

January 28, 2015

## MEMORANDUM

To: Northern Yellowstone Cooperative Wildlife Working Group

From: Travis Wyman, Wildlife Biological Technician, Yellowstone National Park

Subject: 2015 Annual Winter Trend Count of Northern Yellowstone Elk

### Summary

A survey using three airplanes was conducted by biologists from the Montana Department of Fish, Wildlife & Parks and the National Park Service on January 20, 2015. Observers counted 4,850 elk, including 1,130 elk (23%) inside Yellowstone National Park and on Deckard Flats south of Bear Creek and 3,720 elk (77%) elsewhere north of the park. This count was slightly higher than the 3,915 elk counted in 2013 (no count in 2014) and was the highest since 6,037 elk were counted in 2010.

### Introduction

Annual winter counts of northern Yellowstone elk from airplanes have been conducted on the northern range since 1967. The objective of these flights is to obtain a minimum count of the northern Yellowstone elk population while they are concentrated on the relatively open (i.e., non-forested), snow-covered, low-elevation, portions of their winter range. The Northern Yellowstone Cooperative Wildlife Working Group has conducted these counts since 1986. This group is comprised of resource managers and biologists from the Montana Department of Fish, Wildlife & Parks, National Park Service (Yellowstone National Park), U.S. Forest Service (Gallatin National Forest), and U.S. Geological Survey (Northern Rocky Mountain Science Center). The Northern Yellowstone Cooperative Wildlife Working Group was formed in 1974 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 answering questions and solving problems.

### Methods

The 2015 count was conducted on January 20, 2015 using one PA-18 Super Cub, one Husky, and one A.C. Scout. Each plane covered a segment of the winter range for northern Yellowstone elk, which was divided into a total of 68 count units located both inside and outside Yellowstone National Park. Both the pilot and observer in each plane searched for elk during the survey and the observer counted elk in observed groups (i.e.,  $\geq 1$  elk). Group locations were recorded as UTM coordinates using GPS units on NAD 83. Data were entered into an Excel spreadsheet and locations were mapped using Geographic Information Systems software (Figure 1).

James Ortman (Northern Wings Aviation, Belgrade Montana) and Karen Loveless (Montana Fish, Wildlife, and Parks) surveyed count units west of the Yellowstone River from the park boundary north to Yankee Jim Canyon (i.e., units 1-4). They also surveyed count units east of the Yellowstone River from the Bear Creek area north to Dome Mountain (i.e., units 58N and 59 through 68). Mark Packila (Sky Aviation, Dubois Wyoming) and Travis Wyman (Yellowstone Center for Resources, Yellowstone National Park) surveyed count units within Yellowstone National Park from Reese Creek to Tower Creek, south of the Yellowstone River (i.e., units 5-25). Steve Ard (Tracker Aviation, Belgrade, Montana) and Doug Smith (Yellowstone Center for Resources, Yellowstone National Park) surveyed count units within and outside Yellowstone National Park, and north of the Yellowstone River from Bear Creek to the vicinity of Tower Creek and on the South side of the Lamar River (i.e., units 58S through 26).

## **Results**

The count was conducted from 0830 to 1115 inside the park and 0745 to 1330 outside the park on January 20, 2015. Ambient temperatures at the Gardiner, Montana airport during the survey ranged between 20 and 25 degrees Fahrenheit. Skies were mostly clear with some lingering snow showers in high elevation areas, and winds were less than 10 miles per hour across the entire survey area. One to 4 inches of snow accumulated across the survey area during the night and pre-dawn hours before takeoff.

A total of 4,850 elk were counted during the survey (Tables 1 and 2). Seventy-seven percent (3,720) of these elk were observed north of the boundary of Yellowstone National Park, while 23% (1,130) were observed inside the park. Group sizes ranged between 1 and 603 elk.

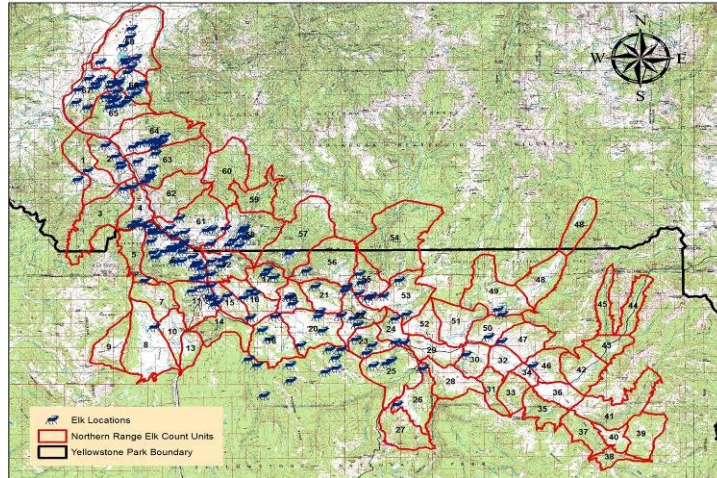
## **Discussion**

The 2015 count of northern Yellowstone elk was slightly higher than the 3,915 elk counted in 2013 (no count in 2014) and was the highest since 6,037 elk were counted in 2010 (Table 1). The long-term trend in counts indicates abundance remains substantially lower than the high count of about 19,000 elk in 1994.

Predation by wolves and other large carnivores (i.e. grizzly bears, black bears, cougars), past human harvests of antler-less elk during the Gardiner Late Hunt, and drought effects on maternal condition and recruitment were indicated as the primary factors contributing to the decreasing trend during 1995-2005. To reduce hunter mortality on female elk, Montana Fish, Wildlife & Parks reduced the number of antler-less permits for the Gardiner Late Elk Hunt from 1,102 in 2005 to 100 per season during 2006-2010, and eliminated this hunt beginning in 2011. Although lag effects from harvests may continue for some time, these reductions should increase the survival of prime-aged females with their high reproductive value and recruitment of calves into the breeding population into the future. Also, a substantial decrease from 94 to 42 (~47% decrease) wolves occurred on the portion of the winter range for northern Yellowstone elk inside the park during 2007-2014 due to intra-specific strife, food stress, and disease. This decrease suggests the wolf population may be beginning to respond numerically to decreased elk availability.

Raw counts underestimate the actual abundance of elk and the extent of undercount could vary markedly among years depending on survey conditions. Also, detection probabilities have likely changed between areas of the northern range following wolf recovery, with elk in the park being more widely distributed in small groups and timbered areas, while elk near Dome Mountain and Dailey Lake continue to congregate in relatively large groups in open areas. To address this issue the Northern Yellowstone Cooperative Wildlife Working Group is collaborating with Utah State University to conduct an elk sightability study during 2015 to 2017 to better estimate how many elk are missed during each annual count.

The winter distribution of northern Yellowstone elk has changed since 2008, with more than one-half of the counted elk being observed north of Yellowstone National Park. Possible reasons for a high proportion of elk migrating to this lower elevation winter range include milder environmental conditions (e.g., less snow) and better forage availability. Wolf densities and the cessation of the late hunt may also be factors influencing the winter distribution of elk.



**Figure 1:** Elk count locations across the Yellowstone Northern Range surveyed on January 20, 2015.

**TABLE 1.** Aerial winter trend counts of northern Yellowstone elk on their winter range in and near Yellowstone National Park during 1990 through 2015.

Survey Date (Winter)	No. Elk Counted	Comments
January 18-19, 1990	14,829	Counts over 2 days during Gardiner late hunt
February 6, 1991	9,465	Poor count; believed to be inaccurate
December 16, 1991 (1992)	12,859	
November 21 and December 3, 1992 (1993)	17,585	Counts over two widely separated days
January 20-21, 1994 (1994)	19,045	Counts over 2 days during Gardiner late hunt
December 21, 1994 (1995)	16,791	
(1996)		No count
(1997)		No count
January 18 and 27, 1998	11,736	Counts over 2 days during Gardiner late hunt
January 30 and February 11, 1999	11,742	Counts over 2 days during Gardiner late hunt
December 27, 1999 (2000)	14,539	Good survey – one day coverage of all units
December 21, 2000 (2001)	13,400	Good survey – one day coverage of all units
December 21-23, 2001 (2002)	11,969	Good conditions, but counts over three days
December 24, 2002 (2003)	9,215	One day coverage of all units
December 18, 2003 (2004)	8,335	Good survey – one day coverage of all units
January 5, 2005	9,545	Good survey – one day coverage of all units
March 22, 2006	6,588	Poor count; believed to be inaccurate
December 30, 2006 (2007)	6,738	Good survey – one day coverage of all units
February 14, 2008	6,279	Good survey – one day coverage of all units
January 30 and February 9, 2009	7,109	Good survey – 2 day coverage 10 days apart
February 26, 2010	6,070	Fair count; believed to be inaccurate
December 21, 2010 (2011)	4,635	Good survey – one day coverage of all units
March 7, 2012	4,174	Good survey – one day coverage of all units
February 18, 2013	3,915	Good survey – one day coverage of all units
(2014)		No Count – weather and pilot constraints
January 20, 2015	4,850	Good survey – one day coverage of all units

**TABLE 2.** Summary by unit of the January 20, 2015 counts of northern Yellowstone elk on their winter range in and near Yellowstone National Park, Montana and Wyoming.

<b>Unit</b>	<b>Unit Area (km2)</b>	<b>No. Elk Counted</b>	<b>Observer</b>	<b>Pilot</b>
1	26.58	79	Loveless	Ortman
2	18.3	473	Loveless	Ortman
3	33.69	3	Loveless	Ortman
4	15.25	51	Loveless	Ortman
5	16.72	15	Wyman	Packila
6	41.85	329	Wyman	Packila
7	17.33	0	Wyman	Packila
8	41.47	1	Wyman	Packila
9	18.28	0	Wyman	Packila
10	13.07	0	Wyman	Packila
11	23.78	29	Wyman	Packila
12	18.06	208	Wyman	Packila
13	9.53	0	Wyman	Packila
14	18.71	0	Wyman	Packila
15	11.64	95	Wyman	Packila
16	18.17	36	Wyman	Packila
17	15.45	17	Wyman	Packila
18	27.29	60	Wyman	Packila
19	12	93	Wyman	Packila
20	29.39	92	Wyman	Packila
21	17.01	10	Wyman	Packila
22	19.57	52	Wyman	Packila
23	14.68	12	Wyman	Packila
24	11.15	19	Wyman	Packila
25	33.61	11	Wyman	Packila
26	21.89	11	Smith	Ard
27	22.18	0	Smith	Ard
28	20.11	0	Smith	Ard
29	16.05	0	Smith	Ard
30	13.62	2	Smith	Ard
31	11.14	0	Smith	Ard
32	10.95	0	Smith	Ard
33	13.16	0	Smith	Ard
34	4.93	0	Smith	Ard
35	15.58	0	Smith	Ard
36	13.29	0	Smith	Ard
37	15.37	0	Smith	Ard
38	7.23	0	Smith	Ard
39	20.53	0	Smith	Ard
40	8.6	0	Smith	Ard

41	33.27	0	Smith	Ard
42	21.92	0	Smith	Ard
43	13.04	0	Smith	Ard
44	14.19	0	Smith	Ard
45	12.3	0	Smith	Ard
46	15.05	1	Smith	Ard
47	19.99	1	Smith	Ard
48	37.83	0	Smith	Ard
49	35.65	3	Smith	Ard
50	16.63	3	Smith	Ard
51	23.13	0	Smith	Ard
52	13.96	0	Smith	Ard
53	29.63	12	Smith	Ard
54	60.38	0	Smith	Ard
55	15.89	13	Smith	Ard
56	32.83	1	Smith	Ard
57	47.33	10	Smith	Ard
58	37.2	128	Smith	Ard
59	16.55	0	Loveless	Ortman
60	31.4	0	Loveless	Ortman
61	36.83	330	Loveless	Ortman
62	29.4	0	Loveless	Ortman
63	38.57	178	Loveless	Ortman
64	38.41	120	Loveless	Ortman
65	28.55	76	Loveless	Ortman
66	13.09	112	Loveless	Ortman
67	27.54	1,121	Loveless	Ortman
68	48.89	1,043	Loveless	Ortman
	Total Elk Counted	4,850		