2019-20 North Carolina Avid Grouse Hunter Survey

Chris Kreh, *NCWRC Upland Game Bird Biologist*
Office: (336) 386-0892
Mobile (336) 618-5749
chris.kreh@ncwildlife.org

Since 1984, the North Carolina Wildlife Resources Commission (NCWRC) has conducted an annual grouse hunter survey to estimate long-term grouse hunting trends and provide annual insight into grouse hunting demographics throughout the mountains of North Carolina. Volunteer grouse hunters participate by recording and submitting their annual hunting activity throughout the season. Grouse hunting activity is recorded by county and landownership type (Private Land or Game Land) within the two grouse management regions (Northern Mountains and Southern Mountains) (Fig. 1). Reported hunting trips typically consist of a single day per hunting party.

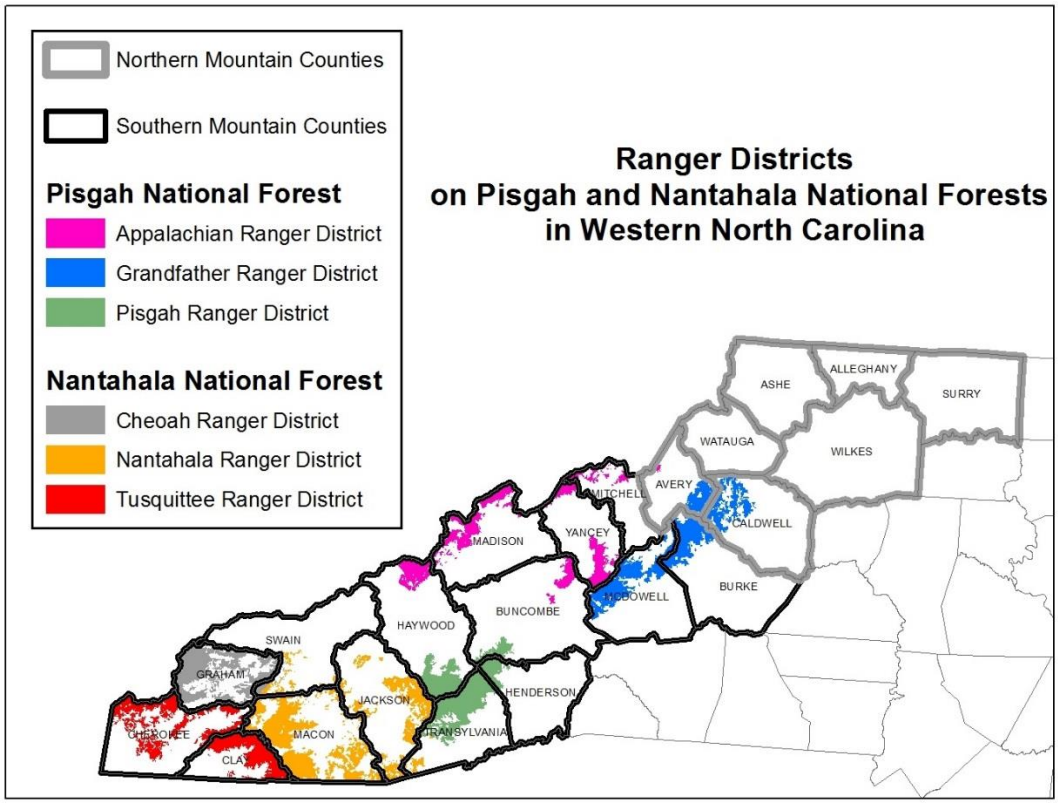

Figure 1. Grouse Management Regions and Ranger Districts on Pisgah and Nantahala National Forests in Western North Carolina.

Forty-seven avid grouse hunters reported information during the 2019-20 season, providing grouse hunting statistics for 454 hunting trips (Fig. 2). The gradual annual decline of total reported grouse hunting trips has primarily been a function of fewer hunters and fewer hunting trips per hunter. Presumably this is due to fewer grouse and poor hunting in recent years. Since the inception of the survey in 1984, Ashe and Madison Counties have had the most grouse hunts reported, with over 4,000 hunts occurring in each of these counties (Fig. 3). During the 2019-20 season, Macon, Haywood, and Clay Counties were most often reported, with more than 50 hunts reported from each.

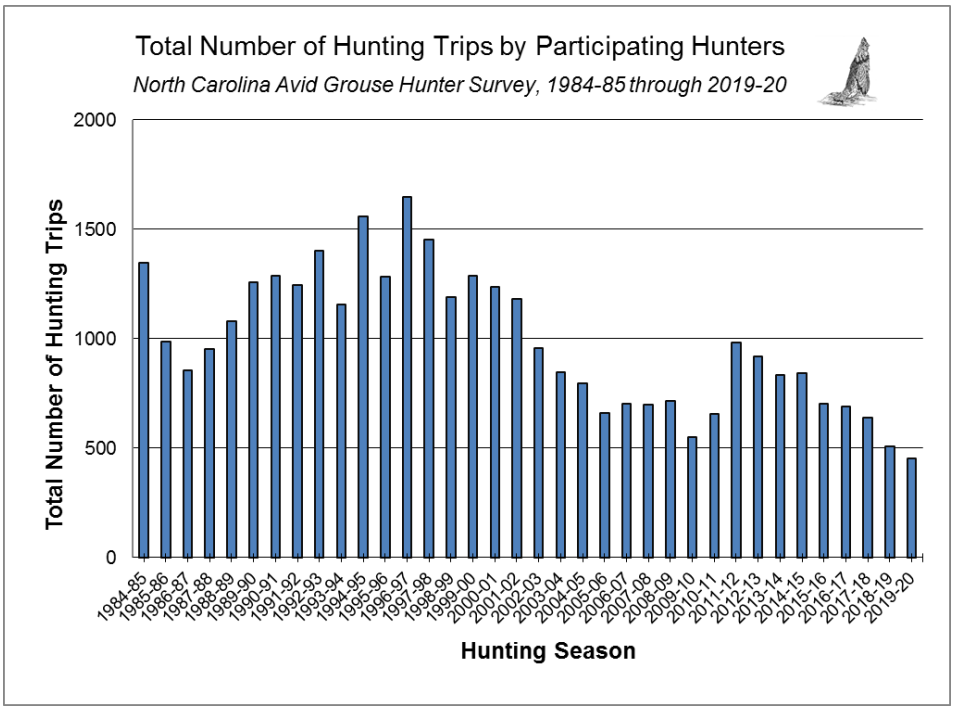

Figure 2. Total number of reported hunts by volunteer avid grouse hunter survey participants, 1984-85 through 2019-20.

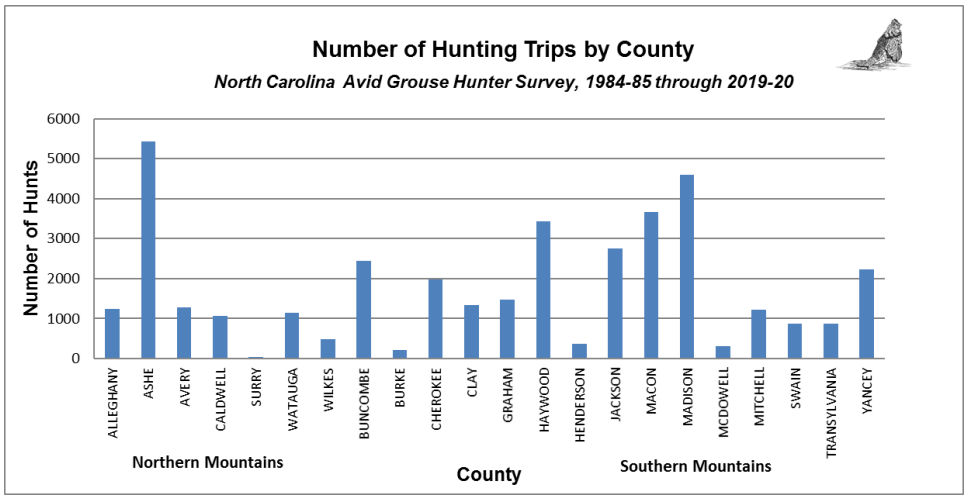

Figure 3. Total number of hunts by county as reported by volunteer avid grouse hunter survey participants, 1984-85 through 2019-20.

During the 2019-20 season, avid grouse survey participants hunted an average of 9.6 times (Fig. 4). It is clear that participants are now hunting considerably fewer times than during the 1980's and 1990's. The average length of a hunting trip has declined somewhat over that time period

as well, with an average trip length of 3.5 hours reported during the 2019-20 season (Fig. 5). This may be a result of aging hunters, poor hunting, or a combination of both.

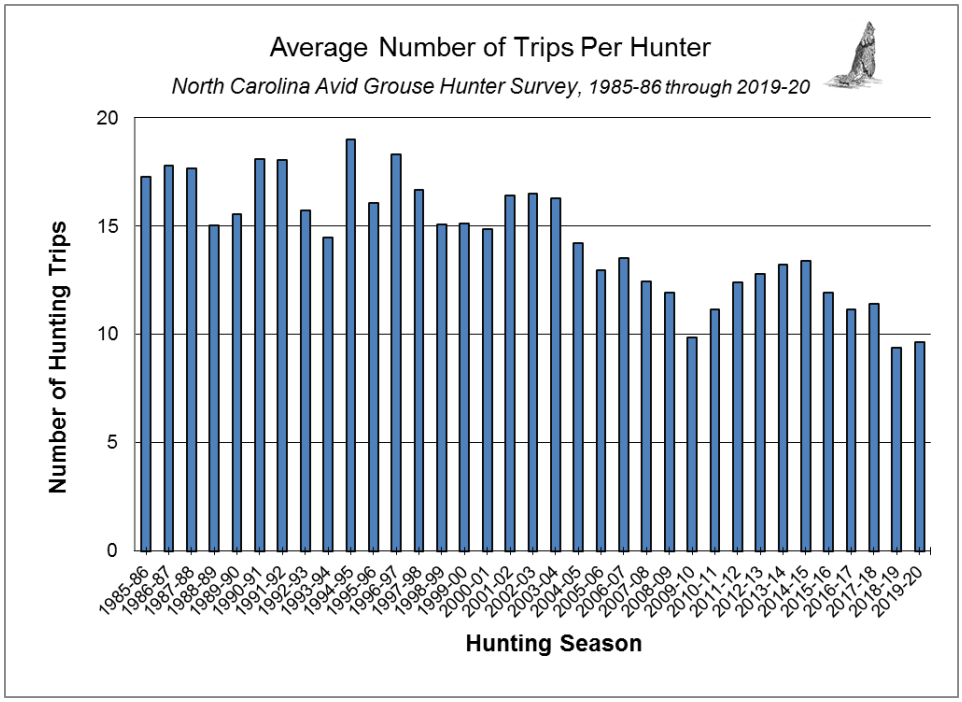

Figure 4. Average number of hunting trips per hunter based on avid grouse hunter survey participants, 1985-86 through 2019-20.

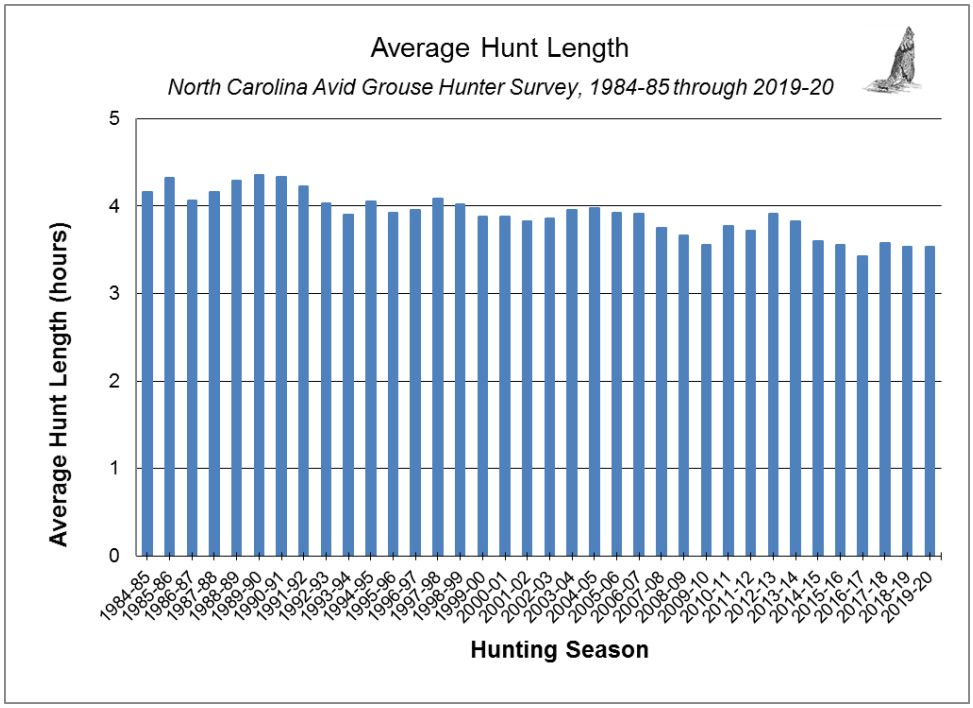

Figure 5. Average length (hours) of hunting trips of avid grouse hunter survey participants, 1984-85 through 2019-20.

Flush rates are presented both by hunting trip and by hours hunted in this report. Flush rates by hour may provide a more precise index to grouse abundance, while flush rates by hunting trip are more applicable from grouse hunting perspectives. However, we recognize that hunters will change their hunting locations over time to areas with relatively more grouse. This selective hunting behavior has a tendency to skew trend estimates such that they may not represent actual annual abundances or changes in abundance across the full landscape.

The avid grouse hunter survey has documented overall long-term declines in hourly flush rates. While some years have shown slight increases, the overall trend has been a steady decline. This has been true on both private land and Game Lands and in both the northern and southern mountain regions. In 2019-20 flush rates on private lands dropped sharply and were only slightly higher than on public Game Lands (Fig. 6). Historically more grouse were reported in the southern mountain region, however flush rates reported from the northern mountains have been very comparable for the last decade (Fig. 7).

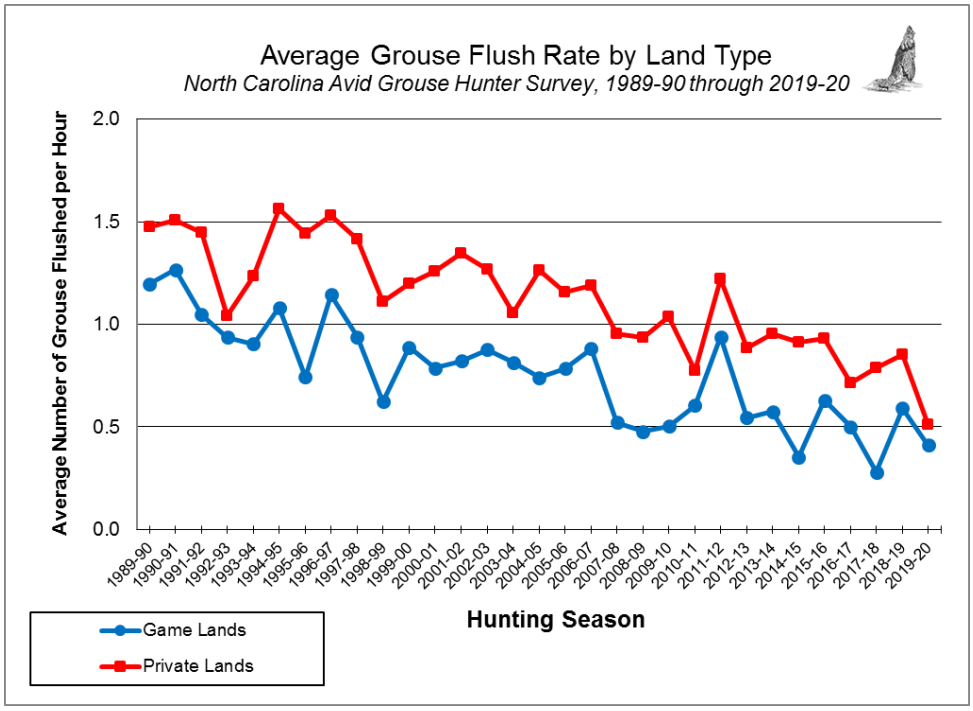

Figure 6. Average grouse flushed per hour by land type by avid grouse hunter survey participants, 1989-90 through 2019-20.

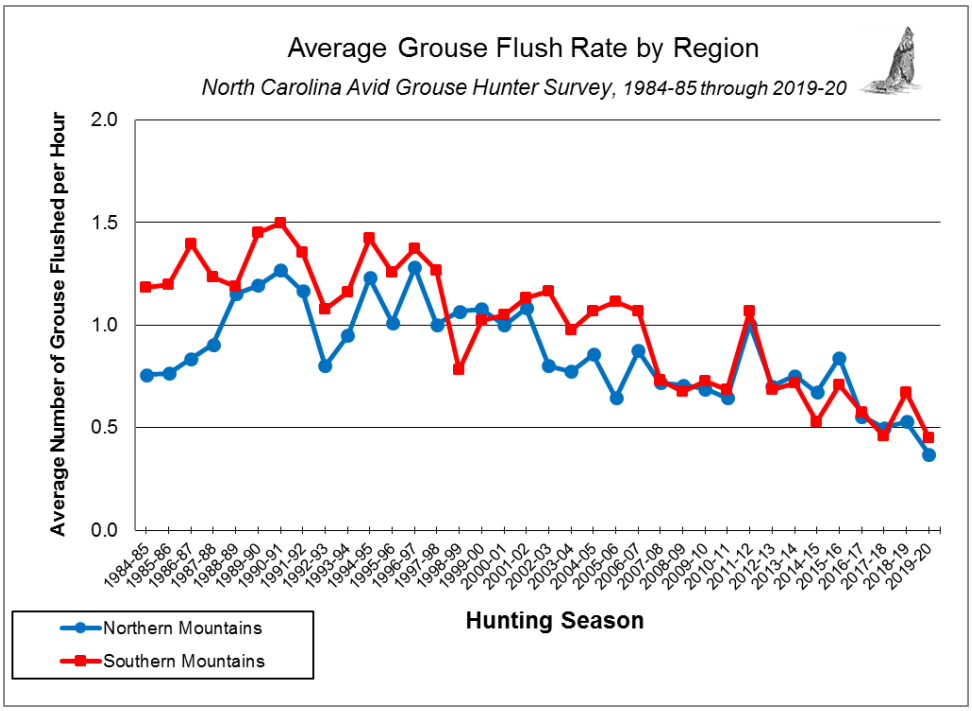

Figure 7. Average grouse flushed per hour by region by avid grouse hunter survey participants, 1984-85 through 2019-20.

Grouse hunting during the 2019-20 season was very poor in comparison to what hunters encountered when this survey began in the 1980's. In fact, grouse hunting this season was the worst on record for the numbers of grouse flushed and bagged per trip (Figs. 8 – 9). On 43% of trips hunters did not flush any grouse (Fig. 10).

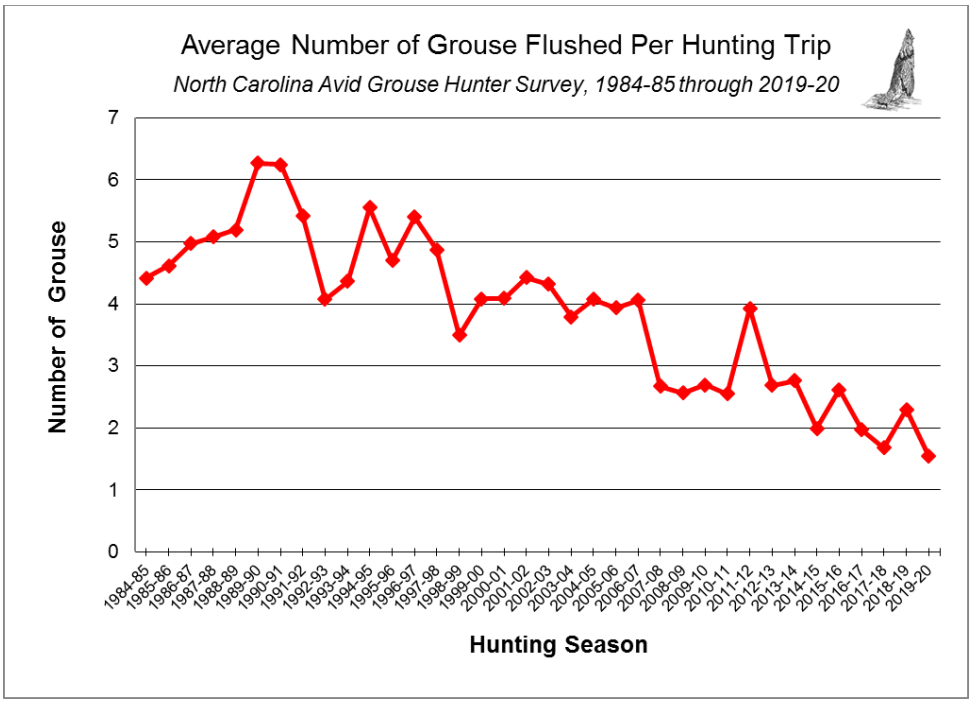

Figure 8. Average number of grouse flushed per hunting trip by avid grouse hunters, 1984-85 through 2019-20.

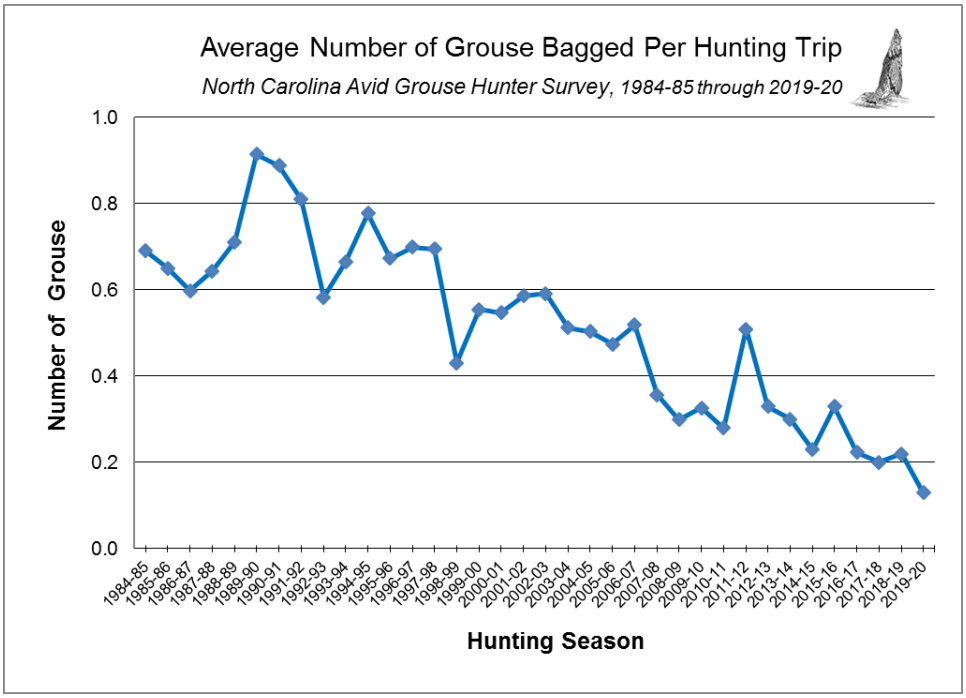

Figure 9. Average number of grouse bagged per hunting trip by avid grouse hunters, 1984-85 through 2019-20.

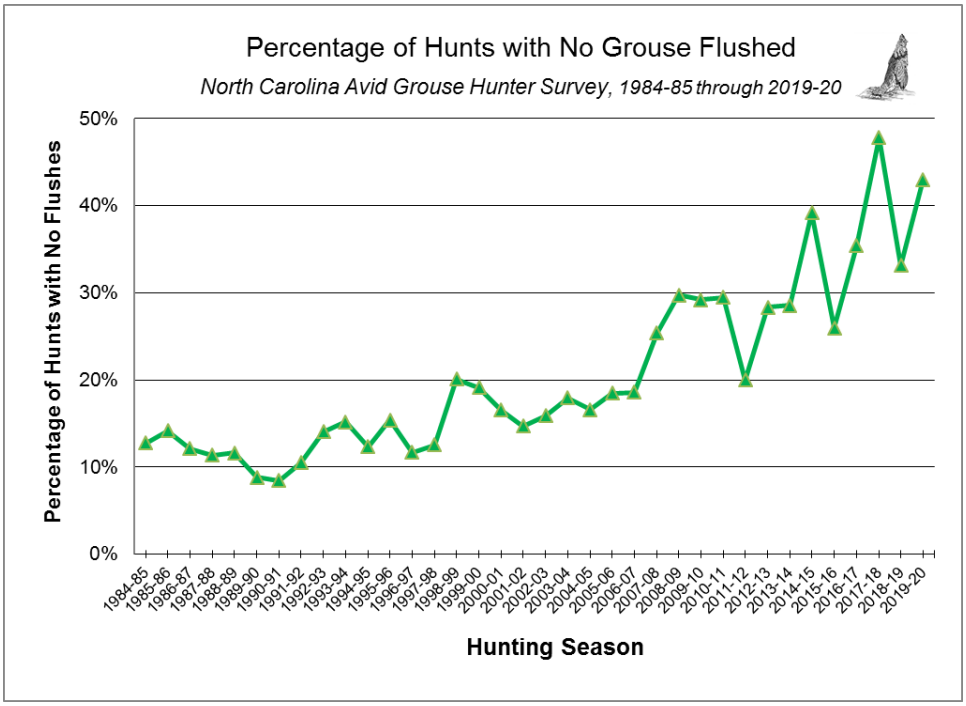

Figure 10. Percent of reported grouse hunting trips with no flushes by avid grouse hunters, 1984-85 through 2019-20.

Not surprisingly, during the 2019-20 hunting season, avid hunters reported more hunting activity later in the winter after big game hunting seasons have closed (Fig. 11). Grouse hunters made substantially more trips in February than earlier in the season. However, the number of grouse killed did not increase in a similar fashion. Hunters reported killing between 7 and 20 grouse each month of the season.

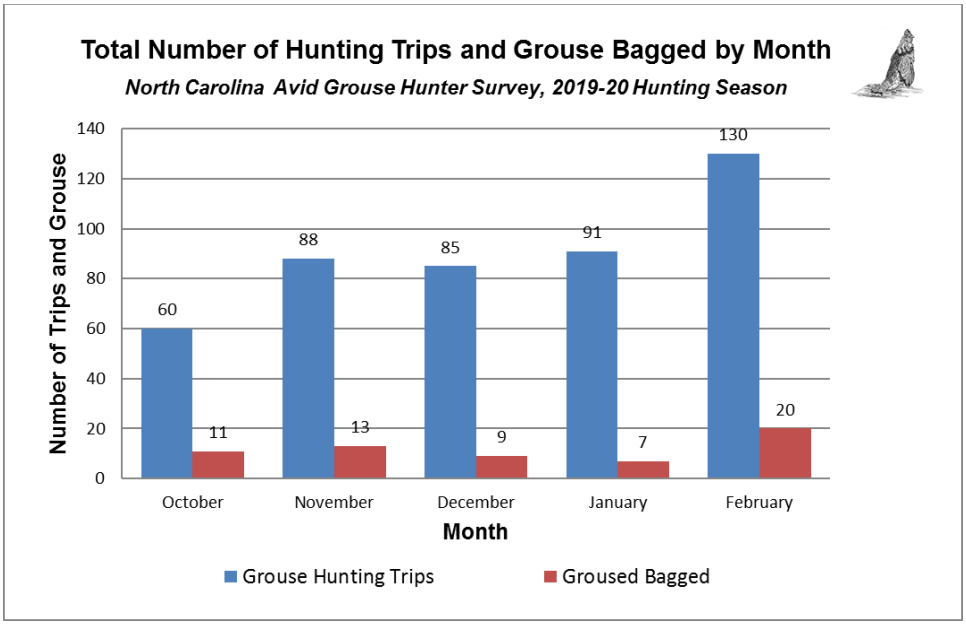

Figure 11. Total reported grouse hunting trips and harvests during the 2018-19 hunting season by avid grouse hunter survey participants.

West Nile Virus

During the 2018-19 and 2019-20 hunting seasons, avid grouse hunters provided feathers and blood samples from 99 ruffed grouse (93 birds from North Carolina and 6 from Tennessee). Of the North Carolina samples, 52% were obtained from Haywood and Macon counties. Forty-three percent of birds submitted were adult males, 18% were adult females, 19% were immature males and 21% were immature females. Laboratory tests revealed that 7% of the grouse from the 2018 season were positive for West Nile virus antibodies. West Nile virus testing from the 2019 samples are pending. While it is unclear what impact West Nile virus may be having on the grouse population, exposure to this virus does occur at some level. The results tell us that some grouse killed by hunters were infected earlier in their life. It does not tell us when the infection occurred or whether the birds had any symptoms or health-related issues as a result of the virus. Also, it is important to realize that this does not tell us how many grouse may have died from infection and therefore were not available for hunters to harvest. Prevalence of 7% is fairly low, which could be a result of low levels of West Nile virus in the region, or it could mean that a high proportion of infected birds did not survive. We will continue our work here in North Carolina and will also continue to collaborate with our colleagues in other states to fully answer these questions.

Funding for the avid grouse hunter survey report was partially provided through a Pittman-Robertson Wildlife Restoration Multi-state Grant. The Federal Aid in Wildlife Restoration Act, popularly known as the Pittman-Robertson Act, was approved by Congress on September 2, 1937, and began functioning July 1, 1938. The purpose of this Act was to provide funding for the selection, restoration, rehabilitation and improvement of wildlife habitat, wildlife management research, and the distribution of information produced by the projects. The Act was amended October 23, 1970, to include funding for hunter training programs and the development, operation and maintenance of public target ranges.

Funds are derived from an 11 percent Federal excise tax on sporting arms, ammunition, and archery equipment, and a 10 percent tax on handguns. These funds are collected from the manufacturers by the Department of the Treasury and are apportioned each year to the States and Territorial areas (except Puerto Rico) by the Department of the Interior on the basis of formulas set forth in the Act. Funds for hunter education and target ranges are derived from one-half of the tax on handguns and archery equipment.

Each state's apportionment is determined by a formula which considers the total area of the state and the number of licensed hunters in the state. The program is a cost-reimbursement program, where the state covers the full amount of an approved project then applies for reimbursement through Federal Aid for up to 75 percent of the project expenses. The state must provide at least 25 percent of the project costs from a non-federal source

Appendix I. Reported hunting activity from avid grouse hunter survey respondents, 1984-85 through 2019-20 hunting seasons.

Year	# Avid Hunter Respondents	# Hunting Trips Reported	# Hunting Hours Reported	Respondent Age	Trips/Hunter	Hunting Hours/Trip	# Grouse Flushed Reported	Grouse Flushed/Trip	Grouse Flushed/Hour	Grouse Flushed/Hour - Northern Mountains	Grouse Flushed/Hour - Southern Mountains	Grouse Flushed/Hour - Game Land	Grouse Flushed/Hour - Private Land	# Grouse Harvests Reported	Grouse Harvested/Trip	Grouse Harvested/Hour	# Hunts No Grouse Flushed	% Hunts No Grouse Flushed
1984-85	*	1,347	5,606	44	*	4.16	5,962	4.42	1.05	0.76	1.18			933	0.69	0.17	172	12.79%
1985-86	57	985	4,284	44	17.28	4.33	4,553	4.62	1.07	0.76	1.20			641	0.65	0.15	140	14.17%
1986-87	48	854	3,474	43	17.79	4.07	4,240	4.97	1.20	0.84	1.39			512	0.60	0.15	104	12.13%
1987-88	54	954	3,973	41	17.67	4.16	4,841	5.08	1.13	0.90	1.24			613	0.64	0.15	109	11.39%
1988-89	72	1,082	4,639	43	15.03	4.29	5,618	5.19	1.18	1.15	1.19			769	0.71	0.17	126	11.65%
1989-90	81	1,259	5,479	44	15.54	4.35	7,890	6.27	1.38	1.19	1.45	1.20	1.48	1151	0.91	0.21	111	8.82%
1990-91	71	1,286	5,576	45	18.11	4.34	8,036	6.25	1.42	1.27	1.49	1.27	1.51	1142	0.89	0.20	109	8.48%
1991-92	69	1,244	5,258	45	18.03	4.23	6,749	5.43	1.28	1.17	1.35	1.05	1.45	1008	0.81	0.19	131	10.53%
1992-93	89	1,401	5,642	46	15.74	4.03	5,706	4.07	0.99	0.80	1.08	0.94	1.04	817	0.58	0.14	197	14.06%
1993-94	80	1,158	4,525	48	14.48	3.91	5,055	4.37	1.10	0.95	1.16	0.90	1.23	769	0.66	0.17	176	15.20%
1994-95	82	1,559	6,312	49	19.01	4.05	8,653	5.55	1.36	1.23	1.42	1.08	1.56	1213	0.78	0.19	192	12.32%
1995-96	80	1,285	5,042		16.06	3.92	6,038	4.70	1.18	1.01	1.26	0.74	1.44	865	0.67	0.17	198	15.41%
1996-97	90	1,648	6,524	50	18.31	3.96	8,898	5.40	1.35	1.28	1.37	1.15	1.53	1152	0.70	0.18	193	11.71%
1997-98	87	1,451	5,932	50	16.68	4.09	7,071	4.87	1.20	1.00	1.27	0.94	1.41	1008	0.69	0.17	182	12.54%
1998-99	79	1,190	4,788	51	15.06	4.02	4,160	3.50	0.87	1.07	0.78	0.62	1.11	512	0.43	0.11	239	20.08%
1999-00	85	1,286	4,987	50	15.13	3.88	5,245	4.08	1.04	1.08	1.02	0.89	1.20	713	0.55	0.14	246	19.13%
2000-01	83	1,235	4,792	53	14.88	3.88	5,050	4.09	1.03	1.00	1.05	0.79	1.26	676	0.55	0.14	204	16.52%
2001-02	72	1,181	4,519	53	16.40	3.83	5,228	4.43	1.12	1.08	1.13	0.82	1.35	692	0.59	0.15	174	14.73%
2002-03	58	956	3,686	55	16.48	3.86	4,128	4.32	1.08	0.80	1.17	0.88	1.27	565	0.59	0.15	152	15.90%
2003-04	52	847	3,355	54	16.29	3.96	3,212	3.79	0.93	0.77	0.98	0.81	1.05	434	0.51	0.13	152	17.95%
2004-05	56	795	3,160	54	14.20	3.97	3,238	4.07	1.01	0.86	1.07	0.74	1.26	400	0.50	0.13	132	16.60%
2005-06	51	660	2,590	55	12.94	3.92	2,601	3.94	0.97	0.65	1.12	0.79	1.16	313	0.47	0.12	122	18.48%
2006-07	52	704	2,751	56	13.54	3.91	2,855	4.06	1.02	0.88	1.07	0.88	1.19	365	0.52	0.13	131	18.61%
2007-08	56	697	2,616	55	12.45	3.75	1,864	2.67	0.73	0.72	0.73	0.52	0.96	249	0.36	0.10	177	25.39%
2008-09	60	716	2,623	56	11.93	3.66	1,835	2.56	0.68	0.71	0.68	0.48	0.94	214	0.30	0.08	213	29.75%
2009-10	56	551	1,960	53	9.84	3.56	1,483	2.69	0.72	0.69	0.72	0.50	1.04	180	0.33	0.09	161	29.23%
2010-11	59	658	2,482	54	11.15	3.77	1,677	2.55	0.67	0.64	0.68	0.60	0.77	184	0.28	0.07	194	29.48%
2011-12	79	983	3,657	56	12.40	3.72	3,867	3.93	1.06	1.00	1.07	0.94	1.22	500	0.51	0.14	203	20.00%
2012-13	72	920	3,603	56	12.78	3.92	2,475	2.69	0.69	0.70	0.68	0.54	0.88	303	0.33	0.08	261	28.37%
2013-14	63	833	3,186	56	13.22	3.82	2,303	2.76	0.72	0.75	0.72	0.58	0.95	249	0.30	0.08	238	28.57%
2014-15	62	843	3,037	56	13.38	3.60	1,678	1.99	0.55	0.67	0.53	0.35	0.91	190	0.23	0.06	330	39.15%
2015-16	59	704	2,503	58	11.93	3.56	1,842	2.62	0.74	0.84	0.71	0.63	0.93	229	0.33	0.09	183	25.99%
2016-17	62	692	2,375	59	11.16	3.43	1,360	1.97	0.57	0.55	0.58	0.50	0.71	154	0.22	0.06	245	35.40%
2017-18	56	640	2,290	58	11.43	3.58	1,074	1.68	0.47	0.50	0.46	0.28	0.79	127	0.20	0.06	306	47.81%
2018-19	54	507	1,788	60	9.40	3.53	1,167	2.30	0.65	0.53	0.67	0.59	0.85	112	0.22	0.06	168	33.13%
2019-20	47	454	1,605	60	9.66	3.53	698	1.54	0.44	0.37	0.45	0.41	0.51	60	0.13	0.04	193	43.00%