



Spring 2022 Mule Deer Survey: Gardiner Basin

Prepared by: Michael Yarnall, Livingston Area Wildlife Biologist

2022 Survey

Survey Details

Date: 8 April 2022

Pilot: Neil Cadwell (FWP)

Observers: Michael Yarnall (FWP) and Warren Hansen (FWP)

Aircraft: A-star (helicopter)

Objective: Obtain a total count and classify deer as adults or fawns in the Gardiner Trend Area as an index of total numbers and population trend. The age and sex structure are characterized relative to the number of adult deer.

Flight Details: This survey was combined with bighorn sheep survey efforts (see 2022 Upper Yellowstone Bighorn Sheep report for sheep details). We took off from the Gardiner airport at 7:17 and surveyed mule deer in the Gardiner Basin Trend Area, beginning on the west side of the Yellowstone because the morning light hits that side of the basin earliest. We crossed the river near at the north end of the trend area and surveyed south to the Deckard Flats vicinity. We completed the mule deer survey on a single fuel load, and returned to the Gardiner airport at approximately 10:56. We refueled and then flew north to survey sheep in the Tom Miner and Point of Rocks areas. We landed again in Gardiner at 12:08. Total flight time was 7 hours, including 4.9 hours of survey time and 2.1 hours of pilot ferry time.

Survey Conditions: The temperature was 36 F at takeoff and 59 F at the end of our flight. Winds were generally mild: 5-6 mph at takeoff and 14 mph when we landed, though it was breezier to the north (approximately 15-20 mph in Tom Miner and southern Paradise Valley). Lighting conditions were good with primarily bright sun. The ground was bare. Deer were primarily up feeding, though some groups were bedded.

Survey Results

We observed **1227** total mule deer in **102** groups. We classified **784** adults and **361** fawns; **82** deer were unclassified (Figure 1). This resulted in **46 fawns per 100 adults**. Observed recruitment was similar on both sides of the Yellowstone River (Table 1).

We also observed **2** golden eagles, **1** grizzly bear, **1** coyotes, and **147** bighorn sheep in addition to many elk.

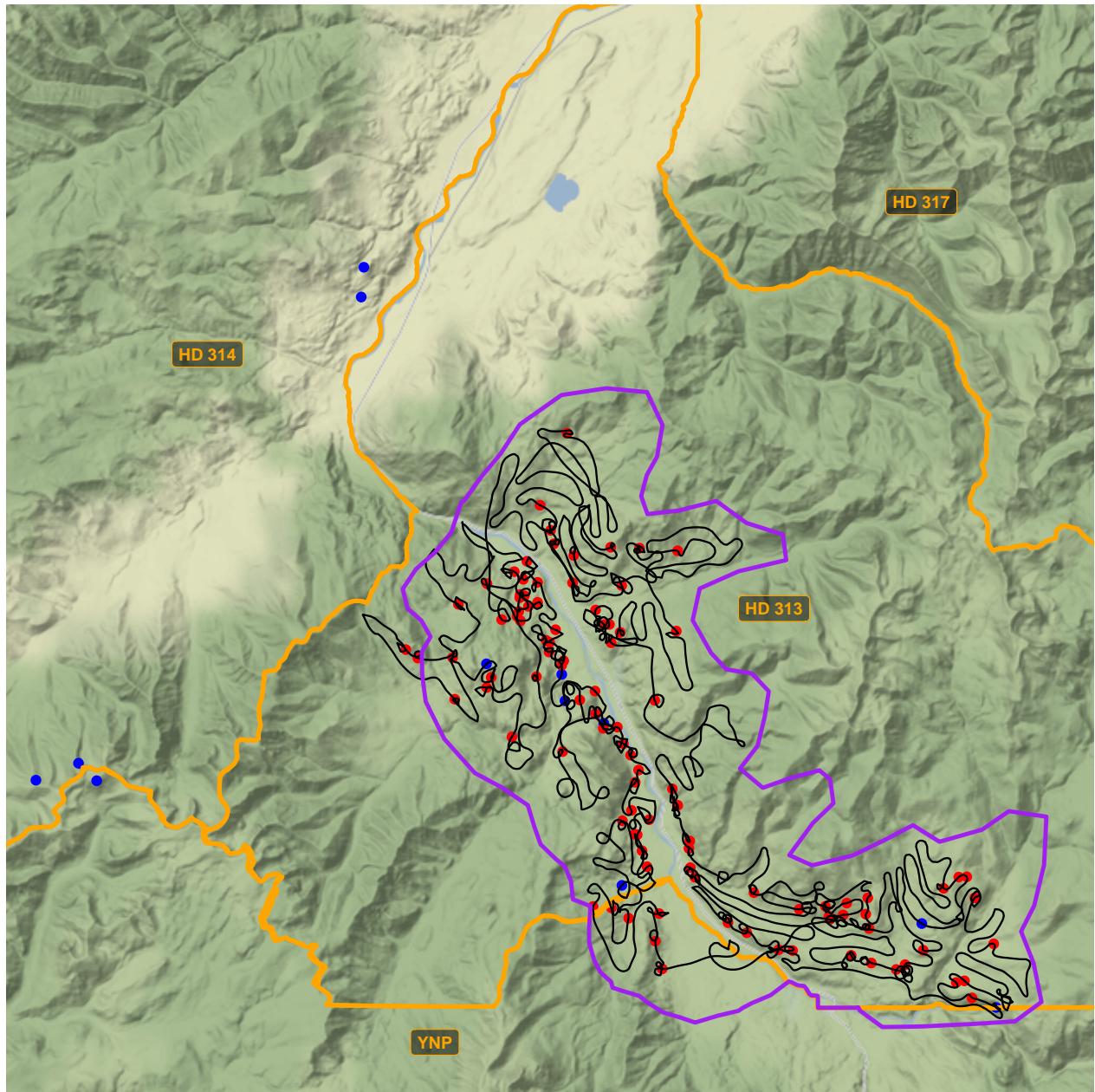


Figure 1: Flight path and locations of mule deer groups (red) and incidental observations of other species (blue) during the 2022 survey of the Gardiner Trend Area (outlined in purple).

Table 1: Mule deer distribution by herd unit as observed during the 2022 spring survey of the Gardiner Trend Area.

Subunit	Adults	Fawn	Unclassified	Total Deer
Slip and Slide Creek to Little Trail Creek	130	68	20	218
Little Trail Creek to Deckard Flats	239	97	43	379
West of Yellowstone River	352	172	19	543
Yellowstone National Park	63	24	0	87
Total	784	361	82	1227

Population Trends

This year's total count (**1227**) was a 20 percent increase from the 2021 count of 1020 (Figure 2). Although an increase from the previous year, the total count was 22 percent lower than the 10-year average (**1570**) and 35 percent lower than the long-term average of counts since 1986 (**1888, SE = 65.7**, Figure 2). In contrast, the proportion of deer observed that were fawns was greater this year (Figure 3, Figure 4); the observed number of fawns per 100 adults (**46**) was 37 percent higher than the 2021 ratio of 33.6 and is 14 percent above the long-term average (**40.3, SE = 2.1**). Montana's Adaptive Harvest Management (AHM) plan for mule deer designates the Gardiner Basin as part of the Southern Mountains Mule Deer Management Area, with a recruitment standard of 30-45 fawns per 100 adults. Ratios observed in the Gardiner Basin have fluctuated above and below this range; the observed ratio this spring is slightly above the recruitment standard (Figure 4).

The 2021-2022 winter was relatively mild, though spring 2022 was relatively cool. In mild years, some deer may not utilize the winter range in the Gardiner basin, or may arrive late/depart early. These behavioral changes may influence trend data collected during spring surveys. It is important to note that aerial surveys are subject to both population and sampling variability. Annual results should be interpreted with caution; inferences based on long term trends are more robust. Future surveys will provide additional insight.

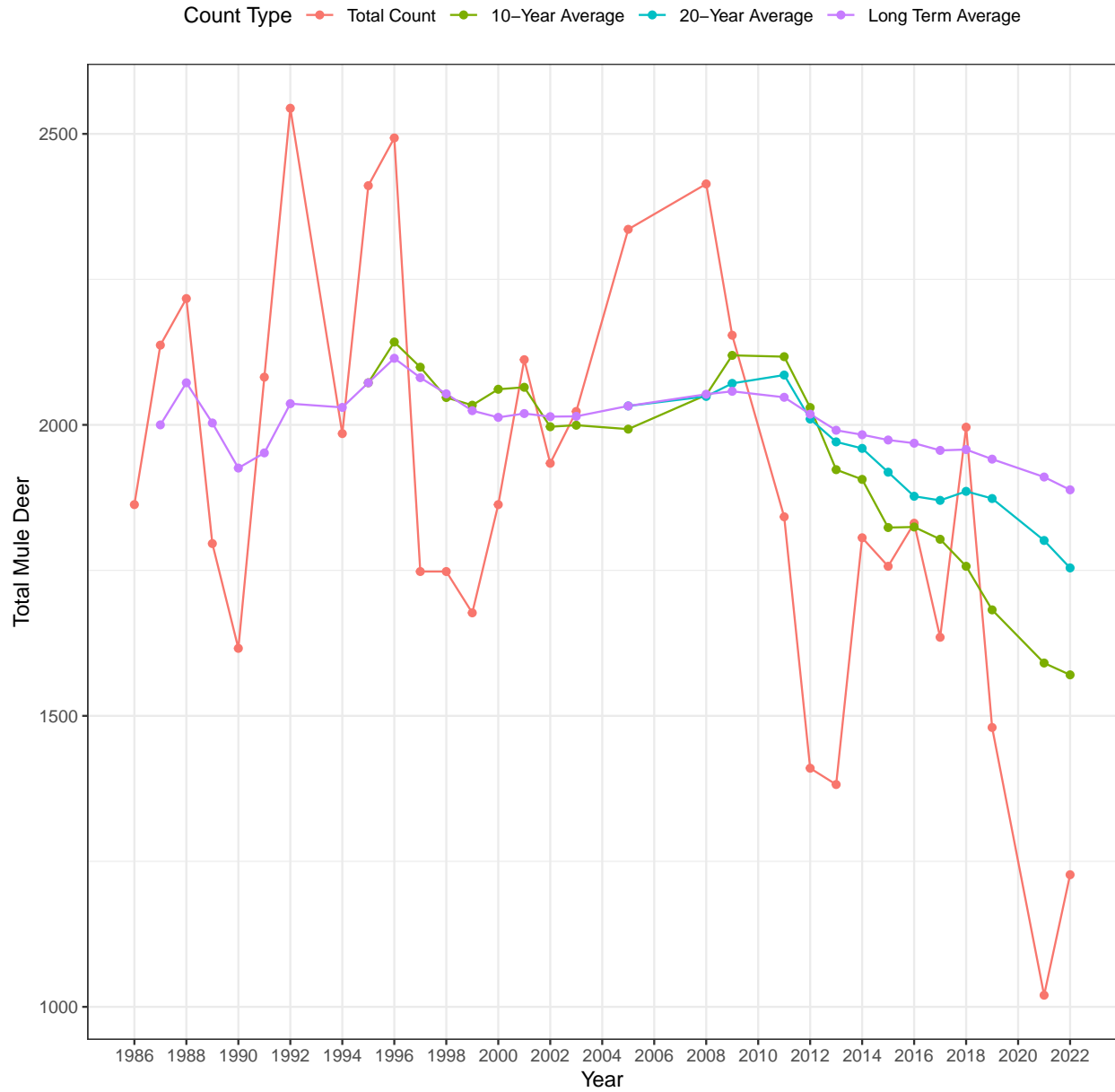


Figure 2: Total mule deer numbers observed during spring surveys of the Gardiner Trend Area located in HD 313, 1986-Present. Note that the 10-year and 20-year averages are the average of all surveys spanning 10/20 years up to and including the current year; because surveys are usually conducted every year, this average typically includes about 10/20 surveys, but may include fewer during decades where an annual survey was not conducted. The long-term average includes all data through the current year.

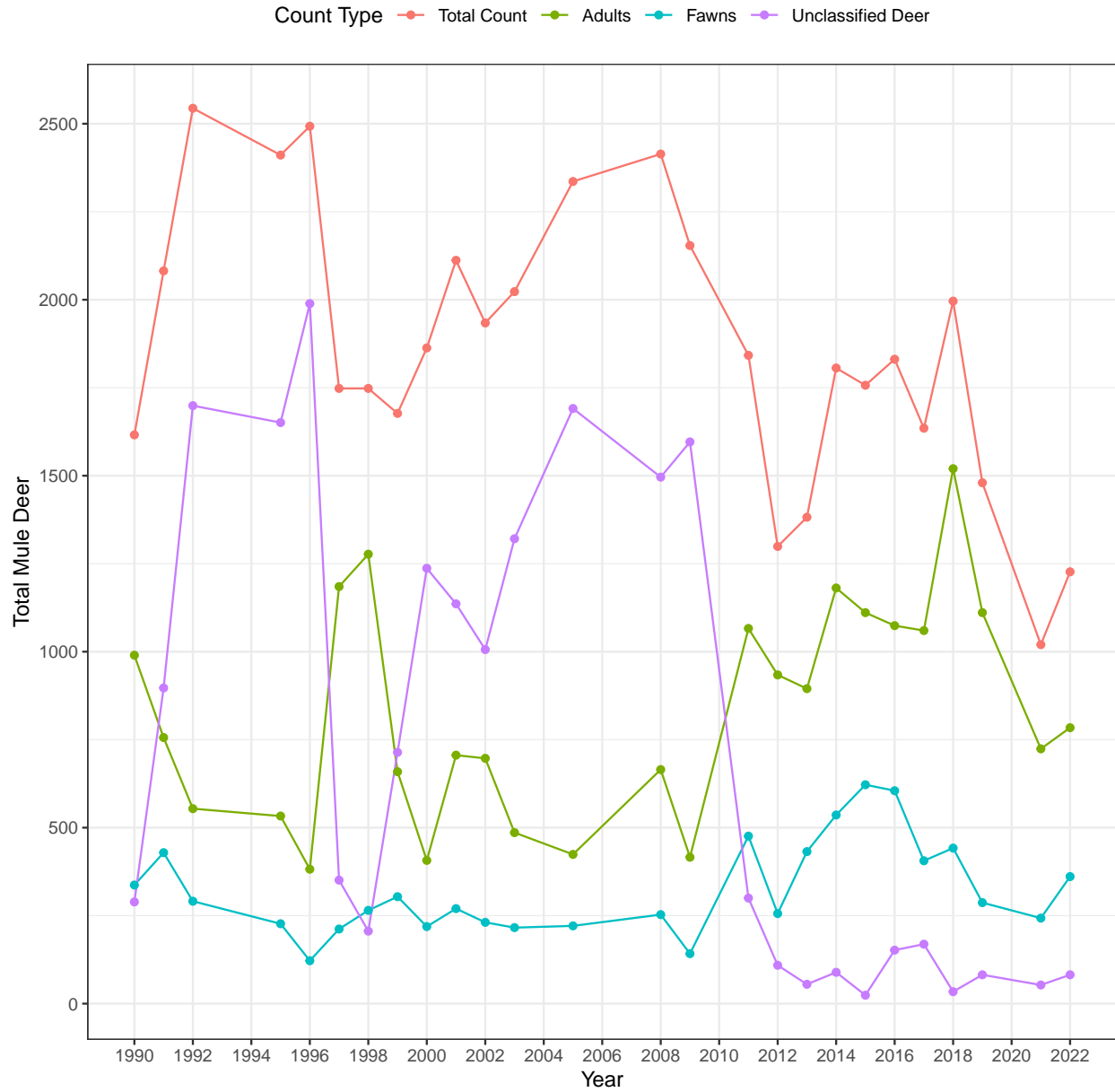


Figure 3: Number of total mule deer, adults, and fawns observed during spring surveys of the Gardiner Trend Area located in HD 313, 1990-Present.

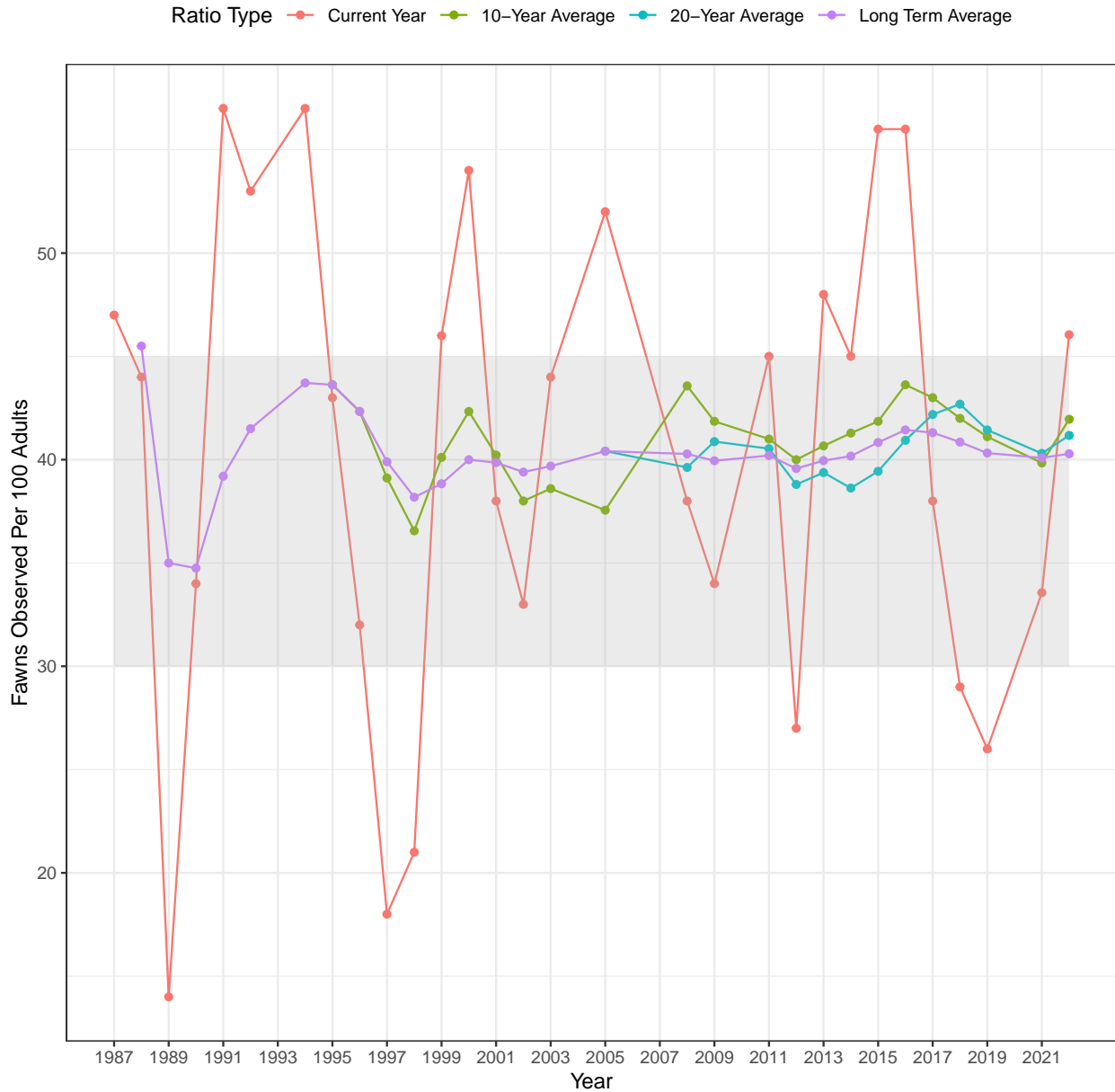


Figure 4: Fawn:Adult ratios observed during spring surveys of the Gardiner Trend Area located in HD 313, 1987-Present. The grey ribbon indicates the recruitment standard of 30-45 fawns per 100 adults for southern mountain areas identified by Montana’s Adaptive Harvest Management Plan for mule deer. Note that the 10-year and 20-year averages are the average of all surveys spanning 10/20 years up to and including the current year; because surveys are usually conducted every year, this average typically includes about 10/20 surveys, but may include fewer during decades where an annual survey was not conducted. The long-term average includes all data through the current year.

Harvest History and Management

HD 313 is a mule deer special management district. Mule deer wintering in the Gardiner Basin are primarily migratory, some traveling long distances from many different summer ranges. Once deer arrive on winter range in the Gardiner Basin they are highly vulnerable to harvest due to the open terrain, large amounts of public land, and road systems that facilitate hunter access in areas of high mule deer use. A special management season has been in place since 1994 which allows a three week buck season and no buck harvest opportunity during the final two weeks of the general season. These changes were made in fall 1994 following three years of a “2-Point Mule Deer Season” during 1991-1993 which did not achieve objectives. These changes were made with the objectives of improving quantity and quality of bucks, specifically to:

- Maintain a post season ratio of at least 15 bucks:100 does (previously 4-6 bucks/100 does)
- Increase the percentage of older bucks (≥ 2.5 years) in the post season population to 35% or more (previously 25-29%).

This year’s observed buck:doe ratio is above the minimum goal (Figure 3). The objectives of the 3-week buck season have been met most years since it was established (Figures 3 and 7) Antlerless harvest has been permitted with antlerless B licenses in varying numbers over the years (Table 1).

Total harvest has trended down in recent years (Figure 9); this decline has been driven by a decline in buck harvest, as antlerless harvest has been relatively stable (Figure 10) since 2018. Although buck harvest has trended down in recent years, the proportion of larger bucks harvested (≥ 4 antler points on one side) has remained relatively stable (Figure 11, Table 1).

Due to spring survey results indicating declining mule deer numbers and declining harvest (Figure 9), antlerless opportunity was reduced for the 2012-2013 seasons. Mule deer antlerless licenses were largely eliminated statewide for the 2014-2015 seasons due to concerns over statewide mule deer numbers. As the number of mule deer observed in the Gardiner Basin increased, antlerless B licenses were reinstated with a limited quota of 50 in 2016. This quota was increased to 100 in 2018.

When the population is within 30% of the long-term average, Montana’s Adaptive Harvest Management plan for mule deer recommends none-moderate numbers of antlerless B licenses. When the population is substantially below the long term-average, the AHM plan recommends limiting antlerless harvest to B licenses issued to respond to localized game damage situations. At this point, no adjustments are planned ahead of the 2022 hunting season.

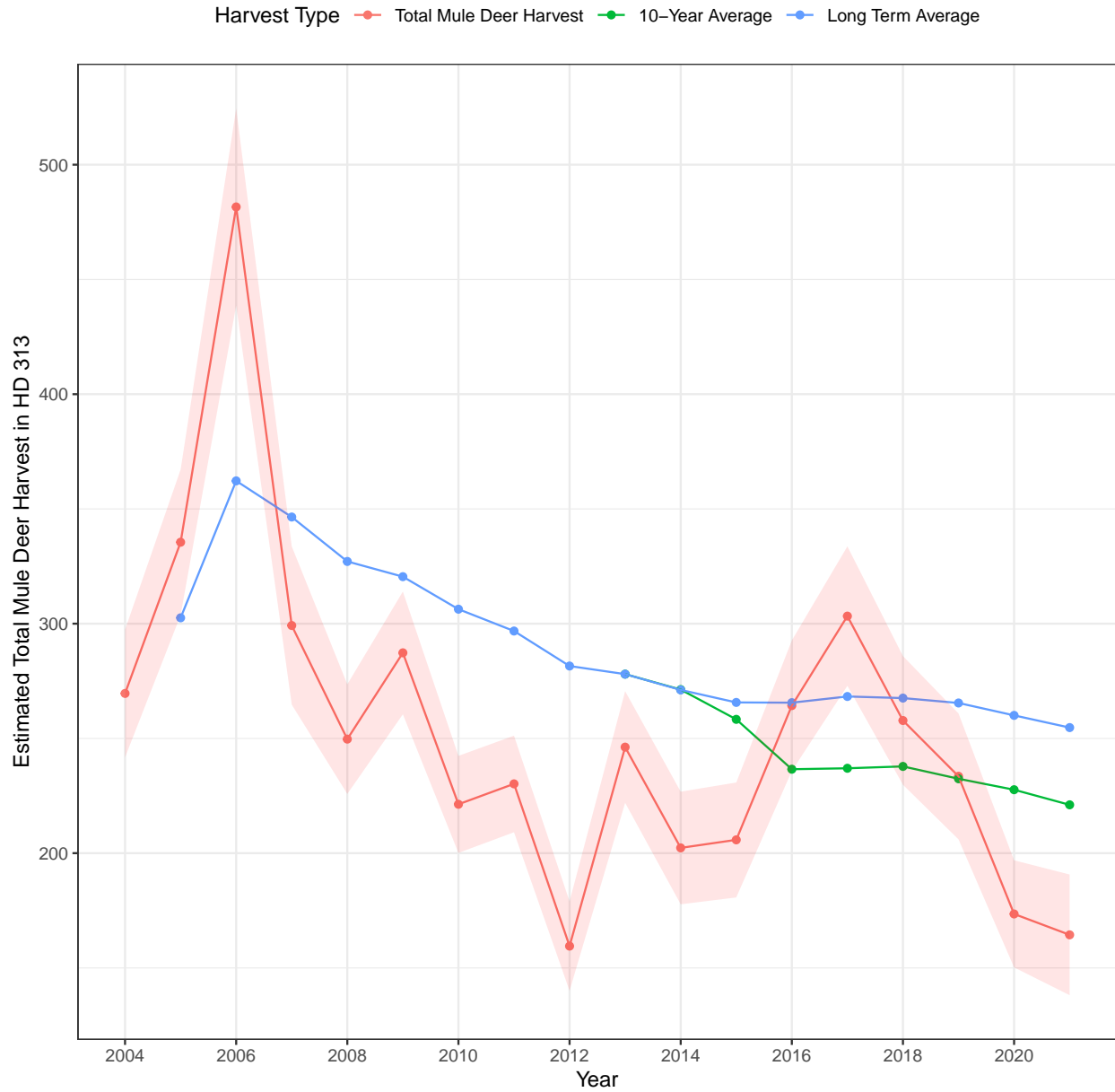


Figure 5: Estimated total mule deer harvest in HD 313, 2004-Present. The shaded red ribbon represents the 80 percent confidence interval for each annual total harvest estimate. Note that the 10-year average is the average of all surveys spanning 10 years up to and including the current year. The long-term average includes all data through the current year (i.e. the sample size increases in later years).

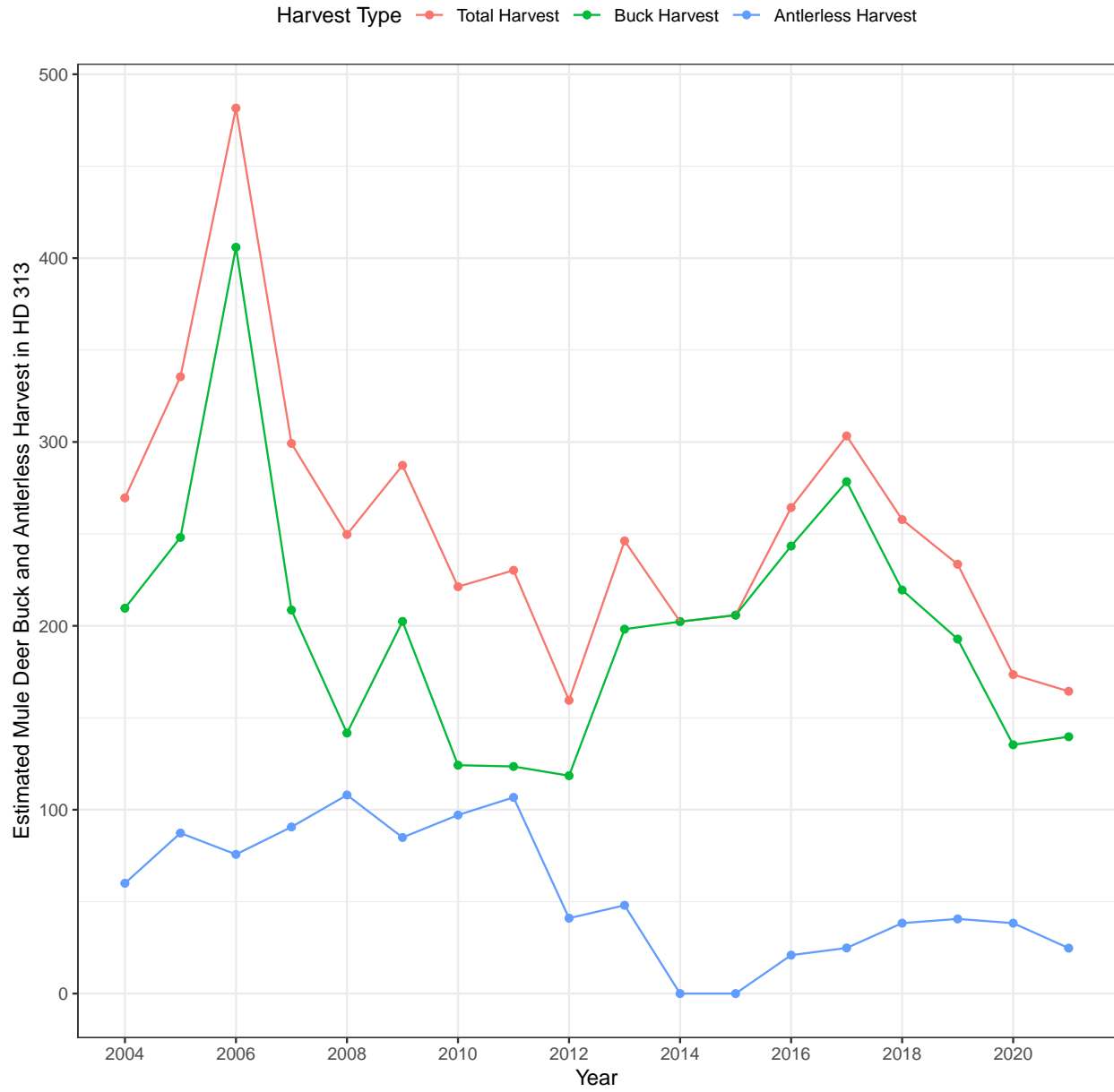


Figure 6: Estimated total, buck, and antlerless mule deer harvest in HD 313, 2004-Present.



Figure 7: Estimated mule deer buck harvest in HD 315, 2004-Present.

Table 2: Mule deer counts in the Gardiner Trend Area and estimated harvest in HD 313, 2004-2022

Year	Total Deer ^a	Total Harvest ^b	Antlerless Harvest	General License Antlerless Harvest ^c	B License Antlerless Harvest ^d	B License Quota ^e	Buck Harvest	Proportion Bucks \geq 4 Points ^f
2004		270	60	9	50	175	210	0.438
2005	2336	336	87	10	74	175	248	0.598
2006		482	76	4	72	175	406	0.589
2007		299	91	5	76	175	209	0.608
2008	2414	250	108	12	87	325	142	0.668
2009	2154	287	85	0	80	325	202	0.640
2010		221	97	0	97	325	124	0.537
2011	1842	230	107	3	99	325	124	0.605
2012	1410	160	41	3	33	85	118	0.671
2013	1382	246	48	3	45	85	198	0.636
2014	1806	202	0	0	0	0	202	0.706
2015	1757	206	0	0	0	0	206	0.611
2016	1831	264	21	3	15	50	243	0.601
2017	1635	303	25	3	19	50	278	0.587
2018	1996	258	38	0	32	100	220	0.631
2019	1480	234	41	3	38	100	193	0.554
2020		174	38	0	38	100	135	0.581
2021	1020	164	25	4	21	100	140	0.645
2022	1227							

^a Total number of mule deer observed in the Gardiner Basin Trend Area during spring survey (if conducted).

^b Rounding error may result in an estimated total that is different than the sum of the buck and antlerless harvest.

^c Antlerless mule deer harvested using a general license.

^d Antlerless mule deer harvested using a B license.

^e Prior to 2014, B licenses in HD 313 were issued for 3 separate subunits; this column represents the total issued in all 3 subunits.

^f The proportion of bucks harvested that had at least 4 antler points on one side.