# Ruffed Grouse Drumming Survey

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

## *Results from Spring 2018*

## Introduction

During the spring 2018 wild turkey hunting season, DEC conducted the 12th 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 2018 season.

## Results from the 2018 Season

During the 2018 season, 217 hunters participated in the Ruffed Grouse Drumming Survey. Survey participants reported data from over 1,973 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 almost 7,200 hours afield and observed over 1,300 grouse. Some general findings from the 2018 season include:

- Hunters participating in the survey averaged about 33 hours afield during the 2018 season. They took about 9 trips afield for the season and spent almost 4 hours afield per trip (Table 1).
- Survey participants averaged about 6 grouse observed per hunter for the 2018 season and had to spend 5 ½ hours afield in order to hear one grouse drumming (Table 1).
- About two-thirds 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 (0.38 vs. 0.21 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 (25% in southeastern NY, 15% in northern NY, 60% in central and western NY; Table 5). We observed the highest drumming rate in DEC Region 6 in the St. Lawrence Valley/western Adirondacks (0.50 grouse drumming/hour) followed by DEC Regions 5, 7, and 9 (0.23-0.26 grouse drumming/hour). The drumming rate was below the statewide average in DEC Regions 3, 4, and 8 (0.05, 0.18, and 0.19 grouse drumming/hour, respectively).
- The drumming rate was highest in the St. Lawrence Valley Ecozone (0.57 grouse drumming/hour), followed by the Adirondacks-Tug Hill and Appalachian Hills & Plateau

ecozones (0.43 and 0.31 grouse drumming/hour, respectively; Table 6, Figures 1 and 2). The drumming rate was close to the statewide average in the Catskills-Delaware Hills and Champlain Valley ecozones, and below average in the Mohawk Valley-Hudson Valley-Taconic Highlands and Lake Plains ecozones (Table 6, Figures 1 and 2).

## Comparing 2018 to Previous Seasons

- Since this survey started in 2007, 762 turkey hunters have taken over 14,700 trips afield and spent over 45,000 hours recording their grouse observations. Over the past 12 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 2017 to 2018 the number of survey participants, survey effort, and number of grouse drumming increased between years. The drumming rate, which controls for the increase in effort, also increased from 2017 to 2018 (Table 1, Figure 4).
- When we look at the ecozone level, from 2017 to 2018 the drumming rate increased in the Appalachian Hills and Plateau and Champlain Valley ecozones, and decreased in the Adirondacks-Tug Hill and St. Lawrence Valley ecozones (Figure 1). The drumming rate was similar between years in the Catskills-Delaware Hills, Lake Plains, and Mohawk Valley-Hudson Valley-Taconic Highlands ecozones (Figure 1). The drumming rates in the Lake Plains and Hudson Valley regions are consistently below the statewide average over the past 12 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 rainfall in May and June of 2016 was below average in most regions, which may have positively impacted nest and brood success. Unfortunately, any gains in 2016 may have been offset by above-normal rainfall in May and June of 2017 in most regions, contributing to poor production.
- 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 12 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 2018-19 hunting season will be slightly

higher than last fall (0.77 grouse flushed/hour in 2017-18) and below the long-term average flush rate (about 1 bird/hour). Despite severe winter conditions in March 2018 in many regions, winter 2017-18 was relatively mild in most of the state with the exceptions of the Adirondacks-Tug Hill ecozone. Fortunately, nesting conditions have been relatively dry in May and June, so that's a good sign for nest and chick success. Good overwinter survival due to mild winter conditions coupled with good production this summer could help hunter prospects this fall.

- 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 2013-18 Ruffed Grouse Drumming Survey.

| Summary Statistics | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 5-yr Avg. (2013-17) |
|---|---|---|---|---|---|---|---|
| # Survey Participants | 236 | 210 | 193 | 185 | 179 | 217 | 201 |
| # Trips | 1,493 | 1,348 | 1,181 | 1,193 | 1,142 | 1,973 | 1,271 |
| # Trips/Participant | 6.3 | 6.4 | 6.1 | 6.4 | 6.4 | 9.1 | 6.3 |
| # Hours Afield | 5,921 | 5,009 | 4,472 | 4,389 | 4,169 | 7,267 | 4,792 |
| # Hours/Participant | 25.1 | 23.9 | 23.2 | 23.7 | 23.3 | 33.5 | 23.8 |
| # Hours/Trip | 4.0 | 3.7 | 3.8 | 3.7 | 3.7 | 3.7 | 3.8 |
| # Grouse Drumming | 1,128 | 944 | 987 | 728 | 723 | 1,320 | 902 |
| # Grouse Drumming/Participant | 4.8 | 4.5 | 5.1 | 3.9 | 4.0 | 6.1 | 4.5 |
| # Grouse Drumming/Trip | 0.76 | 0.70 | 0.84 | 0.61 | 0.63 | 0.67 | 0.71 |
| Drumming Rate (grouse drumming/hour) | 0.23 | 0.22 | 0.24 | 0.20 | 0.22 | 0.24 | 0.22 |
| Hours Afield to Hear 1 Grouse Drumming | 4.3 | 4.5 | 4.5 | 6.0 | 5.8 | 5.5 | 5.0 |

**Table 2.** Survey effort, number of drumming grouse observed, and drumming rate (grouse drumming/hour) by week from the 2018 Ruffed Grouse Drumming Survey.

| Week | Hunter Trips | | Hours Afield | | Grouse Drumming | | Drumming Rate* | |
|---|---|---|---|---|---|---|---|---|
| | # | % | # | % | # | % | Grouse Drumming/Hour | SE |
| Youth Hunt (April 21-22) | 24 | 1% | 87 | 1% | 30 | 2% | 0.38 | 0.09 |
| Regular Season (May 1-31) | 1,949 | 99% | 7,180 | 99% | 1,290 | 98% | 0.23 | 0.02 |
| May 1-7 | 814 | 42% | 3,183 | 44% | 476 | 37% | 0.18 | 0.02 |
| May 8-14 | 459 | 24% | 1,620 | 23% | 334 | 26% | 0.26 | 0.03 |
| May 15-21 | 351 | 18% | 1,205 | 17% | 335 | 26% | 0.38 | 0.06 |
| May 22-31 | 322 | 17% | 1,167 | 16% | 144 | 11% | 0.18 | 0.03 |

**Table 3.** Survey effort, number of drumming grouse observed, and drumming rate (grouse drumming/hour) by grouse season zone from the 2018 Ruffed Grouse Drumming Survey.

| Season Zone | Hunter Trips | | Hours Afield | | Grouse Drumming | | Drumming Rate* | |
|---|---|---|---|---|---|---|---|---|
| | # | % | # | % | # | % | Grouse Drumming/Hour | SE |
| Northern Zone | 307 | 16% | 945 | 13% | 312 | 24% | 0.38 | 0.05 |
| Southern Zone | 1,666 | 84% | 6,322 | 87% | 1,008 | 76% | 0.21 | 0.02 |

**Table 4.** Survey effort, number of drumming grouse observed, and drumming rate (grouse drumming/hour) by land type (public vs. private) from the 2018 Ruffed Grouse Drumming Survey.

| Land Type | Hunter Trips | | Hours Afield | | Grouse Drumming | | Drumming Rate* | |
|---|---|---|---|---|---|---|---|---|
| | # | % | # | % | # | % | Grouse Drumming/Hour | SE |
| Public Land | 310 | 16% | 1,137 | 16% | 257 | 20% | 0.22 | 0.03 |
| Private Land | 1,653 | 84% | 6,096 | 84% | 1,059 | 80% | 0.24 | 0.02 |

**Table 5.** Survey effort, number of drumming grouse observed, and drumming rate (grouse drumming/hour) by DEC Region from the 2018 Ruffed Grouse Drumming Survey.

| DEC Region | Hunter Trips | | Hours Afield | | Grouse Drumming | | Drumming Rate* | |
|---|---|---|---|---|---|---|---|---|
| | # | % | # | % | # | % | Grouse Drumming/Hour | SE |
| 3 - Lower Hudson Valley | 176 | 9% | 685 | 9% | 28 | 2% | 0.05 | 0.01 |
| 4 - Capital Region | 296 | 15% | 1,129 | 16% | 173 | 13% | 0.18 | 0.03 |
| 5 - E Adks/Lk Champlain | 148 | 8% | 461 | 6% | 97 | 7% | 0.25 | 0.03 |
| 6 - W Adks/St. Law. Valley | 175 | 9% | 631 | 9% | 251 | 19% | 0.50 | 0.08 |
| 7 - Central NY | 464 | 24% | 1,654 | 23% | 328 | 25% | 0.26 | 0.04 |
| 8 - Finger Lakes | 270 | 14% | 1,075 | 15% | 152 | 12% | 0.19 | 0.04 |
| 9 - Western NY | 444 | 23% | 1,632 | 22% | 291 | 22% | 0.23 | 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 2018 Ruffed Grouse Drumming Survey.

| Ecozone / WMU Aggregate** | Trips | | Hours | | Grouse Drumming | | Drumming Rate* (grouse drumming/hour) | |
|---|---|---|---|---|---|---|---|---|
| | # | % | # | % | # | % | Mean | SE |
| **St. Lawrence Valley** | **86** | **4.4%** | **304** | **4.2%** | **130** | **9.8%** | **0.57** | **0.16** |
| East Ontario Plain | 39 | 2.0% | 131 | 1.8% | 76 | 5.8% | 0.64 | 0.31 |
| St. Lawrence Valley | 47 | 2.4% | 173 | 2.4% | 54 | 4.1% | 0.52 | 0.13 |
| **Champlain Valley** | **40** | **2.0%** | **108** | **1.5%** | **29** | **2.2%** | **0.28** | **0.08** |
| Champlain Valley & Transition | 40 | 2.0% | 108 | 1.5% | 29 | 2.2% | 0.28 | 0.08 |
| **Adirondacks-Tug Hill** | **131** | **6.6%** | **355** | **4.9%** | **150** | **11.4%** | **0.43** | **0.05** |
| Tug Hill | 15 | 0.8% | 44 | 0.6% | 13 | 1.0% | 0.30 | 0.14 |
| Tug Hill Transition | 59 | 3.0% | 166 | 2.3% | 84 | 6.4% | 0.50 | 0.09 |
| Northern Adirondacks | 35 | 1.8% | 80 | 1.1% | 30 | 2.3% | 0.37 | 0.07 |
| Central Adirondacks | 22 | 1.1% | 65 | 0.9% | 23 | 1.7% | 0.40 | 0.07 |
| **Lake Plains** | **304** | **15.4%** | **1218** | **16.8%** | **21** | **1.6%** | **0.02** | **0.01** |
| Oneida Lake Plains | 106 | 5.4% | 423 | 5.8% | 14 | 1.1% | 0.05 | 0.02 |
| Great Lakes Plain | 148 | 7.5% | 617 | 8.5% | 4 | 0.3% | 0.00 | 0.00 |
| Oswego Lowlands | 50 | 2.5% | 178 | 2.4% | 3 | 0.2% | 0.02 | 0.01 |
| **Appalachian Hills & Plateau** | **843** | **42.7%** | **3,054** | **42.0%** | **734** | **55.6%** | **0.31** | **0.03** |
| East Appalachian Plateau | 274 | 13.9% | 954 | 13.1% | 292 | 22.1% | 0.40 | 0.07 |
| Central Appalachian Plateau | 67 | 3.4% | 268 | 3.7% | 94 | 7.1% | 0.52 | 0.14 |
| North Appalachian Hills | 144 | 7.3% | 518 | 7.1% | 70 | 5.3% | 0.13 | 0.03 |
| West Appalachian Hills | 358 | 18.1% | 1,314 | 18.1% | 278 | 21.1% | 0.28 | 0.02 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Catskills-Delaware Hills** | **213** | **10.8%** | **881** | **12.1%** | **145** | **11.0%** | **0.20** | **0.04** |
| Catskills | 133 | 6.7% | 553 | 7.6% | 110 | 8.3% | 0.21 | 0.03 |
| Otsego-Delaware Hills | 46 | 2.3% | 194 | 2.7% | 26 | 2.0% | 0.25 | 0.16 |
| Neversink-Mongaup Hills | 34 | 1.7% | 134 | 1.8% | 9 | 0.7% | 0.08 | 0.03 |
| **Mohawk Valley-Hudson Valley-Taconic Highlands** | **356** | **18.0%** | **1,347** | **18.5%** | **111** | **8.4%** | **0.10** | **0.01** |
| Mohawk Valley | 105 | 5.3% | 371 | 5.1% | 73 | 5.5% | 0.22 | 0.03 |
| Hudson Valley | 163 | 8.3% | 647 | 8.9% | 21 | 1.6% | 0.03 | 0.01 |
| North Taconic Highlands | 47 | 2.4% | 204 | 2.8% | 14 | 1.1% | 0.09 | 0.03 |
| South Taconic Highlands | 26 | 1.3% | 88 | 1.2% | 3 | 0.2% | 0.04 | 0.02 |
| New York City Transition | 15 | 0.8% | 37 | 0.5% | 0 | 0.0% | 0.00 | 0.00 |
| **Statewide Totals** | **1,973** | | **7,267** | | **1,320** | | **0.24** | **0.02** |

*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.

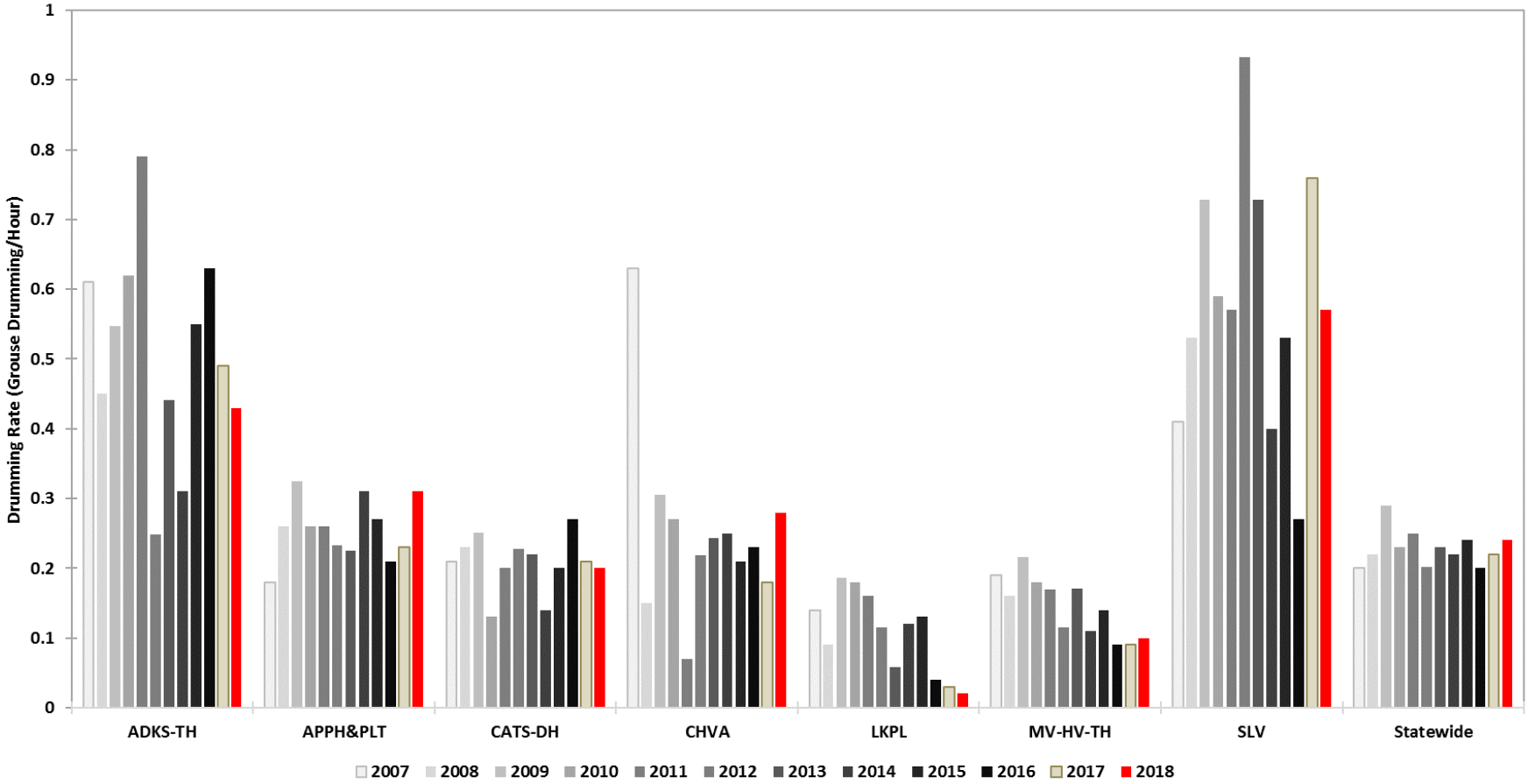


**Figure 1.** Drumming rate (grouse drumming/hour) by ecozone based on the Ruffed Grouse Drumming Survey data, 2007-18. Ecozones are an aggregation of Wildlife Management Units. Abbreviations: Champlain Valley (CHVA), Adirondacks-Tug Hill (ADKS-TH), Catskills-Delaware Hills (CATS-DH), St. Lawrence Valley (SLV), Appalachian Hills & Plateau (APPH&PLT), Lake Plains (LKPL), Mohawk Valley-Hudson Valley-Taconic Highlands (MV-HV-TH). The Costal Lowlands Ecozone (Long Island) only has a two-day youth turkey hunt, so the drumming survey was not conducted there.

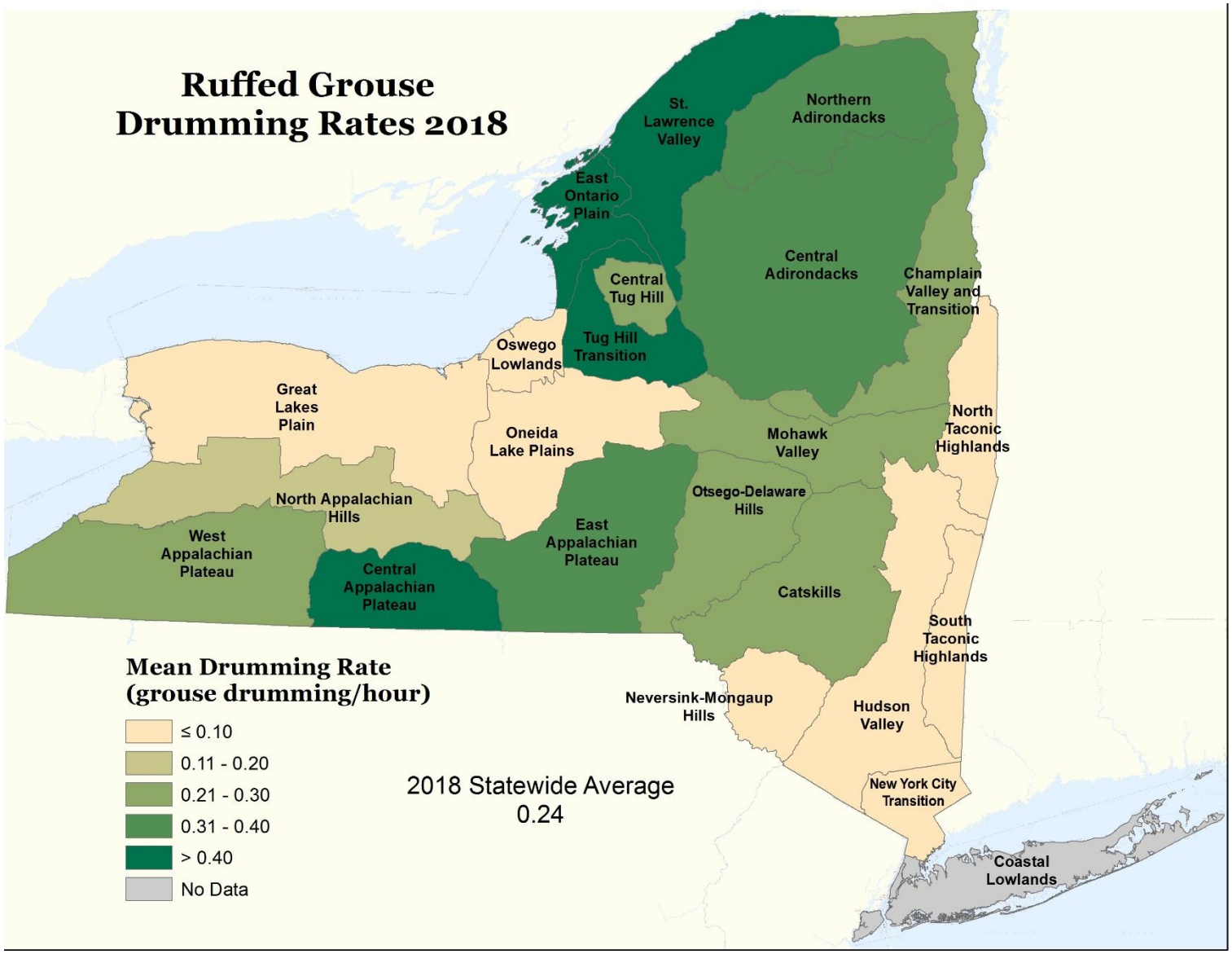


**Figure 2.** Drumming rate (grouse drumming/hour) by Wildlife Management Unit (WMU) aggregate from the Ruffed Grouse Drumming Survey, 2018. Only aggregates with ≥10 observations/records or ≥20 hours were included in the analysis. The statewide drumming rate for 2018 was 0.24 grouse drumming/hour. The 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.

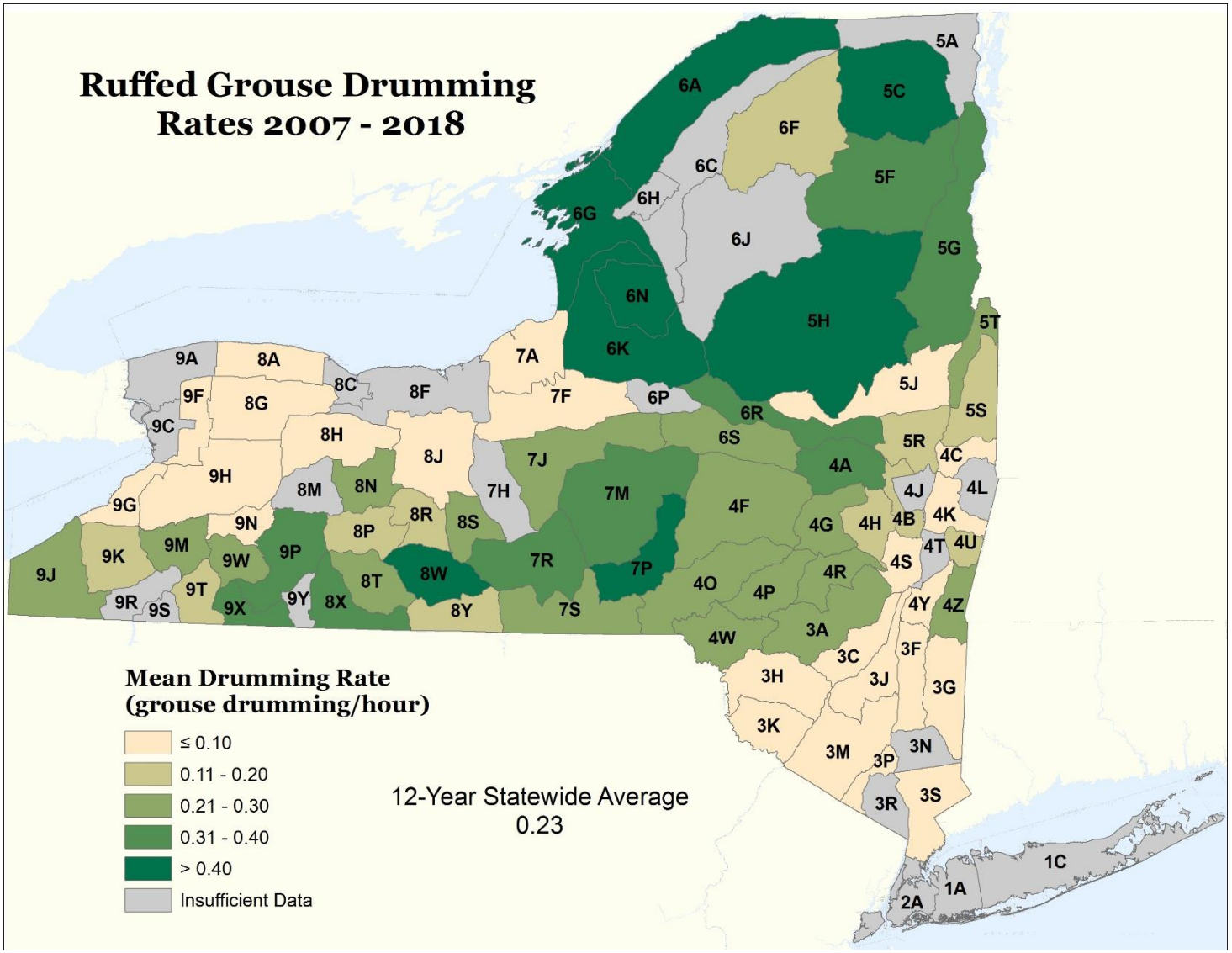


**Figure 3.** Drumming rate (grouse drumming/hour) by Wildlife Management Unit (WMU) from the Ruffed Grouse Drumming Survey, 2007-2018. Only WMUs with ≥50 observations/records or ≥150 hours were included in the analysis. The statewide drumming rate for the 12-year period was 0.23 grouse drumming/hour. 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.

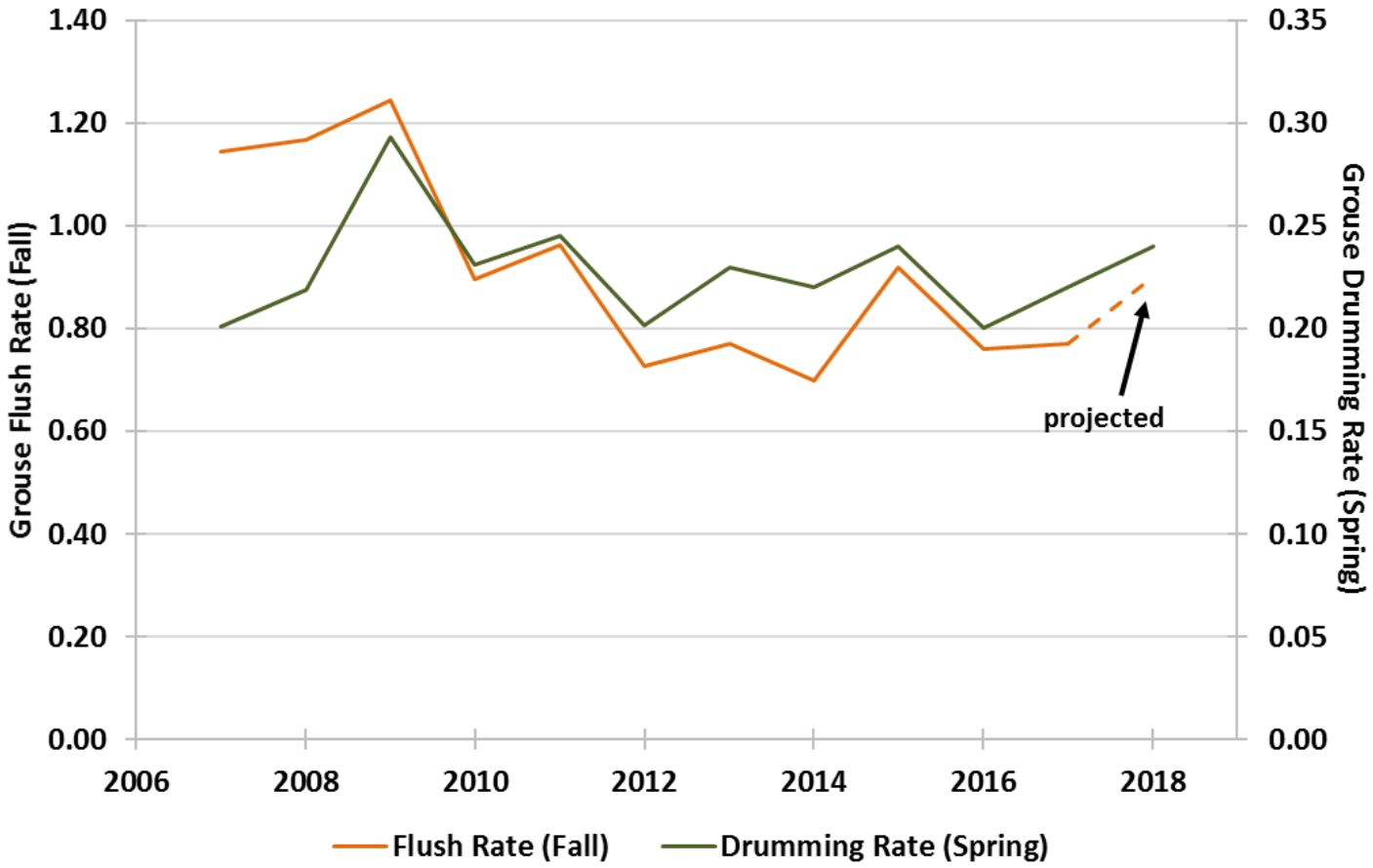


**Figure 4.** Ruffed grouse drumming rate (grouse drumming/hour) from the Ruffed Grouse Drumming Survey conducted during the spring, and the grouse flush rate (grouse flushed/hour) from the Grouse and Woodcock Hunting Log conducted during the fall grouse hunting season. The flush rate for fall 2018 is predicted based on the statewide estimated drumming rate from spring 2018.

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