

# Ruffed Grouse Drumming Survey

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## *Results from Spring 2016*

### Introduction

During the spring 2016 wild turkey hunting season, DEC conducted the 10<sup>th</sup> 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 2016 season.

### Results from the 2016 Season

During the 2016 season, 185 hunters participated in the Ruffed Grouse Drumming Survey. Survey participants reported data from almost 1,200 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 about 4,400 hours afield and observed over 700 grouse. Some general findings from the 2016 season include:

- Hunters participating in the survey averaged about 24 hours afield during the 2016 season. They took about 6 trips afield for the season and spent almost 4 hours afield per trip (Table 1).
- Survey participants averaged about 4 grouse observed per hunter for the 2016 season and had to spend 6 hours afield in order to hear one grouse drumming (Table 1).
- About 65% of all survey effort took place during the first two weeks of May, but the drumming rate (grouse drumming/hour) was highest during the third week of the month (Table 2).
- Overall, there was far more effort expended in the southern zone (about 85% of the total), but the drumming rate was higher in the northern zone (0.34 vs. 0.17 grouse drumming/hour; Table 3).
- Significantly more effort was expended, and more grouse were observed, on private land than public land; however, public land had a higher drumming rate (Table 4).
- Survey effort was distributed across major geographic regions of New York State (27% in southeastern NY, 13% in northern NY, 59% in central and western NY; Table 5). We observed the highest drumming rates in DEC Regions 5 and 6 in northern NY (0.34 and 0.31 grouse drumming/hour, respectively) followed by DEC Region 4 in eastern NY (0.25 grouse drumming/hour). The drumming rate was close to the statewide average (0.20 grouse drumming/hour) in DEC regions 7, 8, and 9, and below average in DEC Region 3 (0.02 grouse drumming/hour).
- The drumming rate was highest in the Adirondacks-Tug Hill Ecozone (0.63 grouse drumming/hour), followed by the Catskills-Delaware Hills and St. Lawrence Valley ecozones

(0.27 grouse drumming/hour; Table 6, Figures 1 and 2). The drumming rate was close to the statewide average in the Champlain Valley and Appalachian Hills & Plateau ecozones, and below average in the Mohawk Valley-Hudson Valley-Taconic Highlands and Lake Plains ecozones (Table 6, Figures 1 and 2).

## Comparing 2016 to Previous Seasons

- Since this survey started in 2007, 711 turkey hunters have taken over 11,600 trips afield and spent over 44,000 hours recording their grouse observations. Over the past 10 years, grouse numbers increased, peaked around 2009, and have declined since. Whether this is a result of some cyclical fluctuation or is related to the influence of habitat and weather on nest and brood success is unknown. A similar pattern has been observed in the flush rate from the Grouse and Woodcock Hunting Log conducted during the fall, providing evidence that changes in the drumming rate reflect changes in abundance over time (Figure 4).
- From 2015 to 2016 the number of survey participants and survey effort was similar between years, but the number of grouse observed and the drumming rate both decreased (Table 1, Figure 4). The amount of time spent afield to hear one grouse drumming increased from 4.5 hours to 6 hours (Table 1).
- When we look at the ecozone level, the changes in the drumming rate from 2015 to 2016 are varied. The drumming rate increased in the Adirondacks-Tug Hill and Catskill-Delaware Hills ecozones, was similar between years in the Champlain Valley, and declined in the rest of the state (Figure 1). The Lake Plains and Hudson Valley regions are consistently below the statewide average over the past ten seasons.
- 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 from April 1 through the end of June 2015, rainfall amounts were above normal in many areas of the state (with the exception of portions of eastern New York). This may have resulted in below-average reproductive success in many areas, but mild winter conditions and good overwinter survival may have offset the negative effects of poor productivity in some regions.
- 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. Over the past ten years, the 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 (Figure 3).

## Drumming Survey vs. Grouse Hunting Log

- At the statewide scale the drumming rate from the spring survey and the flush rate from the Grouse 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 2016-17 hunting season will be lower than last fall (0.9 grouse flushed/hour in 2015-16) 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.

**Table 1.** Summary statistics for the 2011-16 Ruffed Grouse Drumming Survey.

Summary Statistics	2011	2012	2013	2014	2015	2016	5-yr Avg. (2011-15)
# Survey Participants	153	157	236	210	193	185	190
# Trips	1,009	1,046	1,493	1,348	1,181	1,193	1,215
# Trips/Participant	6.6	6.7	6.3	6.4	6.1	6.4	6.4
# Hours Afield	3,688	3,918	5,921	5,009	4,472	4,389	4,602
# Hours/Participant	24.1	25.0	25.1	23.9	23.2	23.7	24.3
# Hours/Trip	3.7	3.7	4.0	3.7	3.8	3.7	3.8
# Grouse Drumming	789	710	1,128	944	987	728	912
# Grouse Drumming/Participant	5.2	4.5	4.8	4.5	5.1	3.9	4.8
# Grouse Drumming/Trip	0.78	0.68	0.76	0.70	0.84	0.61	0.75
Drumming Rate (grouse drumming/hour)	0.25	0.20	0.23	0.22	0.24	0.20	0.23
Hours Afield to Hear 1 Grouse Drumming	4.1	5.0	4.3	4.5	4.5	6.0	4.5

**Table 2.** Survey effort, number of drumming grouse observed, and drumming rate (grouse drumming/hour) by week from the 2016 Ruffed Grouse Drumming Survey.

Week	Hunter Trips		Hours Afield		Grouse Drumming		Drumming Rate*	
	#	%	#	%	#	%	Grouse Drumming/Hour	SE
Youth Hunt (April 23-24)	22	2%	68	2%	24	3%	0.53	0.16
Regular Season (May 1-31)	1,171	98%	4,321	98%	704	97%	0.19	0.01
May 1-7	486	42%	1,821	42%	325	46%	0.20	0.02
May 8-14	269	23%	985	23%	164	23%	0.18	0.03
May 15-21	203	17%	738	17%	123	17%	0.22	0.04
May 22-31	213	18%	777	18%	92	13%	0.15	0.04

**Table 3.** Survey effort, number of drumming grouse observed, and drumming rate (grouse drumming/hour) by grouse season zone from the 2016 Ruffed Grouse Drumming Survey.

Season Zone	Hunter Trips		Hours Afield		Grouse Drumming		Drumming Rate*	
	#	%	#	%	#	%	Grouse Drumming/Hour	SE
Northern Zone	181	15%	603	14%	192	26%	0.34	0.06
Southern Zone	1,012	85%	3,786	86%	536	74%	0.17	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 2016 Ruffed Grouse Drumming Survey.

Land Type	Hunter Trips		Hours Afield		Grouse Drumming		Drumming Rate*	
	#	%	#	%	#	%	Grouse Drumming/Hour	SE
Public Land	221	19%	837	19%	182	25%	0.26	0.04
Private Land	958	81%	3,498	81%	538	75%	0.18	0.02

**Table 5.** Survey effort, number of drumming grouse observed, and drumming rate (grouse drumming/hour) by DEC Region from the 2016 Ruffed Grouse Drumming Survey.

DEC Region	Hunter Trips		Hours Afield		Grouse Drumming		Drumming Rate*	
	#	%	#	%	#	%	Grouse Drumming/Hour	SE
3 - Lower Hudson Valley	91	8%	359	8%	7	1%	0.02	0.01
4 - Capital Region	217	18%	828	19%	155	21%	0.25	0.03
5 - E Adks/Lk Champlain	74	6%	237	5%	64	9%	0.34	0.10
6 - W Adks/St. Law. Valley	89	7%	356	8%	87	12%	0.31	0.06
7 - Central NY	313	26%	1,066	24%	203	28%	0.18	0.03
8 - Finger Lakes	129	11%	470	11%	75	10%	0.18	0.06
9 - Western NY	280	23%	1,073	24%	137	19%	0.16	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 2016 Ruffed Grouse Drumming Survey.

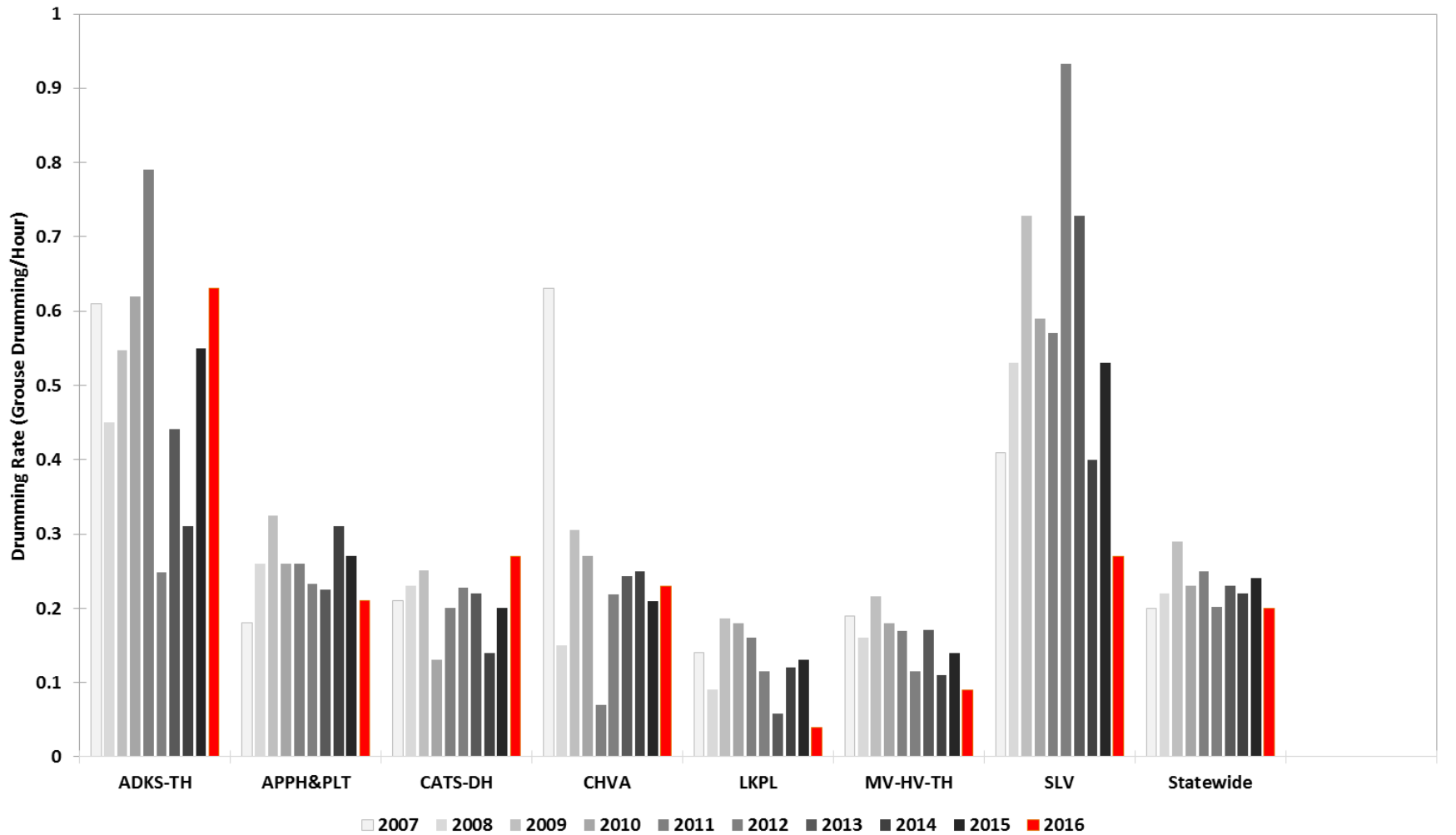
Ecozone WMU Aggregate**	Trips		Hours		Grouse Drumming		Drumming Rate* (grouse drumming/hour)	
	#	%	#	%	#	%	Mean	SE
<b>St. Lawrence Valley</b>	<b>49</b>	<b>4.1%</b>	<b>214</b>	<b>4.9%</b>	<b>45</b>	<b>6.2%</b>	<b>0.27</b>	<b>0.07</b>
East Ontario Plain	16	1.3%	51	1.2%	21	2.9%	0.48	0.20
St. Lawrence Valley	33	2.8%	163	3.7%	24	3.3%	0.17	0.04
<b>Champlain Valley</b>	<b>23</b>	<b>1.9%</b>	<b>58</b>	<b>1.3%</b>	<b>17</b>	<b>2.3%</b>	<b>0.23</b>	<b>0.09</b>
Champlain Valley & Transition	23	1.9%	58	1.3%	17	2.3%	0.23	0.09
<b>Adirondacks-Tug Hill</b>	<b>68</b>	<b>5.7%</b>	<b>189</b>	<b>4.3%</b>	<b>130</b>	<b>17.9%</b>	<b>0.63</b>	<b>0.15</b>
Tug Hill	8	0.7%	10	0.2%	3	0.4%	n/a***	
Tug Hill Transition	35	2.9%	116	2.6%	89	12.2%	0.66	0.21
Northern Adirondacks	16	1.3%	42	1.0%	9	1.2%	0.21	0.09
Central Adirondacks	9	0.8%	21	0.5%	29	4.0%	1.57	0.65
<b>Lake Plains</b>	<b>214</b>	<b>17.9%</b>	<b>715</b>	<b>16.3%</b>	<b>33</b>	<b>4.5%</b>	<b>0.04</b>	<b>0.01</b>
Oneida Lake Plains	94	7.9%	286	6.5%	26	3.6%	0.09	0.02
Great Lakes Plain	79	6.6%	287	6.5%	7	1.0%	0.02	0.01
Oswego Lowlands	41	3.4%	142	3.2%	0	0.0%	0.00	0.00
<b>Appalachian Hills &amp; Plateau</b>	<b>488</b>	<b>40.9%</b>	<b>1,824</b>	<b>41.6%</b>	<b>326</b>	<b>44.8%</b>	<b>0.21</b>	<b>0.02</b>
E Appal Plateau	159	13.3%	570	13.0%	121	16.6%	0.23	0.03
C Appal Plateau	48	4.0%	181	4.1%	52	7.1%	0.37	0.15
N Appal Hills	68	5.7%	254	5.8%	23	3.2%	0.08	0.03
W Appal Hills	213	17.9%	819	18.7%	130	17.9%	0.20	0.03

<b>Catskills-Delaware Hills</b>	<b>163</b>	<b>13.7%</b>	<b>645</b>	<b>14.7%</b>	<b>114</b>	<b>15.7%</b>	<b>0.27</b>	<b>0.04</b>
Catskills	95	8.0%	384	8.7%	69	9.5%	0.28	0.04
Otsego-Del. Hills	38	3.2%	146	3.3%	42	5.8%	0.38	0.09
Neversink-Mngp Hills	30	2.5%	115	2.6%	3	0.4%	0.02	0.02
<b>Mohawk Valley-Hudson Valley-Taconic Highlands</b>	<b>188</b>	<b>15.8%</b>	<b>744</b>	<b>17.0%</b>	<b>63</b>	<b>8.7%</b>	<b>0.09</b>	<b>0.02</b>
Mohawk Valley	59	4.9%	217	4.9%	33	4.5%	0.19	0.05
Hudson Valley	95	8.0%	363	8.3%	15	2.1%	0.05	0.01
N Taconic Highlands	22	1.8%	110	2.5%	6	0.8%	0.05	0.03
S Taconic Highlands	10	0.8%	50	1.1%	9	1.2%	0.18	0.05
NYC Transition	2	0.2%	4	0.1%	0	0.0%	n/a***	
<b>Statewide Totals</b>	<b>1,193</b>		<b>4,389</b>		<b>728</b>		<b>0.20</b>	<b>0.01</b>

\*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; SE = Standard Error

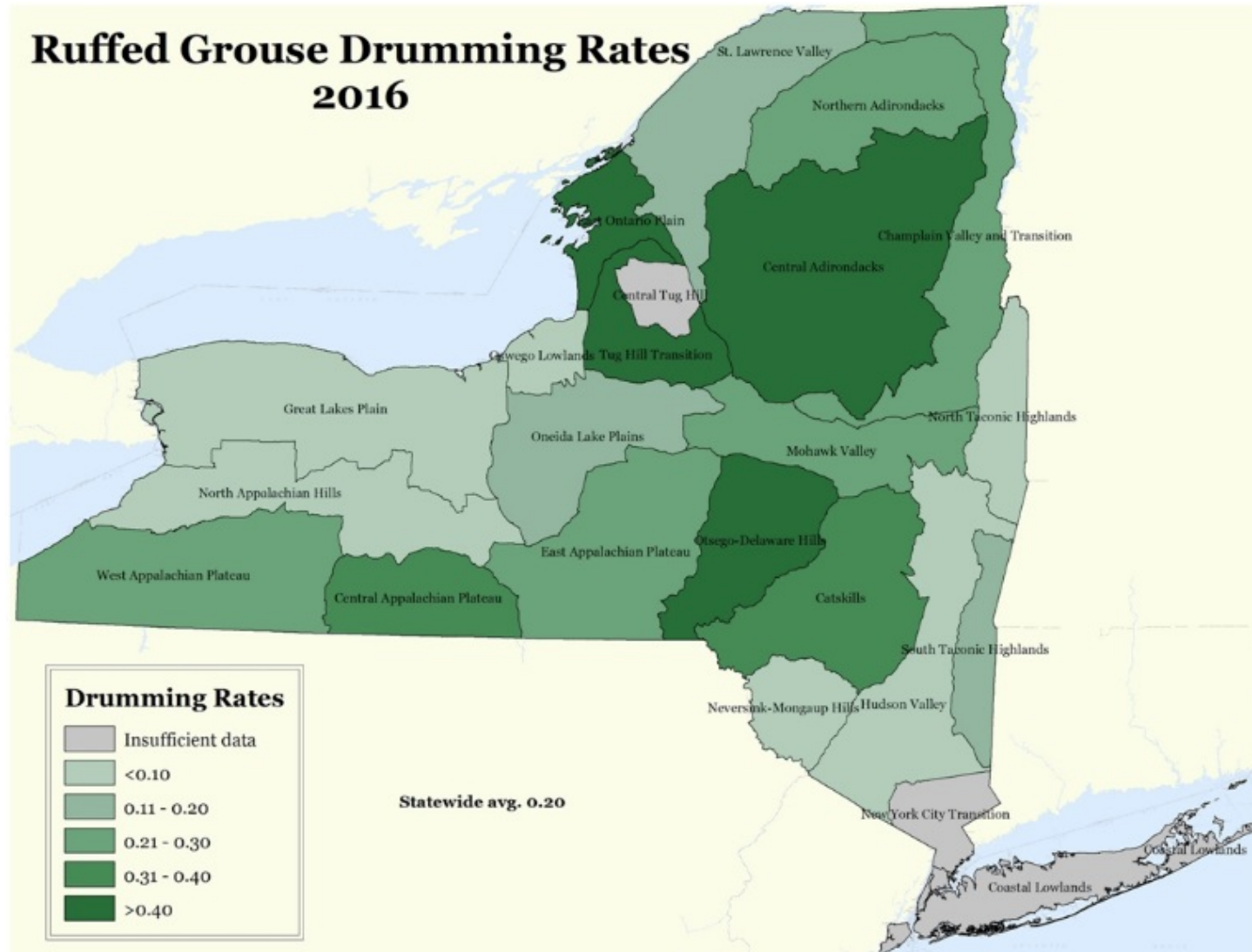
\*\*WMU Aggregates are groupings of Wildlife Management Units. Ecozones are groupings of WMU Aggregates. The Coastal Lowlands Aggregate (Long Island) only has a two-day youth turkey season, thus is not listed.

\*\*\*There was an insufficient sample size in these WMU Aggregates. A minimum of 10 trips or 20 hours is needed for analysis.

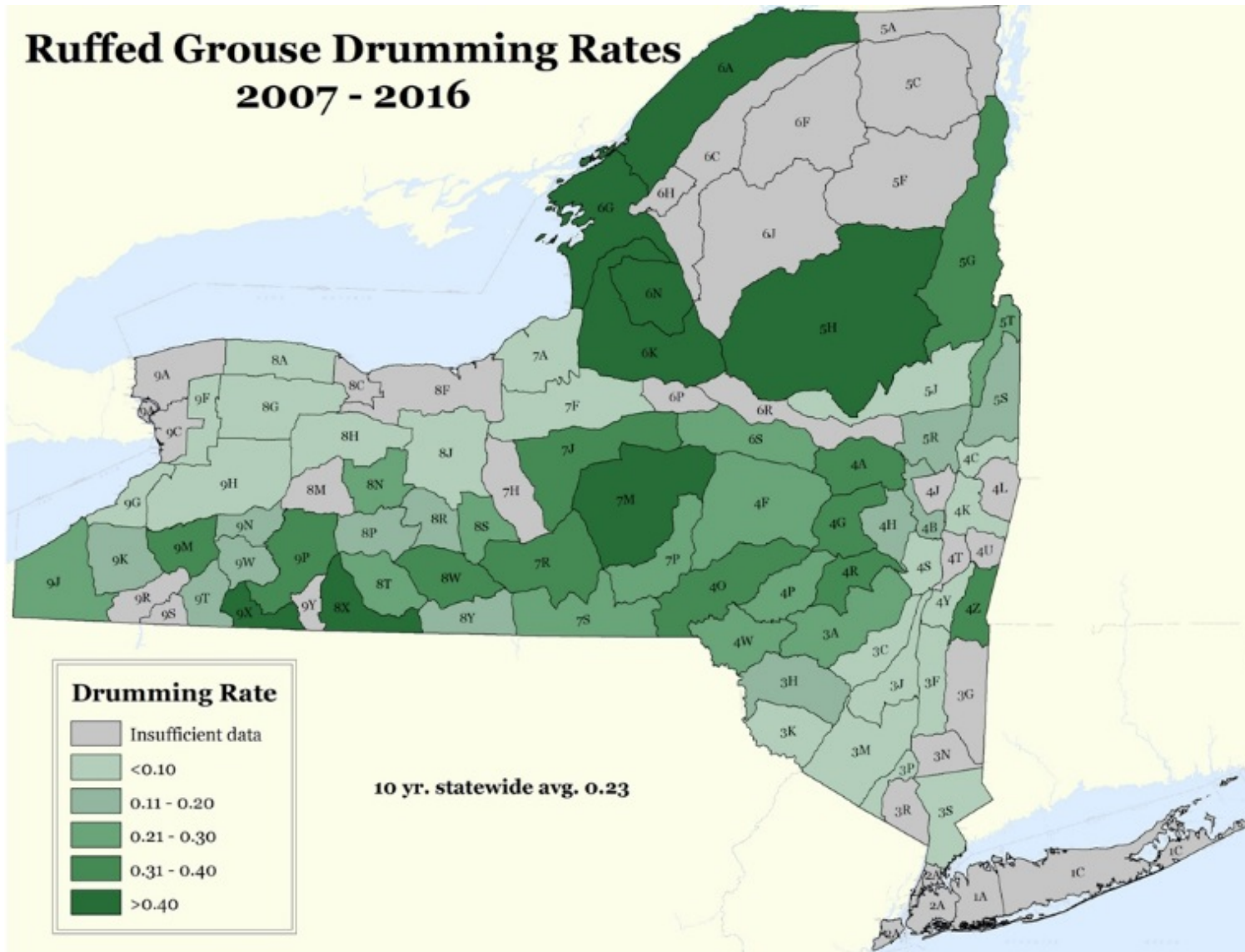


**Figure 1.** Drumming rate (grouse drumming/hour) by ecozone based on the Ruffed Grouse Drumming Survey data, 2007-16. Ecozones are an aggregation of Wildlife Management Units. Abbreviations: Champlain Valley (CHVA), Adirondacks-Tug Hill (ADKS-TH), Catskills-Delaware Hills (CATS-DH), St. Lawrence Valley (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.

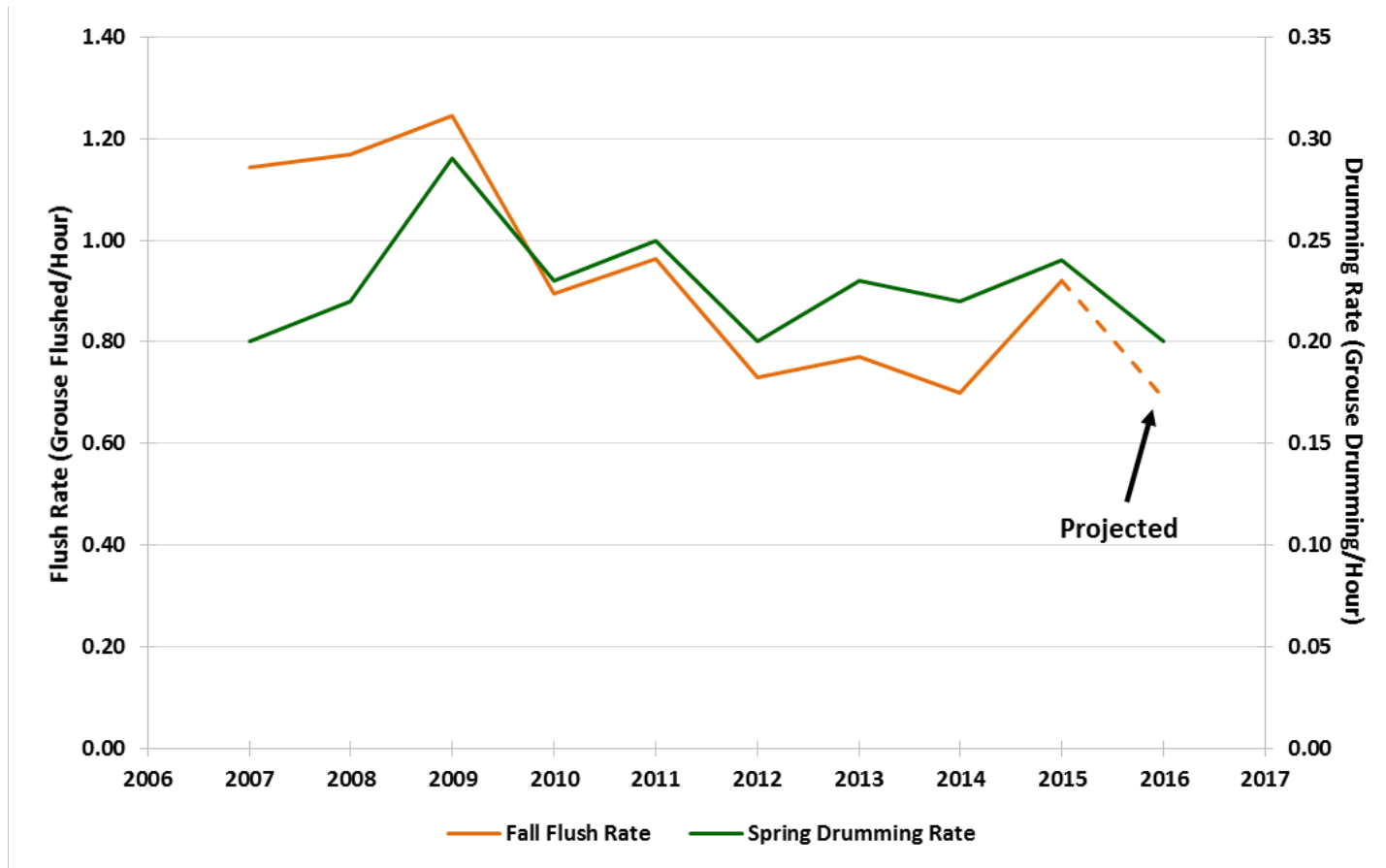




**Figure 2.** Drumming rate (grouse drumming/hour) by Wildlife Management Unit (WMU) aggregate from the Ruffed Grouse Drumming Survey, 2016. Only aggregates with  $\geq 10$  observations/records or  $\geq 20$  hours were included in the analysis. The statewide drumming rate for 2016 was 0.20 grouse drumming/hour. The Tug Hill and NYC Transition aggregates had too few observations for analysis, and 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.



**Figure 3.** Drumming rate (grouse drumming/hour) by Wildlife Management Unit (WMU) from the Ruffed Grouse Drumming Survey, 2007-2016. Only WMUs with  $\geq 50$  observations/records or  $\geq 150$  hours were included in the analysis. The statewide drumming rate for the 10-year period was 0.23 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 2016 is predicted based on the statewide estimated drumming rate from spring 2016.



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