

Ruffed Grouse Drumming Survey



Results from Spring 2019

Introduction

During the spring 2019 wild turkey hunting season, DEC conducted the 13th annual Ruffed Grouse Drumming Survey. This survey asks turkey hunters to record the number of grouse they hear drumming while afield. The primary purpose of the survey is to monitor the number of birds drumming per hour (i.e., the drumming rate). Changes in the drumming rate illustrate trends in the grouse population when viewed over time and will provide insight into statewide distributions for this popular game species as habitats change both locally and on a landscape scale.

We thank all the hunters that participated in the Ruffed Grouse Drumming Survey during the 2019 season.

Results from the 2019 Season

During the 2019 season, 171 hunters participated in the Ruffed Grouse Drumming Survey. Survey participants reported data from 1,074 hunting trips across the state, from the lower Hudson Valley in the south, to the Adirondacks and St. Lawrence Valley in the north, and the Lake Plains and Allegheny Plateau in far western New York. They spent over 4,100 hours afield and observed almost 500 grouse. Some general findings from the 2019 season include:

- Hunters participating in the survey averaged about 24 hours afield during the 2019 season. They took about 6 trips afield for the season and spent almost 4 hours afield per trip (Table 1).
- Survey participants averaged about 3 grouse observed per hunter for the 2019 season and had to spend 8 ½ hours afield to hear one grouse drumming (Table 1).
- Statewide, the drumming rate for 2019 was 0.12 grouse drumming/hour (Table 1, Figure 1). Almost two-thirds of all survey effort took place during the first two weeks of May, and the drumming rate (grouse drumming/hour) was highest during the second week of the month (Table 2).
- Overall, there was far more effort expended in the southern zone (about 89% of the total), but the drumming rate was higher in the northern zone (0.28 vs. 0.11 grouse drumming/hour; Table 3).
- Significantly more effort was expended, and more grouse were observed, on private land than public land; however, the drumming rate was similar on public and private lands (Table 4).
- Survey effort was distributed across major geographic regions of New York State (21% in southeastern NY, 15% in northern NY, 64% in central and western NY; Table 5). We observed the highest drumming rate in DEC Region 6 in the St. Lawrence Valley/western Adirondacks (0.29 grouse drumming/hour) followed by DEC Region 5 (0.17 grouse drumming/hour). The drumming rate was close to the statewide average in DEC Regions 4, 7, and 9, and below the statewide average in DEC Regions 3 and 8.

- The drumming rate was highest in the Adirondacks-Tug Hill Ecozone (0.35 grouse drumming/hour), followed by the St. Lawrence Valley and Champlain Valley ecozones (0.28 and 0.21 grouse drumming/hour, respectively; Table 6, Figures 1 and 2). The drumming rate was close to the statewide average in the Appalachian Hills and Plateau, Catskills-Delaware Hills, and Mohawk Valley-Hudson Valley-Taconic Highlands ecozones (Table 6, Figures 1 and 2).

Comparing 2019 to Previous Seasons

- Since this survey began in 2007, 781 turkey hunters have taken over 15,800 trips afield and spent almost 60,000 hours recording their grouse observations.
- From 2018 to 2019 the number of survey participants and survey effort decreased, but the drumming rate, which controls for the decrease in effort, also decreased between years (0.24 to 0.12 grouse drumming/hour; Table 1, Figure 1).
- While the drumming rate observed in 2019 likely reflects a drop in grouse abundance from 2018, the magnitude of the decline between years was unexpected. The cold, wet weather in May 2019 (see Figure 5) could have limited the frequency with which birds were drumming and contributed to the large drop in the drumming rate between years.
- When we look at the ecozone level, from 2018 to 2019 the drumming rate decreased in every ecozone except the Lake Plains and the Mohawk Valley-Hudson Valley-Taconic Highlands ecozones (Figure 1).
- Annual variation in grouse abundance is likely a result of variation in weather, including spring temperature and rainfall and winter snow conditions, and food availability during the summer and fall (e.g., hard and soft mast, insects). Data from the U.S. Department of Agriculture National Agricultural Statistics Service indicate that rainfall in May and June of 2017 was above average in most regions, which may have negatively impacted nest and brood success. While nesting and brood rearing conditions improved in 2018, cold, wet weather in spring 2019 may further limit reproductive success and grouse abundance.
- Since 2007, the drumming rates in northern New York are consistently above the statewide average, while the drumming rates in the Lake Plains and Hudson Valley regions are consistently below the statewide average (Figure 3). In areas with a lack of the early successional habitats on which this species depends (e.g., Lake Plains, lower Hudson Valley), grouse, their nests, and young are more vulnerable to predation and other limiting factors, thus we tend to observe lower drumming rates in these areas. Wildlife Management Units with the highest drumming rates are those that have a landscape with a greater proportion of the early successional habitats (e.g., shrubland, young forests) that grouse depend upon than aggregates with below-average drumming rates.
- Over the past 13 years, grouse numbers increased, peaked around 2009, and have declined since (Figure 1). The drumming rate in spring 2019 was the lowest observed since this survey began. The drumming rate observed in spring 2019 followed a flush rate of 0.68 grouse flushed per hour during the 2018-19 grouse hunting season, the lowest observed since the Grouse and Woodcock Hunting Log began in 2004 (Figure 4). While this could be related to a cyclical fluctuation in the grouse population, it is more likely related to the influence of habitat and weather on nest and brood success, and potentially, the negative effects of West Nile Virus (WNV) on grouse chick survival. New York and several other states are currently collaborating on a study to better understand the prevalence of WNV in grouse.

Drumming Survey vs. Grouse Hunting Log

- At the statewide scale, the drumming rate from the spring survey and the flush rate from the Grouse and Woodcock Hunting Log conducted during the fall are correlated (i.e., when we observe an annual change in the drumming rate, we see a similar change in the flush rate; Figure 4). Based on this, we anticipate that the flush rate during the upcoming 2019-20 hunting season will be substantially lower than last fall (0.68 grouse flushed/hour in 2018-19) and below the long-term average flush rate (about 1 bird/hour).
- When we attempt to link drumming rates with flush rates at smaller scales, the results are often inconsistent; drumming rates do not consistently predict flush rates at the ecozone or WMU aggregate level. Part of the reason for this may be the unpredictability of the nesting season (i.e., percent of nests that are successful, survival of broods) between the time the drumming survey is conducted in the spring and the time the grouse log is conducted during the fall. Another reason may be that the relatively small sample sizes in some WMU aggregates are not reflective of the actual grouse population so do not allow us to accurately predict fall flush rates at that spatial scale.

Table 1. Summary statistics for the 2014-19 Ruffed Grouse Drumming Survey.

Summary Statistics	2014	2015	2016	2017	2018	2019	5-yr Avg. (2014-18)
# Survey Participants	210	193	185	179	217	171	197
# Trips	1,348	1,181	1,193	1,142	1,973	1,074	1,367
# Trips/Participant	6.4	6.1	6.4	6.4	9.1	6.3	6.9
# Hours Afield	5,009	4,472	4,389	4,169	7,267	4,117	5,061
# Hours/Participant	23.9	23.2	23.7	23.3	33.5	24.1	25.5
# Hours/Trip	3.7	3.8	3.7	3.7	3.7	3.8	3.7
# Grouse Drumming	944	987	728	723	1320	481	940
# Grouse Drumming/Participant	4.5	5.1	3.9	4.0	6.1	2.8	4.7
# Grouse Drumming/Trip	0.70	0.84	0.61	0.63	0.67	0.45	0.69
Drumming Rate (grouse drumming/hour)	0.22	0.24	0.20	0.22	0.24	0.12	0.22
Hours Afield to Hear 1 Grouse Drumming	4.5	4.5	6.0	5.8	5.5	8.6	5.3

Table 2. Survey effort, number of drumming grouse observed, and drumming rate (grouse drumming/hour) by week from the 2019 Ruffed Grouse Drumming Survey.

Week	Hunter Trips		Hours Afield		Grouse Drumming		Drumming Rate*	
	#	%	#	%	#	%	Grouse Drumming/Hour	SE
Youth Hunt (April 20-21)	16	1%	49	1%	12	2%	0.21	0.08
Regular Season (May 1-31)	1,058	99%	4,068	99%	469	98%	0.12	0.01
May 1-7	430	41%	1,681	41%	192	41%	0.11	0.01
May 8-14	206	19%	773	19%	112	24%	0.17	0.03
May 15-21	187	18%	701	17%	70	15%	0.12	0.02
May 22-31	235	22%	913	22%	95	20%	0.11	0.02

Table 3. Survey effort, number of drumming grouse observed, and drumming rate (grouse drumming/hour) by grouse season zone from the 2019 Ruffed Grouse Drumming Survey.

Season Zone	Hunter Trips		Hours Afield		Grouse Drumming		Drumming Rate*	
	#	%	#	%	#	%	Grouse Drumming/Hour	SE
Northern Zone	122	11%	398	10%	120	25%	0.28	0.03
Southern Zone	952	89%	3,719	90%	361	75%	0.11	0.01

Table 4. Survey effort, number of drumming grouse observed, and drumming rate (grouse drumming/hour) by land type (public vs. private) from the 2019 Ruffed Grouse Drumming Survey.

Land Type	Hunter Trips		Hours Afield		Grouse Drumming		Drumming Rate*	
	#	%	#	%	#	%	Grouse Drumming/Hour	SE
Public Land	160	15%	558	14%	88	19%	0.15	0.02
Private Land	896	85%	3,489	86%	385	81%	0.12	0.01

Table 5. Survey effort, number of drumming grouse observed, and drumming rate (grouse drumming/hour) by DEC Region from the 2019 Ruffed Grouse Drumming Survey.

DEC Region	Hunter Trips		Hours Afield		Grouse Drumming		Drumming Rate*	
	#	%	#	%	#	%	Grouse Drumming/Hour	SE
3 - Lower Hudson Valley	85	8%	323	8%	10	2%	0.04	0.02
4 - Capital Region	144	13%	529	13%	71	15%	0.12	0.02
5 - E Adks/Lk Champlain	61	6%	212	5%	38	8%	0.17	0.04
6 - W Adks/St. Law. Valley	101	9%	350	9%	107	22%	0.29	0.04
7 - Central NY	286	27%	1,096	27%	117	24%	0.13	0.02
8 - Finger Lakes	157	15%	737	18%	58	12%	0.08	0.02
9 - Western NY	240	22%	870	21%	80	17%	0.10	0.02

Table 6. Survey effort, number of drumming grouse observed, and drumming rate (grouse drumming/hour) by Wildlife Management Unit (WMU) Aggregate and Ecozone from the 2019 Ruffed Grouse Drumming Survey.

Ecozone WMU Aggregate**	Trips		Hours		Grouse Drumming		Drumming Rate* (grouse drumming/hour)	
	#	%	#	%	#	%	Mean	SE
St. Lawrence Valley	40	3.7%	140	3.4%	43	8.9%	0.28	0.05
East Ontario Plain	21	2.0%	64	1.6%	17	3.5%	0.22	0.07
St. Lawrence Valley	19	1.8%	76	1.8%	26	5.4%	0.35	0.07
Champlain Valley	24	2.2%	76	1.8%	21	4.4%	0.21	0.06
Champl. V. & Transition	24	2.2%	76	1.8%	21	4.4%	0.21	0.06
Adirondacks-Tug Hill	51	4.7%	159	3.9%	56	11.6%	0.35	0.07
Tug Hill	1	0.1%	4	0.1%	0	0.0%	n/a	
Tug Hill Transition	24	2.2%	70	1.7%	32	6.7%	0.44	0.12
Northern Adirondacks	13	1.2%	42	1.0%	12	2.5%	0.26	0.09
Central Adirondacks	13	1.2%	43	1.0%	12	2.5%	0.29	0.10
Lake Plains	202	18.8%	858	20.8%	36	7.5%	0.05	0.02
Oneida Lake Plains	60	5.6%	256	6.2%	24	5.0%	0.12	0.04
Great Lakes Plain	102	9.5%	458	11.1%	12	2.5%	0.03	0.02
Oswego Lowlands	40	3.7%	144	3.5%	0	0.0%	0.00	0.00
Appalachian Hills & Plateau	466	43.4%	1,791	43.5%	211	43.9%	0.13	0.01
East Appal. Plateau	171	15.9%	642	15.6%	85	17.7%	0.16	0.02
Central Appal. Plateau	40	3.7%	206	5.0%	25	5.2%	0.12	0.03
North Appalachian Hills	84	7.8%	315	7.7%	23	4.8%	0.06	0.02
West Appalachian Hills	171	15.9%	628	15.3%	78	16.2%	0.14	0.03
Catskills-Delaware Hills	133	12.4%	525	12.8%	60	12.5%	0.10	0.02
Catskills	87	8.1%	343	8.3%	49	10.2%	0.12	0.03
Otsego-Delaware Hills	27	2.5%	102	2.5%	10	2.1%	0.10	0.05
Neversink-Mongaup Hills	19	1.8%	80	1.9%	1	0.2%	0.02	0.02
Mohawk Valley-Hudson Valley-Taconic Highlands	158	14.7%	568	13.8%	54	11.2%	0.10	0.02
Mohawk Valley	67	6.2%	233	5.7%	34	7.1%	0.14	0.04
Hudson Valley	61	5.7%	217	5.3%	14	2.9%	0.07	0.04
North Taconic Highlands	15	1.4%	65	1.6%	4	0.8%	0.09	0.07
South Taconic Highlands	8	0.7%	28	0.7%	2	0.4%	0.08	0.05
New York City Transition	7	0.7%	25	0.6%	0	0.0%	0.00	0.00
Statewide Totals	1,074		4,117		481		0.12	0.01

*Overall drumming rates are calculated as an average drumming rate for all days afield, not a simple division of the total number of grouse drumming by the total number of hours afield. A minimum of 10 trips or 20 hours is needed for analysis. SE = Standard Error

**WMU Aggregates are groupings of Wildlife Management Units. Ecozones are groupings of WMU Aggregates. The Coastal Lowlands Aggregate (Long Island) only has a two-day youth turkey season, thus is not listed.

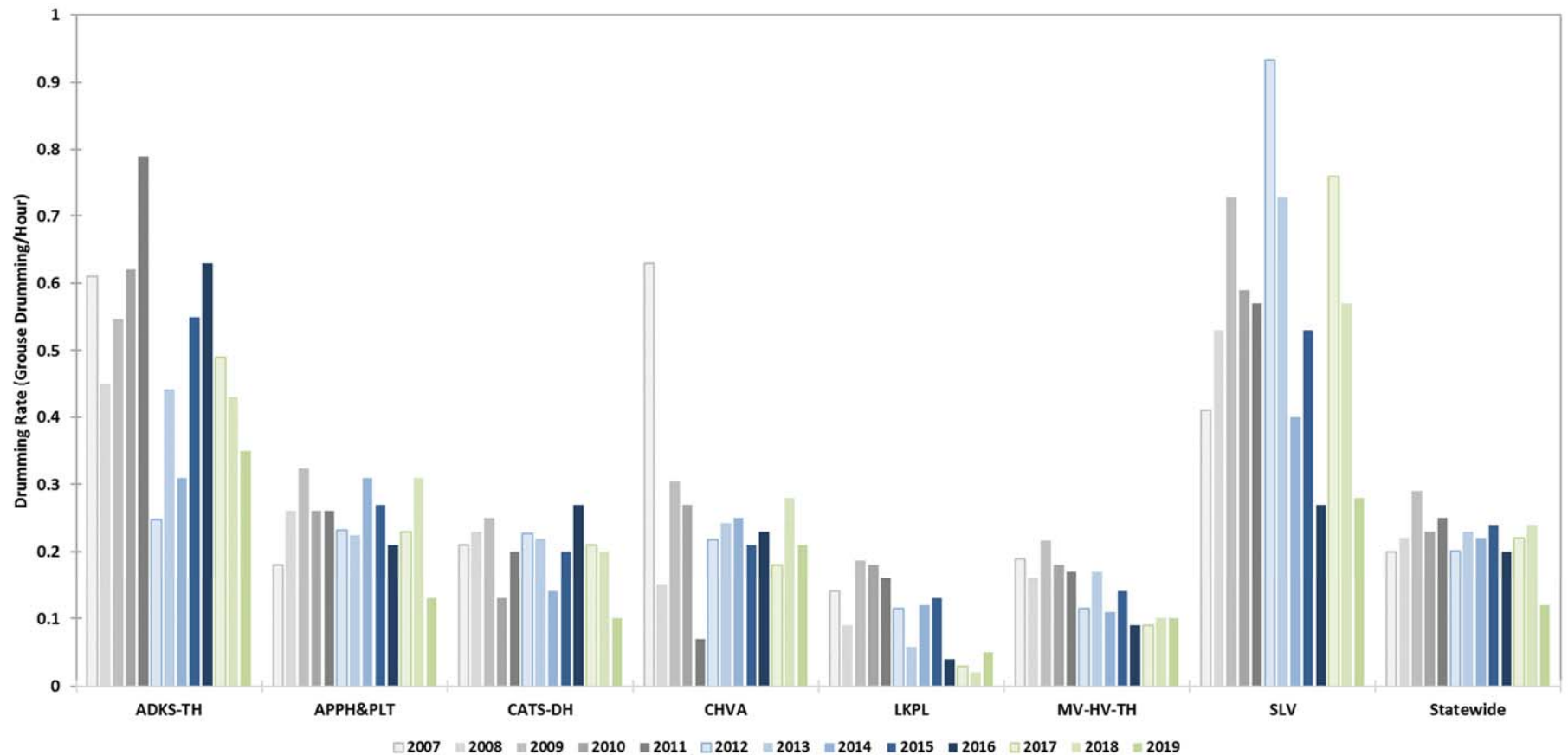


Figure 1. Drumming rate (grouse drumming/hour) by ecozone based on the Ruffed Grouse Drumming Survey data, 2007-19. Ecozones are an aggregation of Wildlife Management Units. Abbreviations: Champlain Valley (CHVA), Adirondacks-Tug Hill (ADKS-TH), Catskills-Delaware Hills (CATS-DH), St. Lawrence Valley (SLV), Appalachian Hills & Plateau (APPH&PLT), Lake Plains (LKPL), Mohawk Valley-Hudson Valley-Taconic Highlands (MV-HV-TH). The Coastal Lowlands Ecozone (Long Island) only has a two-day youth turkey hunt, so the drumming survey was not conducted there.

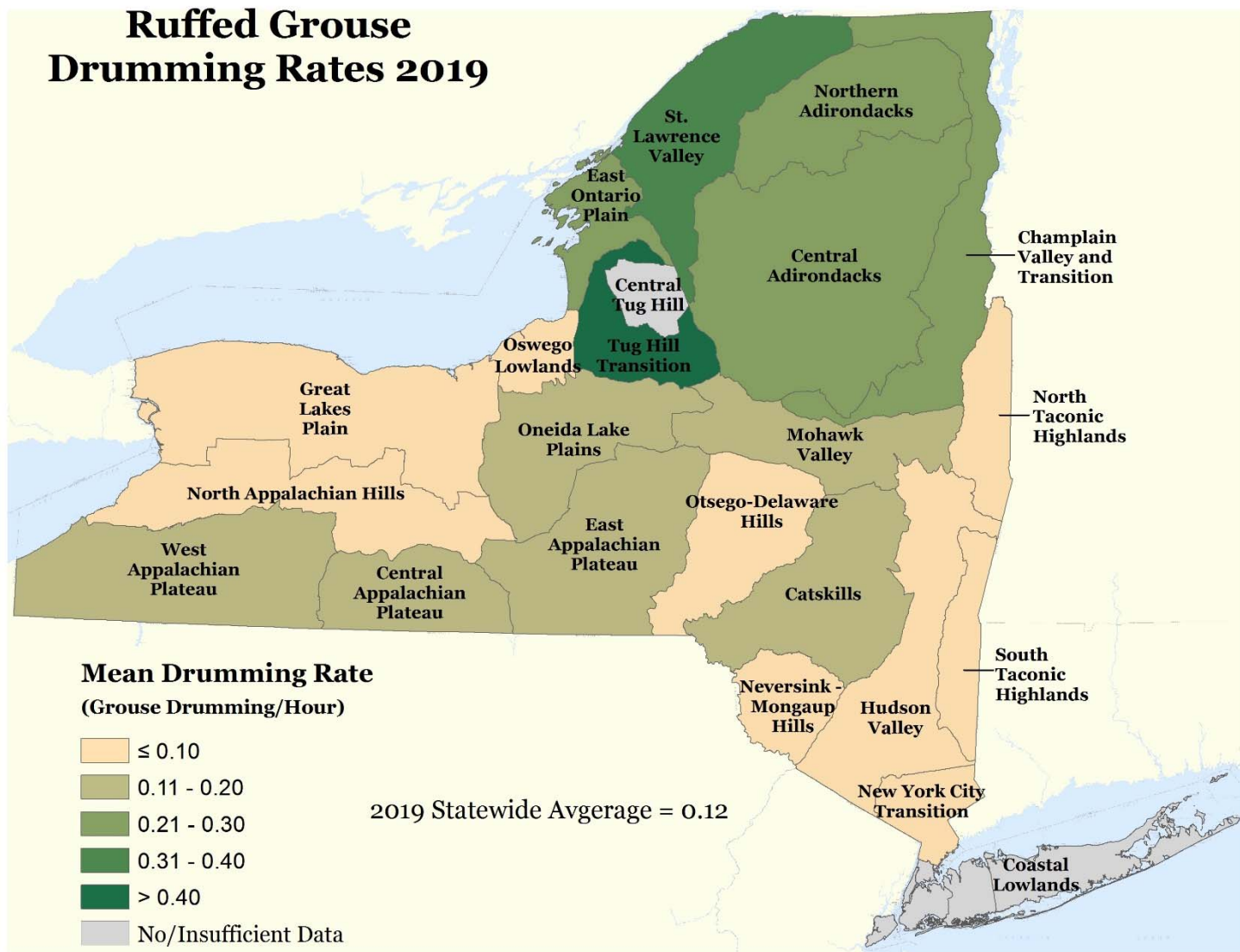


Figure 2. Drumming rate (grouse drumming/hour) by Wildlife Management Unit (WMU) aggregate from the Ruffed Grouse Drumming Survey, 2019. Only aggregates with ≥ 10 observations/records or ≥ 20 hours were included in the analysis. The statewide drumming rate for 2019 was 0.12 grouse drumming/hour. The Coastal Lowlands aggregate only has a two-day youth turkey hunt, so the drumming survey was not conducted there. Drumming rates and sample sizes for each WMU aggregate can be found in Table 6.

Multi-Year Ruffed Grouse Drumming Rates 2007 - 2019

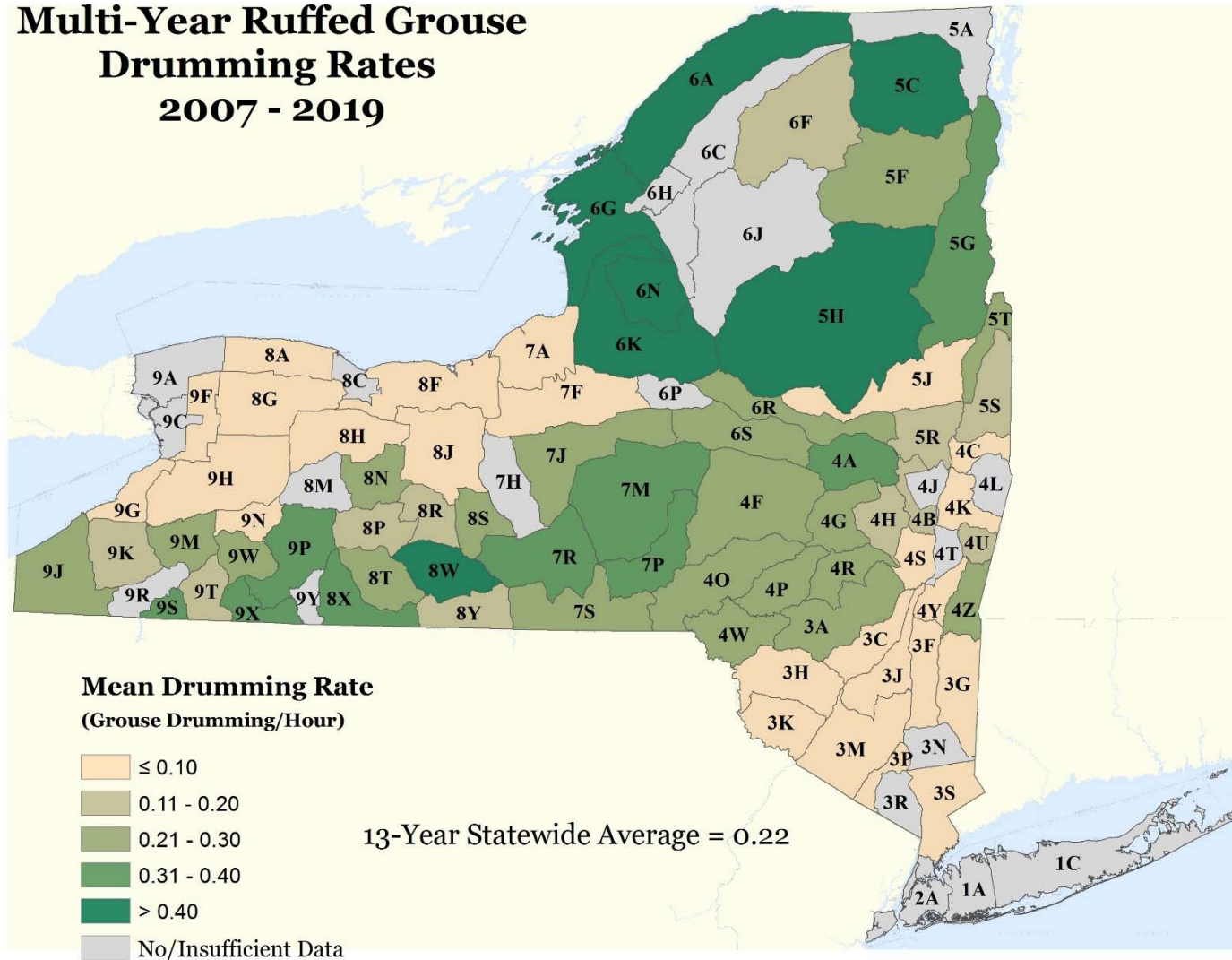


Figure 3. Drumming rate (grouse drumming/hour) by Wildlife Management Unit (WMU) from the Ruffed Grouse Drumming Survey, 2007-2019. Only WMUs with ≥ 50 observations/records or ≥ 150 hours were included in the analysis. The statewide drumming rate for the 13-year period was 0.22 grouse drumming/hour. The Wildlife Management Units in gray had too few observations for analysis. Long Island (WMUs 1A, 1C) only has a two-day youth turkey hunt in Suffolk County, so the drumming survey was not conducted there.

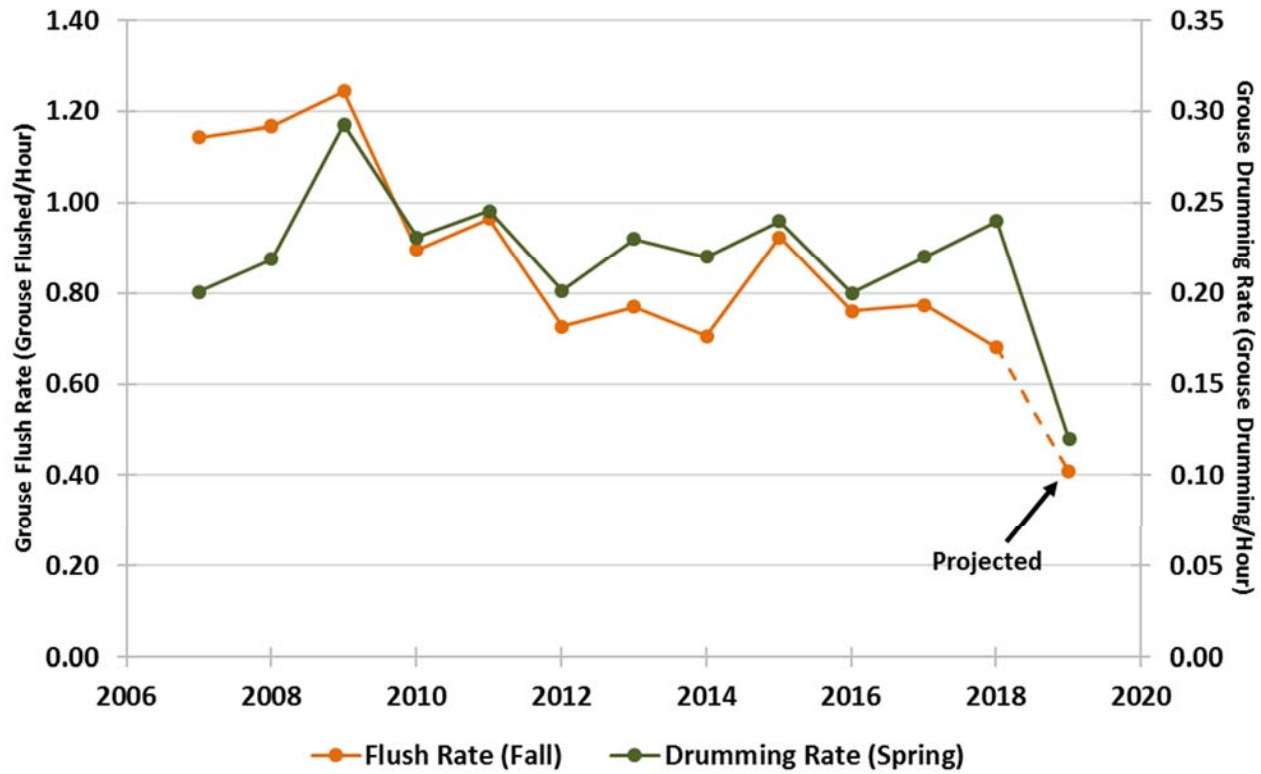
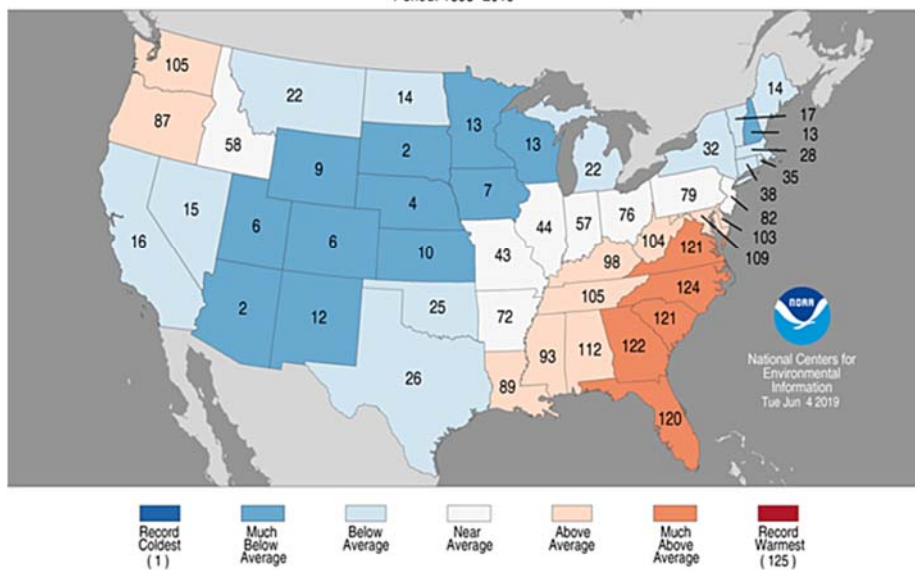


Figure 4. Ruffed grouse drumming rate (grouse drumming/hour) from the Ruffed Grouse Drumming Survey conducted during the spring, and the grouse flush rate (grouse flushed/hour) from the Grouse and Woodcock Hunting Log conducted during the fall grouse hunting season. The flush rate for fall 2019 is predicted based on the statewide estimated drumming rate from spring 2019.

Statewide Maximum Temperature Ranks May 2019 Period: 1895–2019



May 01, 2019 Monthly Departure Precipitation

Created on: July 19, 2019 - 14:14 UTC
Valid on: June 01, 2019 12:00 UTC

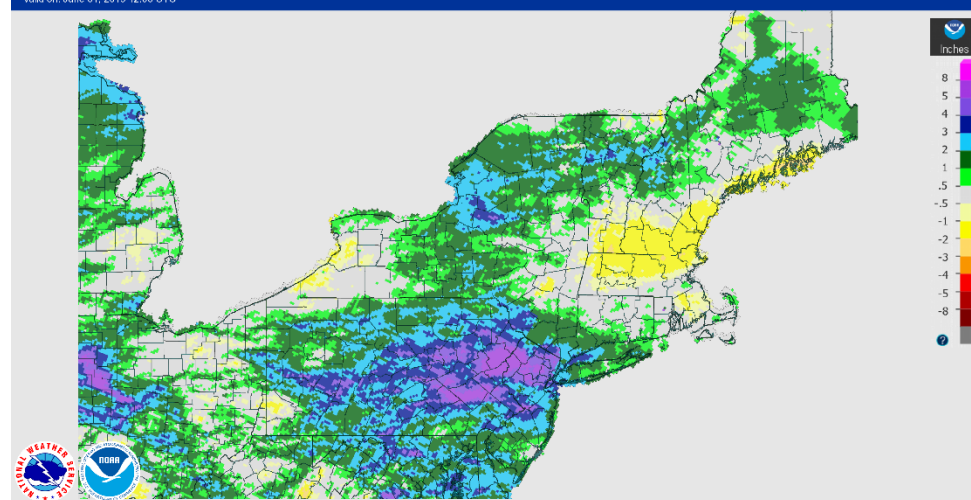


Figure 5. Statewide maximum temperature ranks (left) and precipitation departure from normal (right) for May 2019 from the National Oceanic and Atmospheric Administration (NOAA).



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