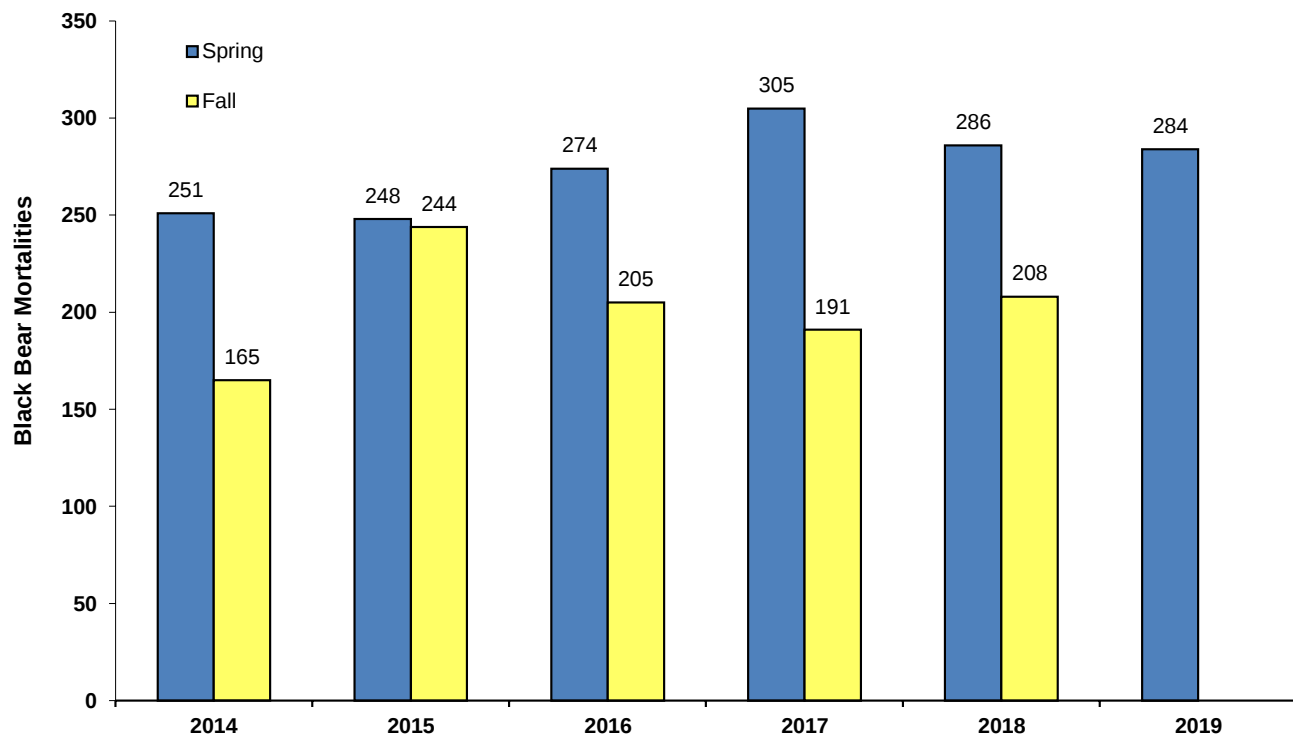
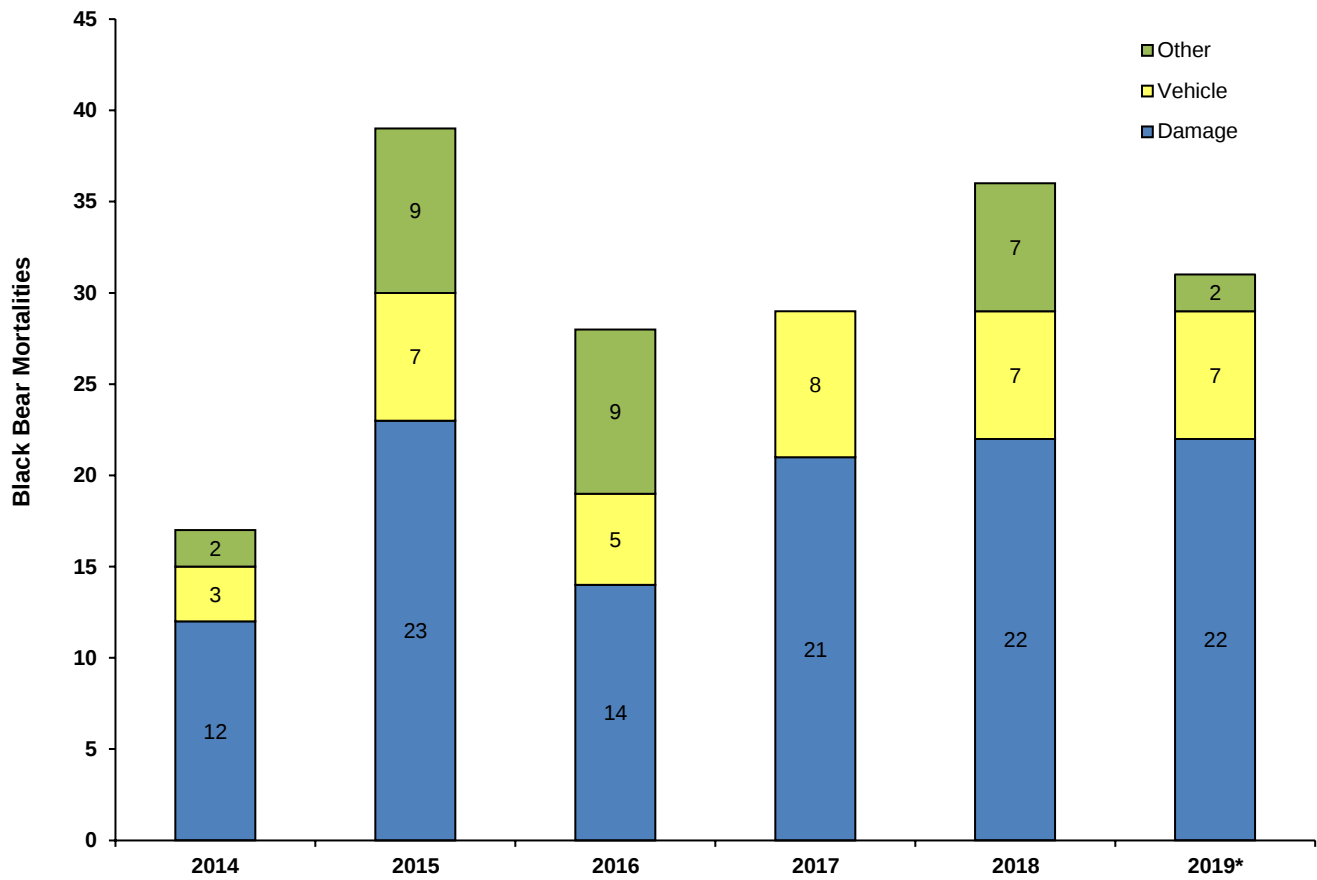


Figure 3. Annual statewide black bear mortalities (all causes) by season, 2014-spring 2019. Fall 2019 data were not available at time of analysis.



*2019 data through September 30

Figure 4. Annual statewide non-harvest black bear mortalities by year, 2014-2019.

License Sale and Harvest

Black bear harvest in Wyoming has increased steadily since the implementation of female mortality limits in the mid 1990s (Figure 5). However, during this period hunter success has changed little. When plotted against legal hunter harvest, increased license sales are strongly correlated with the increase in hunter harvest ($r^2=0.89$). During this period the percentage of licensed black bear hunters successfully harvesting a bear averaged 10%, ranging from 9% to 13%.

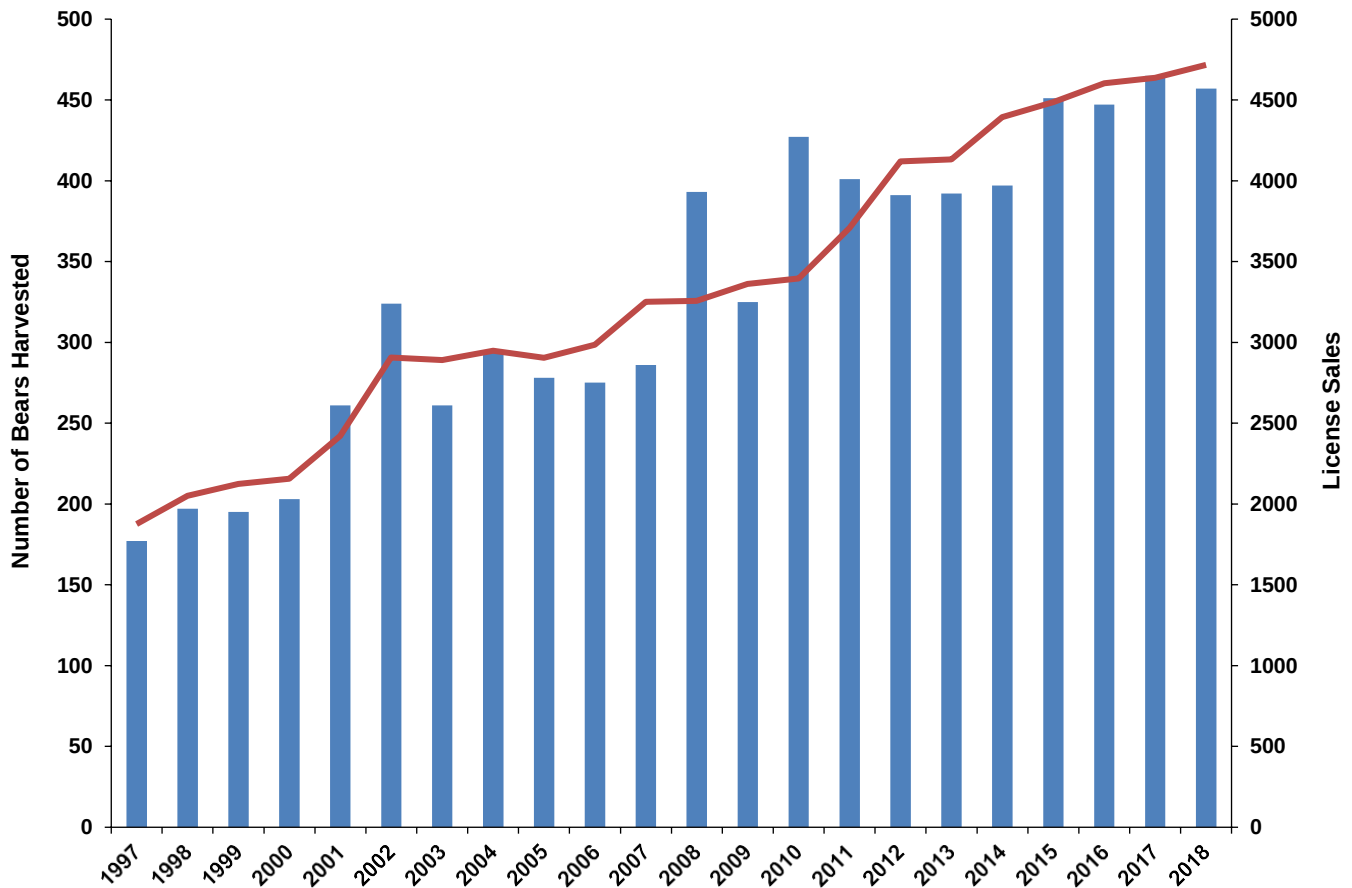


Figure 5. Total legal black bear harvest and license sales in Wyoming, 1997-2018.

JACKSON BEAR MANAGEMENT UNIT (101)

2019 Black Bear Mortality

Female mortality limits for the Jackson BMU remained unchanged for the 2017 – 2019 season cycle from the previous three years (Table 1). During this period, total and harvest mortalities for BMU 101 changed little from 2014-2016 after decreasing significantly from 2008-2011 levels (Figures 6 and 7). Spring 2017-2019 harvest averaged 30.7 bears per year compared to 19.0 for fall seasons 2017-2018 (Table 1). The percent of adult males continues to trend upward (Figure 8) and the percent of females in the harvest continues to remain in the stable range through spring 2019 (Figure 9), both indicating harvest is having a relatively small influence on the black bear population in the BMU. While a high percent of adults in the female harvest (Figure 10) would normally indicate harvest has reduced other sex and age classes of the population, the significant amount of refuge habitat surrounding this BMU provides a large source population and the prohibition of baiting in a majority of the BMU means that bears are harvested more in proportion to their availability in the population. Therefore, this criterion likely reflects an abundance of older-age females in the population and not a deficit of males and subadult females. The adult male and female harvest criteria provide evidence for this. The overall pattern of mortalities and harvest criteria (Table 2) in the Jackson BMU continue to indicate that the black bear population in BMU 101 experienced light to moderate harvest.

Table 1. Jackson BMU female mortality limits, harvest (legal/illegal harvest) by sex and season, and season closure dates for the 2017-spring 2019 black bear hunting seasons. All seasons for this BMU closed on the final date of the season as listed in regulation (Appendix I).

			Female Mortality Limit		Harvest				Season Closure Dates	
					Spring		Fall			
YEAR	MGMT UNIT	HUNT AREA	Spring	Fall	M	F	M	F	Spring	Fall
2017	JACKSON	18, 20, 21, 22, 24 & 29	13	20	18	11	13	6	6/15/17	10/31/17
2018	JACKSON	18, 20, 21, 22, 24 & 29	13	20	26	5	11	13	6/15/18	10/31/18
2019	JACKSON	18, 20, 21, 22, 24 & 29	13	20	22	10	NA	NA	6/15/19	NA

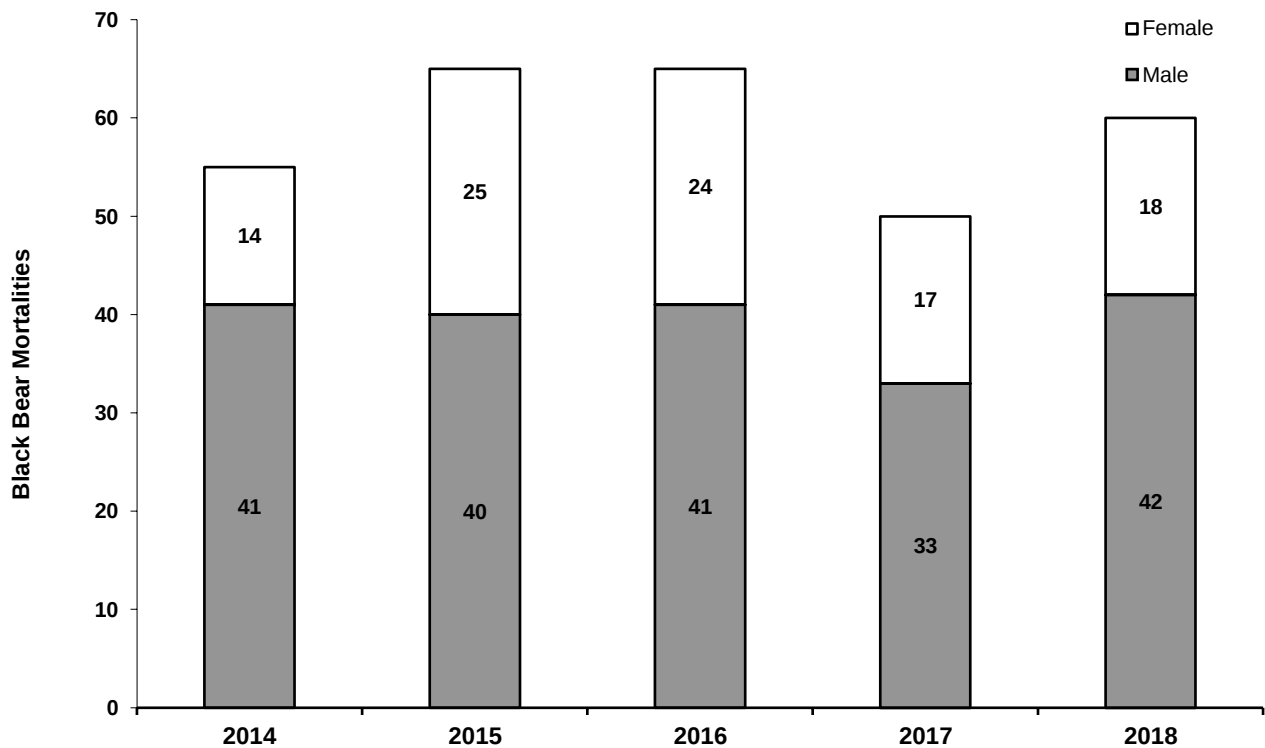


Figure 6. Number of black bear mortalities of all causes in Jackson BMU by sex, 2014-2018.

Table 2. Harvest criteria for Jackson BMU legal black bear harvest, 2017 through spring 2019. Criteria are presented by objective as 3-year averages of percent adult males in the total harvest, percent females in the total harvest, and percent adult females in the female harvest.

Year	Objective	Harvest Criteria		
		% Adult ^a Males in Total Harvest	% Females in Total Harvest	% Adult ^a Females in Female Harvest
	Population Reduction	< 25%	> 40%	> 55%
	Stable Population	25 – 35%	30 – 40%	45 – 55%
	Population Increase	> 35%	< 30%	< 45%
2017-spring 2019		43.3	32.7	54.4

^a Adults classified as males and females ≥ 5 years of age based on tooth cementum annuli.

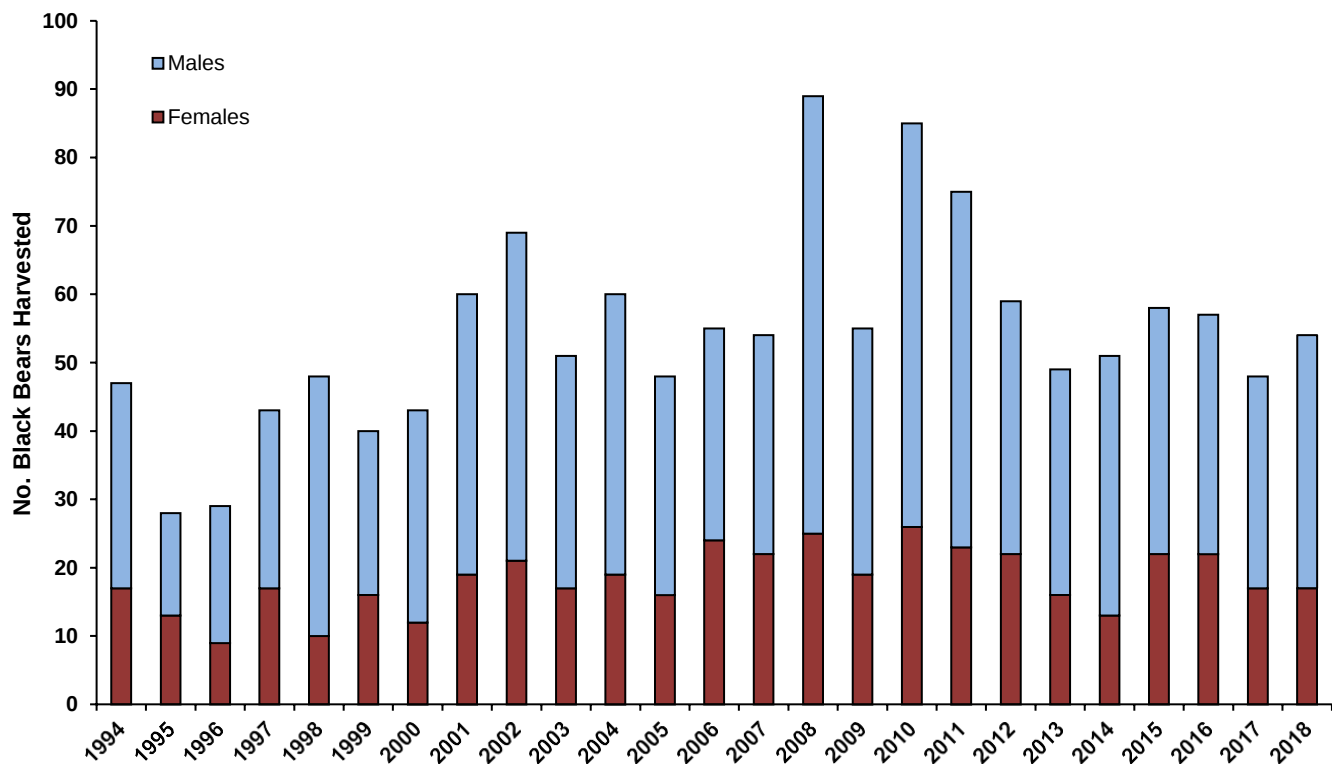


Figure 7. Legal harvest of black bears in Jackson BMU, 1994-2018.

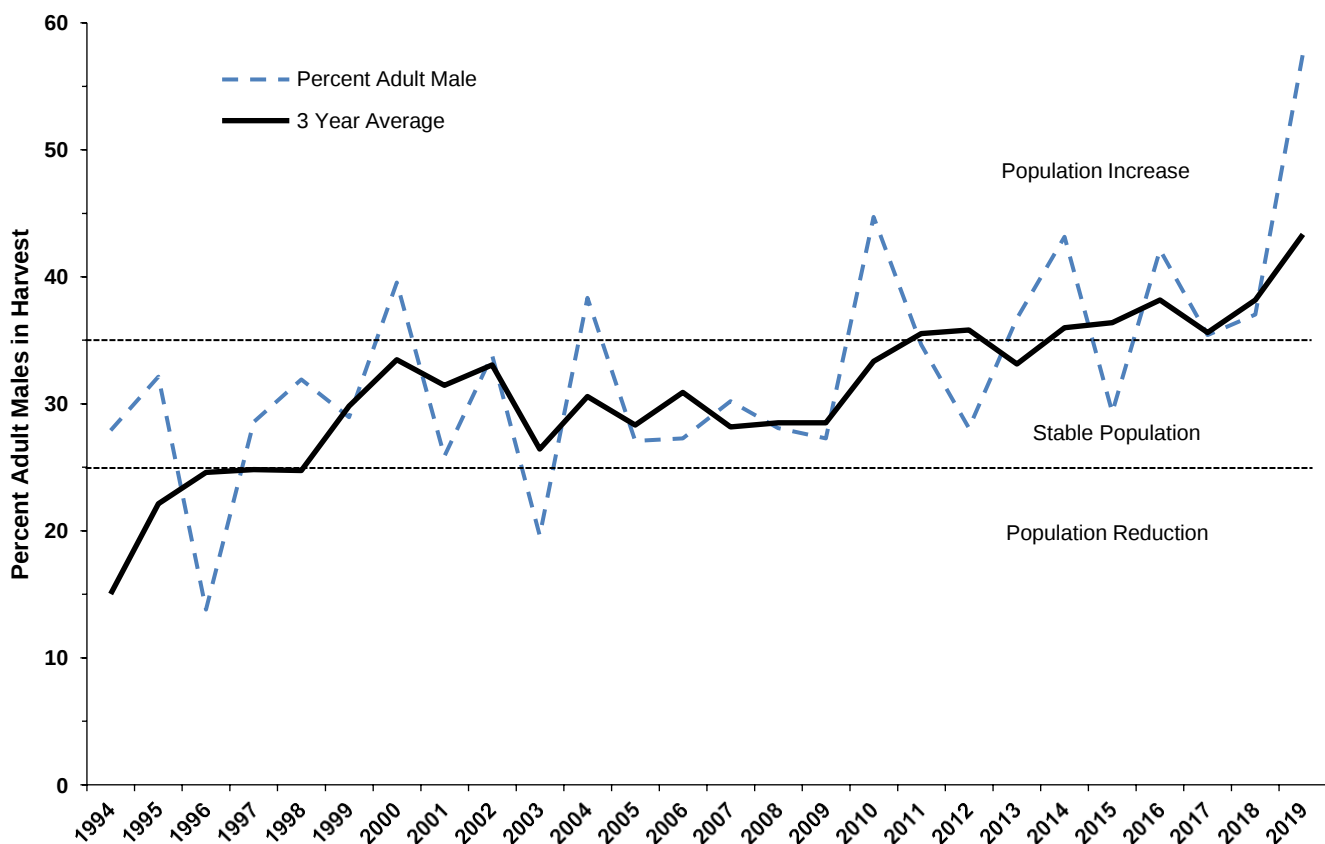


Figure 8. Percent adult males in the total legal black bear harvest in Jackson BMU, 1994-spring 2019.

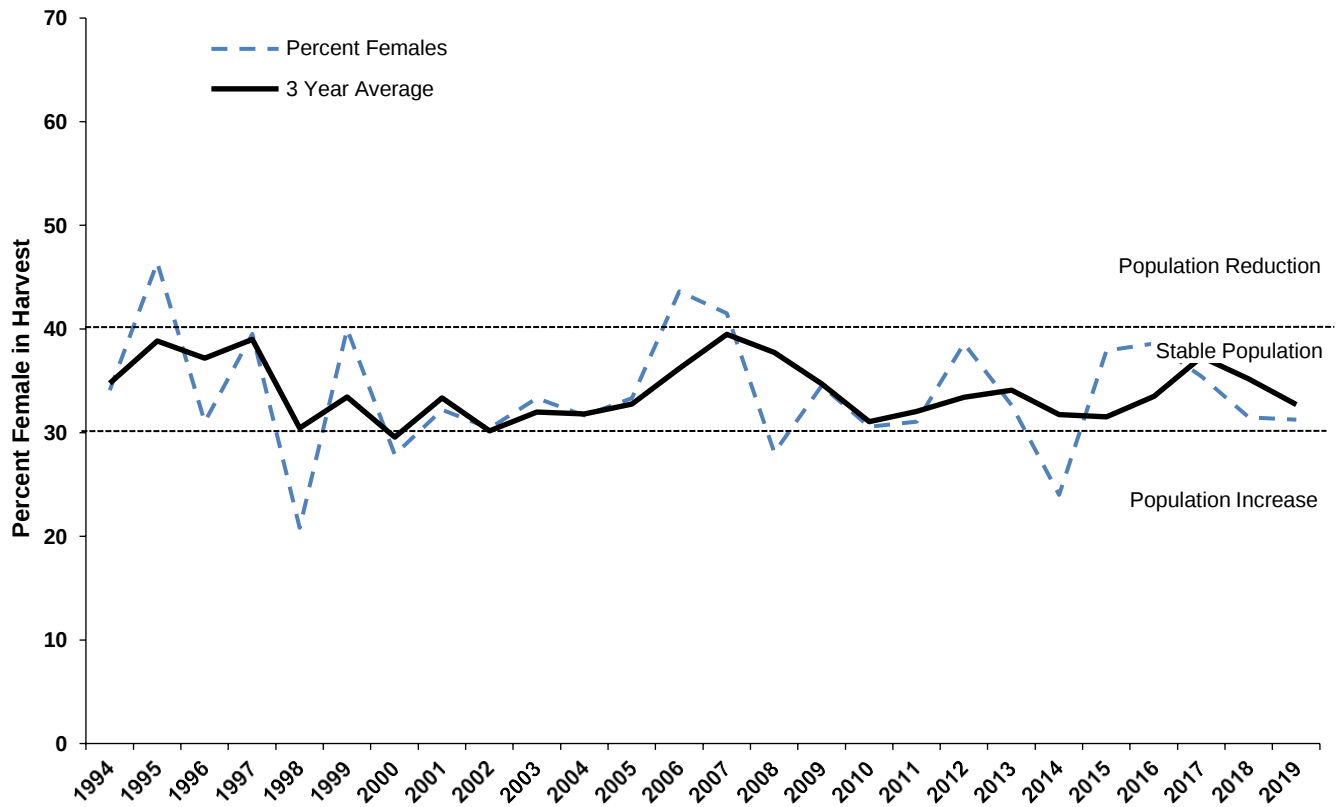


Figure 9. Percent females of the total legal black bear harvest in Jackson BMU, 1994-spring 2019.

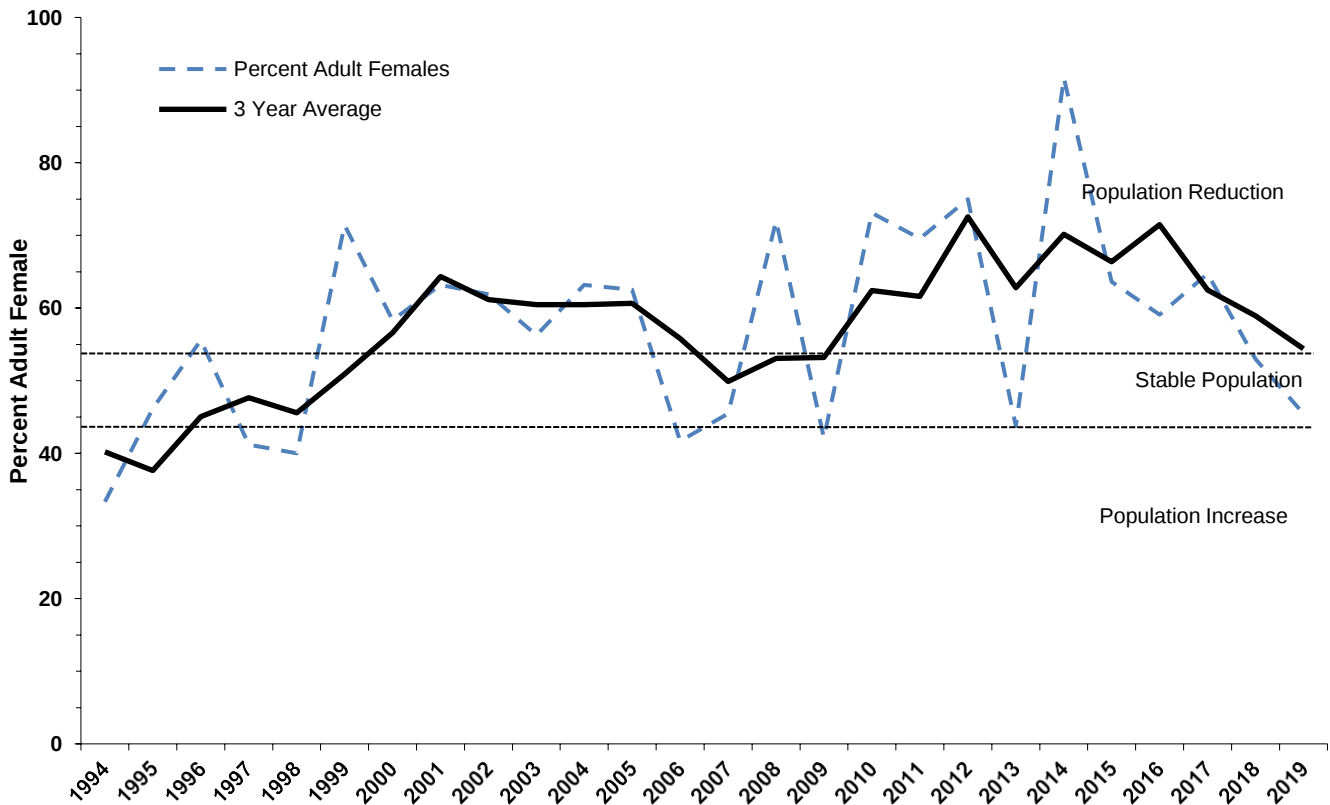


Figure 10. Percent adult females of the total female legal harvest in Jackson BMU, 1994-spring 2019.

GREYS RIVER BEAR MANAGEMENT UNIT (102)

2019 Black Bear Mortality

Female mortality limits were increased by 8 females in the spring and 4 females in the fall for hunt areas 14-17 and 30 for the 2014-2016 season cycle in response to public concerns over black bear predation on mule deer. These limits remained for the 2017-2019 cycle. Female mortality limits for these areas were not reached during any season of the 2017-2019 cycle. Mortality limits for hunt area 11 remained unchanged (Table 3). Total black bear mortalities in BMU 102 remained relatively steady through 2018 (Figure 11), tracking legal harvest (Figures 12 and 16). At the BMU level, harvest criteria continue to indicate constraint of the adult male cohort of the black bear population (Figure 13). The 3-year average of percent females in the harvest decreased since reaching a high in 2015 (Table 4, Figure 14). The percent of adults in the female harvest has increased slightly into the stable range (Figure 15). Because a large majority of the harvest from this BMU comes from hunt areas 14-17 and 30, separate analyses of the harvest criteria for these hunt areas tracks very closely to the overall BMU levels for each criterion (Figures 16-19).

Work to assess the population status using DNA hair snares took place in the summers of 2015 and 2016. Results were analyzed and provided in a separate Department report *Black Bear Population Monitoring in the Greys River, Wyoming Using Clustered Hair Snare Corrals and Spatially-Explicit Capture/Recapture Models*. This report estimates mortality rates for the Greys River ranging from 25-35%, whereas sustainable mortality is estimated at approximately 18%. The report and analysis of harvest data suggest harvest pressure is having a constraining effect on the Greys River black bear population and high harvest levels are likely supported to a large extent by dispersing subadult males from adjacent source populations (Figure 17).

Table 3. Greys River BMU female mortality limits, harvest (legal/illegal harvest) by sex and season, and season closure dates for the 2017 - spring 2019 black bear hunting seasons. Yellow cells indicate season closure prior to the closing date listed in regulation (Appendix I) after reaching the female mortality limit.

			Female Mortality Limit		Harvest				Season Closure Dates	
YEAR	MGMT UNIT	HUNT AREA	Spring	Fall	Spring		Fall		Spring	Fall
2017	GREYS RIVER	11	5	5	9	5	4	2	6/15/17	10/31/17
		14, 15, 16, 17 & 30	30	18	26	27	17	10	6/15/17	10/31/17
2018	GREYS RIVER	11	5	5	11	5	7	2	6/15/18	10/31/18
		14, 15, 16, 17 & 30	30	18	34	28	28	12	6/15/18	10/31/18
2019	GREYS RIVER	11	5	5	9	5	NA	NA	6/15/19	NA
		14, 15, 16, 17 & 30	30	18	29	17	NA	NA	6/15/19	NA

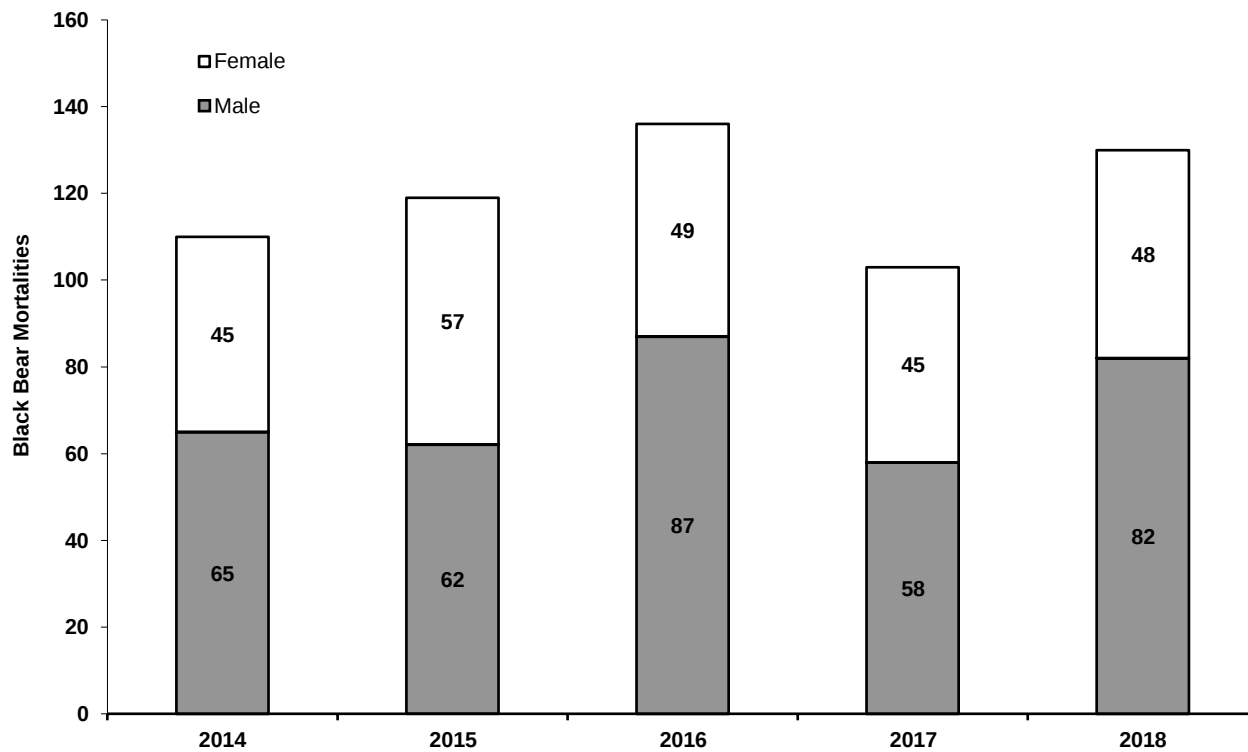


Figure 11. Number of black bear mortalities of all causes in Greys River BMU by sex, 2014-2018.

Table 4. Harvest criteria for Greys River BMU legal black bear harvest, 2017-spring 2019. Criteria are presented by objective as 3-year averages of percent adult males in the total harvest, percent females in the total harvest, and percent adult females in the female harvest.

Year	Objective	Harvest Criteria		
		% Adult ^a Males in Total Harvest	% Females in Total Harvest	% Adult ^a Females in Female Harvest
	Population Reduction	< 25%	> 40%	> 55%
	Stable Population	25 – 35%	30 – 40%	45 – 55%
	Population Increase	> 35%	< 30%	< 45%
2017-spring 2019		16.8	39.2	48.4

^a Adults classified as males and females ≥ 5 years of age based on tooth cementum annuli.

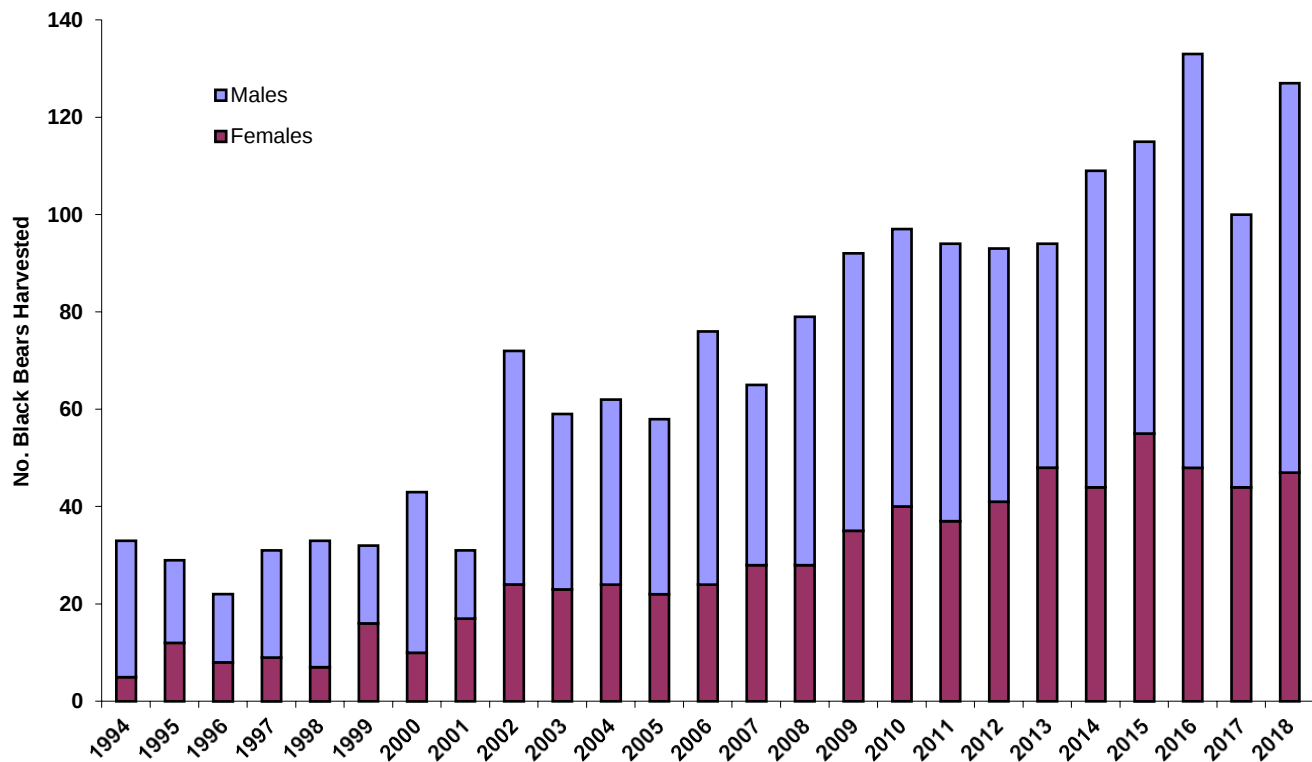


Figure 12. Legal harvest of black bears in Greys River BMU, 1994-2018.

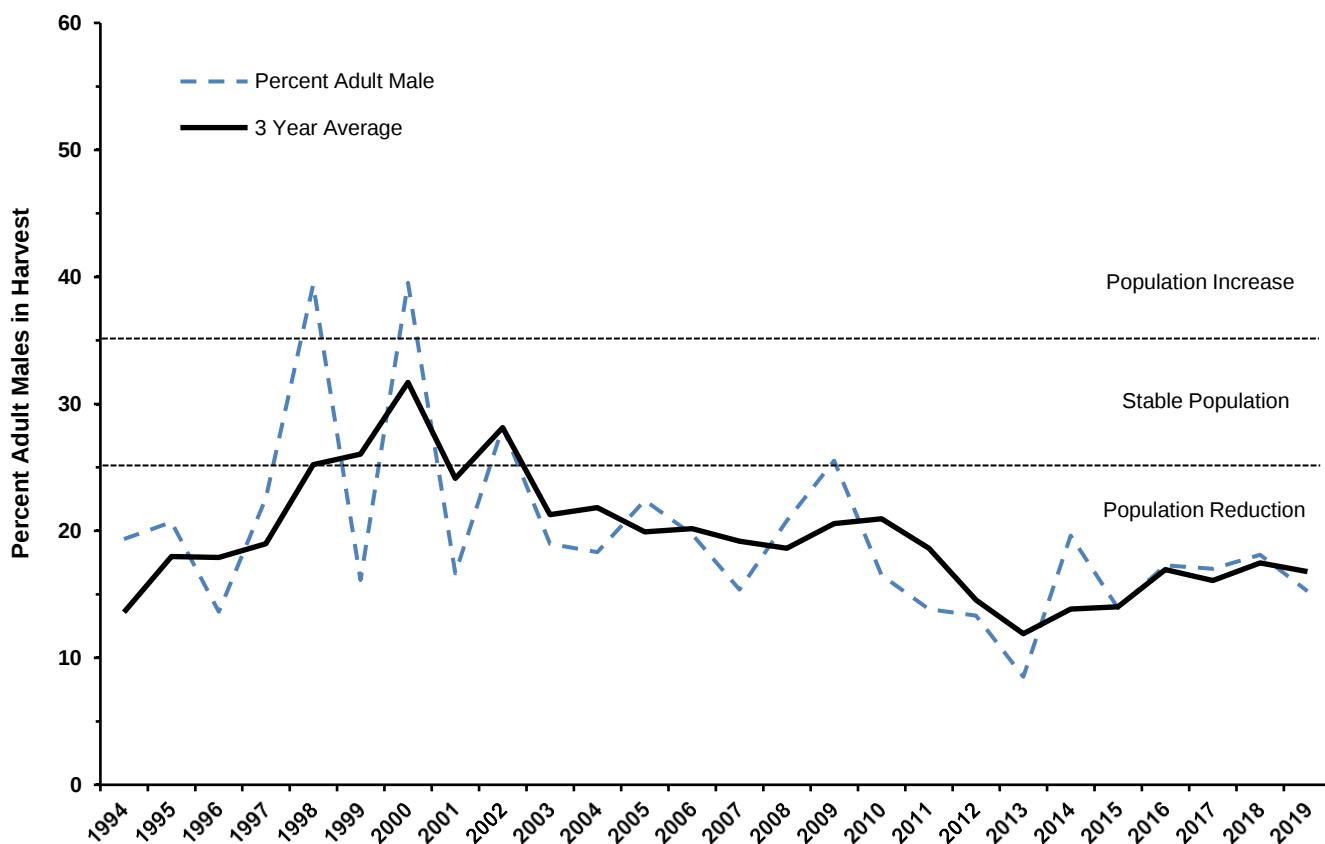


Figure 13. Percent adult males in the total legal black bear harvest in Greys River BMU, 1994-spring 2019.

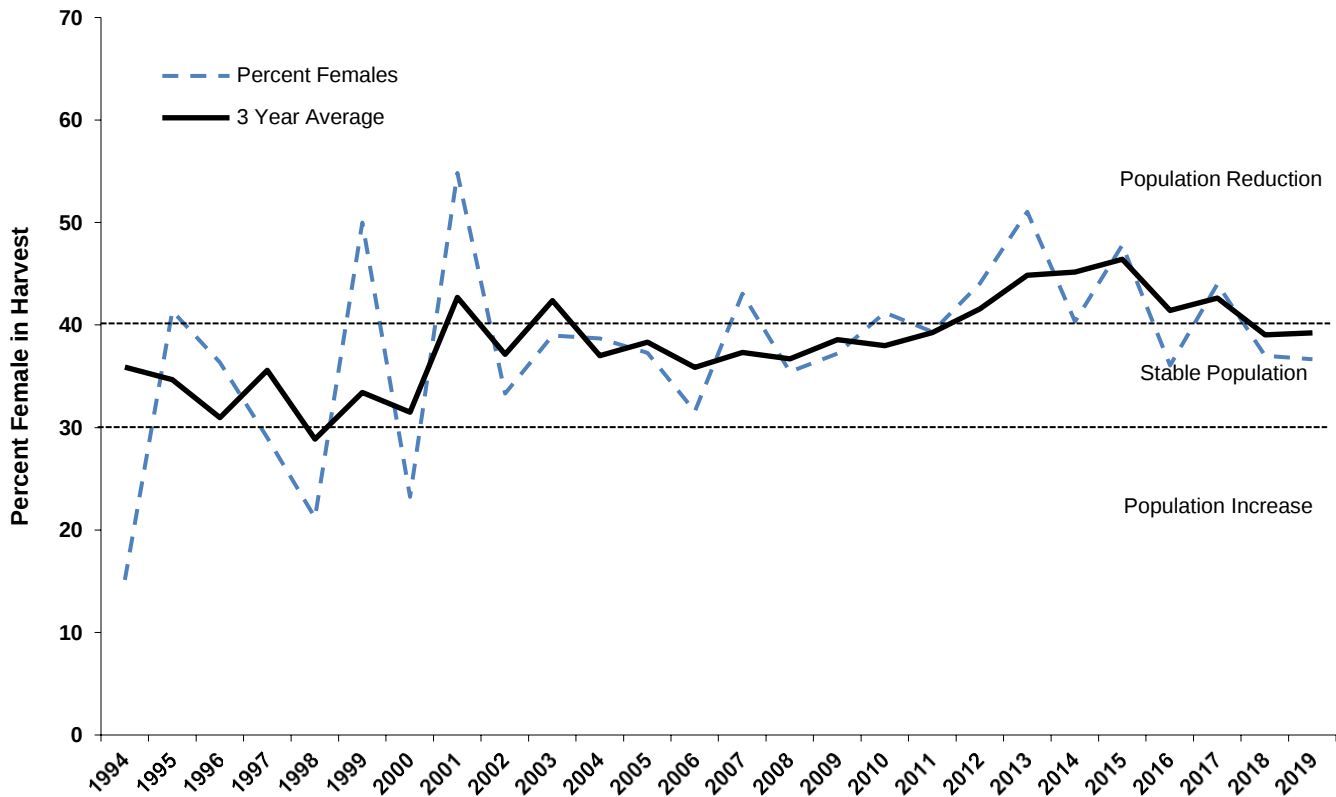


Figure 14. Percent females of the total legal black bear harvest in Greys River BMU, 1994-spring 2019.

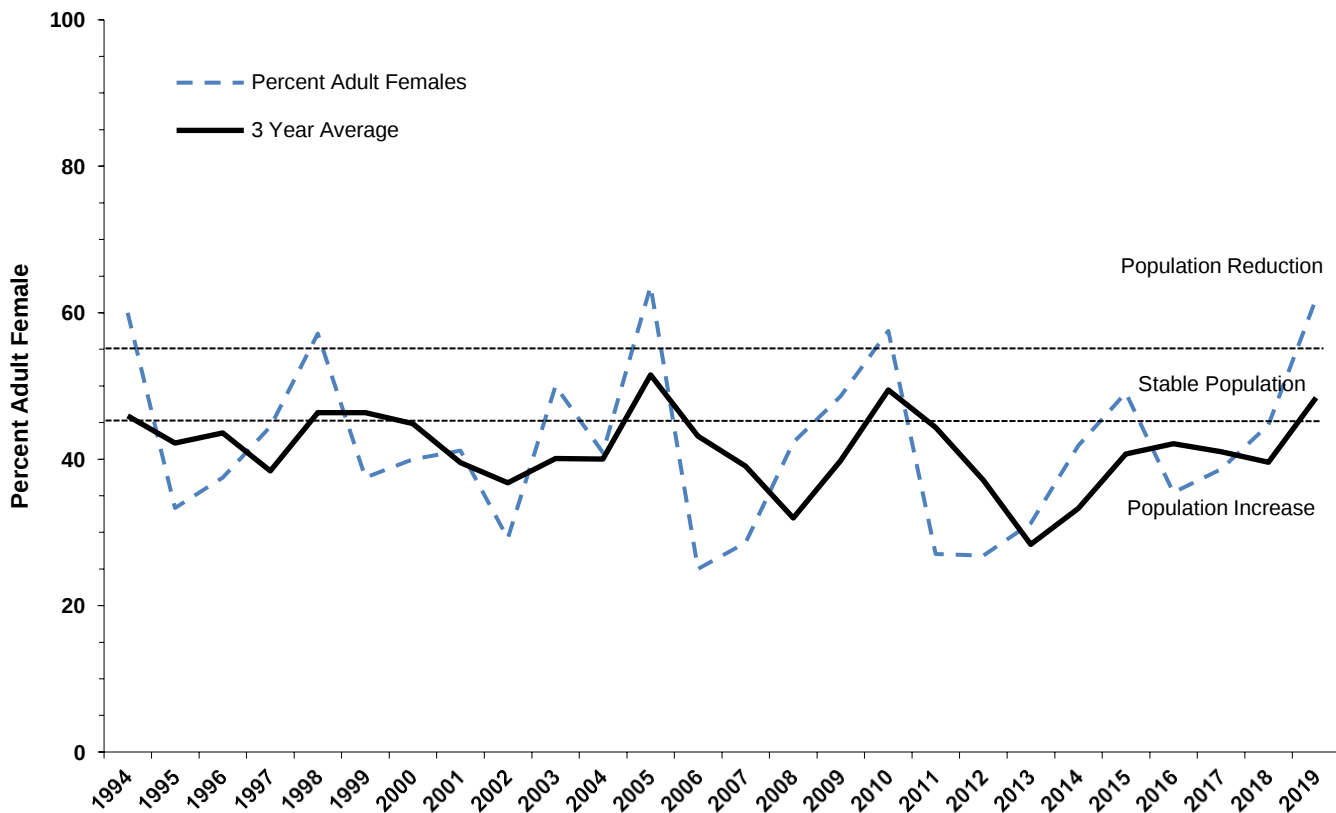


Figure 15. Percent adult females of the total female legal harvest in Greys River BMU, 1994-spring 2019.

Harvest Criteria by Mortality limit – Hunt Areas 14, 15, 16, 17, and 30

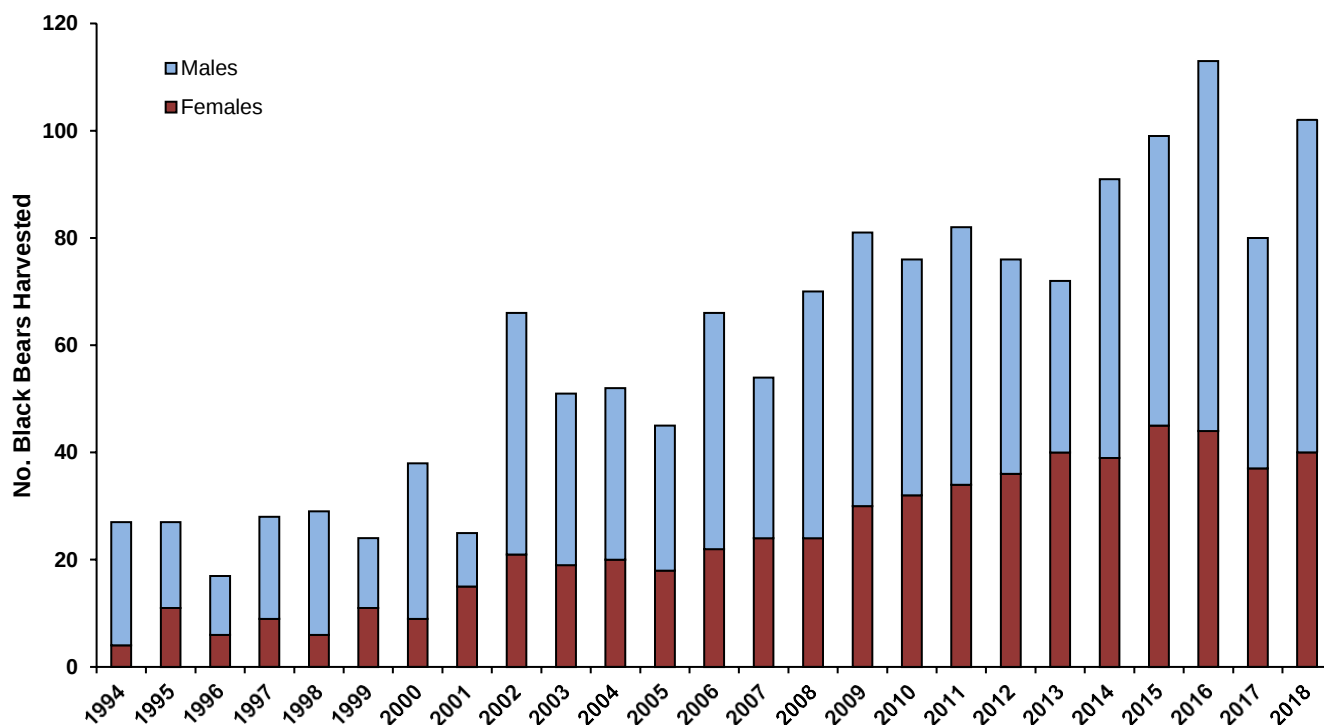


Figure 16. Legal harvest of black bears in hunt areas 14, 15, 16, 17, and 30 of Greys River BMU, 1994-2018.

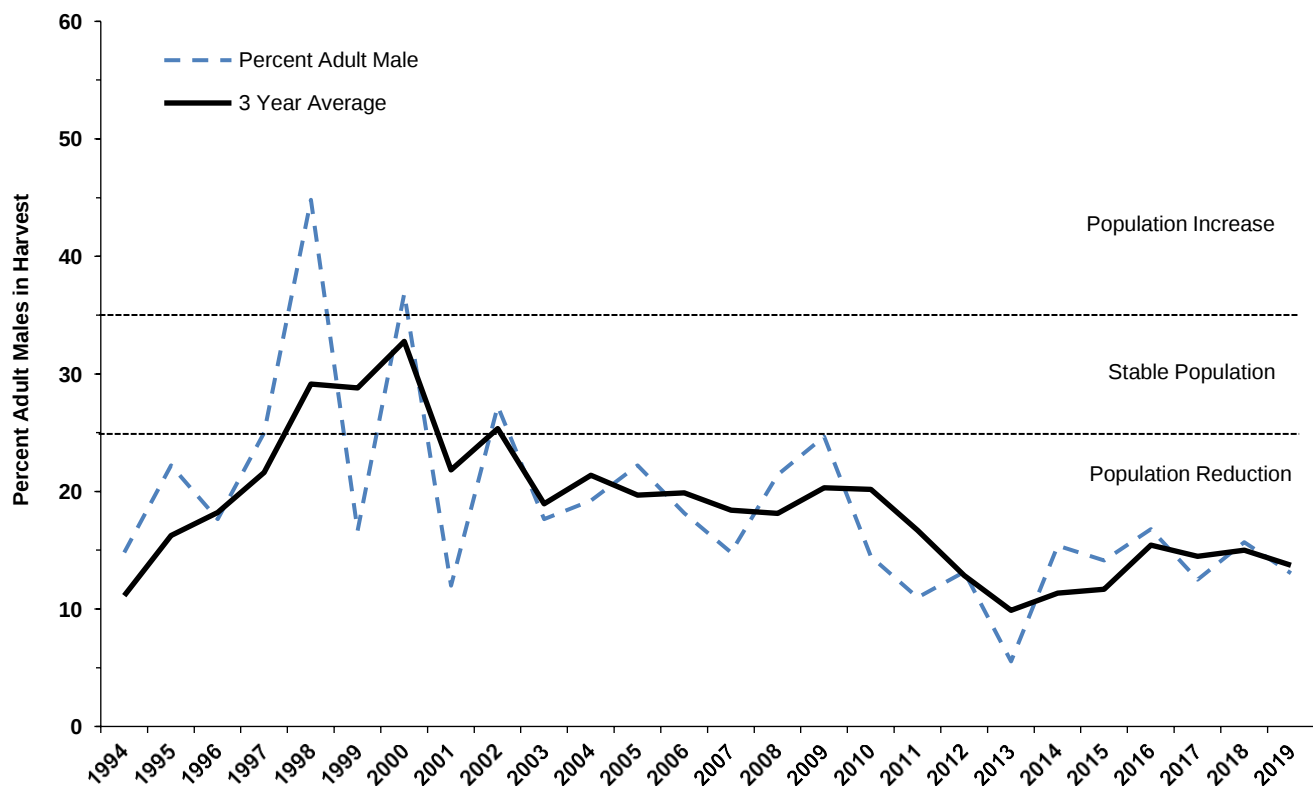


Figure 17. Percent adult males in the total legal black bear harvest in hunt areas 14, 15, 16, 17, and 30 of Greys River BMU, 1994-spring 2019.

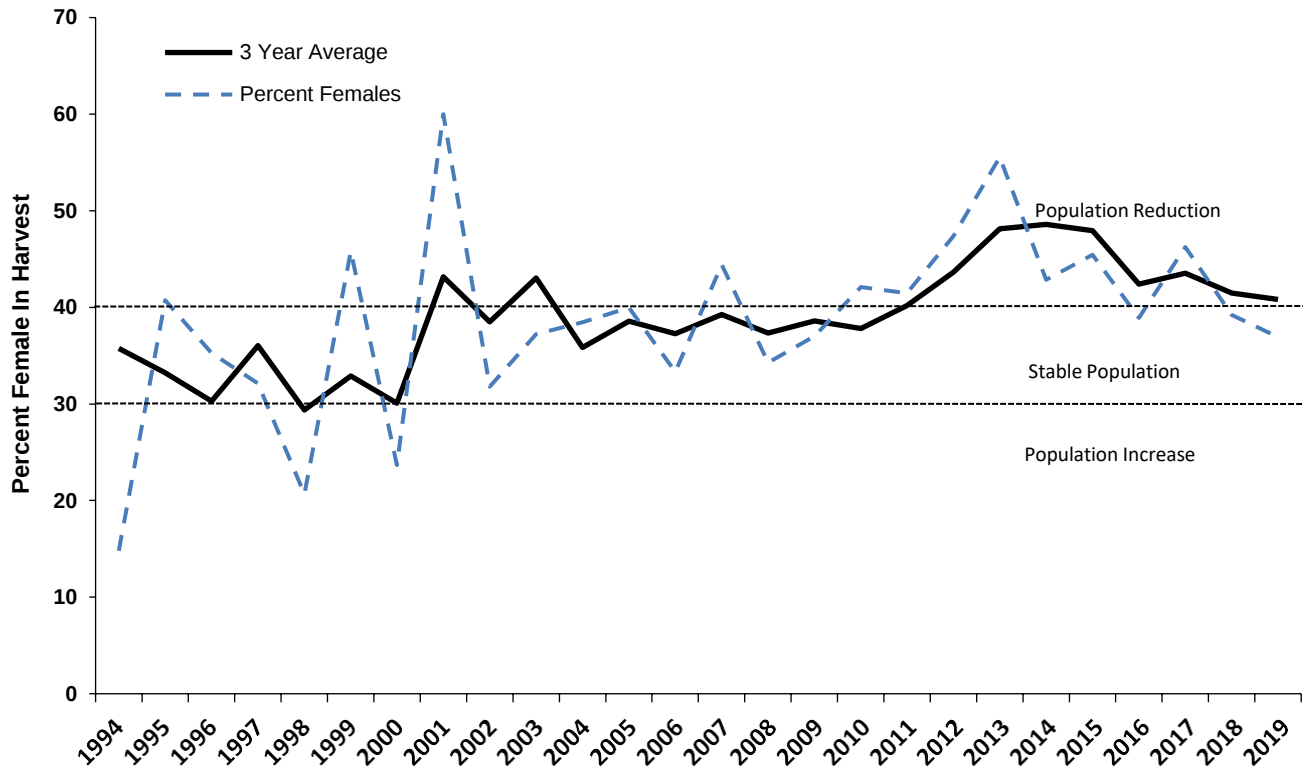


Figure 18. Percent females of the total legal black bear harvest in hunt areas 14, 15, 16, 17, and 30 of Greys River BMU, 1994-spring 2019.

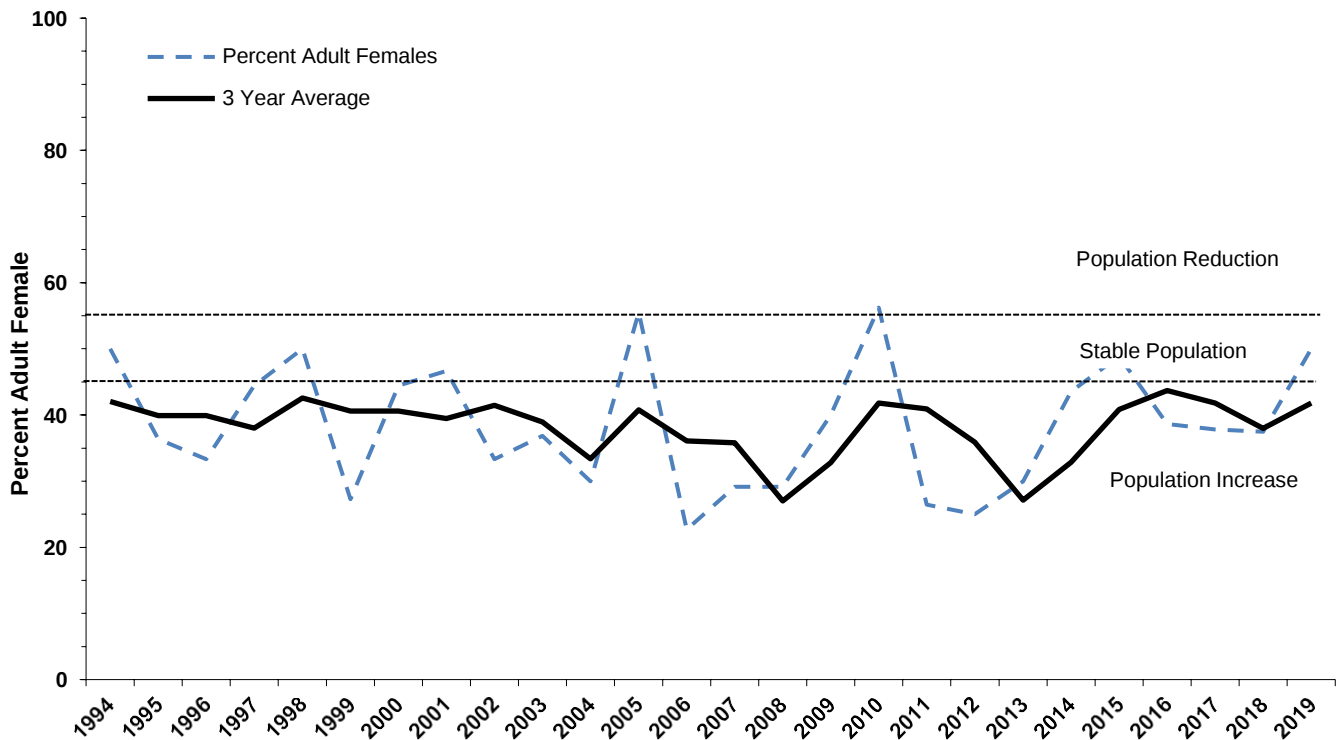


Figure 19. Percent adult females of the total female legal harvest in hunt areas 14, 15, 16, 17, and 30 of Greys River BMU, 1994-spring 2019.

ABSAROKA BEAR MANAGEMENT UNIT (201)

2019 Black Bear Mortality

Female mortality limits for the Absaroka BMU remained unchanged from the 2014-2016 season cycle (Table 5). Overall, 2017-2019 mortalities and harvest were similar to the previous three years, with wide fluctuations likely due to changes snow conditions for access and in the annual availability of natural foods (Figures 21 and 22). The percent of adult males in the harvest remains high, and has trended upward in recent years, indicating relatively low harvest pressure. Likewise, the percent of females in the harvest has been trending downward (Figure 23). The percent of adults in the female harvest remains high (Table 6 and Figures 22-25). However, similar to the Jackson BMU, the significant amount of refuge habitat surrounding this BMU provides a source population. The prohibition of baiting in a majority of the unit reduces hunter selectivity, resulting in harvest proportional to availability in the population, not by their vulnerability to harvest. This criterion likely reflects an abundance of older-age females in the standing population of the BMU and not a deficit of males and subadult females. Analyzed separately, hunt areas 23, 25, 26, and 27 make up the vast majority of harvest for this BMU and show the same trends (Figures 26-29).

Overall, a continued high percent of adult males in the harvest and the relatively low percent of females in the harvest indicate a healthy and stable black bear population experiencing moderate to low harvest pressure.

Table 5. Absaroka BMU female mortality limits, harvest (legal/illegal harvest) by sex and season, and season closure dates for the 2017-spring 2019 black bear hunting seasons. Yellow cells indicate season closure prior to the closing date listed in regulation (Appendix I) after reaching the female mortality limit.

			Female Mortality Limit		Harvest				Season Closure Dates	
YEAR	MGMT UNIT	HUNT AREA	Spring	Fall	Spring		Fall		Spring	Fall
2017	ABSAROKA	23, 25, 26 & 27	8	12	21	8	14	1	6/10/17	10/31/17
		32	NA	NA	5	0	0	0	6/15/17	11/15/17
2018	ABSAROKA	23, 25, 26 & 27	8	12	12	6	11	7	6/15/18	10/31/18
		32	NA	NA	1	1	1	1	6/15/18	11/15/18
2019	ABSAROKA	23, 25, 26 & 27	8	12	25	5	NA	NA	6/15/19	NA
		32	NA	NA	3	0	NA	NA	6/15/19	NA

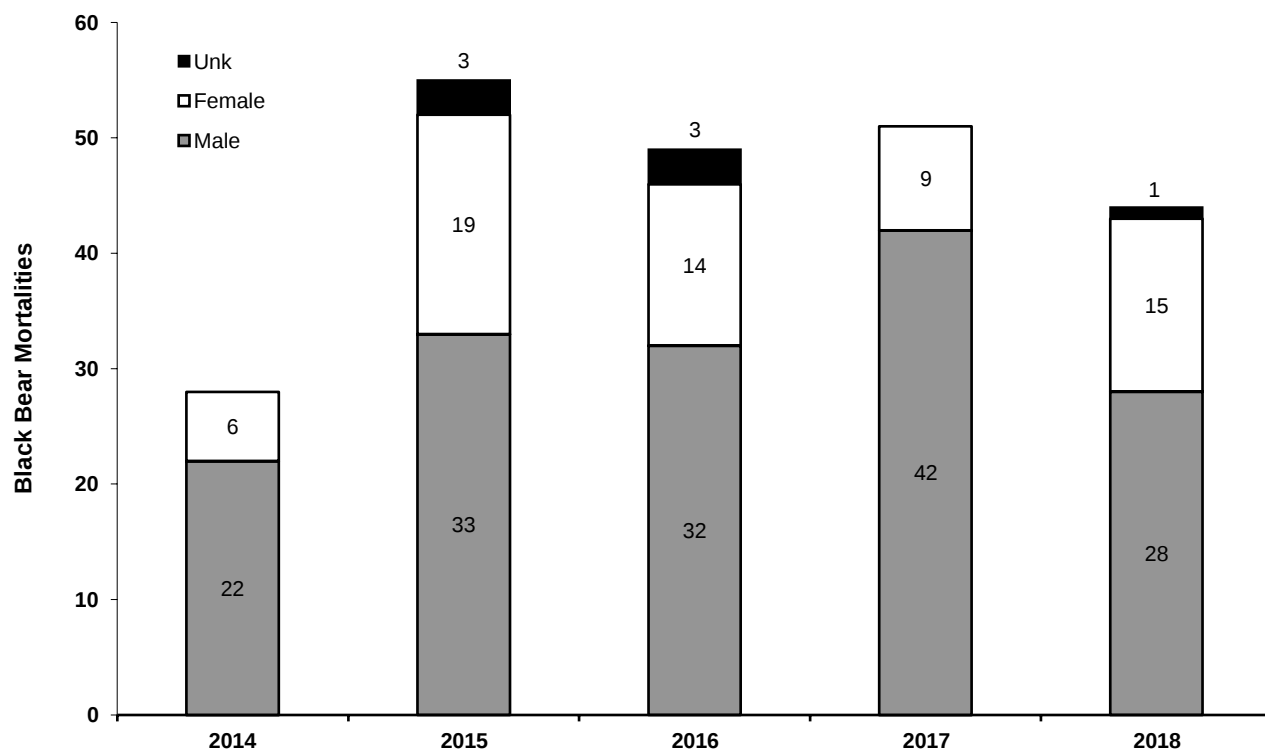


Figure 21. Number of black bear mortalities of all causes in Absaroka BMU by sex, 2014-2018.

Table 6. Harvest criteria for Absaroka BMU legal black bear harvest, 2017-spring 2019. Criteria are presented by objective as 3-year averages of percent adult males in the total harvest, percent females in the total harvest, and percent adult females in the female harvest.

Year	Objective	Harvest Criteria		
		% Adult ^a Males in Total Harvest	% Females in Total Harvest	% Adult ^a Females in Female Harvest
	Population Reduction	< 25%	> 40%	> 55%
	Stable Population	25 – 35%	30 – 40%	45 – 55%
	Population Increase	> 35%	< 30%	< 45%
2017-spring 2019		49.1	23.8	76.3

^a Adults classified as males and females ≥ 5 years of age based on tooth cementum annuli.

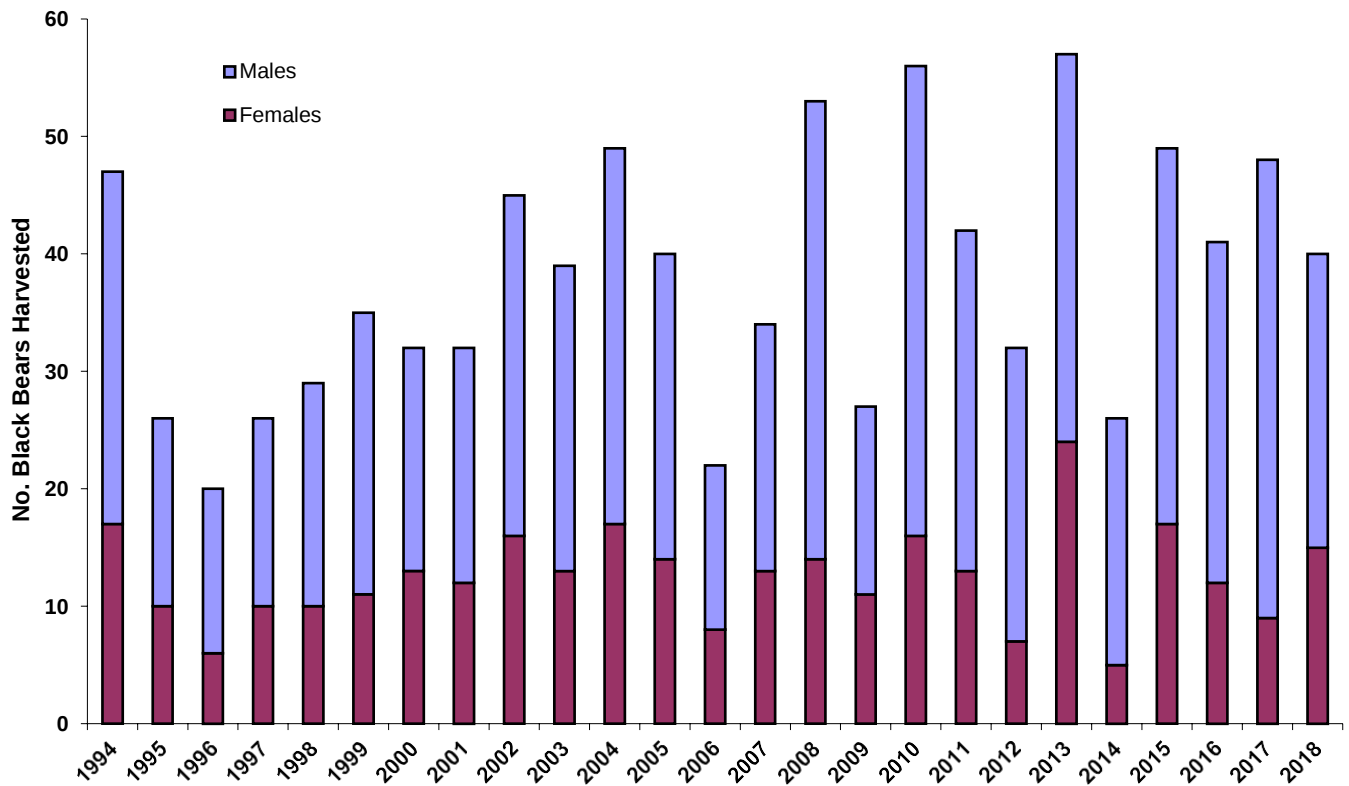


Figure 22. Legal harvest of black bears in Absaroka BMU, 1994-2018.

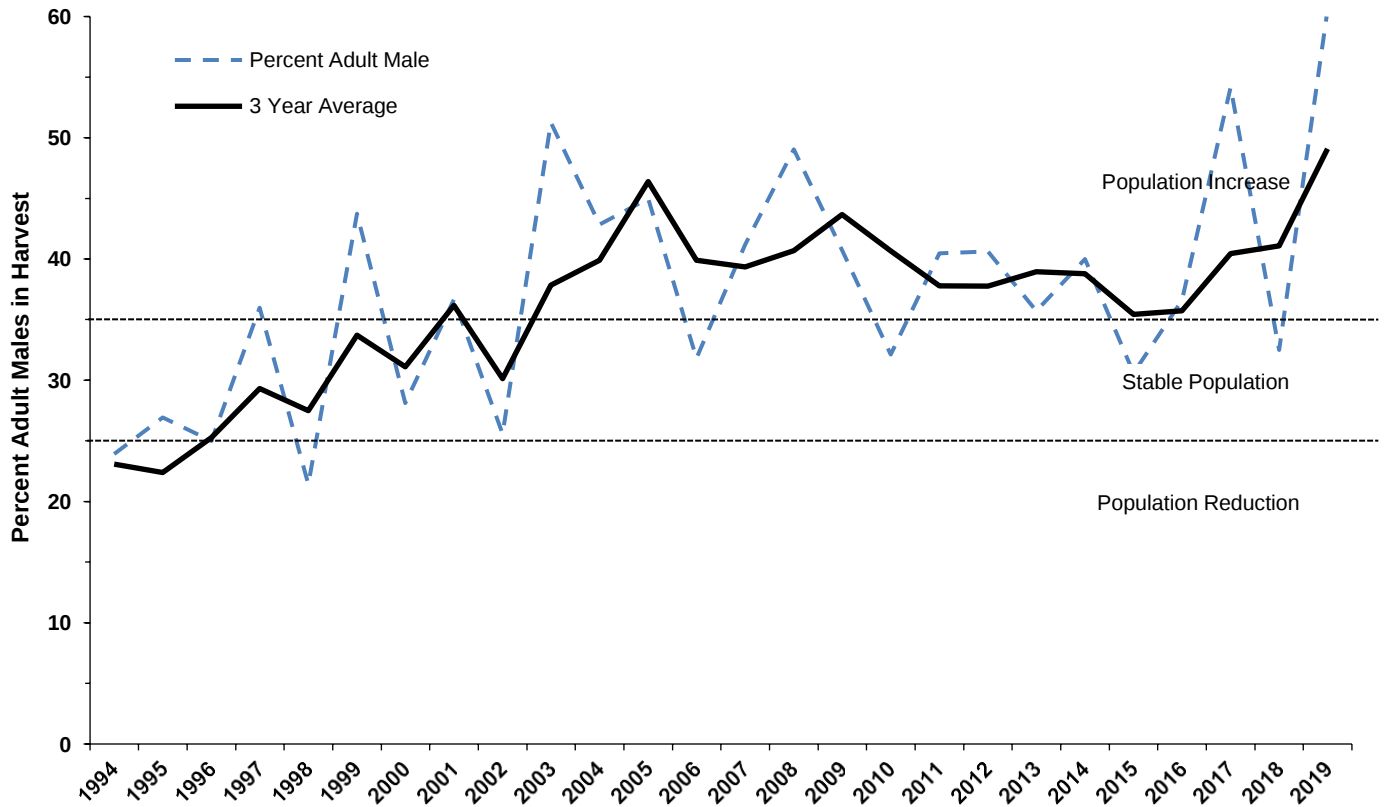


Figure 23. Percent adult males in the total legal black bear harvest in Absaroka BMU, 1994-spring 2019.

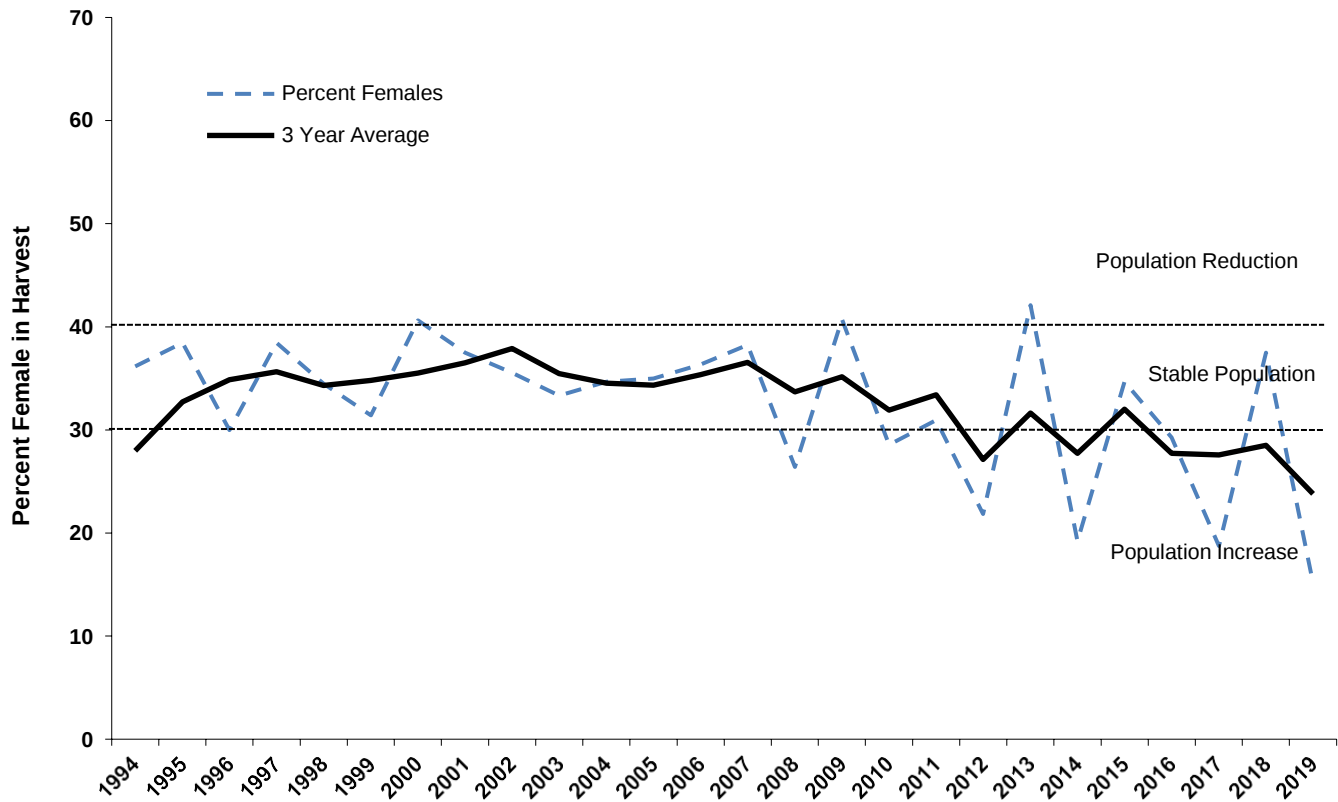


Figure 24. Percent females of the total legal black bear harvest in Absaroka BMU, 1994-spring 2019.

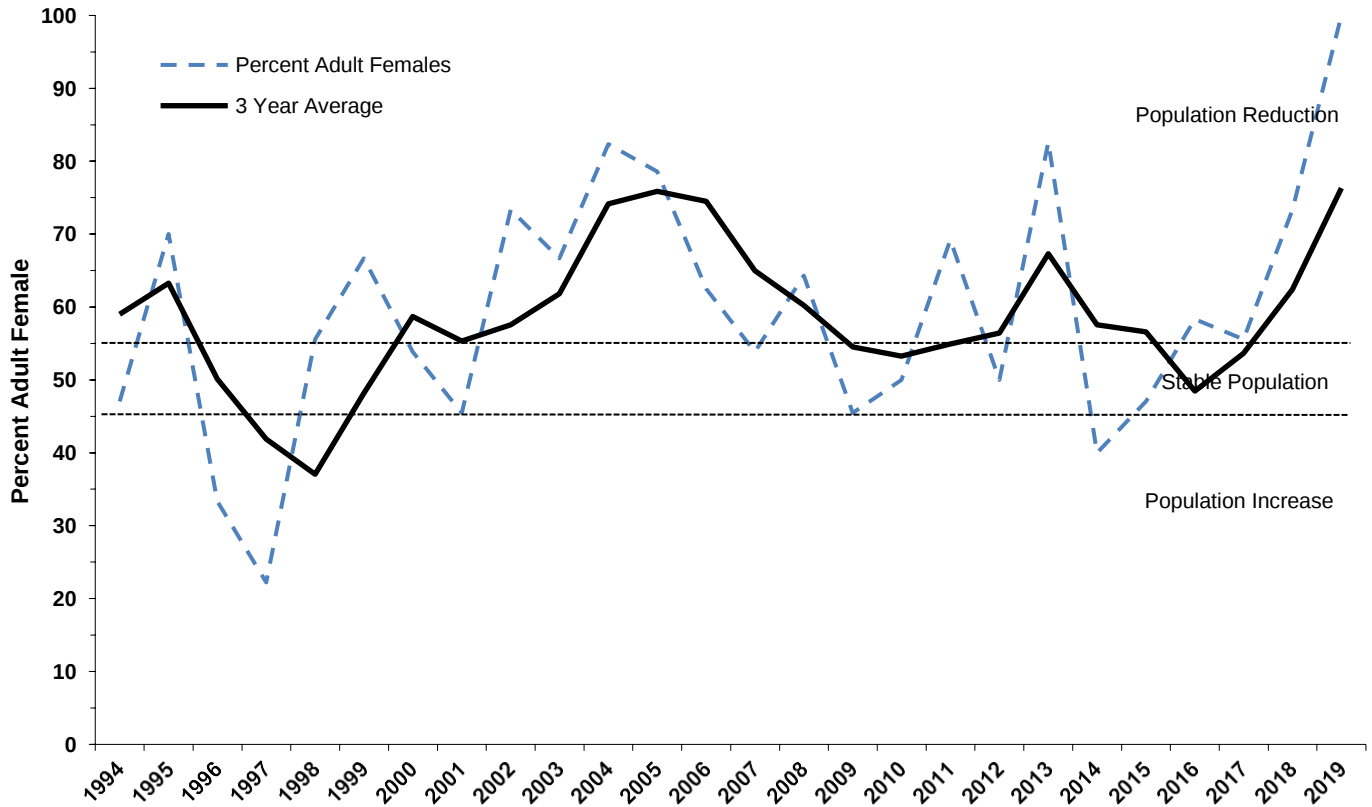


Figure 25. Percent adult females of the total female legal harvest in Absaroka BMU, 1994-spring 2019.

Harvest Criteria by Harvest Limit – Hunt Areas 23, 25, 26, and 27

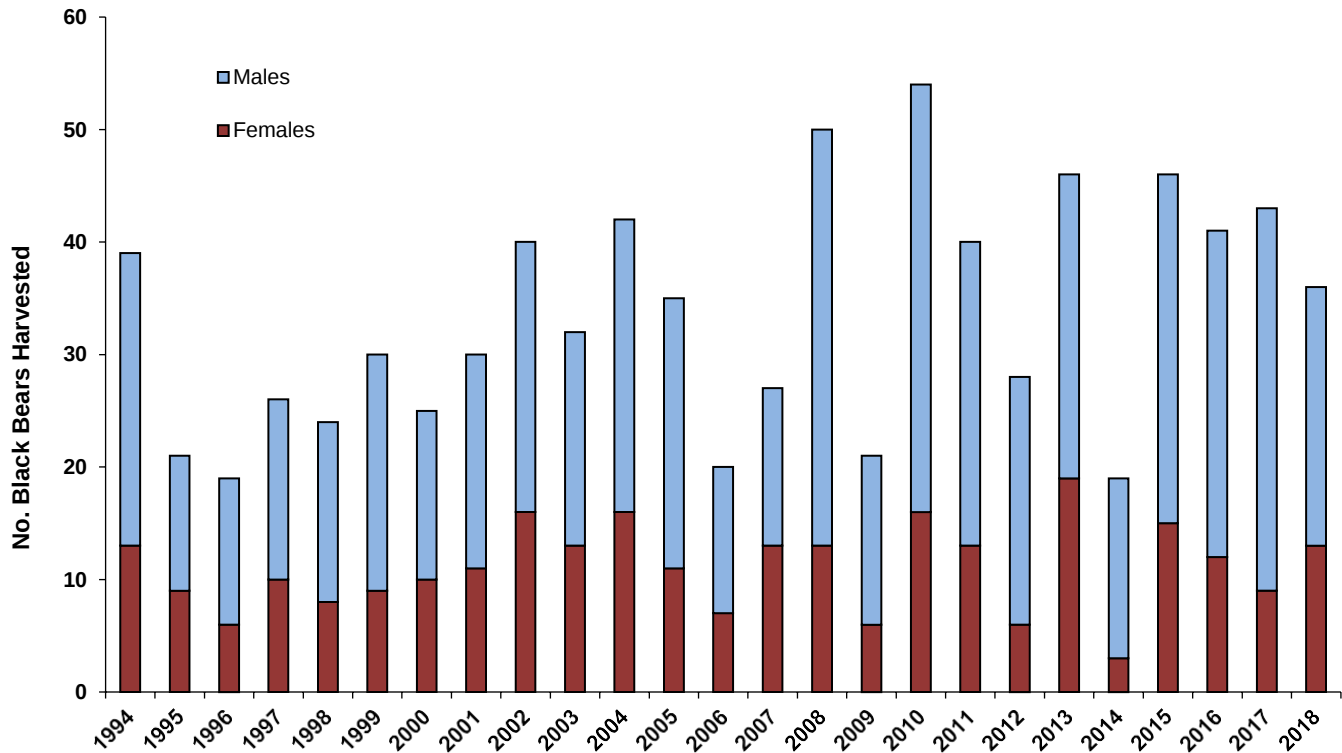


Figure 26. Legal harvest of black bears in hunt areas 23, 25, 26, and 27 of Absaroka BMU, 1994-2018.

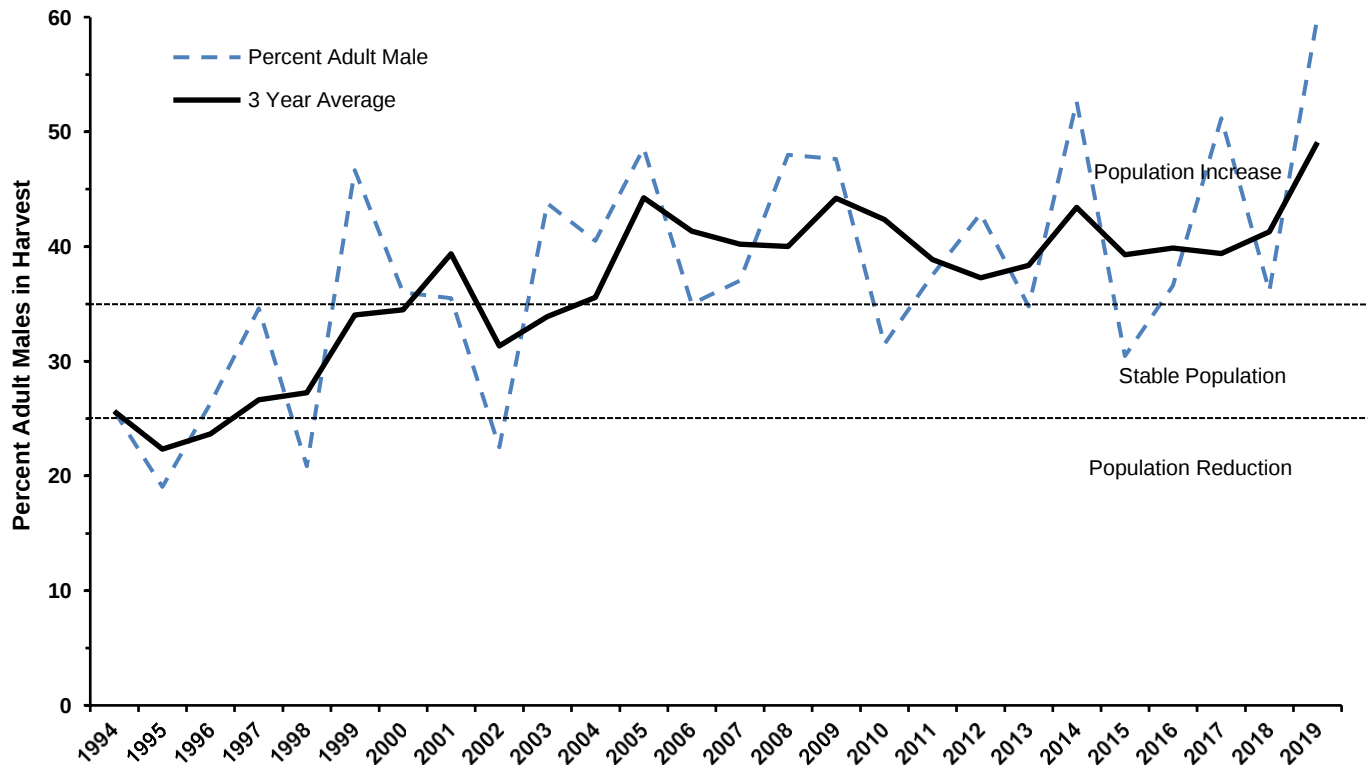


Figure 27. Percent adult males in the total legal black bear harvest in hunt areas 23, 25, 26, and 27 of Absaroka BMU, 1994-spring 2019.

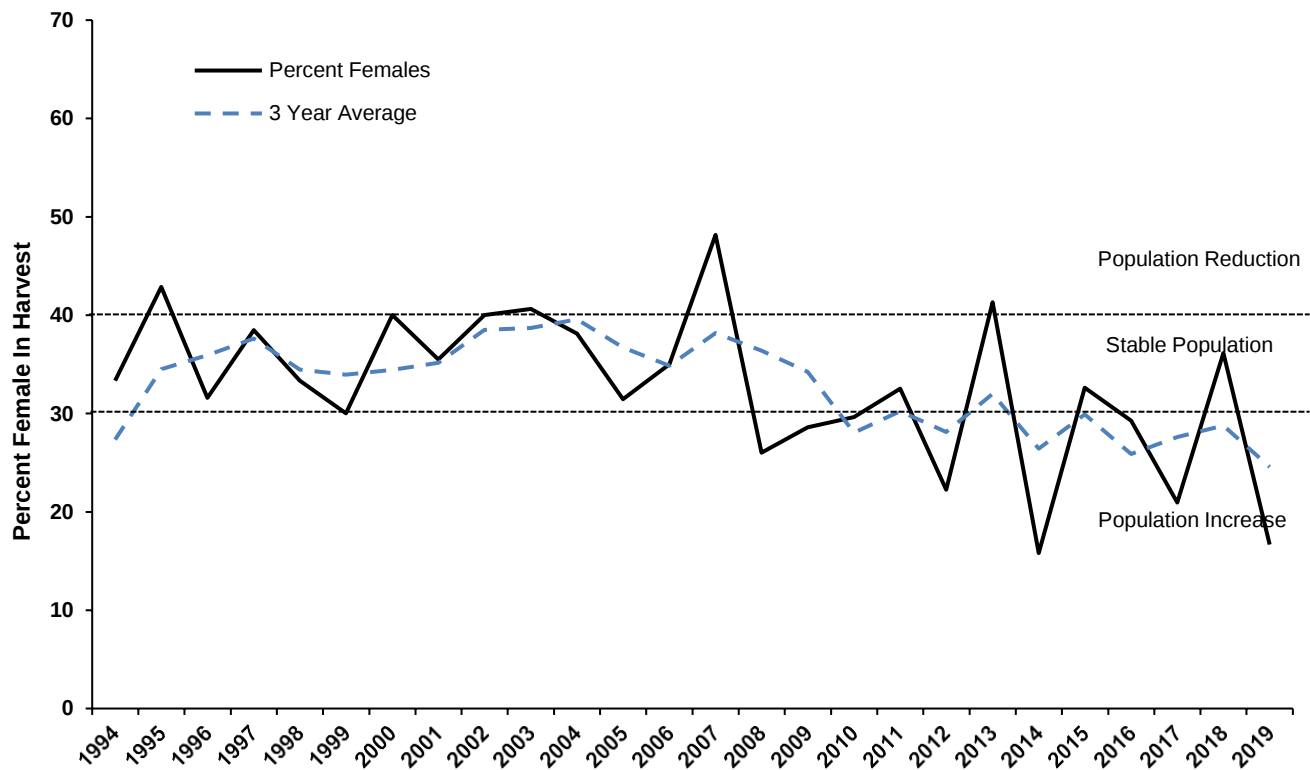


Figure 28. Percent females of the total legal black bear harvest in hunt areas 23, 25, 26, and 27 of Absaroka BMU, 1994-spring 2019.

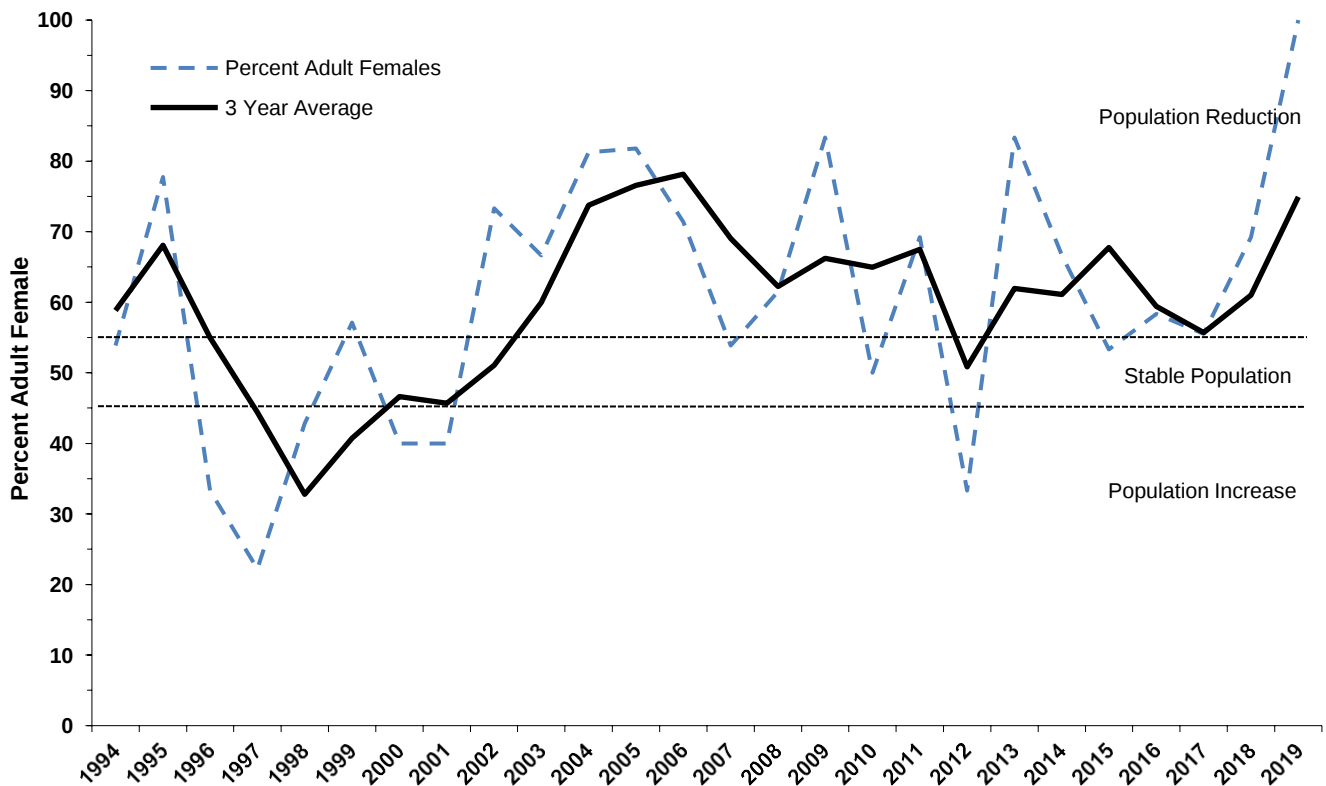


Figure 29. Percent adult females of the total female legal harvest in hunt areas 23, 25, 26, and 27 of Absaroka BMU, 1994-spring 2019.

BIGHORNS BEAR MANAGEMENT UNIT (301)

2019 Black Bear Mortality

The fall female mortality limit for hunt areas 1 and 2 was increased to 6 for the 2014-2016 season cycle and remained at that level for 2017-2019. All other mortality limits for the Bighorns BMU remained unchanged for this period, as well (Table 7). Total mortalities and legal black bear harvest in BMU 301 were slightly higher than the previous season cycle (Figures 30 and 31). The percentage of adult males in the harvest remains low, as it has since the mid-1990's (Figure 32). The percent of females in the harvest and adults in the female harvest have both increased in the past two season cycles and are now in the stable range (Table 8, Figures 33 and 34). Analyzed as groups of areas with a shared female mortality limit, hunt areas 1 and 2 (Figures 35-38) and hunt areas 3 and 4 (Figures 39-42) show trends similar to the overall BMU. While the percent of adults in the female harvest in hunt areas 3 and 4 has increased into the reduction range in the past two season cycles, it is quite variable due to low sample size (Figure 42). Harvest in areas 5 and 6 is too low to provide meaningful data for analysis (Table 7).

Harvest criteria suggest effects of hunter harvest in areas 1 and 2 remain relatively steady, while effects may be increasing slightly in areas 3 and 4. However, while an upward trend in the percent of females in the harvest is beginning to show increase in female segment of the harvest in hunt areas 1,2 and 3,4, the levels are still within the stable range.

Work began in the summer of 2019 to evaluate the black bear population in the northern end of the Bighorns BMU. Nine bears were radio collared and their GPS locations will be used to inform the spatial layout of DNA hair snares during the summer of 2021. The resulting density and abundance estimates will be used to assess the mortality rates for this BMU and inform future management.

Table 7. Bighorns BMU female mortality limits, harvest (legal/illegal harvest) by sex and season, and season closure dates for the 2017- 2019 black bear hunting seasons. Yellow cells indicate season closure prior to the closing date listed in regulation (Appendix I) after reaching the female mortality limit.

			Female Mortality Limit		Harvest				Season Closure Dates	
YEAR	MGMT UNIT	HUNT AREA	Spring	Fall	Spring		Fall		Spring	Fall
2017	BIGHORNS	1, 2	8	6	25	8	10	7	5/30/17	9/5/17
		3, 4	6	4	11	6	11	4	6/2/17	9/5/17
		5, 6	2	2	0	0	2	3	6/15/17	11/15/17
2018	BIGHORNS	1, 2	8	6	11	9	9	7	5/31/18	9/3/18
		3, 4	6	4	20	5	6	3	6/15/18	10/31/18
		5, 6	2	2	1	1	1	1	6/15/18	11/15/18
2019	BIGHORNS	1, 2	8	6	16	9	10	8	6/10/19	9/3/19
		3, 4	6	4	6	6	8	5	6/6/19	9/27/19
		5, 6	2	2	1	0	NA	NA	6/15/19	NA

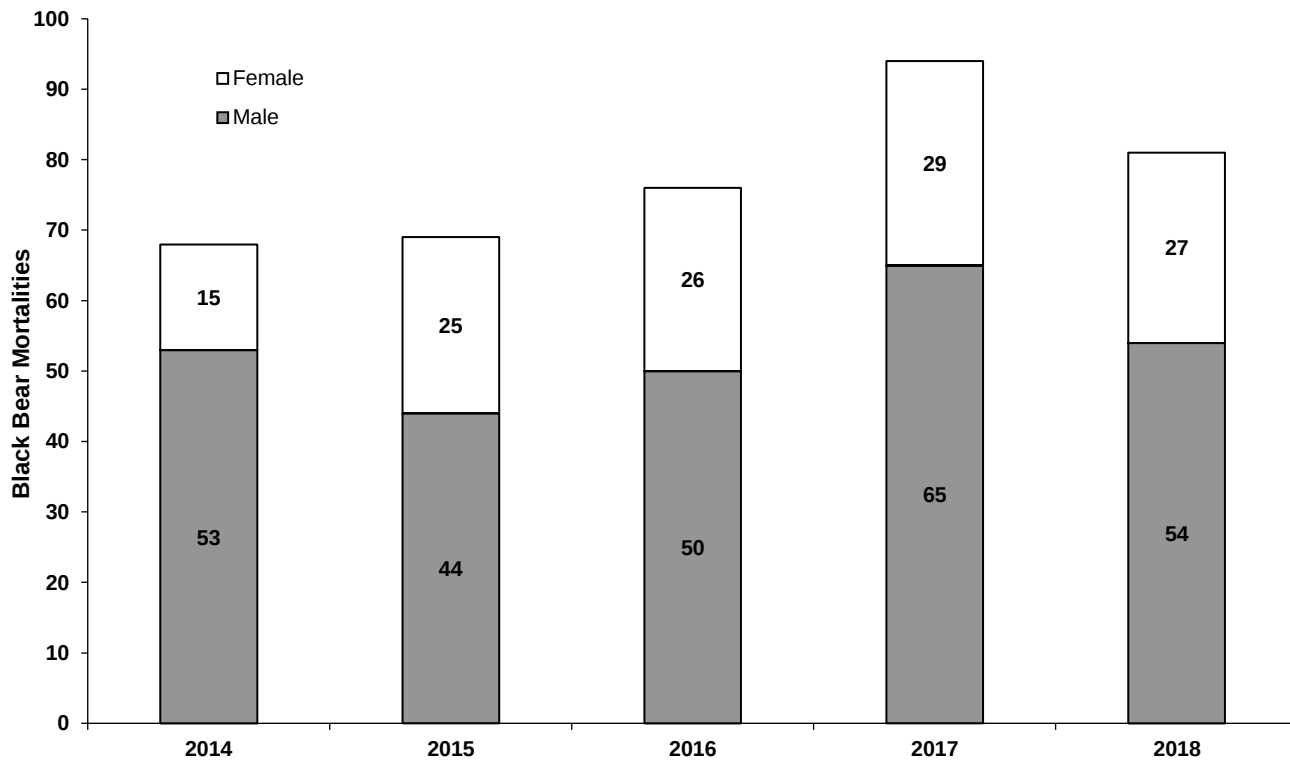


Figure 30. Number of black bear mortalities of all causes in Bighorns BMU by sex, 2014-2018.

Table 8. Harvest criteria for Bighorns BMU legal black bear harvest, 2017-spring 2019. Criteria are presented by objective as 3-year averages of percent adult males in the total harvest, percent females in the total harvest, and percent adult females in the female harvest.

Year	Objective	Harvest Criteria		
		% Adult ^a Males in Total Harvest	% Females in Total Harvest	% Adult ^a Females in Female Harvest
	Population Reduction	< 25%	> 40%	> 55%
	Stable Population	25 – 35%	30 – 40%	45 – 55%
	Population Increase	> 35%	< 30%	< 45%
2017-spring 2019		19.7	35.9	50.5

^a Adults classified as males and females ≥ 5 years of age based on tooth cementum annuli.

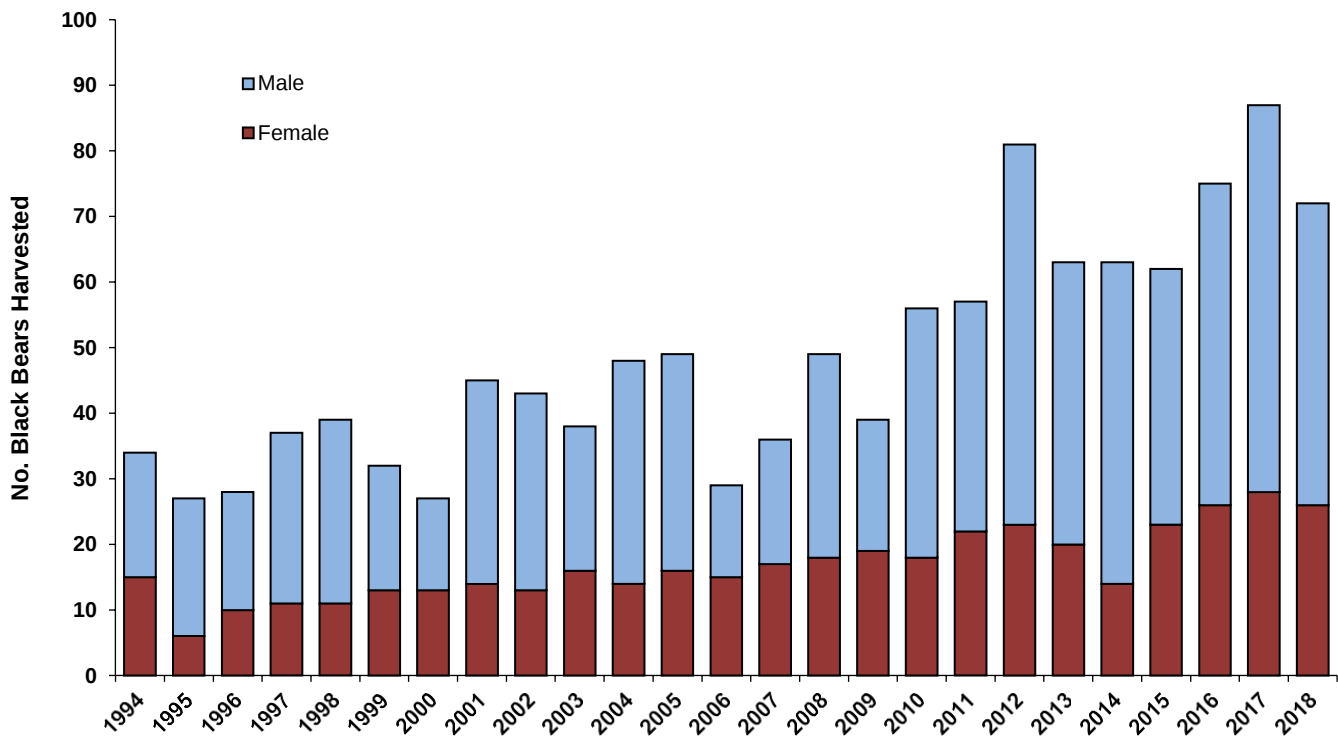


Figure 31. Legal harvest of black bears in Bighorns BMU, 1994-2018.

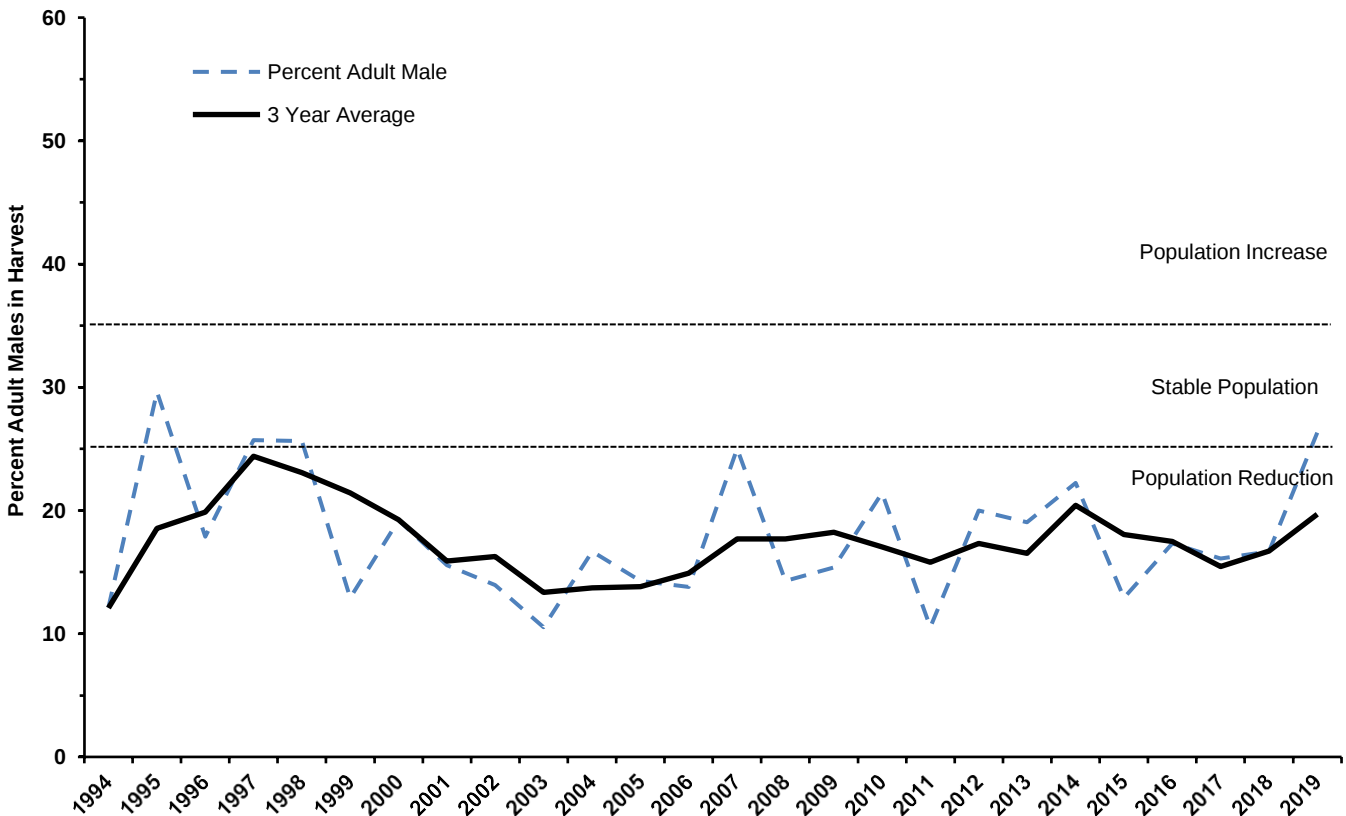


Figure 32. Percent adult males in the total legal black bear harvest in Bighorns BMU, 1994-spring 2019.

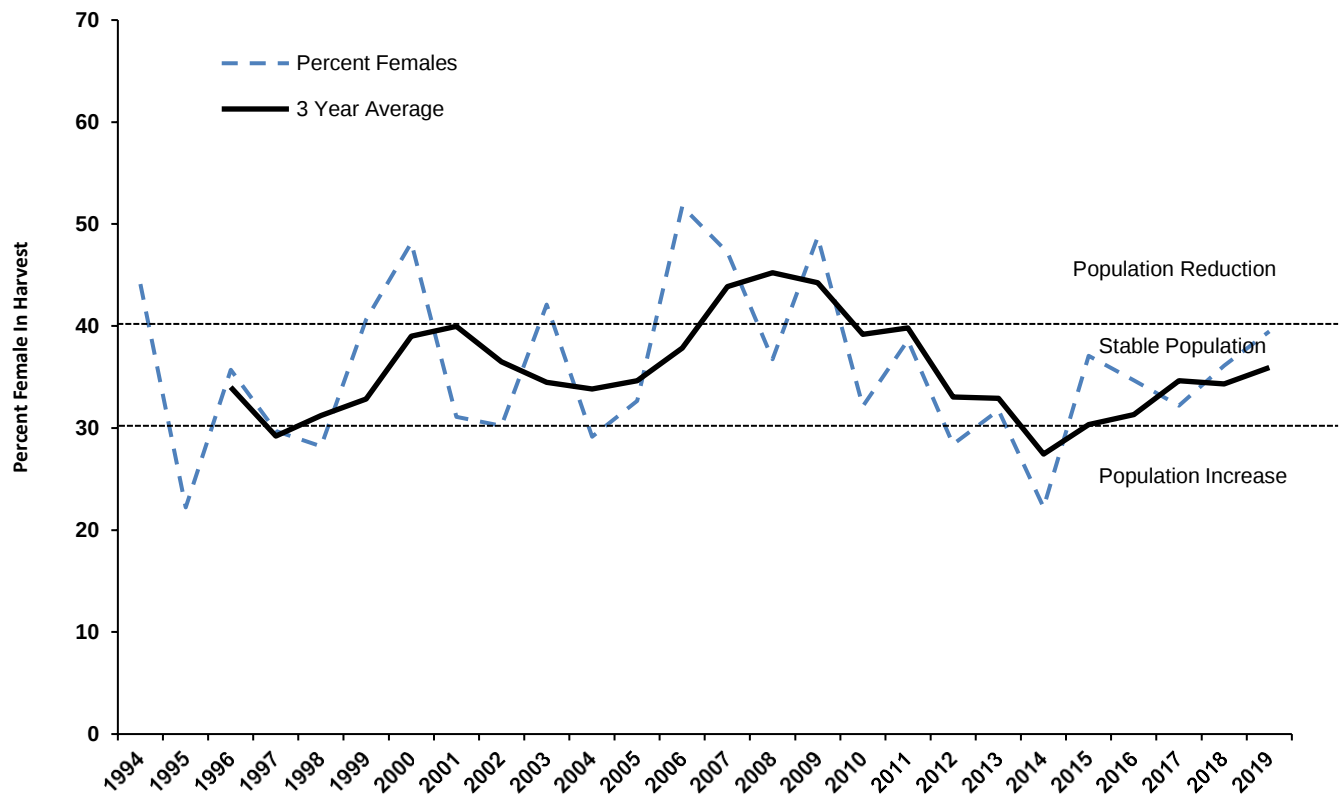


Figure 33. Percent females of the total legal black bear harvest in Bighorns BMU, 1994-2019.

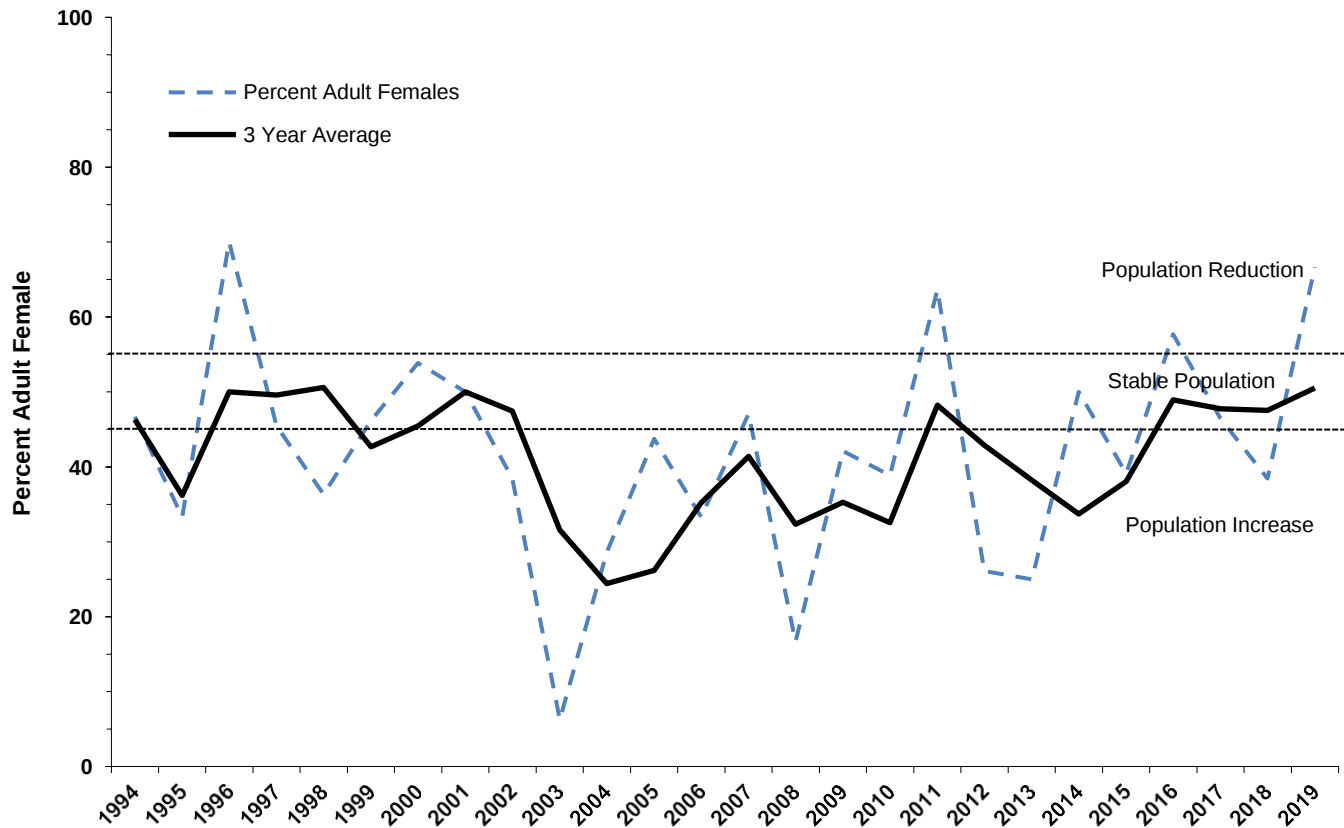


Figure 34. Percent adult females of the total female legal harvest in Bighorns BMU, 1994-spring 2019.

Harvest Criteria by Harvest Limit – Hunt Areas 1 and 2

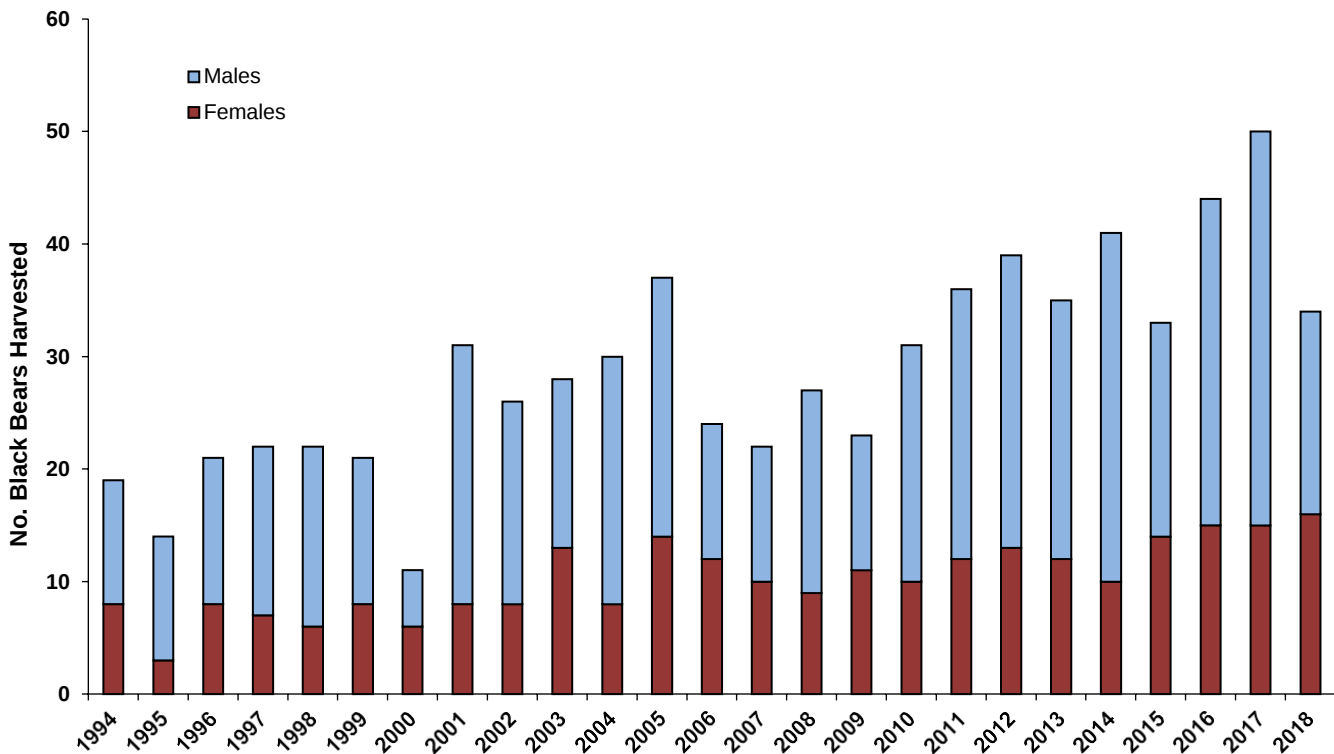


Figure 35. Legal harvest of black bears in hunt areas 1 and 2 of Bighorns BMU, 1994-2018.

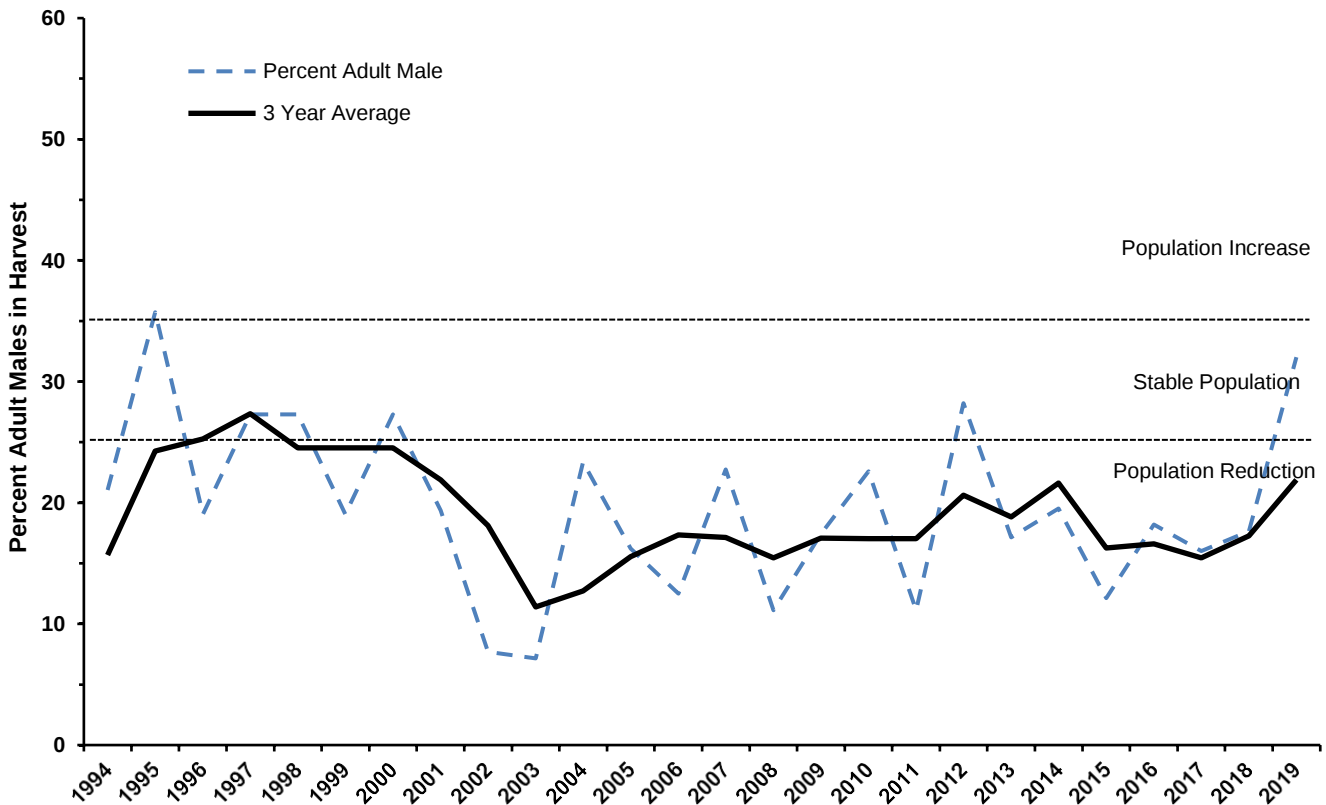


Figure 36. Percent adult males in the total legal black bear harvest in hunt areas 1 and 2 of Bighorns BMU, 1994-spring 2019.

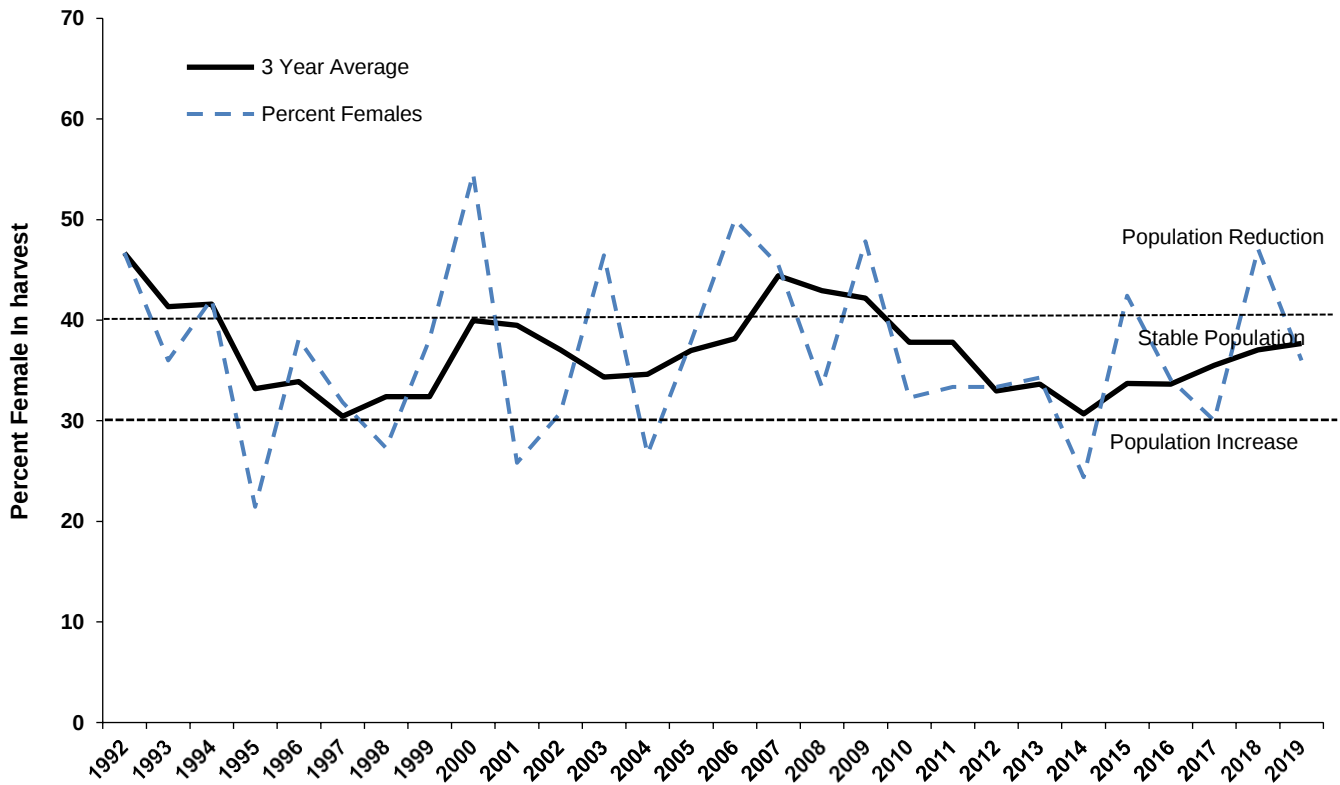


Figure 37. Percent females of the total legal black bear harvest in hunt areas 1 and 2 of Bighorns BMU, 1994-spring 2019.

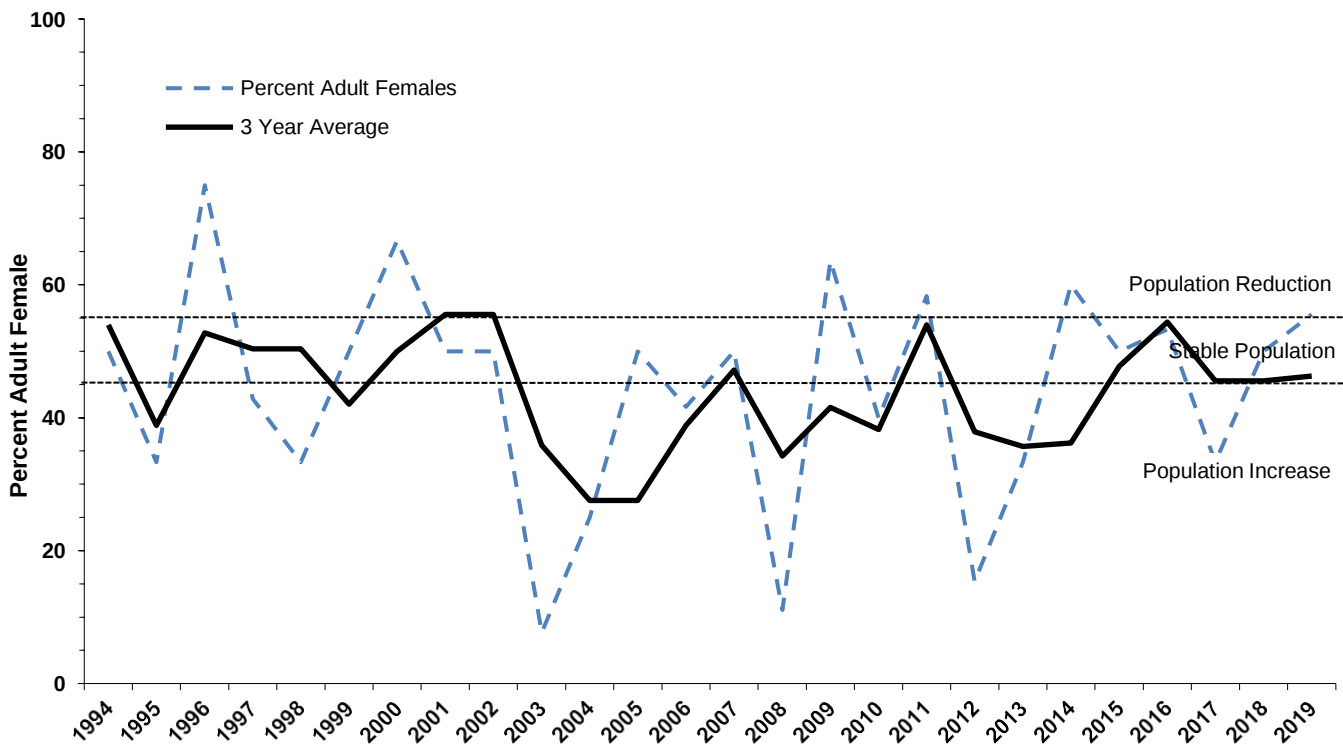


Figure 38. Percent adult females of the total female legal harvest in hunt areas 1 and 2 of Bighorns BMU, 1994-spring 2019.

Harvest Criteria by Harvest Limit – Hunt Areas 3 and 4

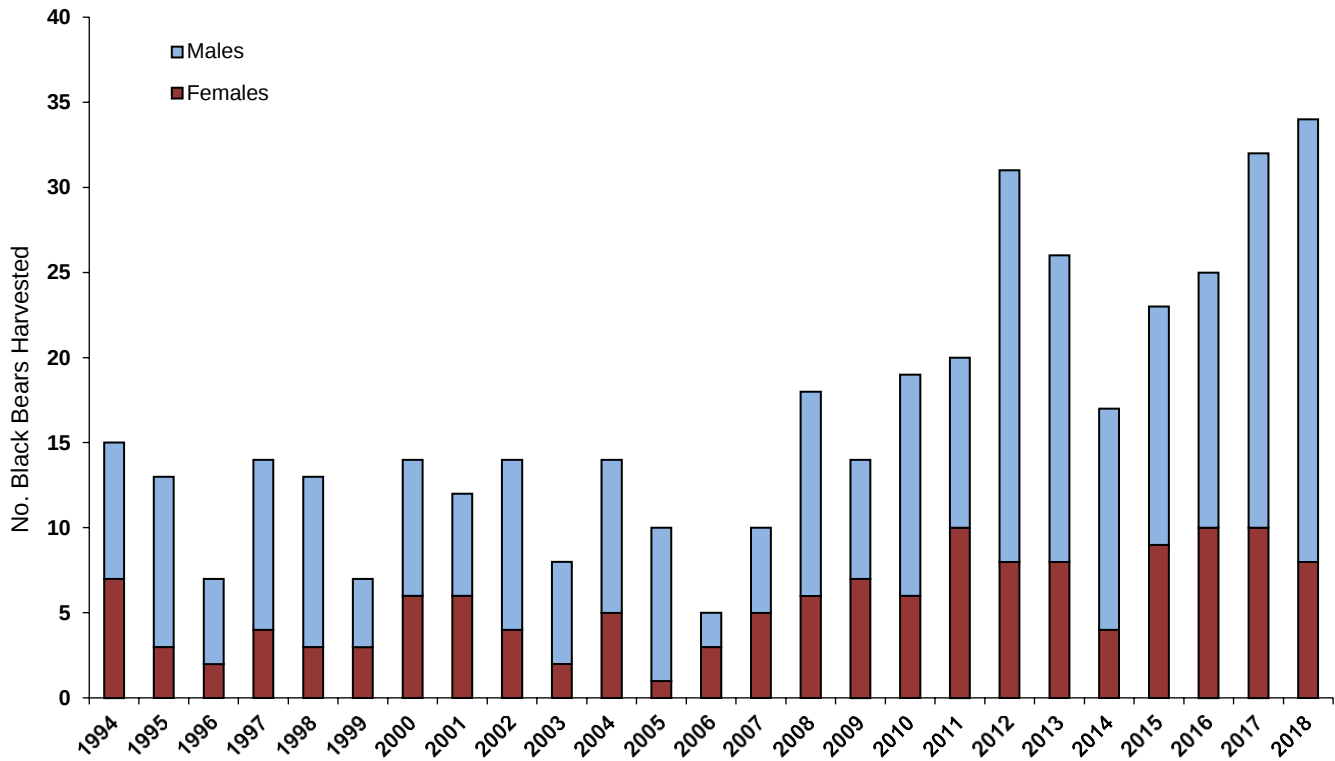


Figure 39. Legal harvest of black bears in hunt areas 3 and 4 of Bighorns BMU, 1994-2018.

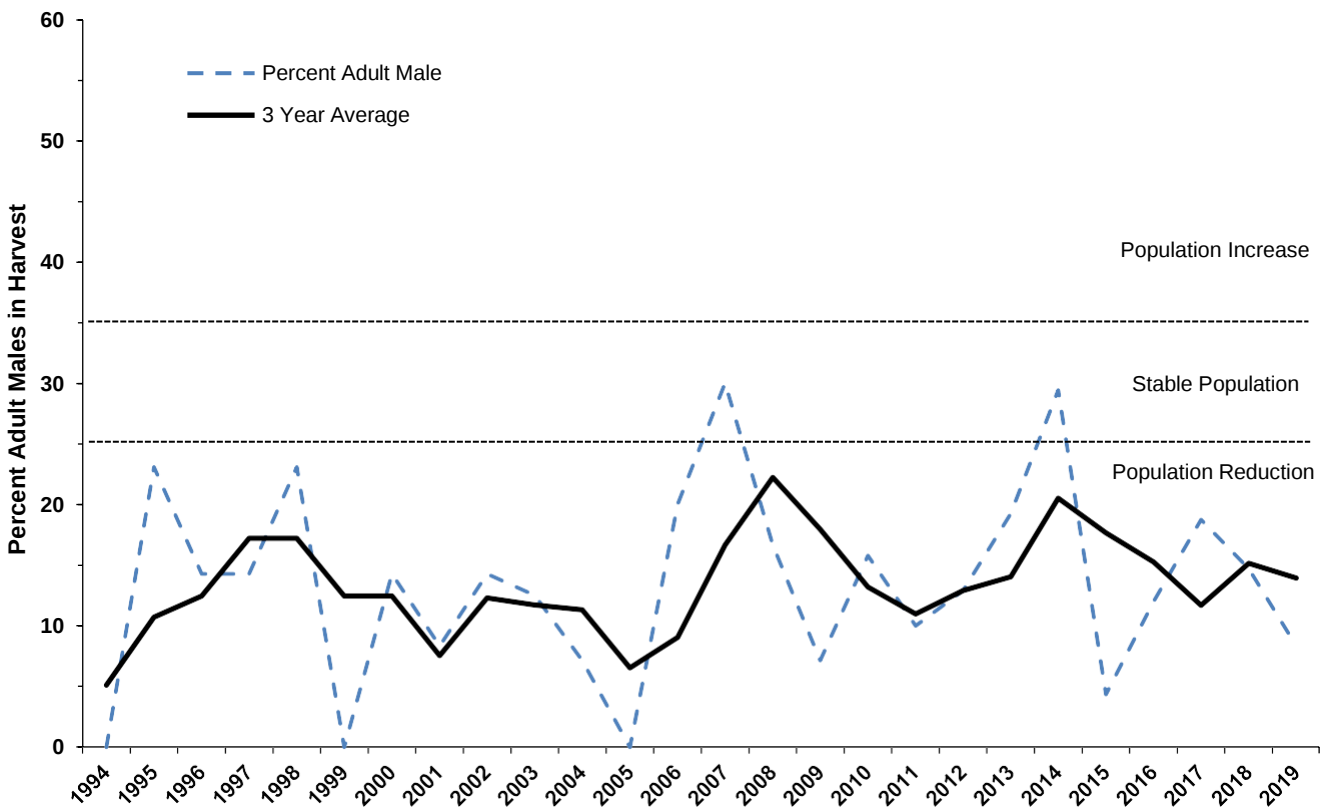


Figure 40. Percent adult males in the total legal black bear harvest in hunt areas 3 and 4 of Bighorns BMU, 1994-spring 2019.

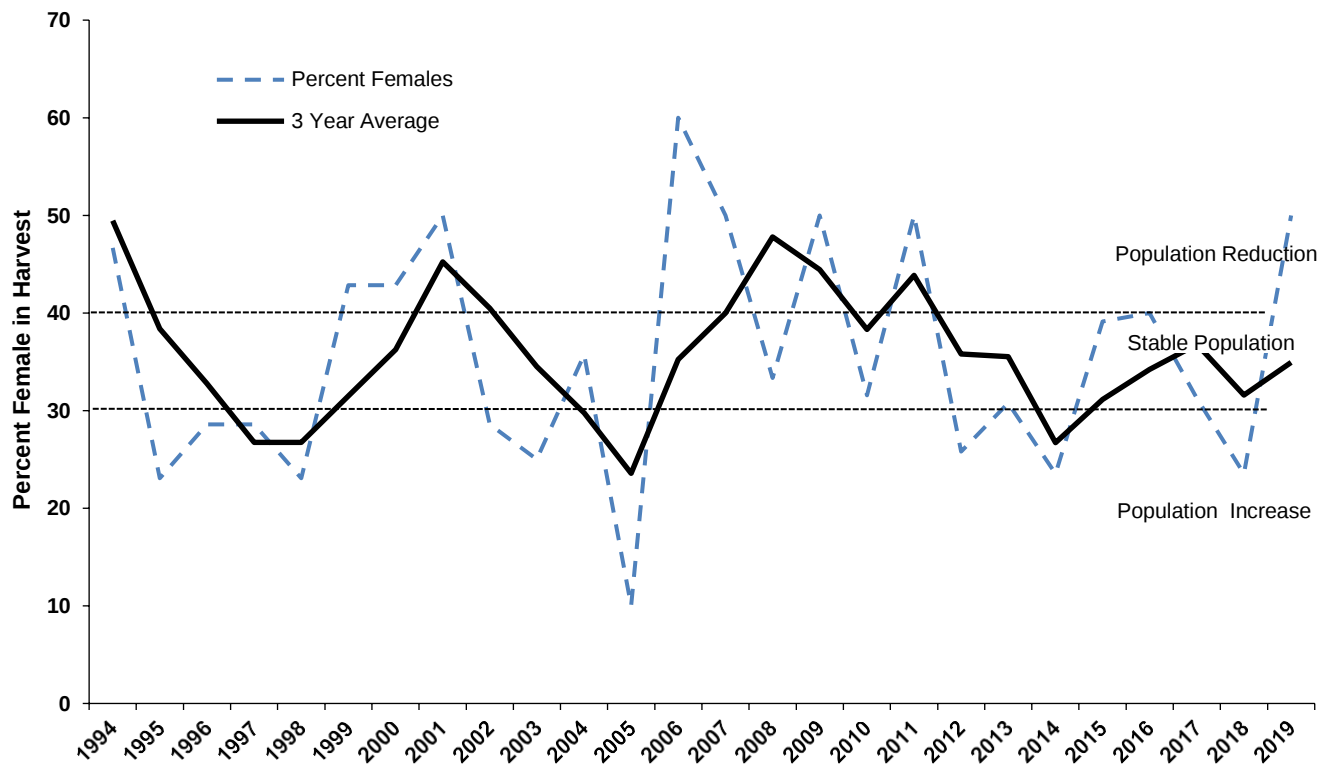


Figure 41. Percent females of the total legal black bear harvest in hunt areas 3 and 4 of Bighorns BMU, 1994-spring 2019.

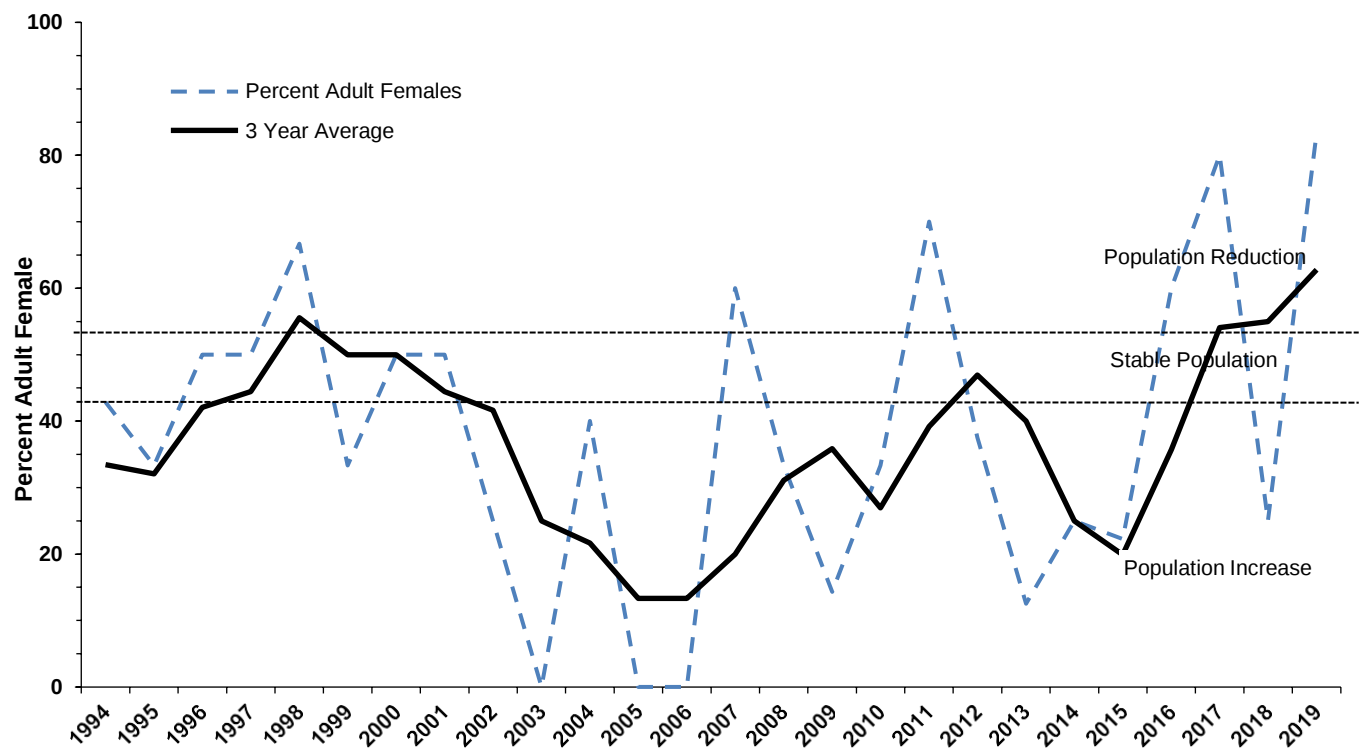


Figure 42. Percent adult females of the total female legal harvest in hunt areas 3 and 4 of Bighorns BMU, 1994-spring 2019.

SIERRA MADRES BEAR MANAGEMENT UNIT (401)

2019 Black Bear Mortality

The female mortality limit for the Sierra Madres BMU remained unchanged for the 2017-2019 harvest cycle (Table 9). The overall mortalities and legal harvest for this cycle were similar to those of 2014-2016, but have increased steadily since 2010 (Figures 43 and 44). The proportion of adult males in the harvest continued a downward trend (Figure 45), a pattern that has been evident in the 3-year average since 2009. However, the percent of females in the harvest and adults in the female harvest have decreased slightly in the past few years, but may be due to small sample size (Figure 47).

Work to assess the population status of the Sierra Madres black bear population using DNA hair snares took place in the summers of 2017 and 2018. Results were analyzed and provided in a separate Department report *Black Bear Population Monitoring in the Sierra Madres, Wyoming Using Clustered Hair Snares and Spatially-Explicit Capture/Recapture Models*. This report estimates mortality rates for the Sierra Madres ranging from 8% for females to 28% for males and 16% for both sexes combined. Sustainable mortality for this population is estimated at approximately 21-22% for both sexes. The report and analysis of harvest data suggest the Sierra Madres black bear population is experiencing moderate harvest pressure, resulting in a low proportion of adult males in the harvest. However, a relatively low mortality rate for females suggests a moderate increase in the female harvest limit would be justified if desired by public and regional input.

Table 9. Sierra Madres BMU female mortality limits, harvest (legal/illegal harvest) by sex and season, and season closure dates for the 2017-spring 2019 black bear hunting seasons. Yellow cells indicate season closure prior to the closing date listed in regulation (Appendix I) after reaching the female mortality limit.

			Female Mortality Limit		Harvest				Season Closure Dates	
					Spring		Fall			
YEAR	MGMT UNIT	HUNT AREA	Spring	Fall	M	F	M	F	Spring	Fall
2017	SIERRA MADRES	9	8	6	30	9	9	5	5/25/17	10/16/17
2018	SIERRA MADRES	9	8	6	23	8	8	6	6/7/18	9/10/18
2019	SIERRA MADRES	9	8	6	30	8	NA	NA	6/5/19	NA

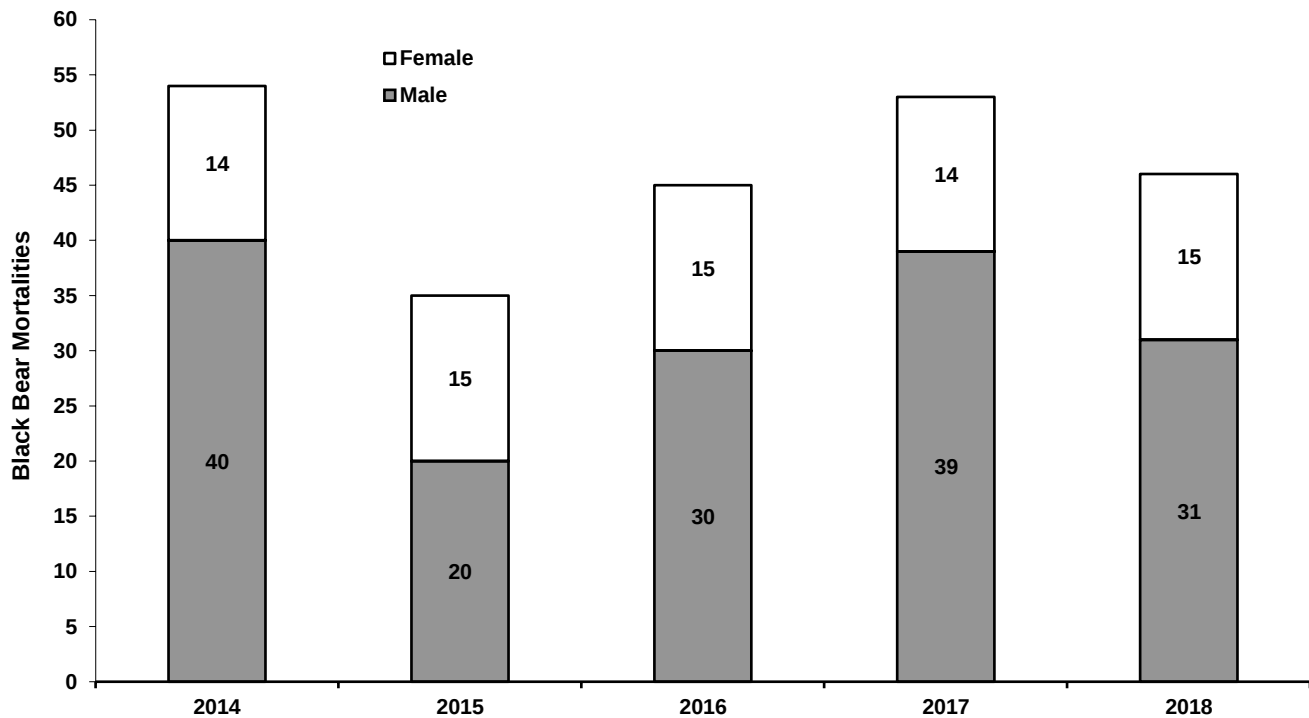


Figure 43. Number of black bear mortalities of all causes in Sierra Madres BMU by sex, 2014-2018.

Table 10. Harvest criteria for Sierra Madres BMU legal black bear harvest, 2017-spring 2019. Criteria are presented by objective as 3-year averages of percent adult males in the total harvest, percent females in the total harvest, and percent adult females in the female harvest.

Year	Objective	Harvest Criteria		
		% Adult ^a Males in Total Harvest	% Females in Total Harvest	% Adult ^a Females in Female Harvest
	Population Reduction	< 25%	> 40%	> 55%
	Stable Population	25 – 35%	30 – 40%	45 – 55%
	Population Increase	> 35%	< 30%	< 45%
2017-spring 2019		12.0	26.2	32.1

^a Adults classified as males and females ≥ 5 years of age based on tooth cementum annuli.

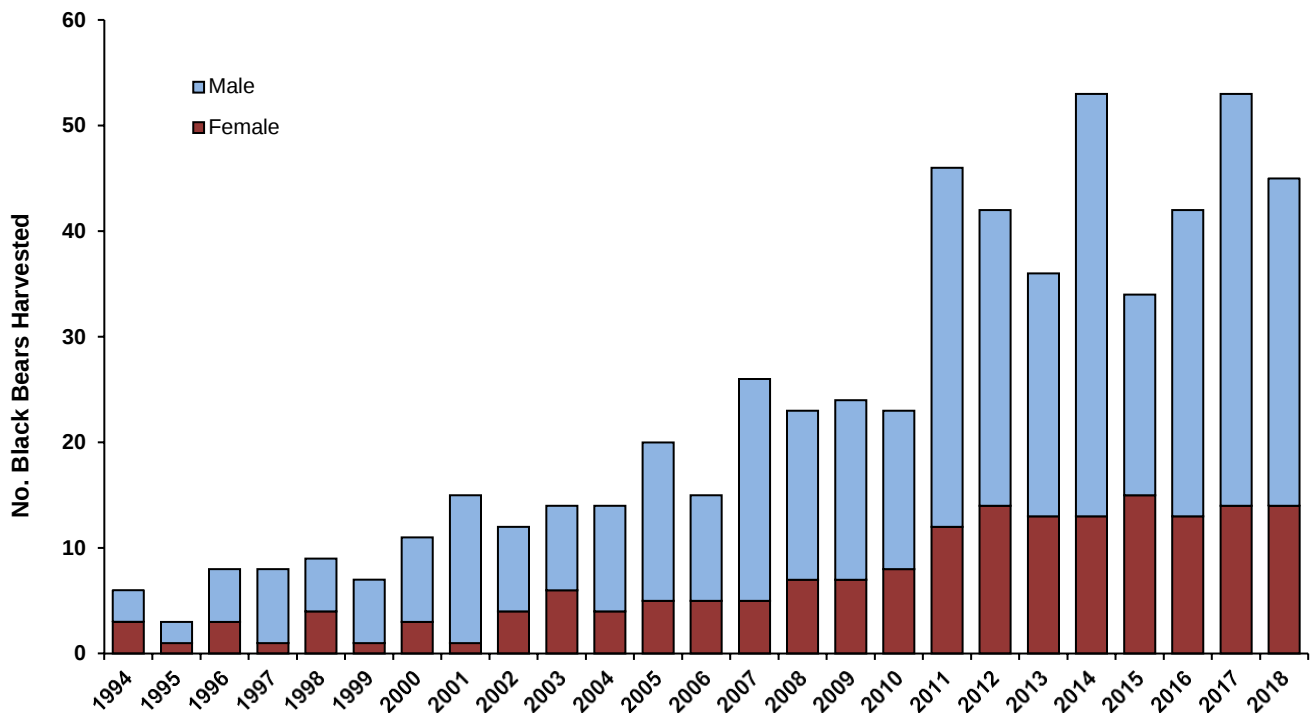


Figure 44. Legal harvest of black bears in Sierra Madres BMU, 1994-2018.

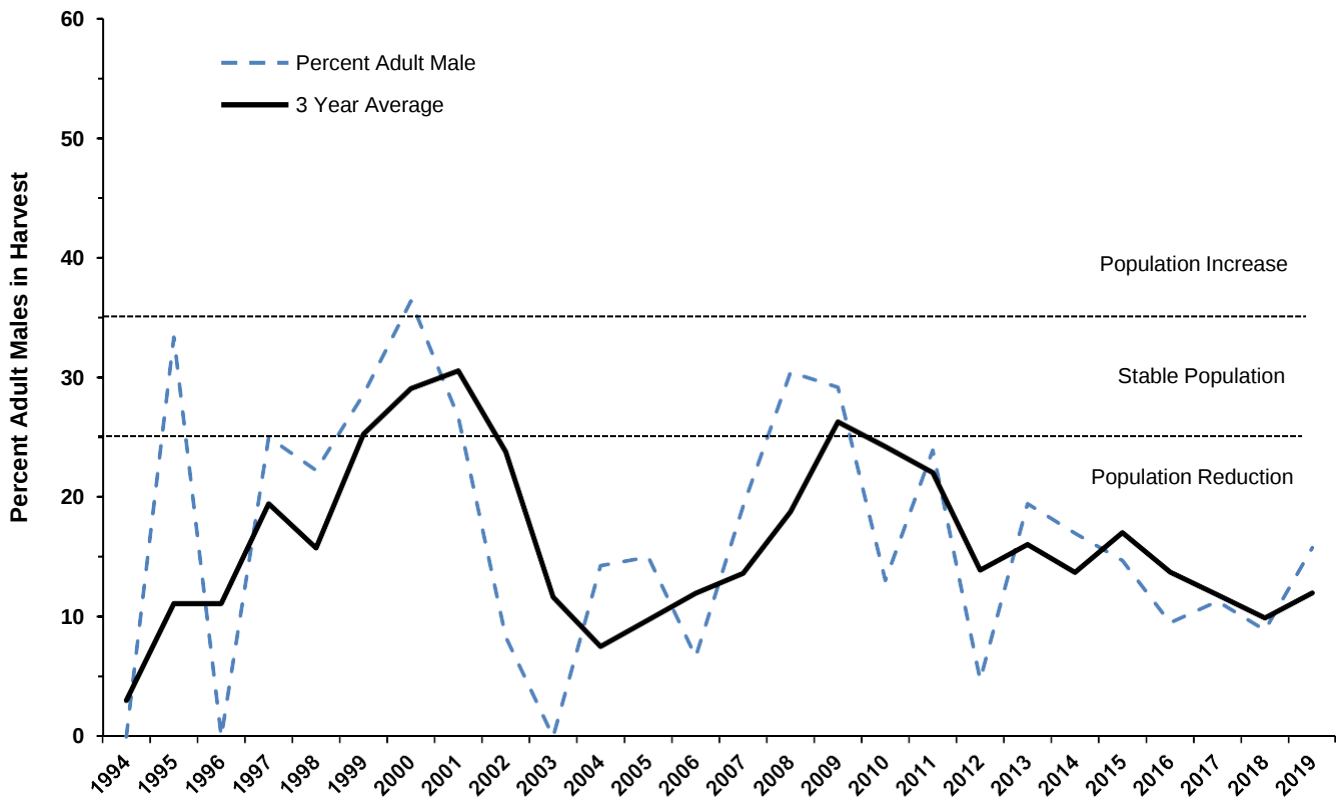


Figure 45. Percent adult males in the total legal black bear harvest in Sierra Madres BMU, 1994-spring 2019.

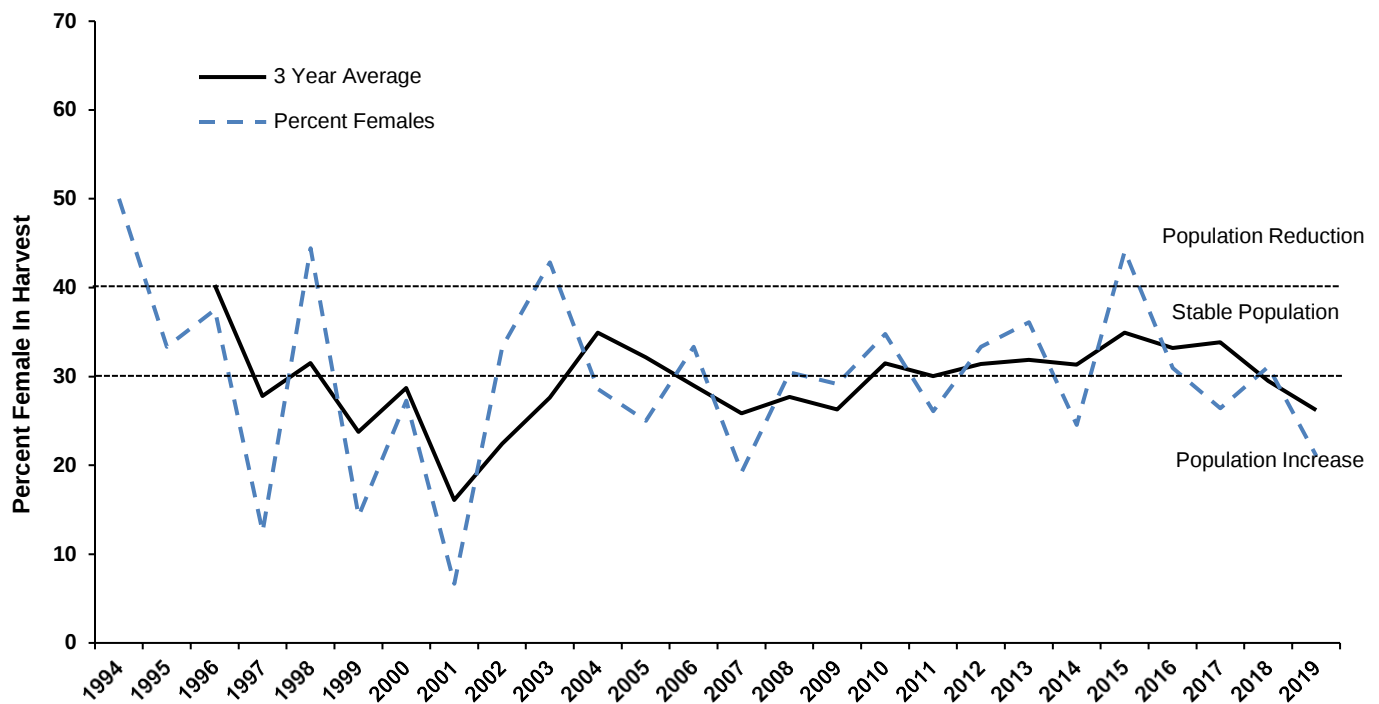


Figure 46. Percent females of the total legal black bear harvest in Sierra Madres BMU, 1994-spring 2019.

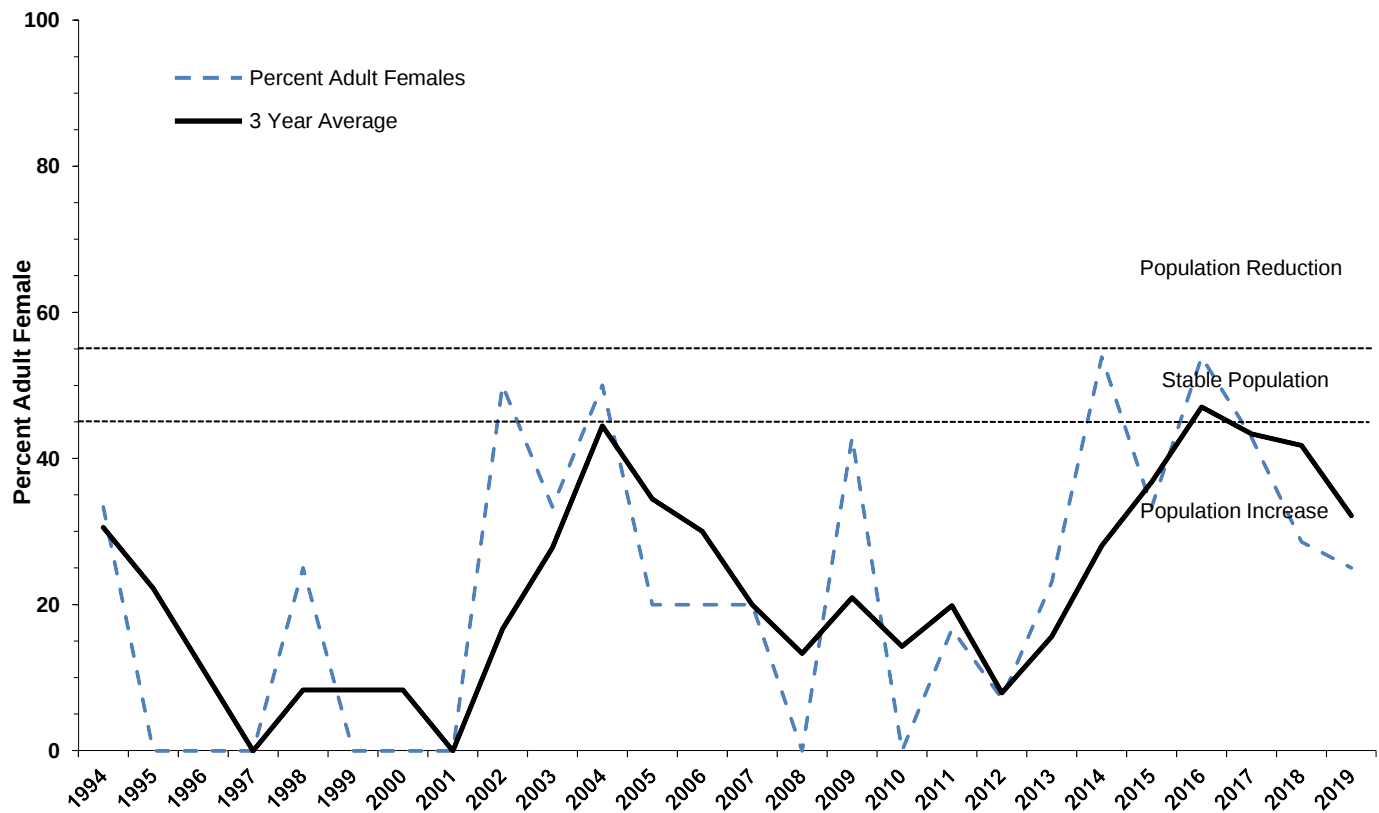


Figure 47. Percent adult females of the total female legal harvest in Sierra Madres BMU, 1994-spring 2019.

UINTA BEAR MANAGEMENT UNIT (402)

2019 Black Bear Mortality

For the 2014-2016 harvest cycle, a new hunt area (Hunt Area 12) was created from the eastern portion of BMU 402 (Figure 1). A mortality limit of 2 females (1 spring, 1 fall) was allocated to this area. Hunt area boundaries for this BMU remained unchanged for the 2017-2019 cycle. The female mortality limit for the portion of BMU 402 west of Flaming Gorge Reservoir remained at 4 females (2 spring, 2 fall) for the 2017-2019 seasons. Overall mortalities increased in this BMU due to the introduction of hunt area 12 (Table 11, Figure 48). Most harvest for this BMU took place in the spring season and the female mortality limit for area 12 was reached in early June 2018 and 2019 (Table 11). In addition to harvest mortality, there were 2 damage mortalities in 2018. Small sample sizes prevent interpretation of harvest data and their relationship to the harvest criteria for BMU 402. However, this relatively low level of harvest is unlikely to be adversely affecting the black bear population in this BMU. It is advisable to monitor the harvest in area 12 for future changes in levels and composition since the relatively small amount of black bear habitat in this area could make the black bear population susceptible to harvest impacts.

Table 11. Uinta BMU female mortality limits, harvest (legal/illegal harvest) by sex and season, and season closure dates for the 2017-spring 2019 black bear hunting seasons. Yellow cells indicate season closure prior to the closing date listed in regulation (Appendix I) after reaching the female mortality limit.

			Female Mortality Limit		Harvest				Season Closure Dates	
					Spring		Fall			
YEAR	MGMT UNIT	HUNT AREA	Spring	Fall	M	F	M	F	Spring	Fall
2017	UINTA	10	2	2	3	0	3	0	6/15/17	10/31/17
		12	1	1	4	0	1	1	6/15/17	10/31/17
2018	UINTA	10	2	2	4	1	1	0	6/15/18	10/31/18
		12	1	1	2	1	0	0	6/1/18	10/31/18
2019	UINTA	10	2	2	3	1	NA	NA	6/15/19	NA
		12	1	1	2	1	NA	NA	6/7/19	NA

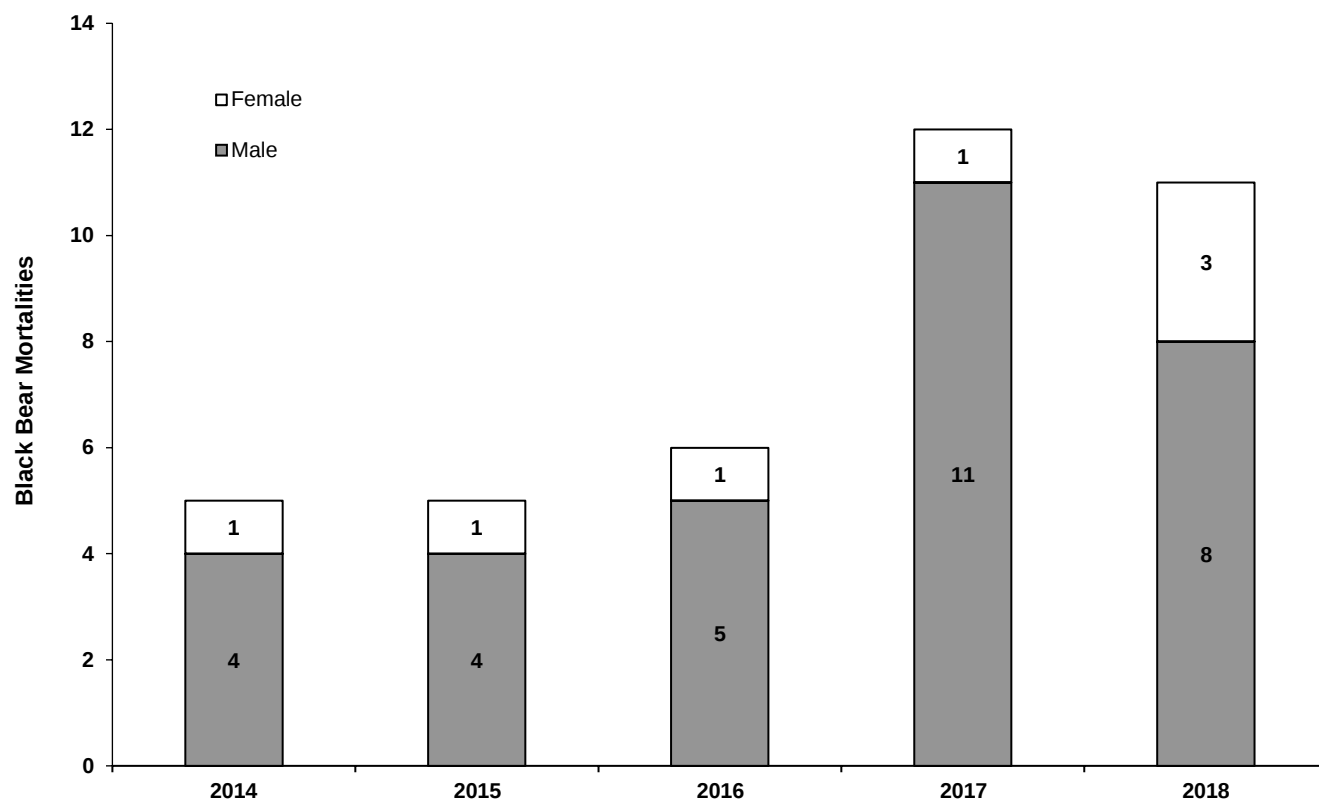


Figure 48. Number of black bear mortalities of all causes in Uinta BMU by sex, 2014-2018.

LARAMIE PEAK BEAR MANAGEMENT UNIT (501)

2019 Black Bear Mortality

The fall female mortality limit for hunt area 7 was increased by 2 for the 2017-2019 harvest cycle, while the female mortality limits for hunt area 33 remained unchanged (Table 12). Despite this increase in area 7, black bear mortalities and harvest in BMU 501 were similar to levels those seen in 2014-2016 (Figures 48 and 49). The percent of adult males in the harvest has remained steady at around 20% after a decline beginning in the early 2000s (Figure 51). The percentage of females in the harvest continues to fluctuate around the stable range (Table 13, Figure 52). The proportion of adults in the female harvest has increased in recent years, but this may be due in large part to adults making up 5 of 5 females harvested in the spring of 2019 (Figure 53). Issues with small sample sizes are common with this statistic for this BMU. Because hunt area 7 makes up the majority of harvest for this BMU, separate analysis of hunt area 7 shows similar trends (Figures 54-57).

The long-term trend of the percent of adult males in the harvest, decreasing since 1998, suggests that the adult male segment of the population has been limited by harvest, but there has been less effect on females. Data suggest a fluctuating cycle of high and low harvests with varying proportions of males and females indicating possible reductions followed by recruitment of subadults, specifically males, which make up a slightly increasing proportion of the harvest.

Work will begin in the summer of 2020 to evaluate the black bear population in the Laramie Peak BMU with a trapping and radio collaring effort. These collar data will inform the spatial layout of DNA hair snares to be deployed during the summer of 2022. The resulting density and abundance estimates will be used to assess the mortality rates for this BMU and inform future management.

Table 12. Laramie Peak BMU female mortality limits, harvest (legal/illegal harvest) by sex and season, and season closure dates for the 2017-spring 2019 black bear hunting seasons. Yellow cells indicate season closure prior to the closing date listed in regulation (Appendix I) after reaching the female mortality limit.

			Female Mortality Limit		Harvest				Season Closure Dates	
					Spring		Fall			
YEAR	MGMT UNIT	HUNT AREA	Spring	Fall	M	F	M	F	Spring	Fall
2017	LARAMIE PEAK	7	4	6	5	4	10	6	5/25/17	9/30/17
		33	3	2	3	1	3	0	5/31/17	10/31/17
2018	LARAMIE PEAK	7	4	6	7	3	7	7	5/31/18	10/4/18
		33	3	2	0	0	4	0	5/31/18	10/31/18
2019	LARAMIE PEAK	7	4	6	5	1	NA	NA	5/31/19	NA
		33	3	2	0	1	NA	NA	5/31/19	NA

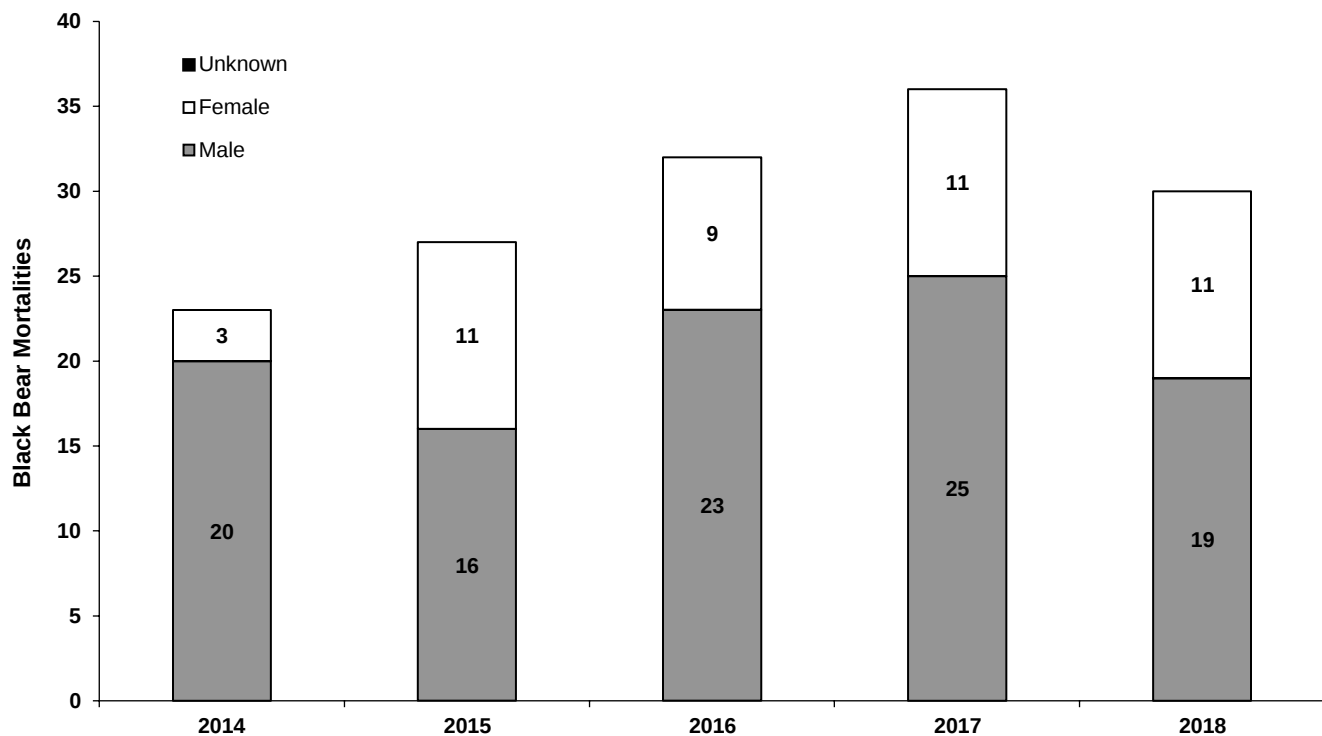


Figure 49. Number of black bear mortalities of all causes in Laramie Peak BMU by sex, 2014-2018.

Table 13. Harvest criteria for Laramie Peak BMU legal black bear harvest, 2017-spring 2019. Criteria are presented by objective as 3-year averages of percent adult males in the total harvest, percent females in the total harvest, and percent adult females in the female harvest.

Year	Objective	Harvest Criteria		
		% Adult ^a Males in Total Harvest	% Females in Total Harvest	% Adult ^a Females in Female Harvest
	Population Reduction	< 25%	> 40%	> 55%
	Stable Population	25 – 35%	30 – 40%	45 – 55%
	Population Increase	> 35%	< 30%	< 45%
2017-spring 2019		21.9	32.1	55.9

^a Adults classified as males and females ≥ 5 years of age based on tooth cementum annuli.

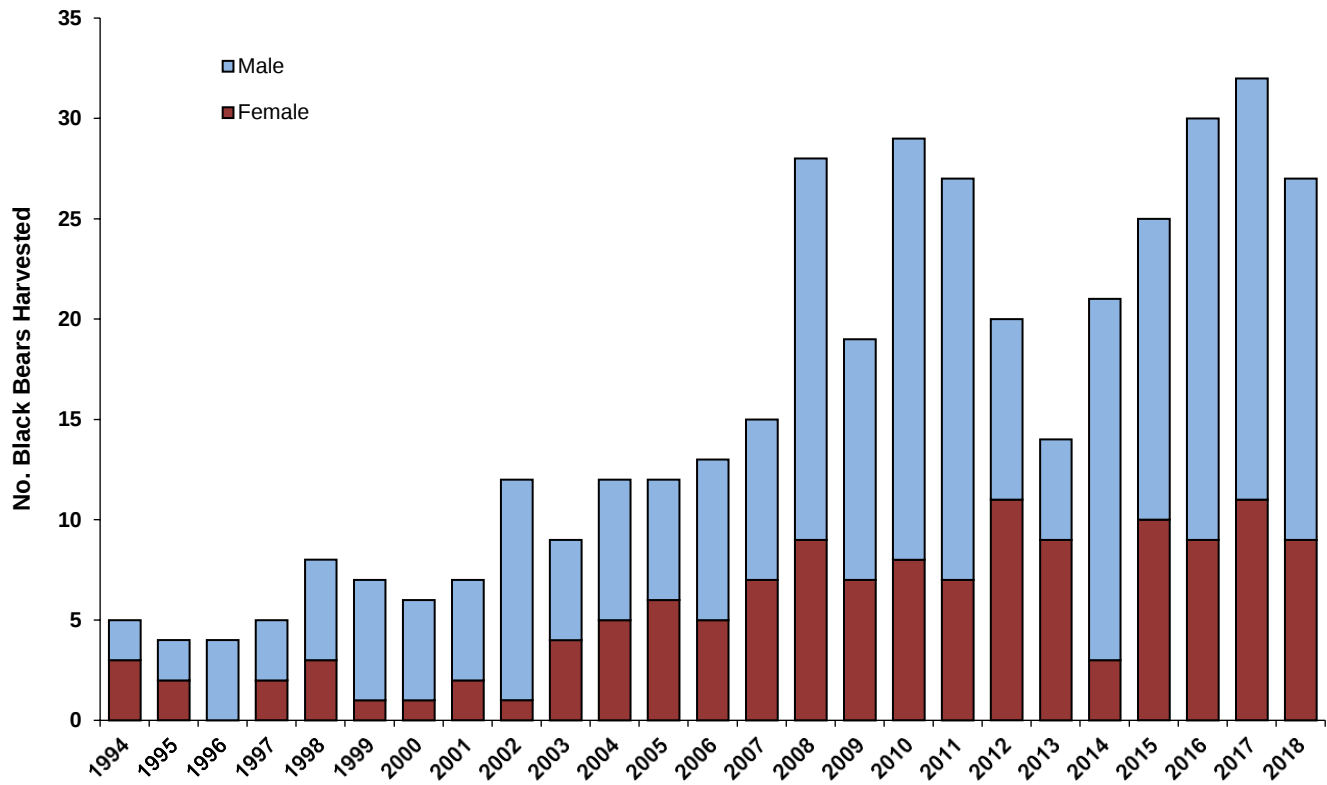


Figure 50. Legal harvest of black bears in Laramie Peak BMU, 1994-2018.

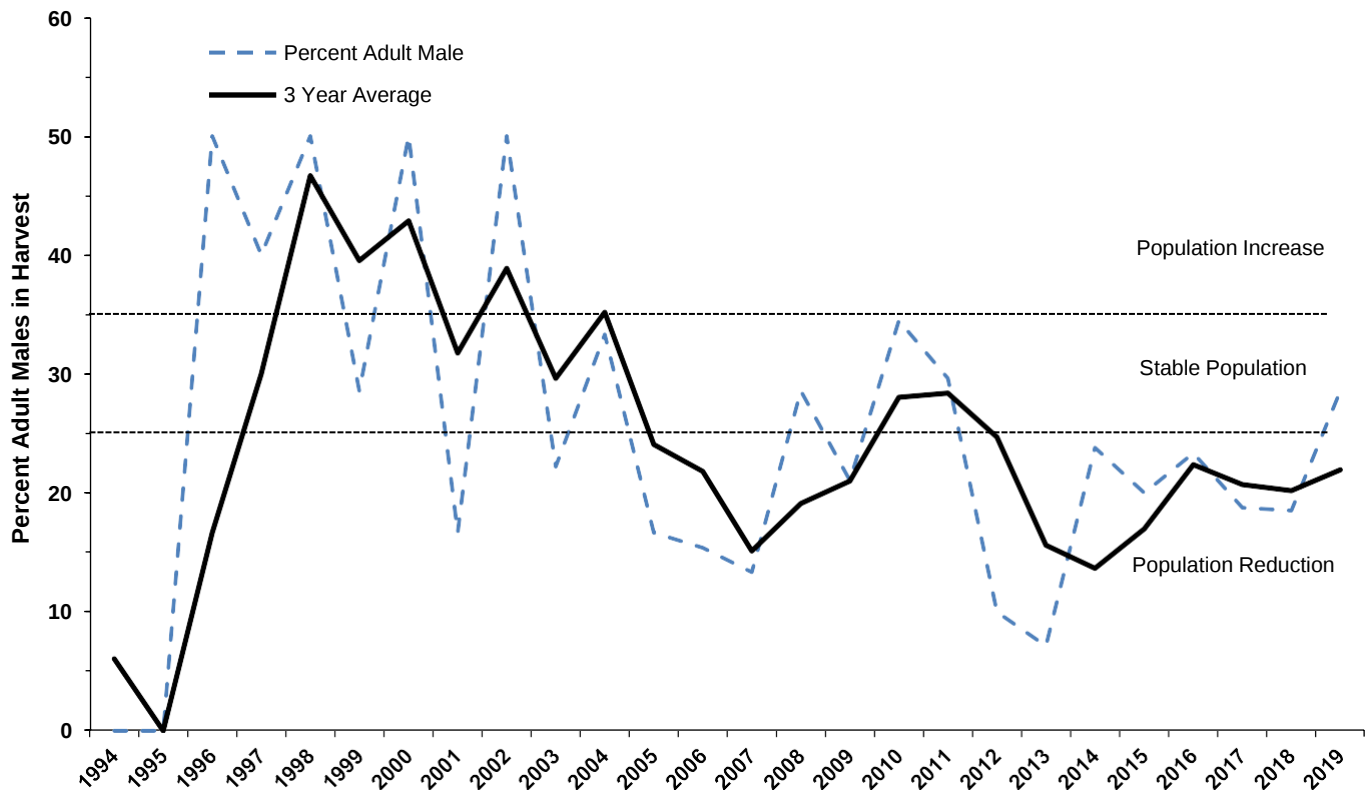


Figure 51. Percent adult males in the total legal black bear harvest in Laramie Peak BMU, 1994-spring 2019.

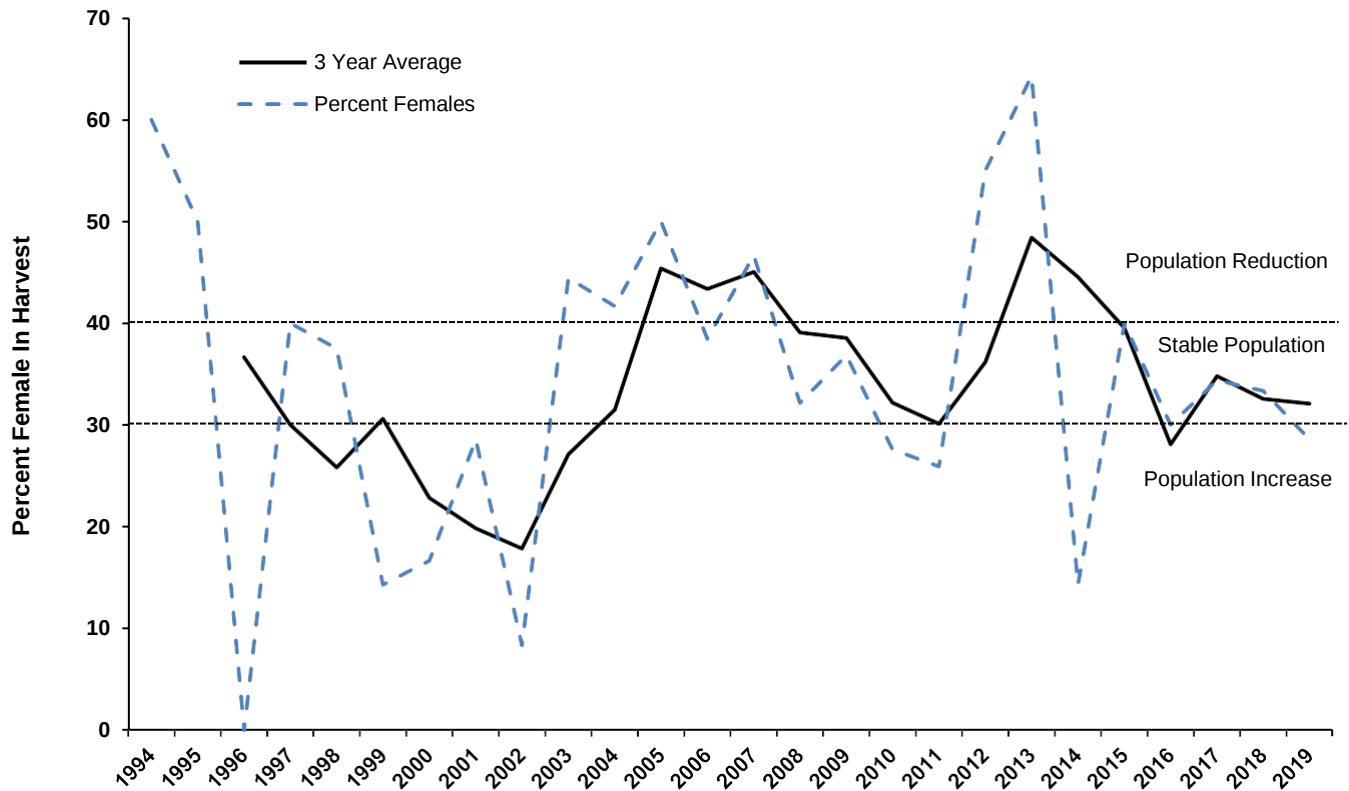


Figure 52. Percent females of the total legal black bear harvest in Laramie Peak BMU, 1994-spring 2019.

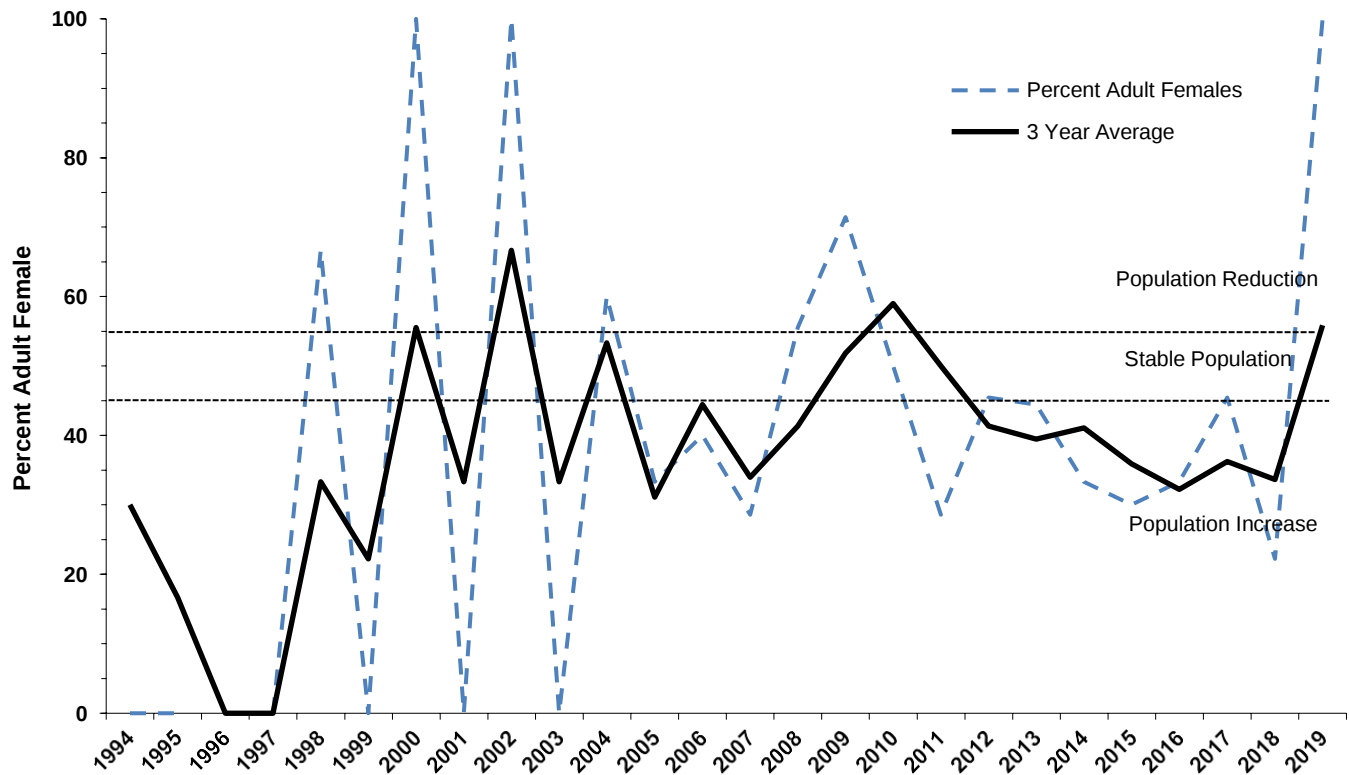


Figure 53. Percent adult females of the total female legal harvest in Laramie Peak BMU, 1994-spring 2019.

Harvest Criteria by Harvest Limit – Hunt Area 7

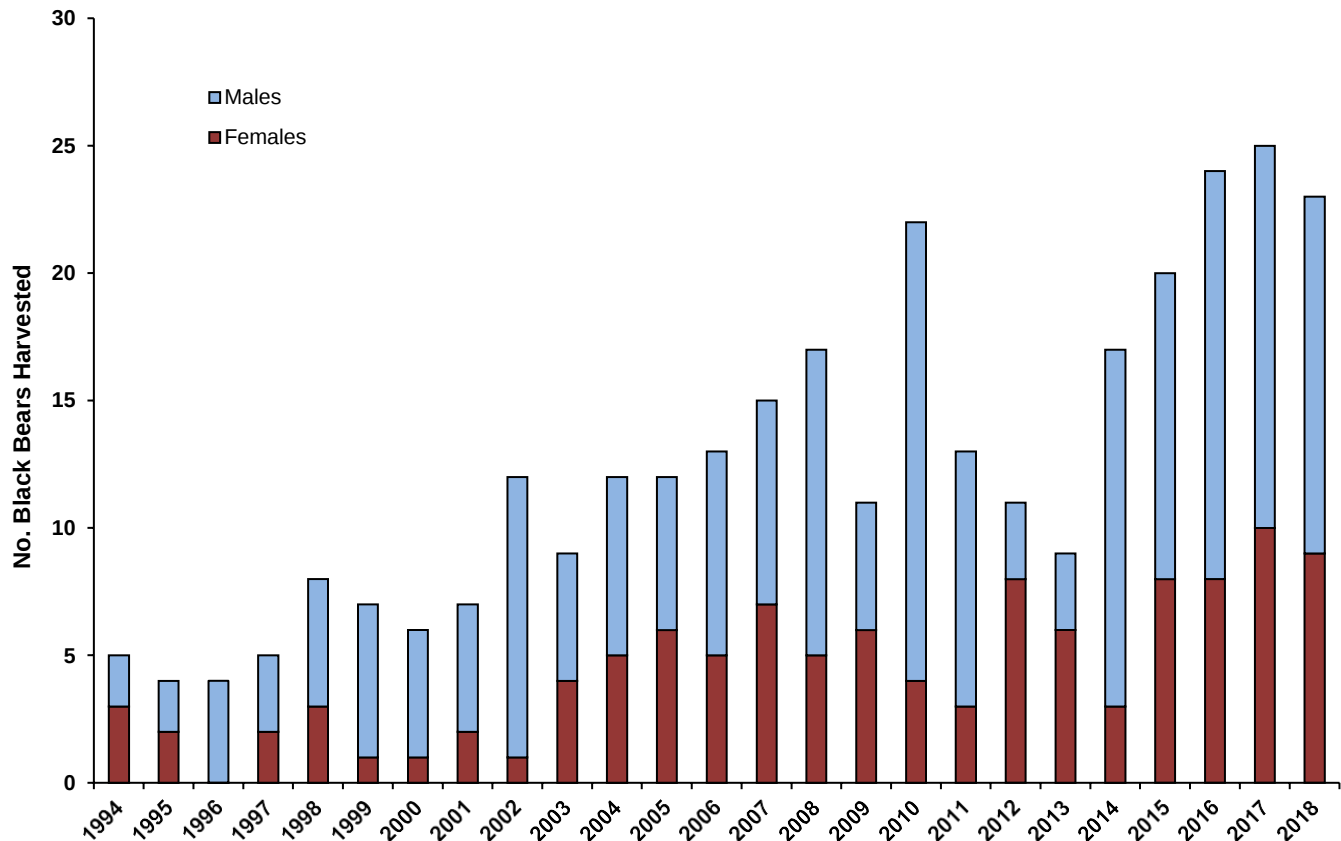


Figure 54. Legal harvest of black bears in hunt area 7 of Laramie Peak BMU, 1994-2018.

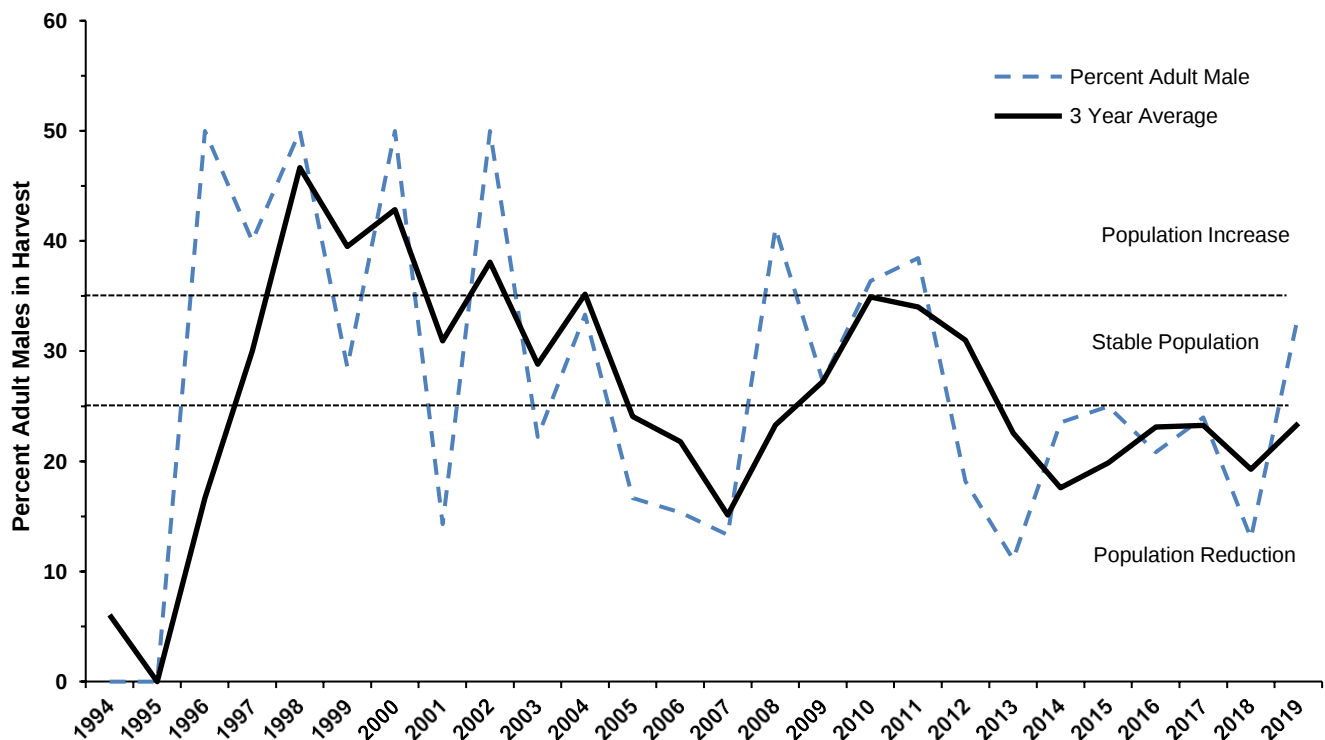


Figure 55. Percent adult males in the total legal black bear harvest in hunt area 7 of Laramie Peak BMU, 1994-spring 2019.

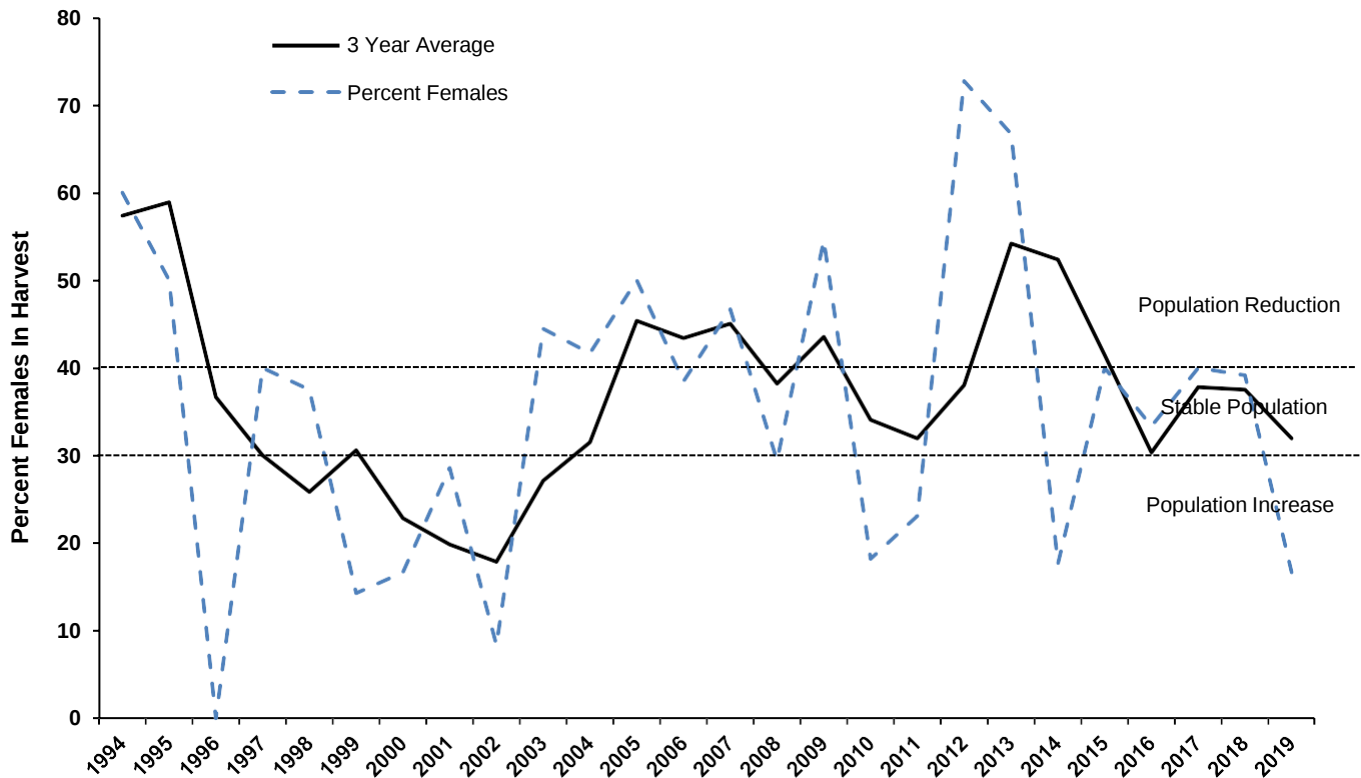


Figure 56. Percent females of the total legal black bear harvest in hunt area 7 of Laramie Peak BMU, 1994-spring 2019.

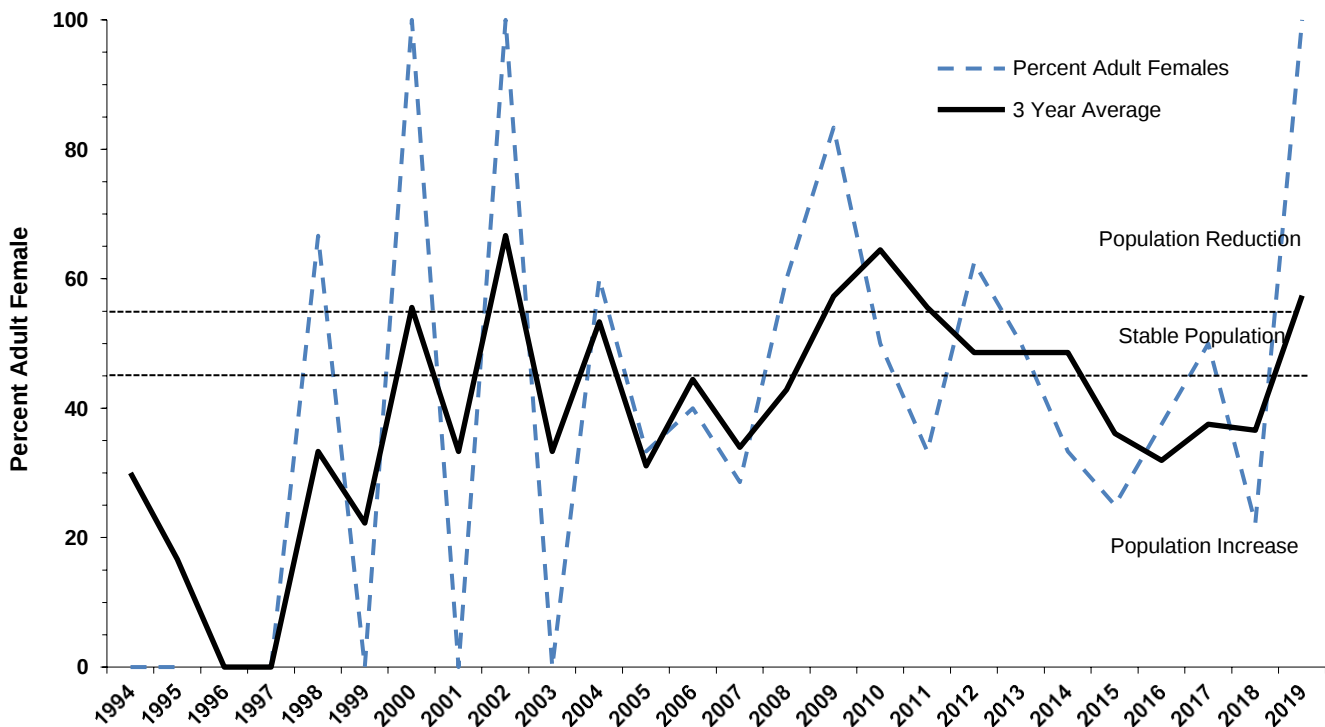


Figure 57. Percent adult females of the total female legal harvest in hunt area 7 of Laramie Peak BMU, 1994-spring 2019.

SNOWY RANGE BEAR MANAGEMENT UNIT (502)

2019 Black Bear Mortality

Female mortality limits for the Snowy Range BMU were unchanged for the 2017-2019 harvest cycle (Table 14). The spring season female harvest limits were met in all 3 years of the cycle and the fall limit was met in 2019 (Table 14). With the exception of a spike in harvest in 2015, total mortalities and harvest have been very consistent since the mid 2000s (Figures 58 and 59). All 3 harvest criteria continue to fluctuate around the stable range, indicating moderate harvest pressure for this BMU (Table 15, Figures 60-62).

Stability in harvest levels and criteria indicate moderate harvest effects in this BMU. Thus, a moderate increase in the female harvest limit, especially in the spring, would be justified if regional and public input indicate interest.

Table 14. Snowy Range BMU female mortality limits, harvest (legal/illegal harvest) by sex and season, and season closure dates for the 2017-spring 2019 black bear hunting seasons. Yellow cells indicate season closure prior to the closing date listed in regulation (Appendix I) after reaching the female mortality limit.

			Female Mortality Limit		Harvest				Season Closure Dates	
					Spring		Fall			
YEAR	MGMT UNIT	HUNT AREA	Spring	Fall	M	F	M	F	Spring	Fall
2017	SNOWY RANGE	8	5	6	11	6	7	4	5/25/17	10/31/17
2018	SNOWY RANGE	8	5	6	9	5	9	3	5/29/18	10/31/18
2019	SNOWY RANGE	8	5	6	12	7	NA	NA	6/3/19	9/20/19

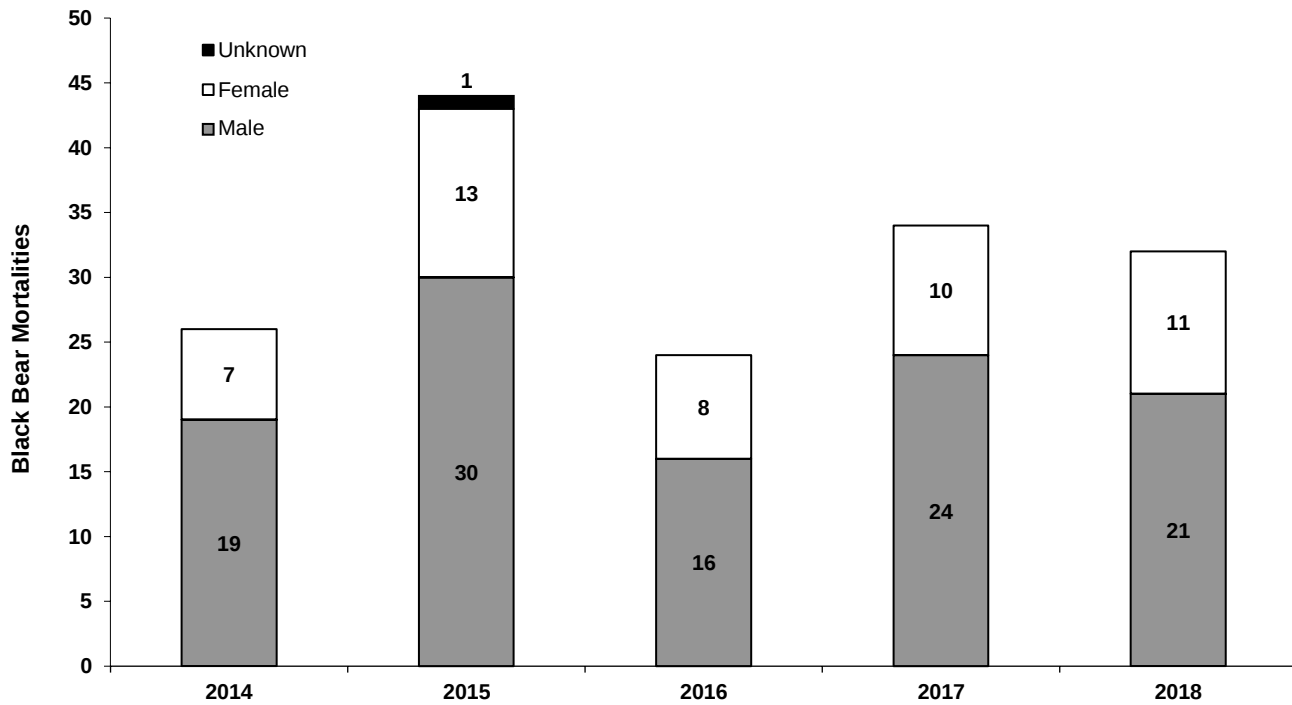


Figure 58. Number of black bear mortalities of all causes in Snowy Range BMU by sex, 2014-2018.

Table 15. Harvest criteria for Snowy Range BMU legal black bear harvest, 2017-spring 2019. Criteria are presented by objective as 3-year averages of percent adult males in the total harvest, percent females in the total harvest, and percent adult females in the female harvest.

Year	Objective	Harvest Criteria		
		% Adult ^a Males in Total Harvest	% Females in Total Harvest	% Adult ^a Females in Female Harvest
	Population Reduction	< 25%	> 40%	> 55%
	Stable Population	25 – 35%	30 – 40%	45 – 55%
	Population Increase	> 35%	< 30%	< 45%
2017-spring 2019		25.5	33.5	53.3

^a Adults classified as males and females ≥ 5 years of age based on tooth cementum annuli.

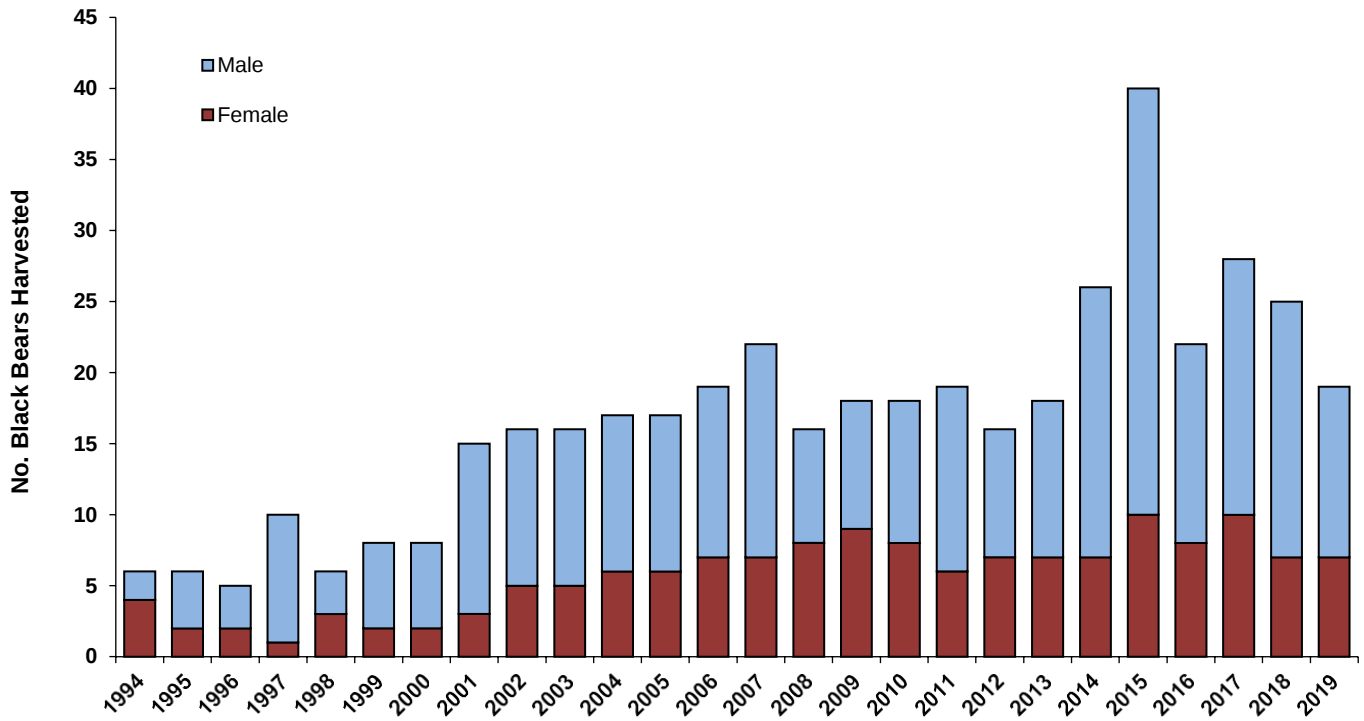


Figure 59. Legal harvest of black bears in Snowy Range BMU, 1994-2018.

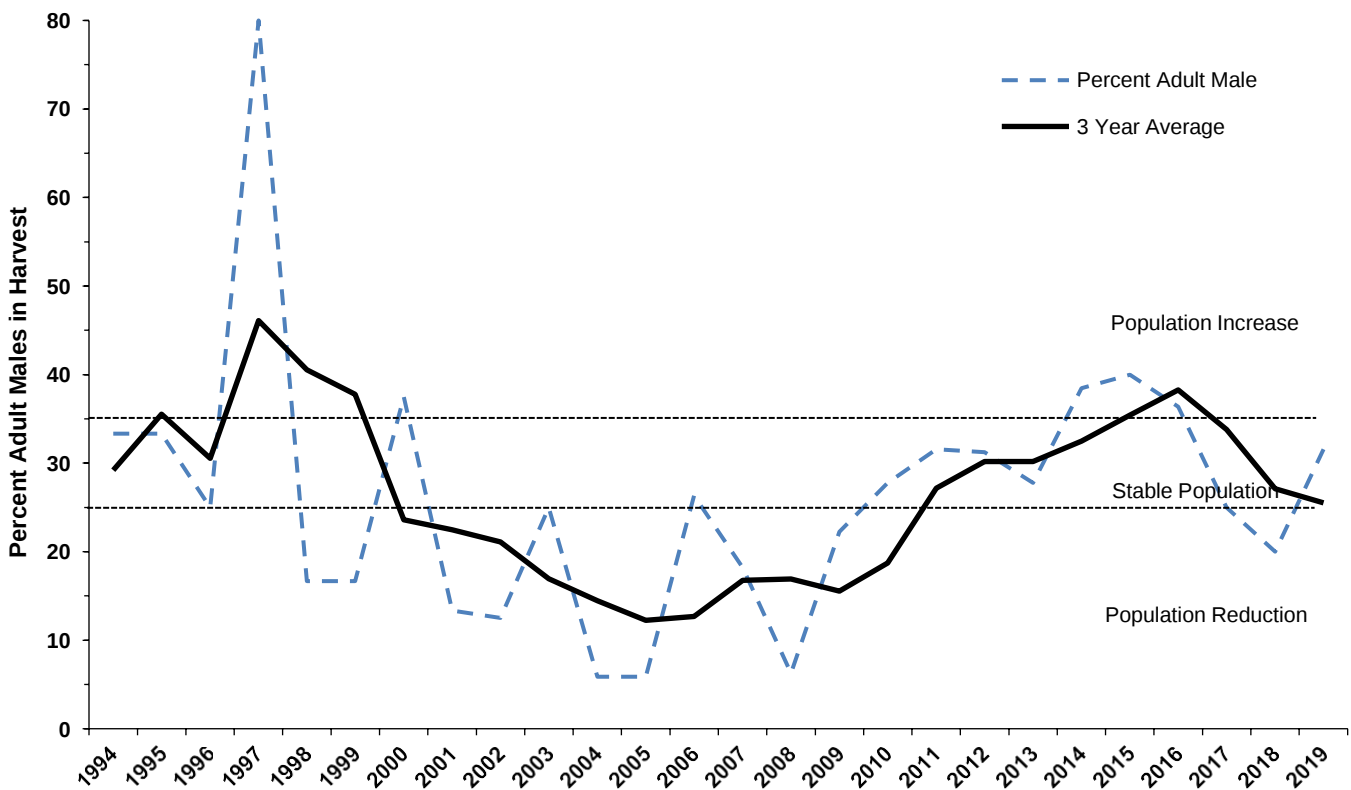


Figure 60. Percent adult males in the total legal black bear harvest in Snowy Range BMU, 1994-spring 2019.

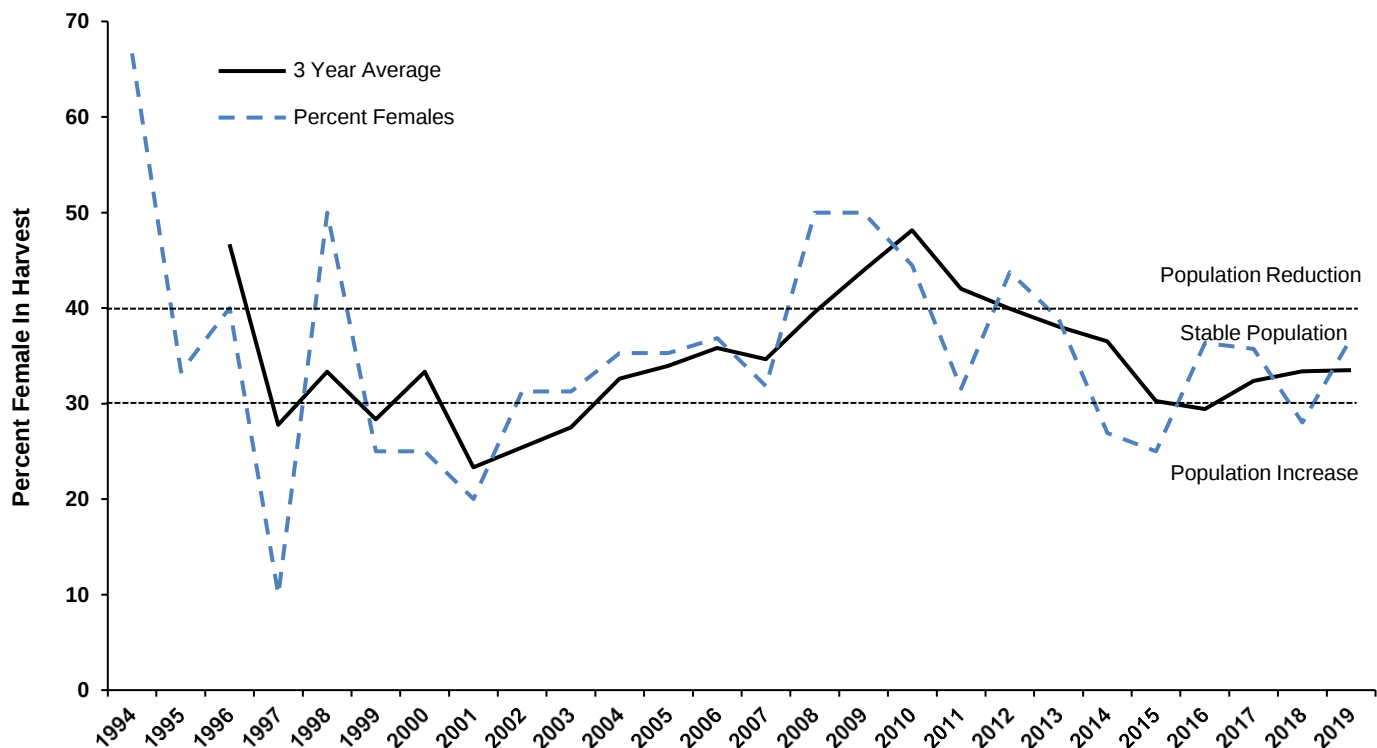


Figure 61. Percent females of the total legal black bear harvest in Snowy Range BMU, 1994-spring 2019.

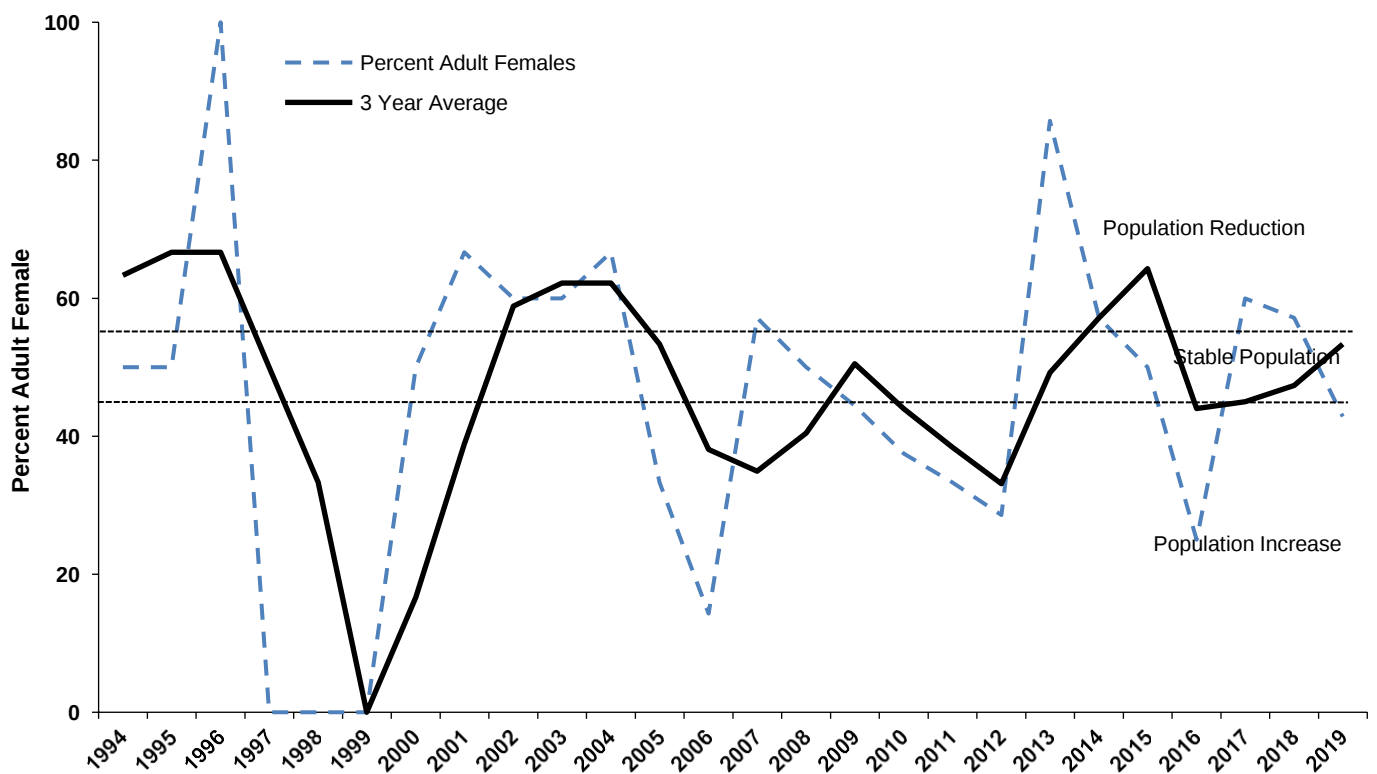


Figure 62. Percent adult females of the total female legal harvest in Snowy Range BMU, 1994-spring 2019.

WIND RIVER RANGE BEAR MANAGEMENT UNIT (601)

2019 Black Bear Mortality

Female mortality limits were unchanged in the Wind River BMU for the 2017-2019 harvest cycle. The fall 2018 female harvest limit in area 13 was the only seasonal limit reached in any area of the BMU during this harvest cycle (Table 16). At the BMU level, total black bear mortalities and legal harvest in BMU 601 were comparable to that of previous 15+ years (Figures 63 and 64). All 3 harvest criteria remained in the stable to increase range (Table 17; Figures 65-67). Analyzed independently, hunt area 13 shows some effect of harvest on the adult male cohort (Figure 69), however, the percent female (Figure 70) and percent adult female (Figure 71) criteria both indicate that females in hunt area 13 are minimally impacted by harvest. In hunt area 19, the increasing trend in the percent adult males and the relatively stable female criteria suggest minimal impacts of harvest on the black bear population in this hunt area (Figures 72-75).

Overall, the black bear population in the Wind River BMU appears to be generally stable and experiencing light to moderate harvest effects, with adult males in hunt area 13 showing some signs of reduction.

Table 16. Wind River BMU female mortality limits, harvest (legal/illegal harvest) by sex and season, and season closure dates for the 2017-spring 2019 black bear hunting seasons. Yellow cells indicate season closure prior to the closing date listed in regulation (Appendix I) after reaching the female mortality limit.

			Female Mortality Limit		Harvest				Season Closure Dates	
YEAR	MGMT UNIT	HUNT AREA	Spring	Fall	Spring		Fall		Spring	Fall
2017	WIND RIVER	13	5	5	11	4	1	2	6/15/17	10/31/17
		19	10	8	18	4	1	3	6/15/17	11/15/17
		28	4	4	2	0	4	0	6/15/17	10/31/17
		31	2	2	0	0	0	0	6/15/17	10/31/17
2018	WIND RIVER	13	5	5	12	5	6	5	6/15/18	9/8/18
		19	10	8	11	1	1	0	6/15/18	11/15/18
		28	4	4	2	1	1	1	6/15/18	10/31/18
		31	2	2	0	0	0	0	6/15/18	10/31/18
2019	WIND RIVER	13	5	5	12	3	NA	NA	6/15/19	NA
		19	10	8	13	2	NA	NA	6/15/19	NA
		28	4	4	4	0	NA	NA	6/15/16	NA
		31	2	2	1	0	NA	NA	6/15/19	NA

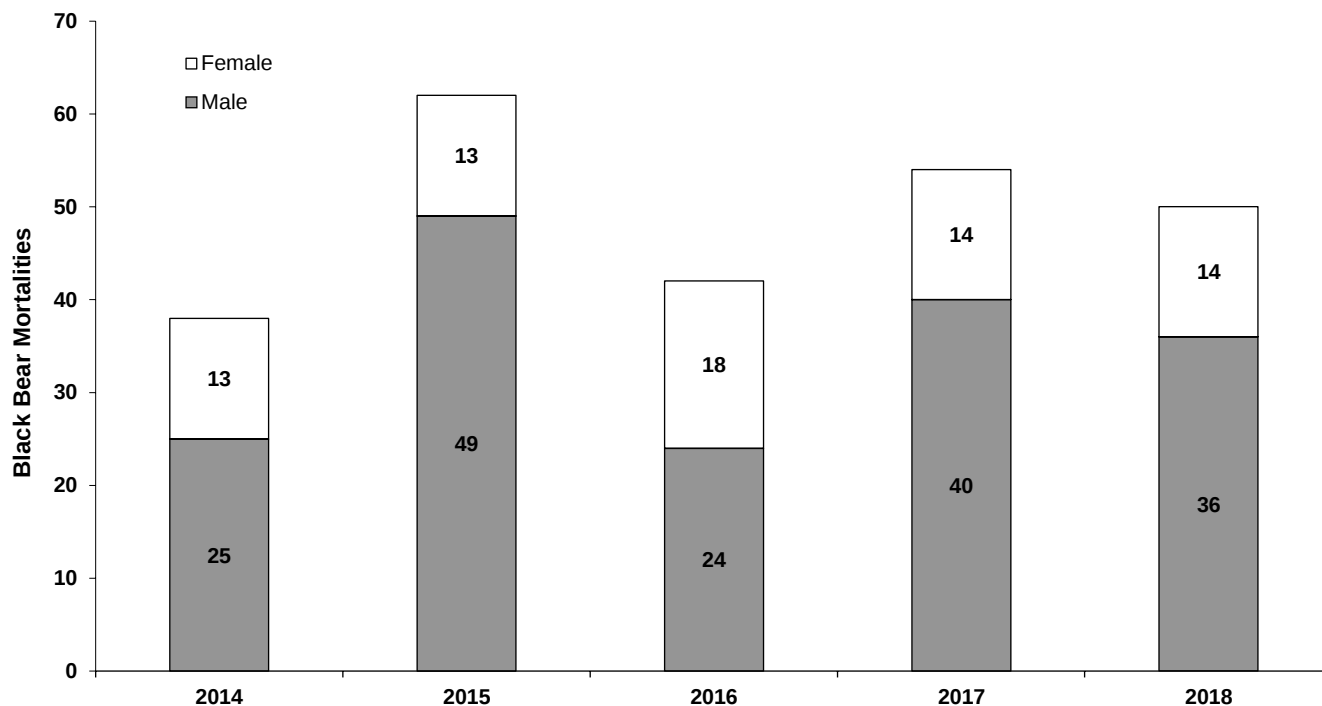


Figure 63. Number of black bear mortalities of all causes in Wind River BMU by sex, 2015-2018.

Table 17. Harvest criteria for Wind River BMU legal black bear harvest, 2017-spring 2019. Criteria are presented by objective as 3-year averages of percent adult males in the total harvest, percent females in the total harvest, and percent adult females in the female harvest.

Year	Objective	Harvest Criteria		
		% Adult ^a Males in Total Harvest	% Females in Total Harvest	% Adult ^a Females in Female Harvest
	Population Reduction	< 25%	> 40%	> 55%
	Stable Population	25 – 35%	30 – 40%	45 – 55%
	Population Increase	> 35%	< 30%	< 45%
2017-spring 2019		39.9	24.1	47.9

^a Adults classified as males and females ≥ 5 years of age based on tooth cementum annuli.

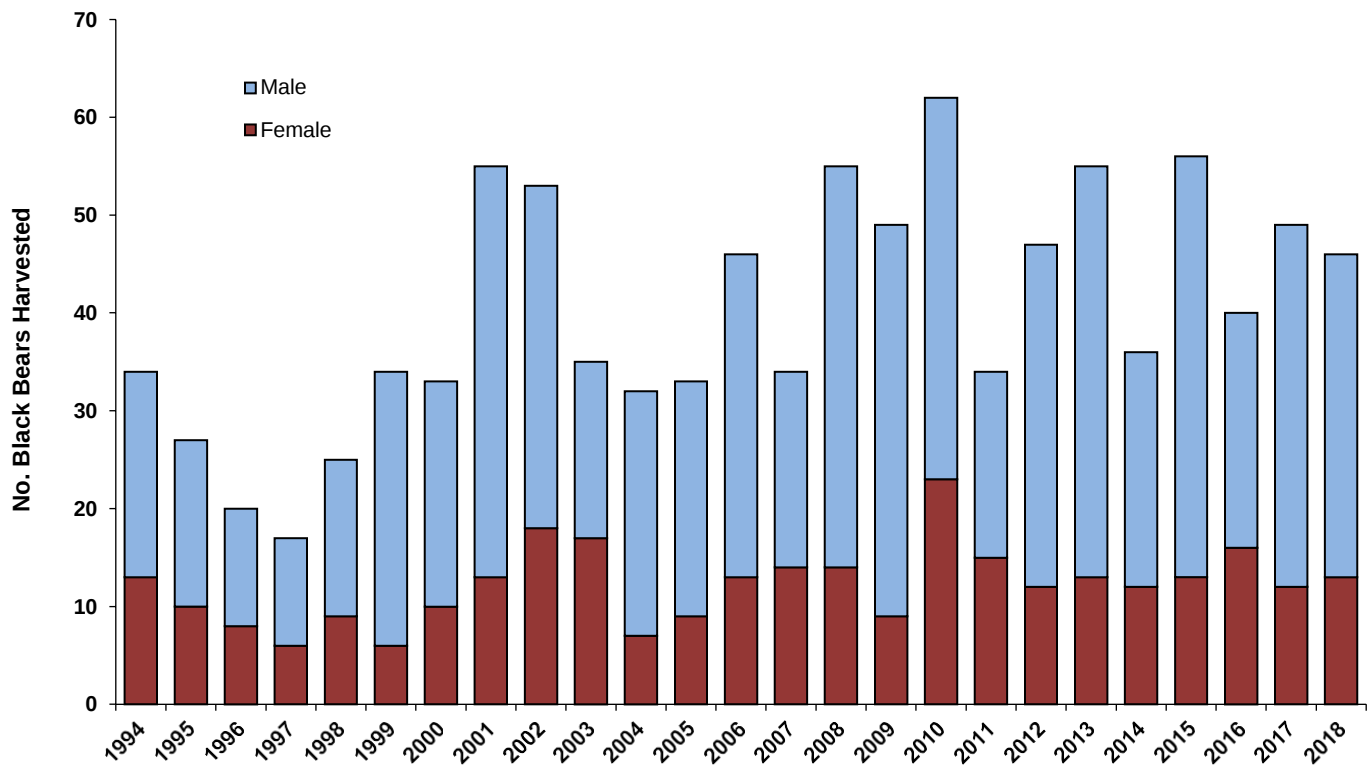


Figure 64. Legal harvest of black bears in Wind River BMU, 1994-2018.

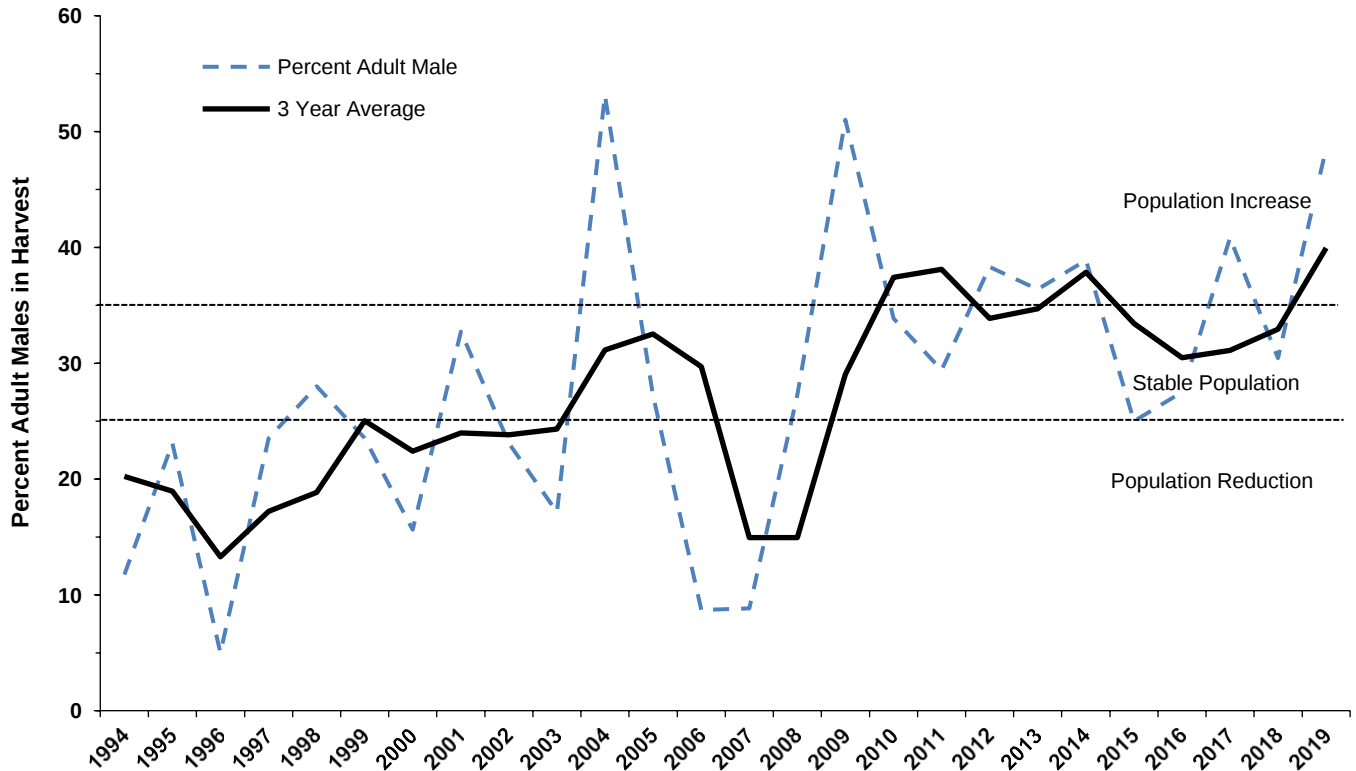


Figure 65. Percent adult males in the total legal black bear harvest in Wind River BMU, 1994-spring 2019.

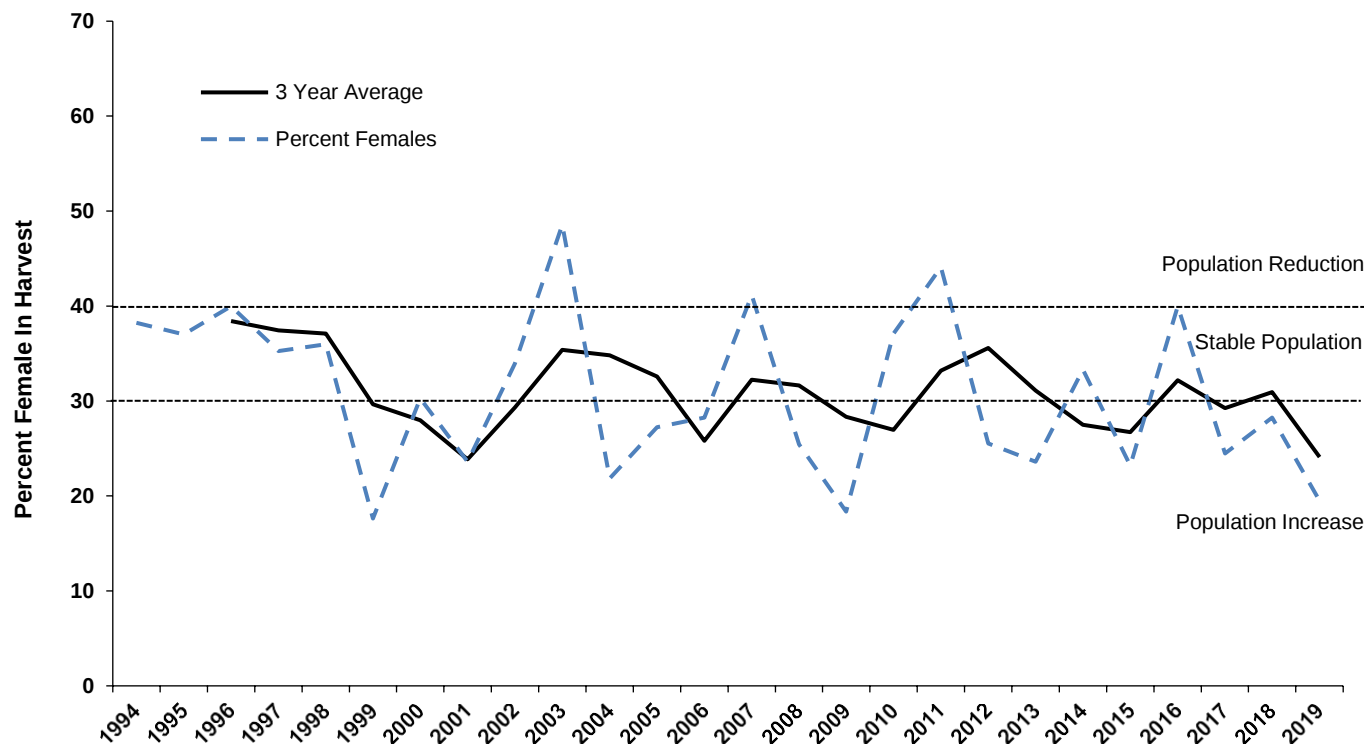


Figure 66. Percent females of the total legal black bear harvest in Wind River BMU, 1994-spring 2019.

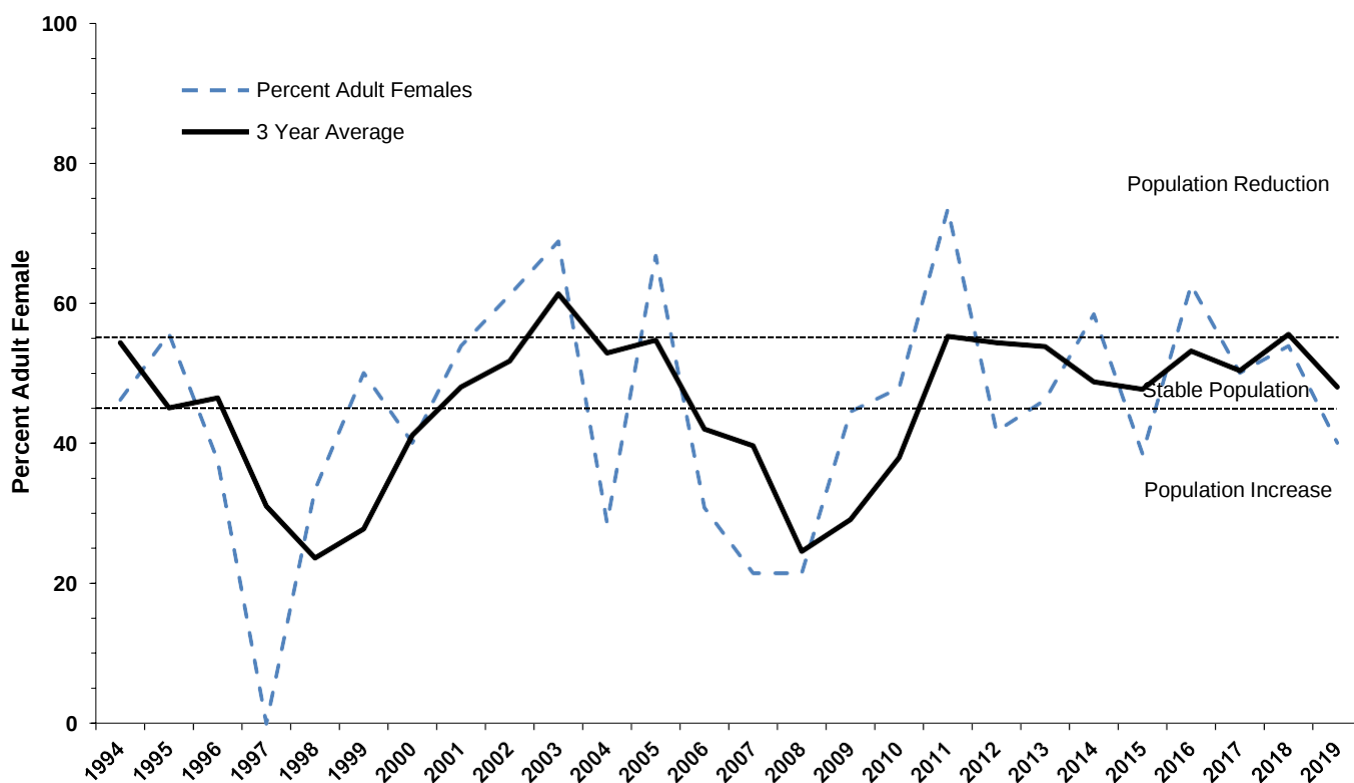


Figure 67. Percent adult females of the total female legal harvest in Wind River BMU, 1994-spring 2019.

Harvest Criteria by Harvest Limit – Hunt Area 13

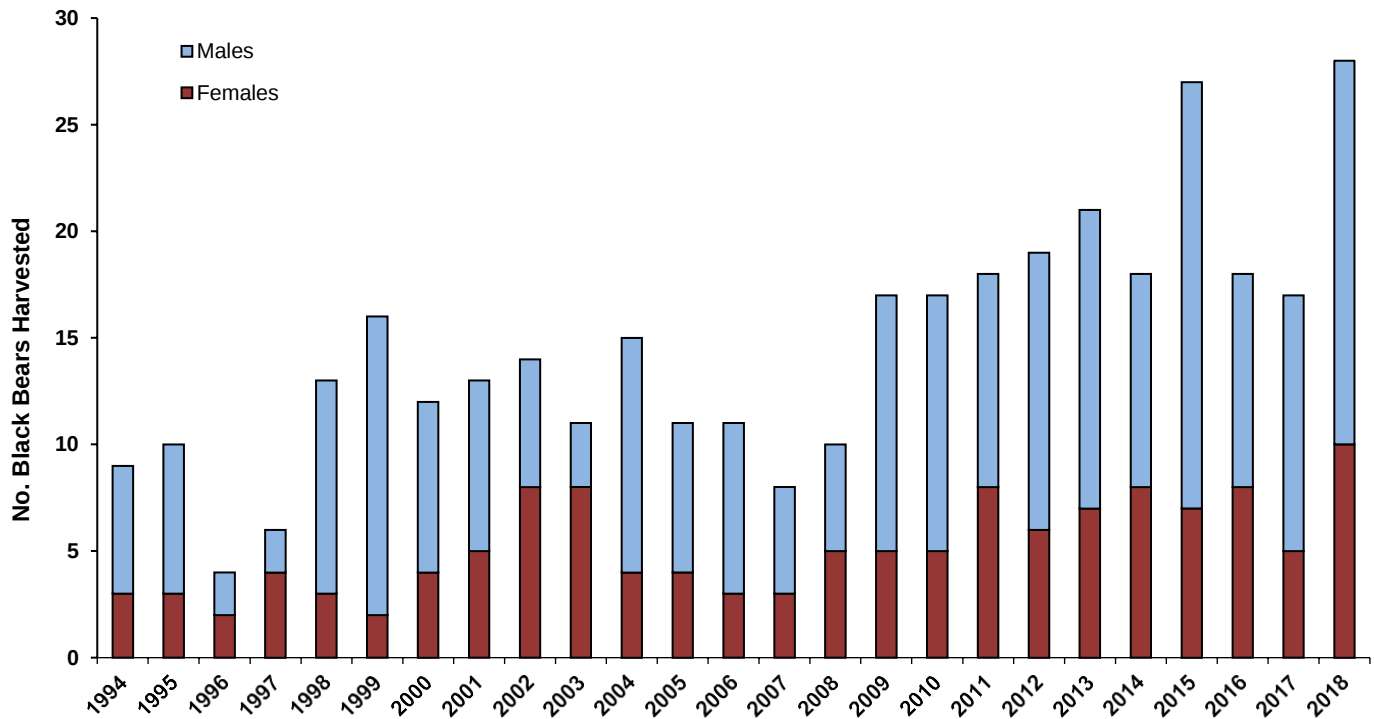


Figure 68. Legal harvest of black bears in hunt area 13 of Wind River BMU, 1994-2018.

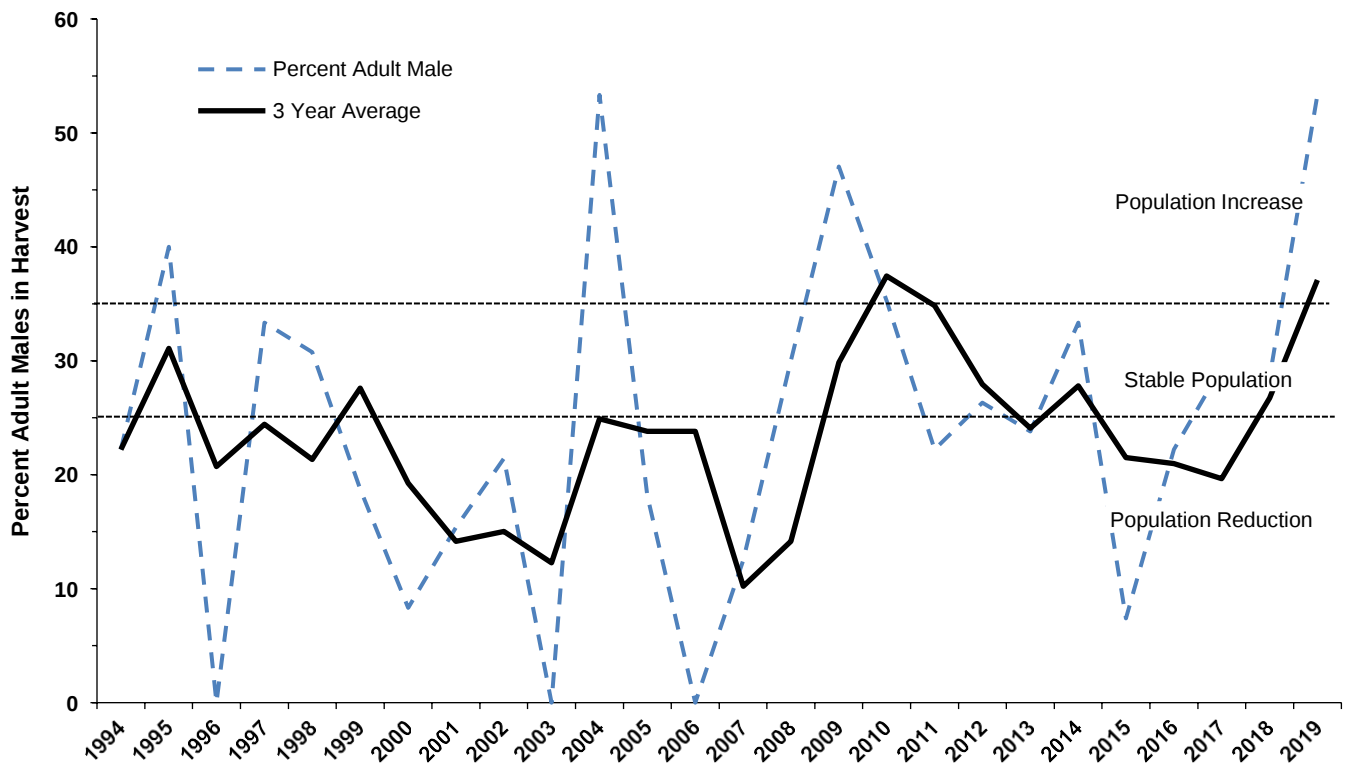


Figure 69. Percent adult males in the total legal black bear harvest in hunt area 13 of Wind River BMU, 1994-spring 2019.

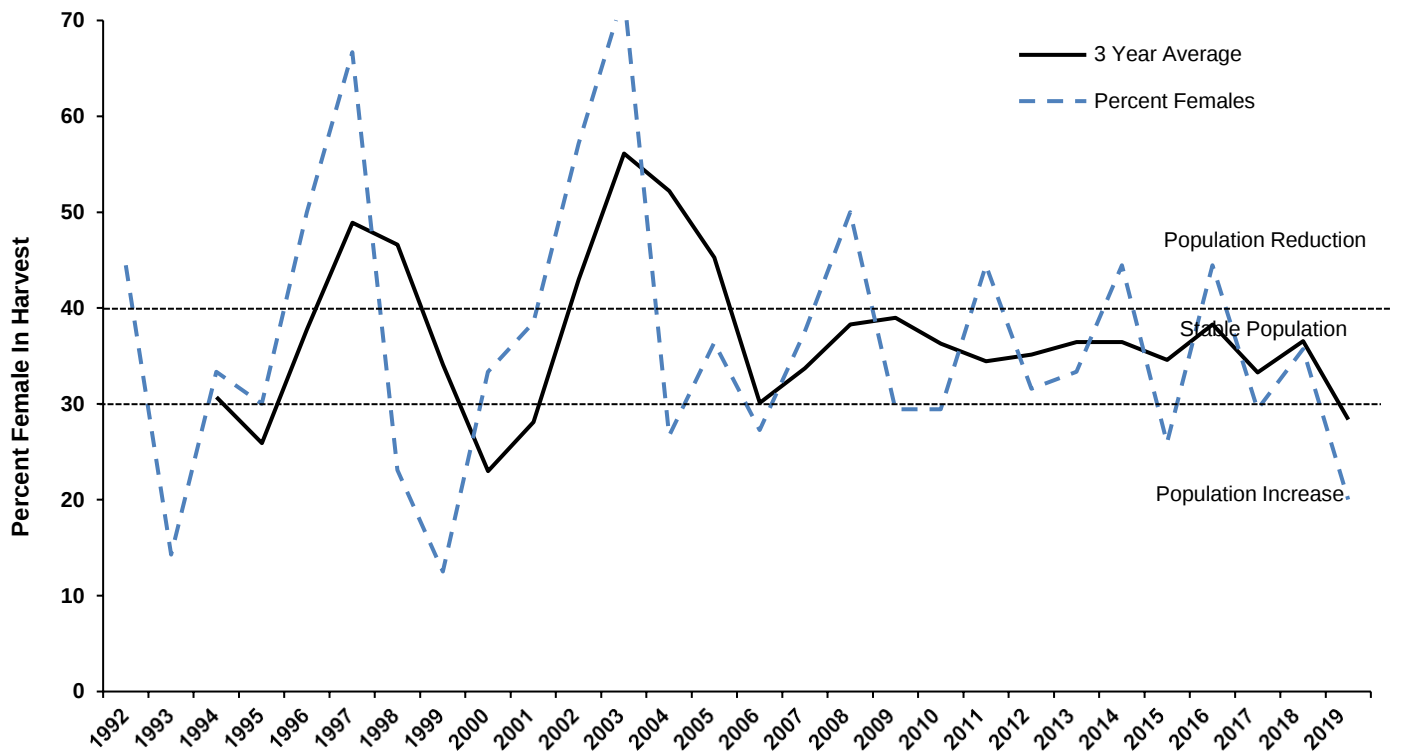


Figure 70. Percent females of the total legal black bear harvest in hunt area 13 of Wind River BMU, 1994-spring 2019.

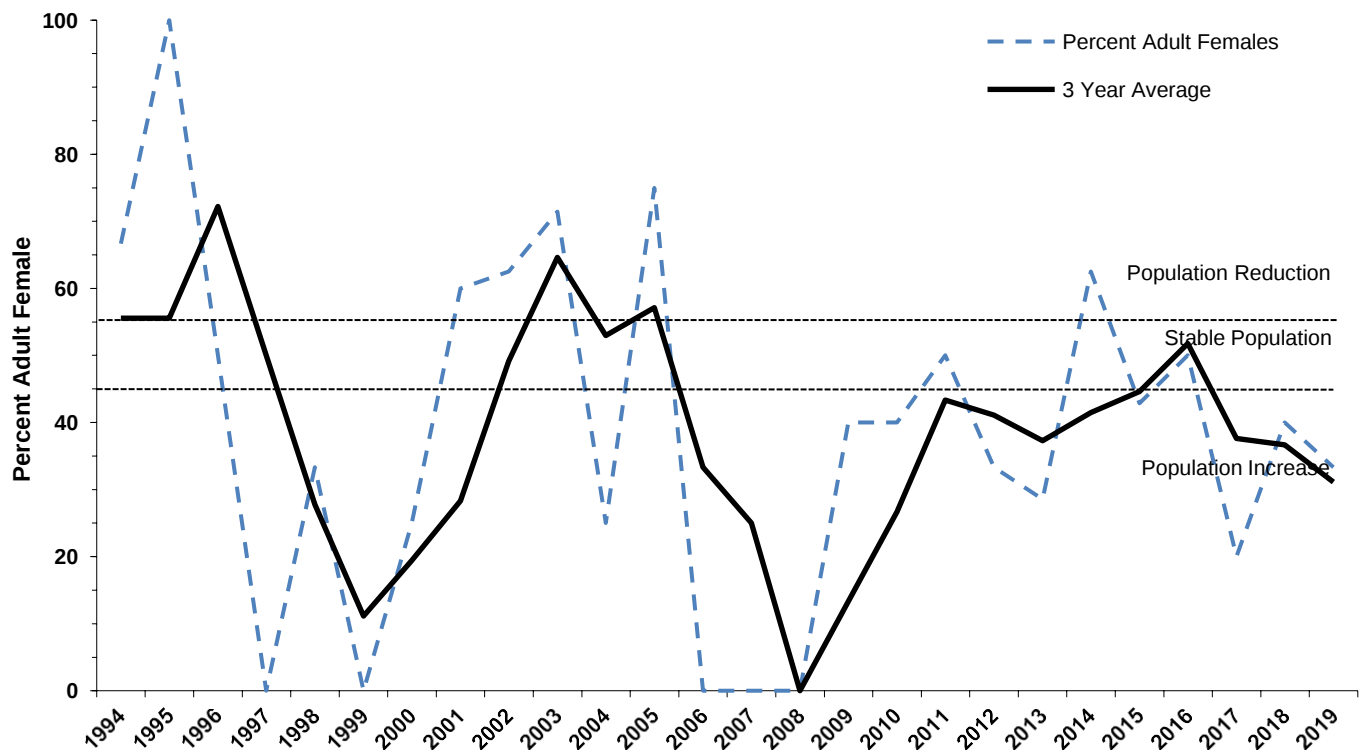


Figure 71. Percent adult females of the total female legal harvest in hunt area 13 of Wind River BMU, 1994-spring 2019.

Harvest Criteria by Harvest Limit – Hunt Area 19

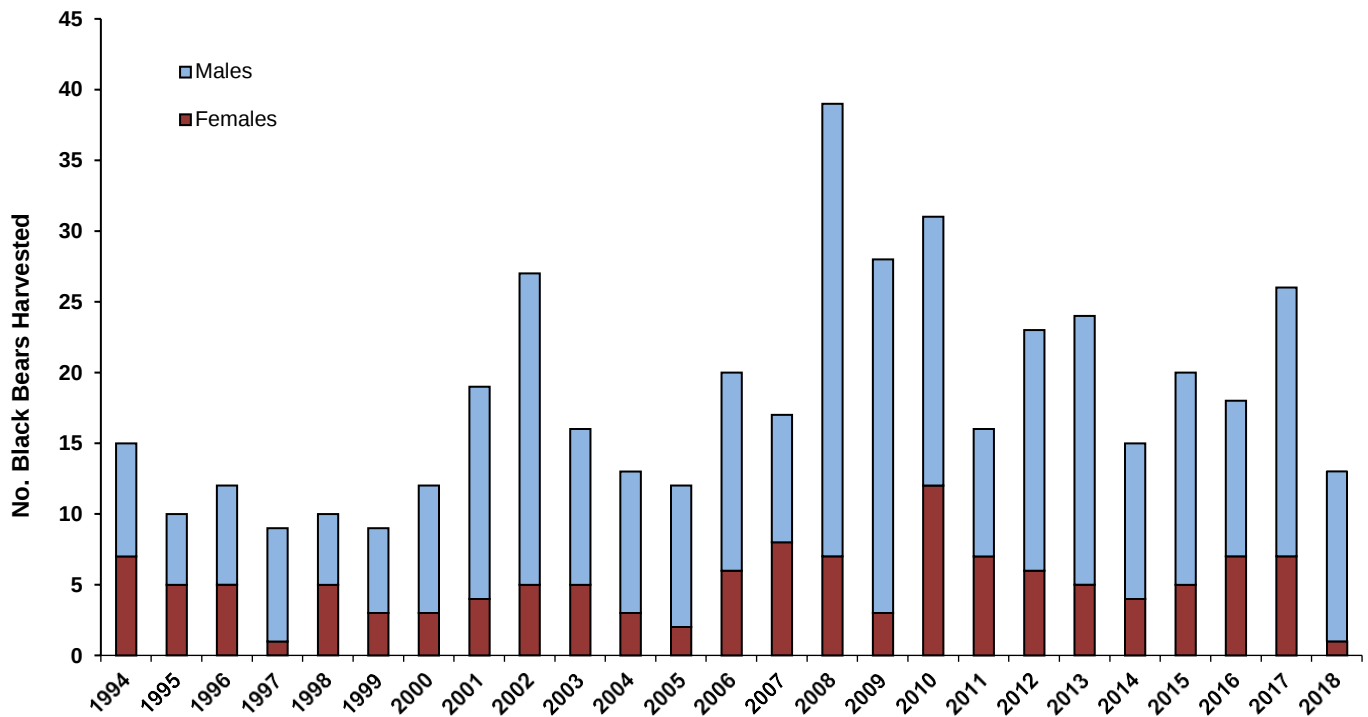


Figure 72. Legal harvest of black bears in hunt area 19 of Wind River BMU, 1994-2018.

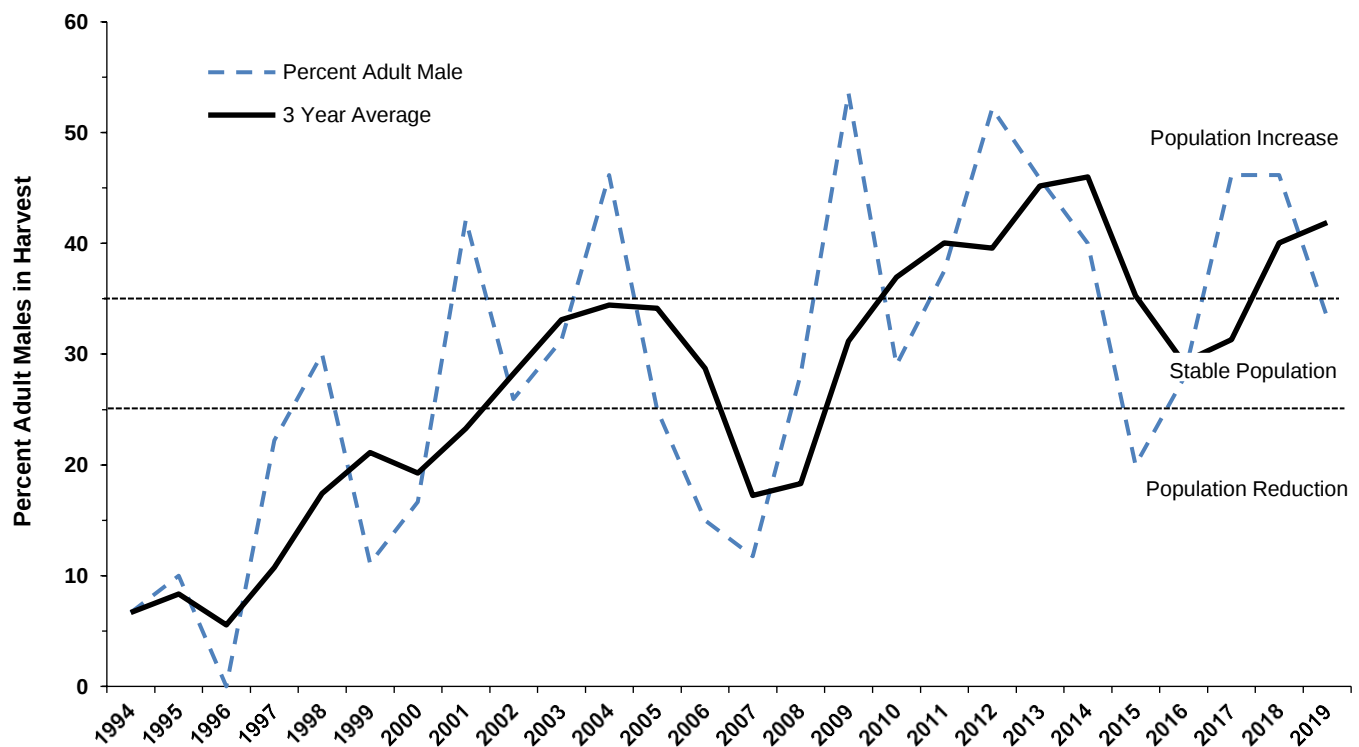


Figure 73. Percent adult males in the total legal black bear harvest in hunt area 19 of Wind River BMU, 1994-spring 2019.

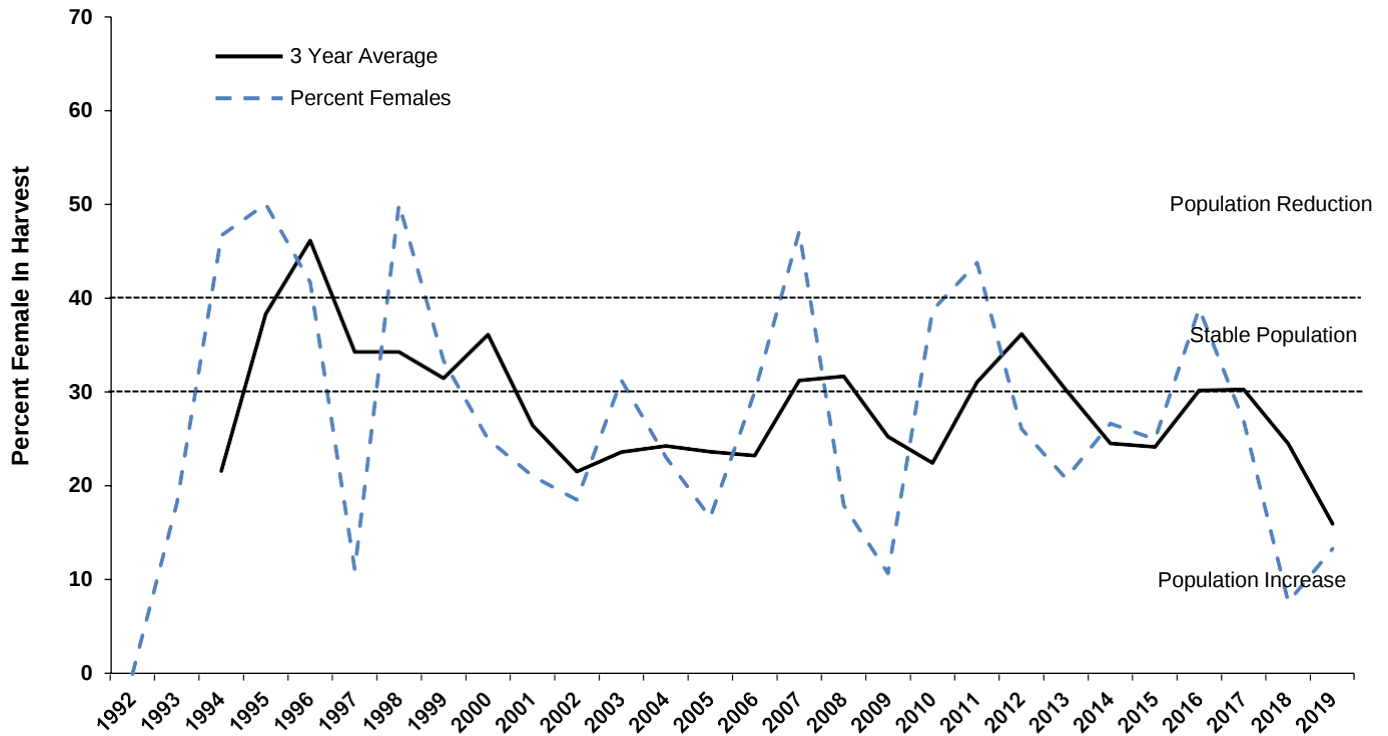


Figure 74. Percent females of the total legal black bear harvest in hunt area 19 of Wind River BMU, 1994-spring 2019.

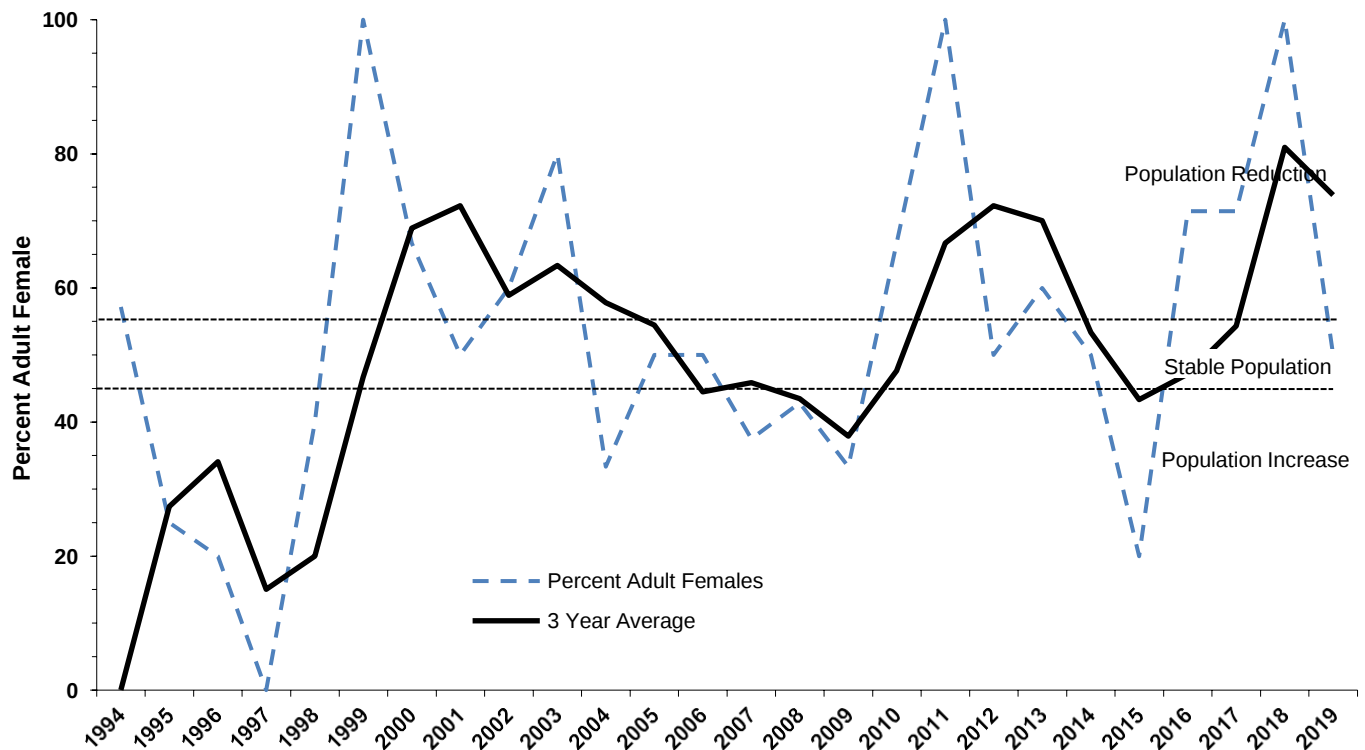


Figure 75. Percent adult females of the total female legal harvest in hunt area 19 of Wind River BMU, 1994-spring 2019.

STATEWIDE HUNT AREA 35

During the season-setting process prior to the 2011-2013 cycle, hunt area 35 was created to include all areas of Wyoming that previously did not fall within established hunt areas. Although there are pockets of suitable habitat, this area is not considered quality black bear habitat and contains relatively few black bears. However, black bears, especially subadult males dispersing from higher quality habitats, may move through and occasionally take up residence in some of the smaller, more isolated mountain ranges and riparian habitats of the state. Hunt area 35 was created to provide hunting opportunity for these ranges. The hunt area has no female mortality limit and the season runs from April 15 to June 15 and August 1 to October 31 (Table 18).

Through the spring of 2019, there were 24 total black bear mortalities in hunt area 35 during the 2017-2019 harvest cycle, 16 during the spring season and 8 during the fall. These mortalities were distributed throughout central and eastern Wyoming (Figure 76). These mortalities included 19 legal harvests, 1 damage removal, 3 vehicle-related, and 1 incidental human-caused mortality. The number of legally harvested black bears decreased was 8 in 2017, 8 in 2018, and 3 in the spring of 2019 (Table 18). Eleven of the 24 (46%) mortalities were subadult males, which is expected given this cohort's tendency to disperse long distances in search of new areas to establish home ranges. Of note was a damage mortality in 2017 of a bear living in a cornfield southwest of the town of Torrington, only 17 miles from the Nebraska border (Figure 76).

Table 18. Statewide BMU female mortality limits, harvest (legal/illegal harvest) by sex and season, and season closure dates for the 2017-spring 2019 black bear hunting seasons. Because there is no female harvest limit, all seasons for this BMU closed on the final date of the season as listed in regulation (Appendix I).

			Female Mortality Limit		Harvest				Season Closure Dates	
					Spring		Fall			
YEAR	MGMT UNIT	HUNT AREA	Spring	Fall	M	F	M	F	Spring	Fall
2017	STATEWIDE	35	NA	NA	4	1	2	1	6/15/17	10/31/17
2018	STATEWIDE	35	NA	NA	5	1	2	0	6/15/18	10/31/18
2019	STATEWIDE	35	NA	NA	2	1	NA	NA	6/15/19	10/31/19

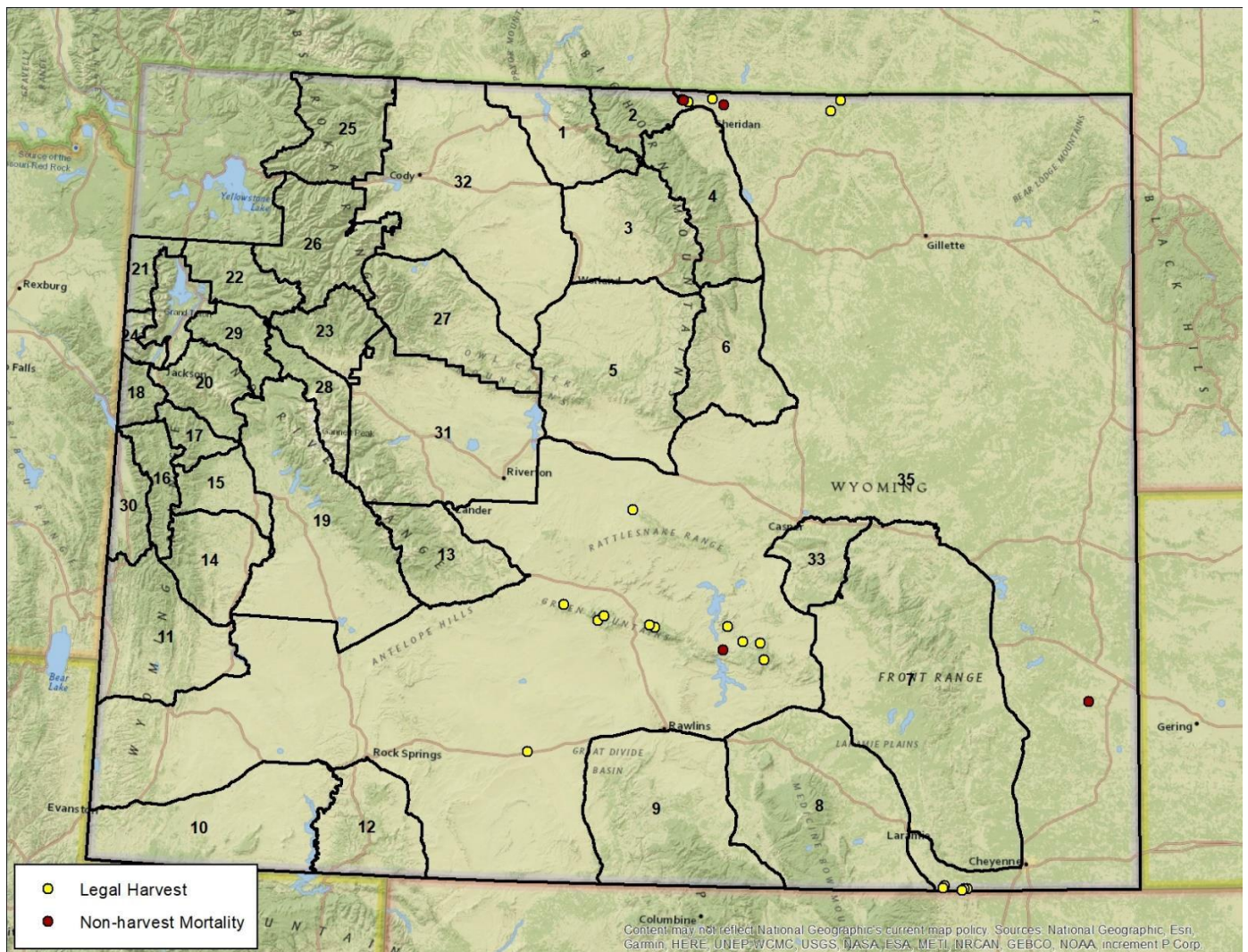


Figure 76. Statewide hunt area 35 harvest and non-harvest black bear mortalities, 2017-2019. Dots may represent more than one black bear mortality.

Appendix I. Wyoming black bear hunting season dates and seasonal female mortality limits by management unit and hunt area, 2017 – 2019.

Black Bear Management Units	Hunt Areas	Season Dates		Female Mortality Limits
		Archery	General	
Bighorns (301)	1, 2	May 1-14	May 15-June 15 Sept.1-Oct. 31	8 Spring 6 Fall
	3, 4	May 1-14	May 15-June 15 Sept. 1-Oct. 31	6 Spring 4 Fall
	5, 6		May 1-June 15 Aug. 15-Nov. 15	2 Spring 2 Fall
Laramie Peak (501)	7		April 15-May 31 Sept. 1-Oct. 31	4 Spring 6 Fall
	33		April 15-May 31 Sept 1-Oct 31	3 Spring 2 Fall
Snowy Range (502)	8	Sept. 15-30	April 15-June 7 Oct. 1-31	5 Spring 6 Fall
Sierra Madres (401)	9	April 15-30 Sept. 1-30	May 1-June15 Oct. 1-31	8 Spring 6 Fall
Uinta (402)	10	April 15-30 Aug.1-Sept. 30	May 1-June15 Oct. 1-31	2 Spring 2 Fall
	12	April 15-30 Sept. 1-30	May 1-June15 Oct. 1-31	1 Spring 1 Fall
Greys River (102)	11	April 15-30 Aug. 15-31	May 1-June15 Sept. 1- Oct. 31	5 Spring 5 Fall
	14, 15, 16 17, 30	April 15-30 Aug. 15-31	May 1-June 15 Sept. 1-Oct 31	30 Spring 18 Fall
Wind River (601)	13	April 15-30	May 1-June 15 Aug. 1-31-valid only in that portion of Hunt Area 13 within the Popo Agie Wilderness Sept 1-Oct. 31	5 Spring 5 Fall
	19	April 15-30 Aug. 15-31	May 1-June 15 Sept. 1-Nov. 15	10 Spring 8 Fall
	28	April 15-30 Aug. 1-14	May 1-June 15 Aug. 15-Oct. 31	4 Spring 4 Fall
	31	April 15-30 Aug. 1-14	May 1-June 15 Aug. 15-Oct. 31	2 Spring 2 Fall
Jackson (101)	18, 20, 21 22, 24, 29	April 15-30 Aug. 15-31	May 1-June 15 Sept. 1-Oct. 31	13 Spring 20 Fall
Absaroka (201)	23	April 15-30 Aug. 1-14	May 1-June 15 Aug. 15-Oct. 31	8 Spring* 12 Fall*
	25, 26, 27	April 15-30 Aug. 15-31	May 1-June 15 Sept. 1- Oct. 31	
	32	April 15-30	May 1 – June 15 Aug. 1 – Oct. 31	Unlimited
Statewide	35		April 15-June 15 August 1-Oct. 31	Unlimited

*Annual female mortality limit applies to areas 23, 25, 26, and 27 in combination.