2019 LATE WINTER CLASSIFICATION OF NORTHERN YELLOWSTONE ELK

A collaborative survey by the Northern Yellowstone Cooperative Wildlife Working Group

Report Prepared by: Karen Loveless, Montana Fish Wildlife and Parks

kloveless@mt.gov (406) 333-4211

March 2019

Introduction

Annual classification surveys of northern Yellowstone elk have been conducted on their winter range since 1968. The objective of this survey is to classify a representative sample of the northern Yellowstone elk herd in order to estimate the overall sex and age structure of the population. These estimates are used to obtain an index of winter calf survival and recruitment as well as adult and yearling bulls in the population. The Northern Yellowstone Cooperative Wildlife Working Group (NYCWWG) has conducted these classifications since 1986. This group is comprised of resource managers and biologists from Montana Fish, Wildlife, and Parks (MFWP), National Park Service; Yellowstone National Park (YNP), U.S. Forest Service; Gallatin-Custer National Forest (USFS), and U.S. Geological Survey; Northern Rocky Mountain Science Center (USGS). The purpose of the Working Group is to cooperatively preserve and protect the long-term integrity of the northern Yellowstone winter range for wildlife species by increasing our scientific knowledge of the species and their habitats, promoting prudent land management activities, and encouraging an interagency approach to data collection, answering questions, and solving problems.

Summary

The 2019 northern Yellowstone elk classification was conducted by helicopter March 17-19. Most years we conduct this survey as a sampling of the population. This year's survey was flown intensively, consistent with the 2016 survey. We covered most of the northern range and counted all elk observed (Figure 1). We classified all groups for brow-tine bulls and classified most groups for calves, yearling bulls and cows.

A total of 5800 elk were counted, and 5510 were classified, resulting in a total of 629 calves, 214 yearling bulls and 524 mature bulls. Observed ratios were 15.2 calves and 17.8 total bulls per 100 cows, including 5.2 yearling bulls and 12.6 brow-tined bulls per 100 cows (Table 1). Of the 499 classified brow-tined bulls, 249 (50%) had 5 or fewer antler points and 250 (50%) had 6 or more antler points (Table 2).

In comparison to 2016 results and long-term trends (Tables 3-5):

- Total elk numbers were down 23% from the 7,510 counted during the 2016 classification survey. This was due to 16% fewer cows, 46% fewer calves and 42% fewer yearling bulls.
- Elk numbers were also down 23% as compared to the 2018 trend count of 7,579 elk, however this years count of 5,800 elk is above than the 10-year average count of 5,399 elk
- The calf ratio of 15.2 per 100 cows is below average. This is the second year of below average calf ratios, as compared to above average ratios 2015-2017.
- The yearling bull ratio is below average, as compared to above average ratios 2015-2018.
- Brow-tined bulls increased by 92 (21.3%), from 432 observed in 2016 to 524 observed in 2019.
- Ratios of brow-tined bulls per 100 cows increased from 8.7 in 2016 to 12.6 in 2019, partly due to increased numbers of mature bulls and partly due to a 16% decrease in cow numbers.
- The ratio of 12.6 brow-tined bulls per 100 cows is above the recent average of 8.8, but below the long-term average of 20.5.
- The proportion of 6-point and greater bulls increased from 46% in 2016 to 50% in 2019.

Discussion

Winter 2019 has brought long spells of sub-zero temperatures and very deep snow conditions in some areas of the Yellowstone northern range. Elk were concentrated in the lower elevations and generally appeared to be in poor condition. Conditions in the Dome Mountain area were unusually severe, and we observed low ratios of calves (11.5 calves:100 cows) and yearling bulls (4.4 yearling bulls:100 cows). Conditions in Gardiner Basin north of YNP appeared to be less severe as compared to Dome Mountain and within YNP. Calf ratios were higher (22.3 calves:100 cows) in Gardiner Basin however many elk appeared to be in poor condition in this area as well. This is the second consecutive year with calf ratios below the threshold of 20 calves per 100 cows considered necessary to maintain a stable population. It is likely that additional winter mortalities will occur into spring, further reducing overall numbers and recruitment.

North of the Park in hunting district 313 bull ratios remain low. We observed a slight increase from 2.6 brow-tined bulls per 100 cows observed in 2016 to 3.4 in 2019, and a decrease in the proportion of 6-point and greater bulls from 44% to 27% . Within YNP brow-tined bull numbers increased 21% from 339 observed in 2016 to 410 observed in 2019, and the proportion of 6-point and greater bulls increased from 39% in 2016 to 57% observed in 2019. During the 2016 survey, 17% of bulls within YNP had already shed their antlers when the survey occurred, as compared to 4% shed bulls in 2019. The larger proportion of shed bulls in 2016 makes it impossible to assess whether the proportion of 6-point+ bulls in the population has increased.

Since the hunting season structure was adjusted in 2016, we observed below average harvest of 103 bulls in 2016 when weather was mild, and above average harvest of 305 bulls in 2017 when severe weather resulted in an early elk migration out of the Park. Given the mild weather during the 2018 hunting season it is likely that harvest was more similar to 2016, and this may explain the slight increase in brow-tined bulls this year. Below average yearling bull and calf recruitment this year is likely to result in lower numbers of brow-tined bulls being recruited into the population over the next two years.

Typically a cooperative trend count is conducted each year to estimate overall elk numbers and population trends. This year we were unable to complete the trend count, and instead attempted to obtain an overall count during the course of the classification. In recent years, the number of elk observed during the classification has been similar or greater than the number observed during the trend count, due to higher sightability of elk with a helicopter versus fixed-wing aircraft. We observed a total of 5,800 elk, which is 23% lower than the 7,579 observed during the 2018 trend count, and 23% lower than the 7,511 observed during the 2016 classification survey. The 2018 trend count resulted in a 42% increase from the previous year, and we speculated on whether there were unusual elk movements that resulted in that high count, or whether unusually high sightability had resulted in a higher count. Again this year, the high fluctuation in numbers could be due to unusual elk movements. However, with two consecutive years of low calf recruitment, some degree of population decline would be expected until calf recruitment improves.

Table 1. Results of northern Yellowstone elk classification survey by elevation sector, March 2019

Year	Area		Cows	Calves	Yearling Bulls	Total BTB[1]	Total Bulls	Total Elk Classified	Calves: 100 Cows	YB[2]:100 cows	BTB[1]:100 Cows	Total Bulls: 100 Cows
2019	Montana (HD313)		3328	539	168	114	282	4149	16.2	5.0	3.4	8.5
	Yellowstone Park	Lower	607	69	38	103	141	817	11.4	6.3	17.0	23.2
		Middle	140	14	5	232	237	391	10.0	3.6	165.7	169.3
		Upper	68	7	3	75	78	153	10.3	4.4	110.3	114.7
		Total YNP	815	90	46	410	456	1361	11.0	5.6	50.3	56.0
	Total Northern Range		**4143**	**629**	**214**	**524**	**738**	**5510**	**15.2**	**5.2**	**12.6**	**17.8**
							Long-term Average		20.5	6.3	20.5	26.8

[1]BTB = Brow-tined Bull [2]YB = Yearling Bull

Table 2. Bull classification results by elevation sector, March 2019. Bulls were classified as yearling bull ("YB"), brow-tined bull ("BTB") or shed bull. Brow-tined bulls were classified as either 5-points or fewer ("BTB 5-"), 6-points or greater ("BTB 6+") or unclassified ("Uncl BTB").

Year	Area		Total YB	Total BTB	BTB 5-	BTB 6+	Shed Bulls	Uncl BTB	Total BTB	Total Bulls	% YB	% ≤ 5 points*	% ≥ 6 points*	% Shed Bulls
2019	Montana (HD313)		168	114	80	30	4		114	282	60%	73%	27%	4%
	Yellowstone Park	Lower	38	103	50	44	6	3	103	141	27%	53%	47%	6%
		Middle	5	232	81	141	8	2	232	237	2%	36%	64%	3%
		Upper	3	75	38	35	2		75	78	4%	52%	48%	3%
		Total YNP	46	410	169	220	16	5	410	456	10%	43%	57%	4%
	Total Northern Range		**214**	**524**	**249**	**250**	**20**	**5**	**524**	**738**	**29%**	**50%**	**50%**	**4%**

* Calculated as % of total classified (not shed) brow-tined bulls

Table 3. Comparison of brow-tined bulls observed during the 2016 versus 2019 classification surveys.

Area	Total Brow-tined bulls			Shed Bulls			Brow-tined bulls/ 100 cows			%6-point or greater bulls		
	2016	2019	%change	2016	2019	%change	2016	2019	%change	2016	2019	%change
HD 313	93	114	22.6%	3	4	33.3%	2.6	3.4	30.8%	46%	27%	-41.3%
YNP	339	410	20.9%	56	16	-71.4%	23.6	50.3	113.1%	46%	57%	23.9%
Northern Range Total	432	524	21.3%	59	20	-66.1%	8.7	12.6	44.8%	46%	50%	8.7%

Figure 1. Locations of elk observed during the March 2019 northern Yellowstone elk classification survey, including boundaries of elevation sectors used to distribute classifications: Montana HD 313/Lower Outside Sector, and the three sectors within Yellowstone Park: Lower Inside, Middle and Upper.

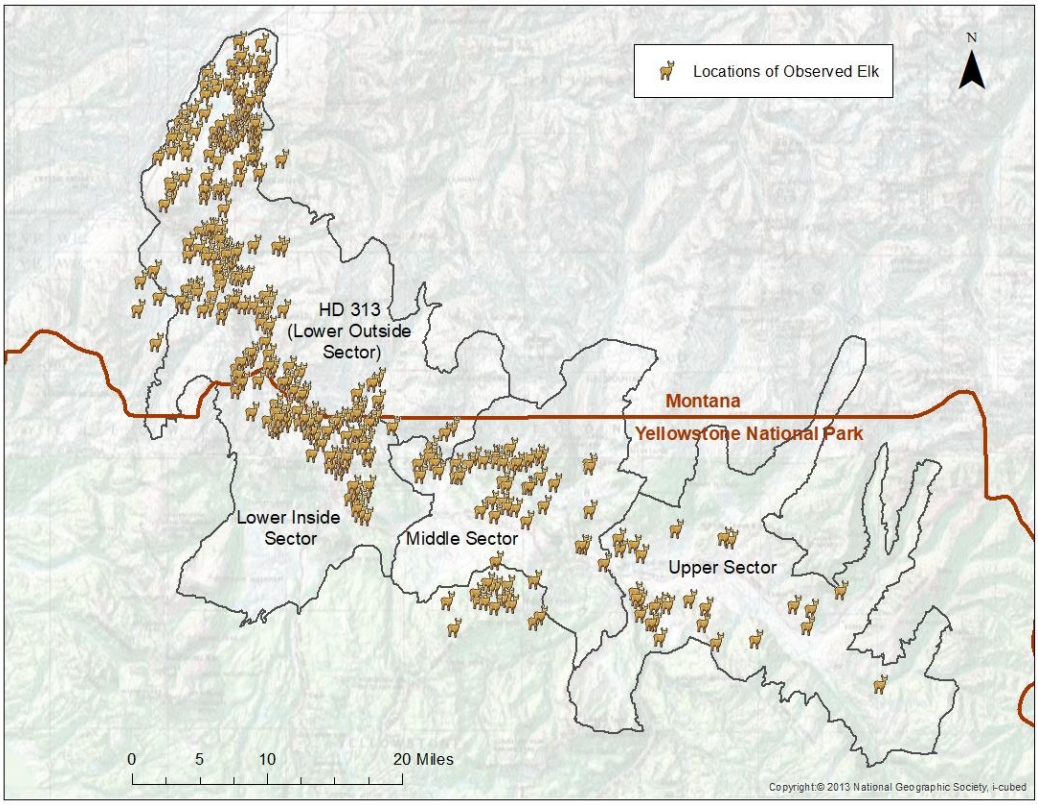

Table 4. Population and harvest trends for northern Yellowstone elk 2004-2019

Year	Total Elk Observed	Elk Observed in HD313	Migration Size	Late Hunt Harvest	General Season Harvest	Total Harvest	Total Antlerless Harvest	Total BTB Harvested	% BTB Harvest ≥ 6 Points
2004	8,471	3,990	47%	457	87	544	421	123	88%
2005	9,545	3,243	34%	132	291	423	124	299	86%
2006	6,588	3,549	54%	124	449	573	120	453	75%
2007	6,738	*	30%	103	140	243	102	141	53%
2008	6,279	4,088	65%	127	140	267	145	122	60%
2009	7,109	3,638	51%	91	163	254	126	128	54%
2010	6,070	3,359	55%	0	379	379	88	291	69%
2011	4,635	3,303	71%	0	216	216	61	155	53%
2012	4,174	2,763	66%	0	186	186	18	168	54%
2013	3,915	3,000	77%	0	187	187	22	165	53%
2014	2063*	1,587	77%	0	349	349	31	315	48%
2015	4,850	3,714	77%	0	509	509	37	472	58%
2016	4,912	3,804	77%	0	154	154	52	103	25%
2017	5,349	4,776	89%	0	364	364	59	305	50%
2018	7,579	5,738	76%	0	Harvest data not available at time of report				
2019	5800**	4,352	75%	0	2019 Harvest has not yet occurred				

* Survey conditions were poor, count was not reliable

** Count was conducted by helicopter during classification in March

Table 5. Late winter helicopter classification survey results for northern Yellowstone elk, 1995-2019 and annual brow-tined bull ("BTB") harvest. The "Total Northern Range" results include elk classified within the Montana and Yellowstone National Park portions of the range; "Montana Only" results include only those elk classified north of Yellowstone National Park in hunting district 313.

	Total Northern Range				Montana Only				
Year	Calves: 100 Cows	Yearling Bulls: 100 cows	Brow-tined Bulls :100 cows	Total Bulls: 100 cows	MT Calves: 100 Cows	MT Yearling Bulls: 100 cows	MT Brow-tined Bulls: 100 cows	MT Total Bulls: 100 Cows	Brow-tined Bulls Harvested
1995	33.4	10.9	28.7	39.7	62.1	20.0	60.1	80.0	220
1996	28.5	8.7	25.8	34.5	Survey restricted to YNP				144
1997	No Survey				No Survey				98
1998	22.4	4.2	60.9	65.1	34.7	9.0	50.8	59.8	86
1999	33.9	8.9	42.0	50.8	46.3	13.4	28.0	41.3	131
2000	22.7	6.7	16.8	23.5	26.8	6.4	1.3	7.7	229
2001	29.0	6.5	53.6	60.1	35.2	6.9	10.2	17.0	134
2002	13.8	7.2	35.9	43.1	11.4	9.5	13.3	22.8	200
2003	12.4	3.7	18.1	21.8	18.0	2.6	3.9	6.4	105
2004	12.3	3.4	20.7	24.1	19.8	3.9	6.3	10.2	114
2005	13.0	4.5	15.8	20.3	17.2	7.5	1.7	9.2	297
2006	23.8	6.0	13.9	19.9	26.6	7.1	7.3	14.5	405
2007	18.6	6.1	11.7	17.8	23.0	7.1	1.0	8.1	116
2008	11.4	2.4	14.4	16.8	14.0	2.2	9.6	11.9	81
2009	21.5	4.0	10.7	14.7	27.2	4.7	1.9	6.6	123
2010	No Survey				No Survey				301
2011	No Survey				No Survey				161
2012	10.8	4.2	8.1	12.3	11.1	4.3	0.8	5.1	167
2013	18.4	5.4	10.5	15.8	20.9	7.3	2.7	10.0	165
2014	Survey restricted to north of YNP				24.1	8.7	3.1	11.8	315
2015	26.5	8.7	6.5	15.2	29.6	9.4	2.7	12.1	472
2016	23.3	7.4	8.7	16.1	25.2	8.0	2.6	10.6	103
2017	21.0	9.7	7.3	17.0	22.1	10.8	3.8	14.6	305
2018	18.7	8.0	7.9	15.9	20.7	8.3	4.5	12.9	
2019	15.2	5.2	12.6	17.8	16.2	5.0	3.4	8.5	
10-Year Ave (2010-2019)	19.1	6.9	8.8	15.7	21.2	7.7	3.0	10.7	234.7
Prev 10-Year Ave (1999-2009)	19.3	5.4	23.0	28.4	24.1	6.5	7.7	14.2	172.5
25-Year Average (1995-2019)	20.5	6.3	20.5	26.8	25.3	7.7	10.4	18.1	194.4