Cooperator Ruffed Grouse & American Woodcock Hunting Log

During the 2019-20 ruffed grouse and American woodcock hunting seasons, 200 hunters recorded their daily hunting activities, including the number of birds flushed, the number of hours hunted, the number of birds killed, and if a dog was used to hunt grouse and woodcock. The primary purpose of the log is to monitor the number of birds flushed per hour. Changes in the flush rate illustrate trends in the grouse and woodcock populations when viewed over a long period of time and will provide insight into statewide distributions for these popular game species as habitats change both locally and on a landscape scale.

We thank all the hunters that participated in this survey during the 2019-20 seasons.

Results from the 2019-20 Season

During the 2019-20 season, participants reported data from over 1,800 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 4,900 hours afield and flushed just over 2,500 grouse (about 0.6 flushes/hour) and almost 1,500 woodcock (about 0.6 flushes/hour). Findings from the 2019-20 season include:

Grouse Hunting

- Hunters participating in the survey averaged about 24 hours afield during the 2019-20 season. They took about 9 trips afield for the season and spent about 3 hours afield per trip (Table 1).
- Grouse log participants averaged about 13 grouse flushed per hunter for the 2019-20 season and had to spend about 2 hours hunting to flush one grouse. In addition, hunters averaged about 1 bird harvested for the season and had to invest about 23 hours of hunting effort to harvest one grouse. On average, one out of every 12 grouse flushes resulted in a kill (a 8.5% success rate; Table 1).
- Almost 70% of the effort expended by hunters occurred during the first half of the season (September - November; Table 2). In addition, about 70% of the grouse flushed and harvested occurred during this early part of the season; however, the flush rate was higher during the late portion of the season (0.56 grouse flushed/hour in Sept.-Nov vs. 0.63 grouse flushed/hour in Dec.-Feb.).
- More effort was expended by hunters on public lands, and the number of grouse flushed was higher there (Table 3); however, the flush rate was slightly higher on private lands.
- Overall, there was far more effort expended in the southern grouse season zone than the northern season zone (about 70% of the total), but the flush rate was higher in the northern zone (Table 4).
- Overall, the flush rate for the 2019-20 season was 0.59 grouse flushed/hour, the lowest observed since this survey started in 2004 (Figure 1). The flush rate was highest in the Adirondacks-Tug Hill and Catskills-Delaware Hills ecozones (about 0.80 grouse

flushed/hour). The rest of the ecozones were below the annual statewide average (Table 5, Figures 1 and 2).
- Most hunters that participated in the survey used a dog to hunt grouse (Table 6). In general, hunters that used a dog flushed and harvested more grouse and had a higher flush rate (0.73 grouse flushed/hour) than hunters that did not use a dog (0.37 grouse flushed/hour).

Woodcock Hunting

- Analyses for woodcock data were restricted to 20 September through 30 November. This represents the period in which resident and migrating woodcock were in New York and accounted for 99% of all the woodcock observations during the survey. The results presented in this report are based on 1,182 trips and 3,296 hours afield by 175 hunters.
- Hunters participating in the survey averaged about 19 hours afield during the 2019 woodcock season. They took about 7 trips afield for the season and spent about 3 hours afield per trip (Table 1).
- Survey participants averaged about 8 woodcock flushed per hunter for the 2019 season and had to spend about 2 hours hunting to flush one woodcock. In addition, hunters averaged 2 birds harvested for the season and had to invest about 9 hours of hunting effort to harvest one woodcock. On average, one out of every 4 woodcock flushes resulted in a kill (a 26% success rate; Table 1).
- There was a peak in hunting effort during the third week of October (Table 7). More birds were flushed and killed during the third week of October than during any other week of the season, but the highest flush rate occurred during the first week of November (0.87 birds flushed/hour; Table 7). The overall flush rate from 20 September through 30 November was 0.60 birds/hour, slightly below fall 2018.
- There was more hunting effort and woodcock flushed and killed on public land than on private land, but the flush rates on public and private lands were similar (0.60 birds flushed/hour; Table 3).
- There was more hunting effort in the southern zone than in the northern zone, but the number of birds flushed and killed, and the flush rate was higher in the northern zone (0.96 woodcock flushed/hour vs. 0.40 woodcock flushed/hour; Table 4).
- The flush rate was highest in the Champlain Valley ecozone (1.92 woodcock flushed/hour), followed by the St. Lawrence Valley and Adirondacks-Tug Hill ecozones (0.96 and 0.83 woodcock flushed/hour, respectively; Table 8). The remaining ecozones were below the statewide average (0.60 woodcock flushed/hour for 2019).
- Most hunters that participated in the survey used a dog to hunt woodcock (Table 6). Hunters that used a dog flushed and harvested more woodcock and had a higher flush rate (0.89 birds flushed/hour) than hunters that did not use a dog (0.12 birds flushed/hour).

Comparing 2019-20 to Previous Seasons

Ruffed Grouse

- Over the past 16 seasons, almost 1,500 hunters have participated in this survey. They have taken almost 42,000 trips afield, spent about 115,000 hours pursuing grouse, flushed about

105,000 birds, and harvested over 8,600 grouse. During this period, the average flush rate was about 0.94 grouse flushed/hour.

- Summary statistics for hunter effort (trips/hunter, hours/hunter) during the 2019-20 season were similar to the previous season. Despite similar effort to last year, the indices for grouse abundance (flushes/hunter, flushes/hour) for 2019-20 were lower than last year and lower than the long-term average.
- Flush rates were similar between 2018-19 and 2019-20 in Northern New York and the Catskills-Delaware Hills Ecozone, and declined in the rest of the state (Figure 1).
- Statewide, ruffed grouse flush rates have declined since the peak observed in 2009-10. This is likely related to declining habitat quantity and quality on a landscape scale that is limiting grouse survival and productivity (e.g., hen survival, nest and chick success).
- Over the past 16 seasons, flush rates in the Catskills-Delaware Hills and Adirondacks-Tug Hill ecozones have been consistently above the statewide average and have been relatively stable over the past 8-10 years (Figure 1).
- As in previous years, the 2019-20 survey results emphasize a "focus area" for grouse in the central part of the state from the St. Lawrence Valley south through the Catskills. When data are analyzed across the 16 years of the survey, they highlight other areas outside of this core region that will also benefit from active habitat protection, management, or restoration. Improving habitat in or close to regions with high quality habitat has a better chance at improving grouse populations than habitat management in regions devoid of high quality grouse habitat. There are several Wildlife Management Units along the southern tier in DEC Regions 8 and 9 that have relatively good grouse populations that would benefit from habitat management efforts (Figure 3).

American Woodcock

- The statewide flush rate in 2019 was slightly below 2018 and was similar to the long-term average (0.58 birds flushed/hour; Figure 6). From 2018 to 2019, the statewide woodcock flush rate declined 12% from 0.68 to 0.60 birds flushed/hour. Despite the decline between years at the statewide level, the flush rate increased from 2018 to 2019 in the Champlain Valley and St. Lawrence Valley in northern New York and in the Lake Plains in western New York (Figure 6). The flush rate was similar between years in the Adirondacks-Tug Hill ecozone. Over the past two seasons the Champlain Valley has had the highest flush rate in the state.
- From 2010-18, the peak of woodcock migration occurred in mid to late October, but in fall 2019 it occurred during the first week of November. This is the latest peak in migration observed since woodcock were added to the survey in 2010 (Figure 6).
- In the spring (April-May), DEC staff conduct the "Singing-ground Survey" (SGS) coordinated by the U.S. Fish and Wildlife Service. This survey provides a "breeding index" (the number of singing males per route) for the state and the Eastern Management Region and helps track changes in woodcock populations over time. Results of this survey indicate that woodcock populations in New York have been stable over the past 15 years. Similarly, the woodcock flush rate observed in the Ruffed Grouse & American Woodcock Hunting Log has been relatively stable from 2010 through 2019 (Figure 6).
- From 2010 through 2016 the spring breeding index helped predict the flush rate observed in the fall (i.e., when the breeding index increased between years the flush rate was likely to

also increase between years). From 2017 through 2019 the breeding index was a less reliable predictor of the fall flush rate. Spring weather impacts during migration (e.g., late winter storms) and variability in reproductive success for woodcock populations breeding north of New York and migrating through the state in the fall may contribute to the difficulty of using the spring breeding index to predict fall hunting success.

- Results from the "*American woodcock population status*" report published by the U.S. Fish and Wildlife Service can be found on-line at https://www.fws.gov/birds/surveys-and-data/reports-and-publications/population-status.php.

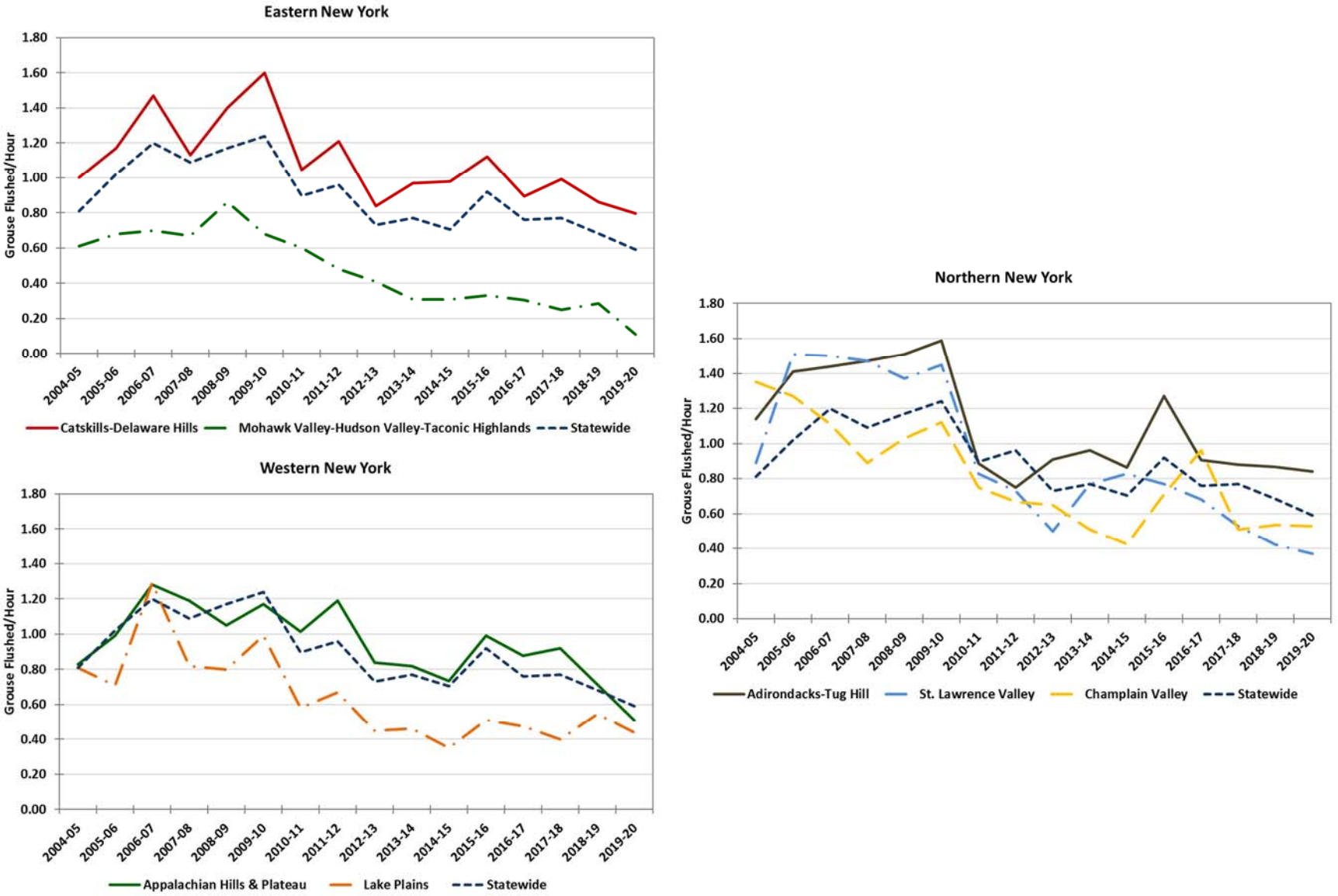

Figure 1. Ruffed grouse flush rate (grouse flushed/hour) by ecozone based on Ruffed Grouse and American Woodcock Hunting Log data for the 2004-05 through 2019-20 seasons. Ecozones are an aggregation of Wildlife Management Units. The Costal Lowlands Ecozone (New York City and Long Island) does not have a ruffed grouse hunting season.

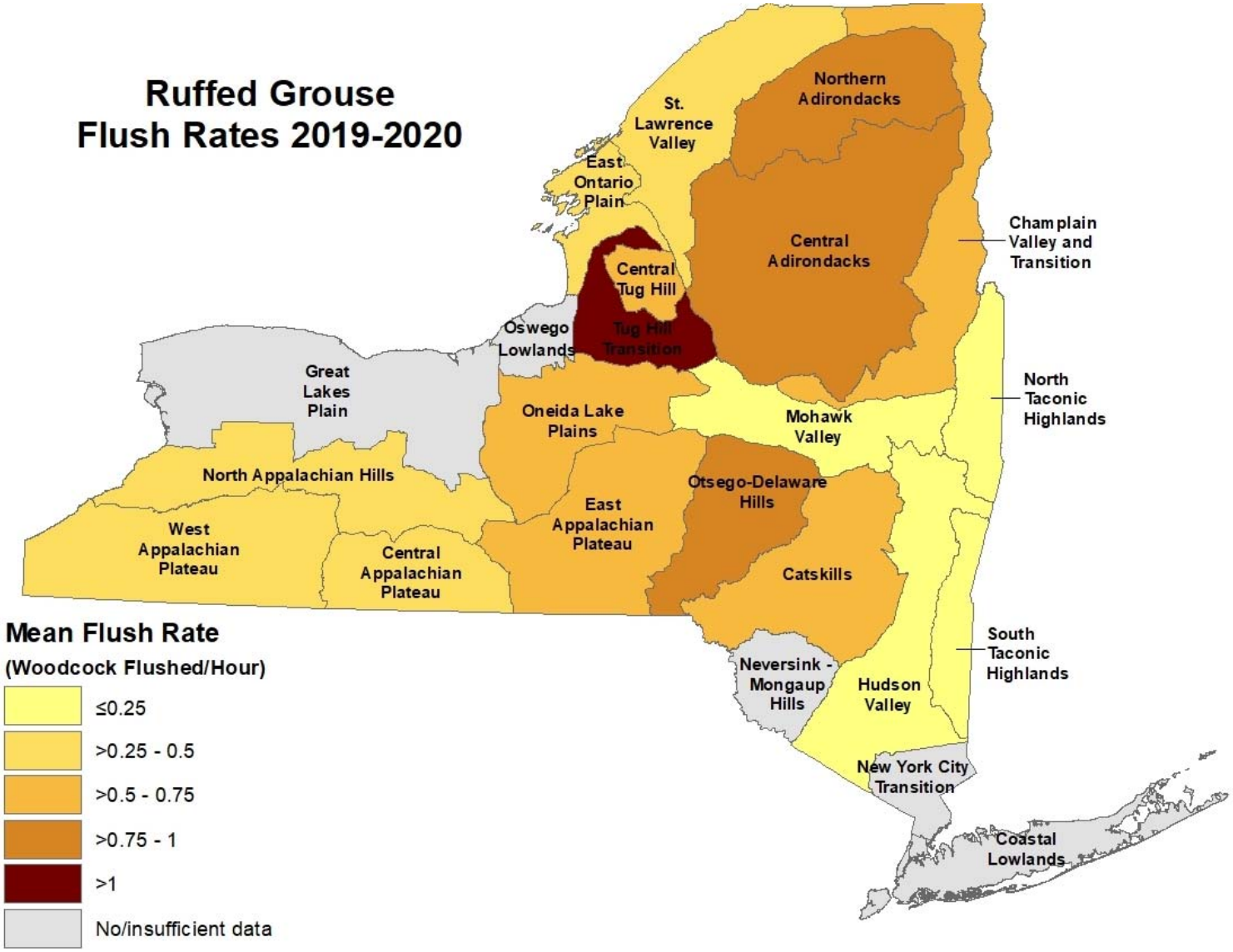

Figure 2. Ruffed Grouse flush rate (grouse flushed/hour) by Wildlife Management Unit (WMU) aggregate from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2019-20. Only aggregates with ≥20 observations/records and ≥35 hours were included in the analysis. The statewide flush rate for 2019-20 was 0.59 grouse flushed/hour. WMU aggregate in gray north of New York City had too few observations for analysis. The Coastal Lowlands aggregate does not have a grouse hunting season, so the survey was not conducted there.

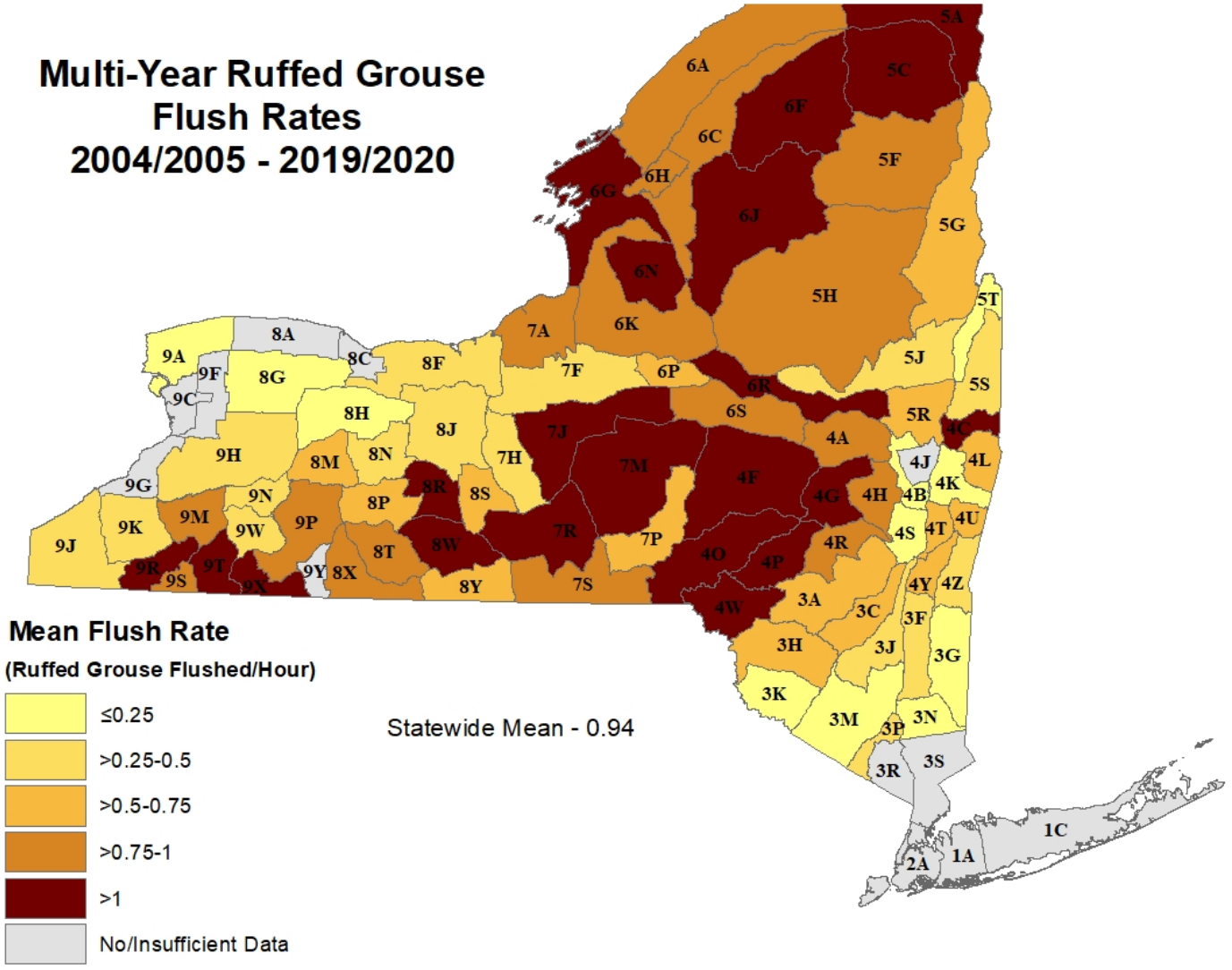

Figure 3. Ruffed Grouse flush rate (grouse flushed/hour) by Wildlife Management Unit (WMU) from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2004-05 – 2019-20. Only WMUs with ≥50 observations/records and ≥150 hours were included in the analysis. The statewide flush rate for the 16-year period was 0.94 grouse flushed/hour. WMUs in gray north of New York City (WMU 2A) had too few observations for analysis. WMUs comprising the Coastal Lowlands aggregate (WMUs 2A, 1A, and 1C) do not have a grouse hunting season.

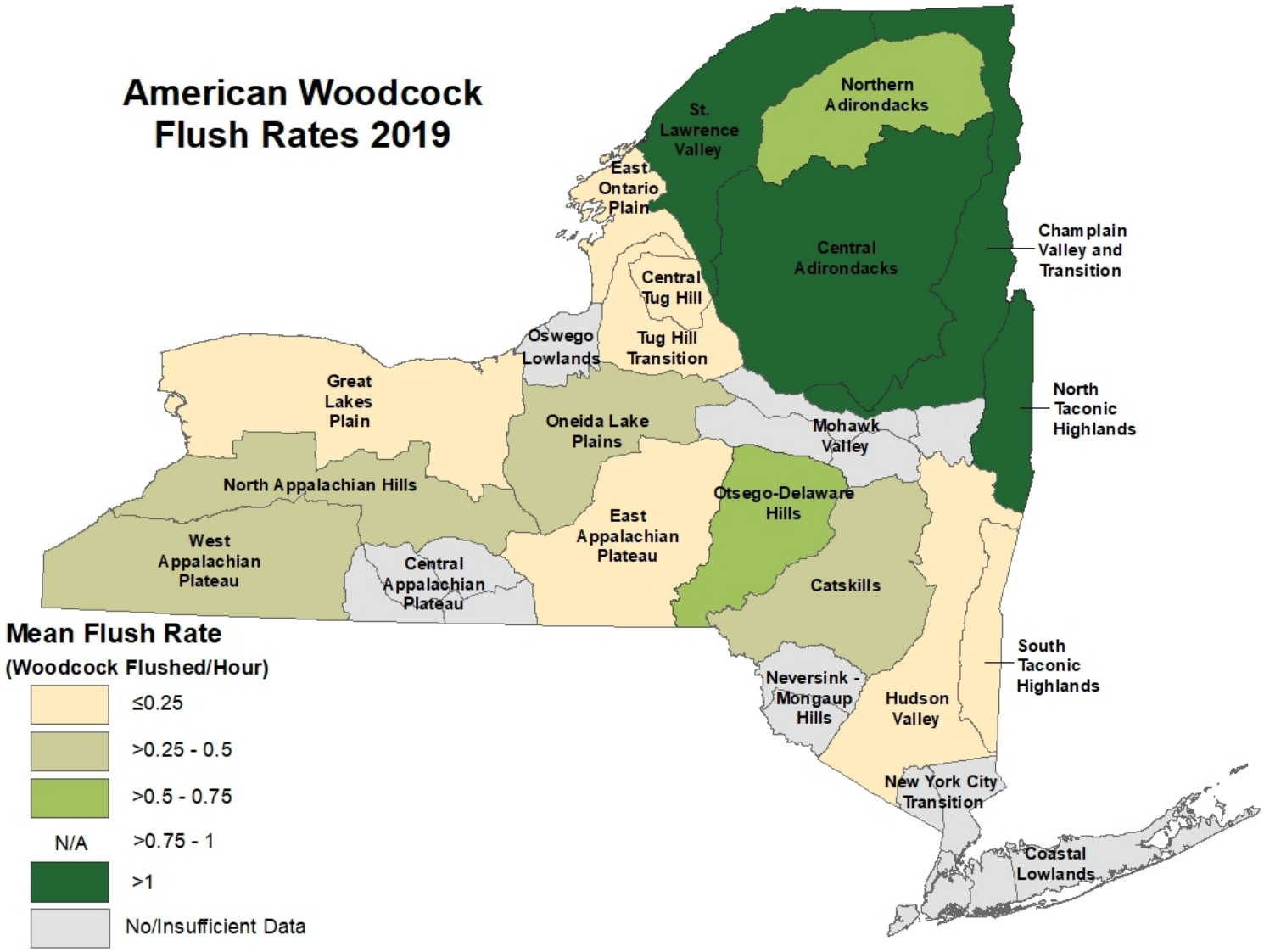

Figure 4. American woodcock flush rate (birds flushed/hour) by Wildlife Management Unit (WMU) aggregate from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2019-20. Only aggregates with ≥20 observations/records and ≥35 hours were included in the analysis. The statewide flush rate for 2019 was 0.60 woodcock flushed/hour. The Coastal Lowlands aggregate does not have a grouse hunting season, so the survey was not conducted there.

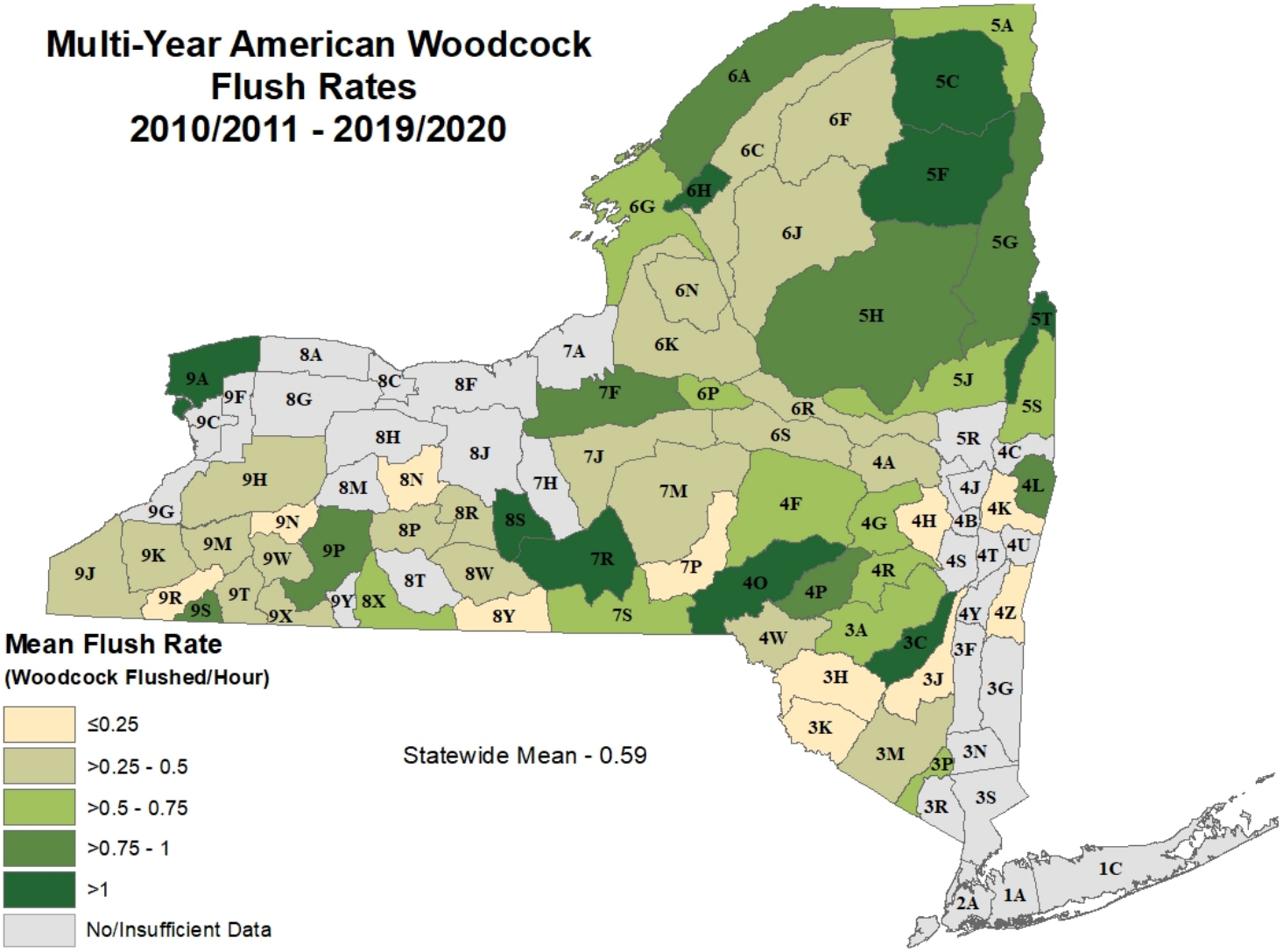

Figure 5. American woodcock flush rate (birds flushed/hour) by Wildlife Management Unit (WMU) from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2010-11 – 2019-20. Only WMUs with ≥50 observations/records and ≥150 hours were included in the analysis. The statewide flush rate for 2010-19 was 0.58 woodcock flushed/hour. WMUs in gray north of New York City (WMU 2A) had too few observations for analysis. WMUs comprising the Coastal Lowlands aggregate (WMUs 2A, 1A, and 1C) do not have a grouse hunting season, so the survey was not conducted there.

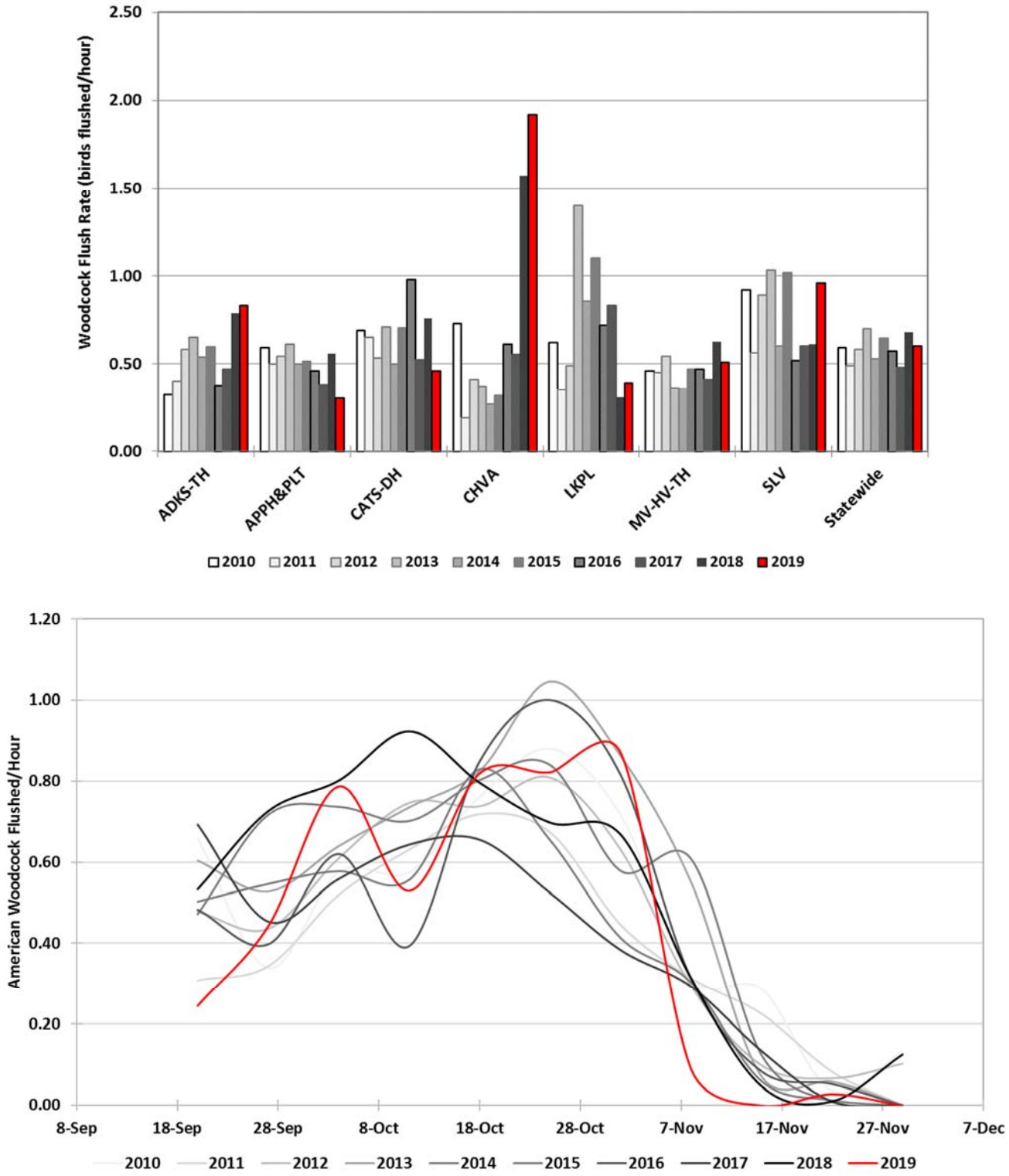

Figure 6. American woodcock flush rate (woodcock flushed/hour) by ecozone (top) and the flush rate by week (bottom) from the Cooperator Ruffed Grouse & Woodcock Hunting Log. The statewide flush rate for 2019 was 0.60 woodcock flushed/hour. Abbreviations: Champlain Valley (CHVA), Adirondacks-Tug Hill (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 (New York City and Long Island) does not have a grouse season, so data are not available for this region.

Table 1. Summary statistics for the grouse and woodcock hunting seasons from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2019-20.

Summary Statistics	Grouse Hunting					Woodcock Hunting				
	2016-17	2017-18	2018-19	2019-20	3-Year Avg. (16-17 - 18-19)	Fall 2016	Fall 2017	Fall 2018	Fall 2019	3-Year Avg. (2016-18)
Number of Hunters	239	212	210	200	220	213	191	188	175	197
Trips/Hunter	9.1	9.2	8.6	9.1	9.0	6.8	7.1	6.4	6.8	6.8
Hours/Trip	2.7	2.7	2.7	2.7	2.7	2.8	2.8	2.7	2.8	2.8
Hours/Hunter	24.7	25.2	23.1	24.3	24.3	19.4	19.7	17.6	18.8	18.9
Birds Flushed/Hunter	18.0	18.7	15.4	12.5	17.4	9.5	8.4	9.5	8.3	9.1
Birds Harvested/Hunter	1.2	1.3	1.0	1.1	1.2	2.0	1.9	2.1	2.1	2.0
Hours/Bird Flushed*	1.4	1.4	1.5	1.9	1.4	2.0	2.3	1.8	2.3	2.0
Hours/Bird Harvested*	19.8	19.3	22.9	22.9	20.7	9.8	10.3	8.4	8.9	9.5
% of Birds Flushed that were Harvested	6.9	7.0	6.6	8.5	6.8	20.7	22.7	21.9	25.5	21.8
Flush Rate (birds flushed/hour)**	0.76	0.77	0.68	0.59	0.74	0.57	0.48	0.68	0.60	0.58

* Number of hours afield to flush or harvest one bird.

** Overall flush rates are calculated as an average flush rate for all days hunted, not a simple division of the total number of birds flushed by the total number of hours hunted.

NOTE: Analyses for woodcock data were restricted to 20 September through 30 November. This represents the period in which resident and migrating woodcock were in New York and accounted for 99% of all the woodcock observations during the survey. Results for 2019 are based on 1,182 trips and 3,296 hours afield by 175 hunters.

Table 2. Grouse hunting effort, grouse flushed and killed, and flush rates (grouse flushed/hour) by month from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2019-20.

Month	# of Trips	% of Total	# of Hours	% of Total	# Grouse Flushed	% of Total	# Grouse Harvested	% of Total	Flush Rate ± SE* (flushes/hour)
September	75	4%	208	4%	180	7%	18	9%	0.88 ± 0.13
October	778	43%	2,111	43%	959	38%	75	35%	0.50 ± 0.03
November	329	18%	977	20%	494	20%	51	24%	0.63 ± 0.06
December	165	9%	407	8%	275	11%	21	10%	0.73 ± 0.07
January	259	14%	647	13%	352	14%	35	17%	0.65 ± 0.07
February	210	12%	515	11%	244	10%	12	6%	0.53 ± 0.07

* SE = standard error; Data analysis included logs with some missing data. Overall flush rates are calculated as an average flush rate for all days hunted, not a simple division of the total number of birds flushed by the total number of hours hunted.

Table 3. Hunting effort, grouse and woodcock flushed and killed, and flush rates (birds flushed/hour) by land type (public vs. private) from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2019-20.

	Public Land				Private Land			
	Grouse Hunting		Woodcock Hunting		Grouse Hunting		Woodcock Hunting	
	#	%	#	%	#	%	#	%
Number of Trips	1,107	62%	766	67%	665	38%	385	33%
Number of Hours	3,140	66%	2,239	70%	1,593	34%	959	30%
# Birds Flushed	1,593	65%	955	67%	867	35%	465	33%
# Birds Harvested	136	65%	271	75%	74	35%	92	25%
Flush Rate ± SE* (flushes/hour)	0.55 ± 0.03		0.60 ± 0.05		0.66 ± 0.04		0.59± 0.10	

Table 4. Hunting effort, grouse and woodcock flushed and killed, and flush rates (birds flushed/hour) by season zone from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2019-20.

	Northern Zone				Southern Zone			
	Grouse Hunting		Woodcock Hunting		Grouse Hunting		Woodcock Hunting	
	#	%	#	%	#	%	#	%
Number of Trips	538	30%	418	35%	1,278	70%	764	65%
Number of Hours	1,485	31%	1,218	37%	3,380	69%	2,078	63%
# Birds Flushed	981	39%	804	55%	1,523	61%	653	45%
# Birds Harvested	97	46%	190	51%	115	54%	181	49%
Flush Rate ± SE* (flushes/hour)	0.73 ± 0.04		0.96 ± 0.11		0.53 ± 0.03		0.40 ± 0.03	

* SE = standard error; Data analysis included logs with some missing data. Overall flush rates are calculated as an average flush rate for all days hunted, not a simple division of the total number of birds flushed by the total number of hours hunted.

NOTE: Analyses for woodcock data were restricted to 20 September through 30 November. This represents the period in which resident and migrating woodcock were in New York and accounted for 99% of all the woodcock observations during the survey. Results for 2019 are based on 1,182 trips and 3,296 hours afield by 175 hunters.

Table 5. Number of hours hunted, number of grouse flushed and killed, and flush rates (grouse flushed/hour) from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2019-20.

Ecozone / WMU Aggregate*	Trips		Hours		Grouse Flushed		Grouse Killed		Flush Rate** (grouse flushed/hour)	
	#	%	#	%	#	%	#	%	Mean	SE**
St. Lawrence Valley	**107**	**5.9%**	**292**	**6.0%**	**112**	**4.5%**	**13**	**6.2%**	**0.37**	**0.05**
East Ontario Plain	32	1.8%	76	1.6%	22	0.9%	2	1.0%	0.31	0.09
St. Lawrence Valley	75	4.1%	216	4.5%	90	3.6%	11	5.2%	0.39	0.06
Champlain Valley	**47**	**2.6%**	**95**	**2.0%**	**38**	**1.5%**	**4**	**1.9%**	**0.53**	**0.15**
Champlain Valley & Transition	47	2.6%	95	2.0%	38	1.5%	4	1.9%	0.53	0.15
Adirondacks-Tug Hill	**379**	**20.9%**	**1,089**	**22.5%**	**819**	**32.7%**	**80**	**38.1%**	**0.84**	**0.06**
Tug Hill	67	3.7%	249	5.1%	183	7.3%	16	7.6%	0.68	0.09
Tug Hill Transition	44	2.4%	107	2.2%	106	4.2%	9	4.3%	1.13	0.22
Northern Adirondacks	71	3.9%	292	6.0%	198	7.9%	19	9.0%	0.83	0.12
Central Adirondacks	197	10.9%	441	9.1%	332	13.3%	36	17.1%	0.84	0.08
Lake Plains	**136**	**7.5%**	**393**	**8.1%**	**120**	**4.8%**	**5**	**2.4%**	**0.44**	**0.07**
Oneida Lake Plains	106	5.9%	263	5.4%	108	4.3%	5	2.4%	0.51	0.08
Great Lakes Plain	25	1.4%	121	2.5%	0	0.0%	0	0.0%	0.00	0.00
Oswego Lowlands	5	0.3%	9	0.2%	12	0.5%	0	0.0%	n/a***	
Appalachian Hills & Plateau	**529**	**29.2%**	**1,363**	**28.1%**	**600**	**24.0%**	**39**	**18.6%**	**0.51**	**0.04**
East Appalachian Plateau	184	10.2%	463	9.5%	239	9.5%	17	8.1%	0.61	0.09
Central Appalachian Plateau	27	1.5%	65	1.3%	32	1.3%	0	0.0%	0.44	0.10
North Appalachian Hills	93	5.1%	229	4.7%	80	3.2%	5	2.4%	0.48	0.10
West Appalachian Hills	225	12.4%	606	12.5%	249	9.9%	17	8.1%	0.44	0.06
Catskills-Delaware Hills	**411**	**22.7%**	**1,092**	**22.5%**	**759**	**30.3%**	**63**	**30.0%**	**0.80**	**0.05**
Catskills	264	14.6%	738	15.2%	455	18.2%	44	21.0%	0.71	0.06
Otsego-Delaware Hills	142	7.8%	343	7.1%	303	12.1%	19	9.0%	0.98	0.10
Neversink-Mongaup Hills	5	0.3%	11	0.2%	1	0.0%	0	0.0%	n/a***	
Mohawk Valley-Hudson Valley-Taconic Highlands	**202**	**11.2%**	**525**	**10.8%**	**55**	**2.2%**	**6**	**2.9%**	**0.11**	**0.02**
Mohawk Valley	15	0.8%	41	0.8%	5	0.2%	1	0.5%	0.17	0.09
Hudson Valley	94	5.2%	233	4.8%	8	0.3%	0	0.0%	0.03	0.02
North Taconic Highlands	56	3.1%	131	2.7%	21	0.8%	3	1.4%	0.18	0.05
South Taconic Highlands	34	1.9%	113	2.3%	21	0.8%	2	1.0%	0.19	0.08
New York City Transition	3	0.2%	7	0.1%	0	0.0%	0	0.0%	n/a***	
Statewide Totals	**1,811**		**4,849**		**2,503**		**210**		**0.59**	**0.02**

*WMU Aggregates are groupings of Wildlife Management Units. Ecozones are groupings of WMU Aggregates. The Coastal Lowlands Aggregate (New York City and Long Island) does not have a ruffed grouse season, thus is not listed.

** Overall flush rates are calculated as an average flush rate for all days hunted, not a simple division of the total number of grouse flushed by the total number of hours hunted; Data analysis included logs with some missing data. SE = Standard Error

***There was an insufficient sample size in these WMU aggregates. A minimum of 20 trips or 35 hours is needed for analysis. Data from these aggregates contributed to the ecozone and statewide totals.

Table 6. Hunting effort, grouse and woodcock flushed and killed, and flush rates (birds flushed/hour) by hunting method (with dog vs. without) from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2019-20.

	Hunted *WITH* a Dog				Hunted *WITHOUT* a Dog			
	Grouse Hunting		Woodcock Hunting		Grouse Hunting		Woodcock Hunting	
	#	%	#	%	#	%	#	%
Number of Trips	1,106	62%	726	63%	679	38%	433	37%
Number of Hours	2,708	57%	3,230	70%	2,073	43%	1,383	30%
# Birds Flushed	1,831	73%	1,448	92%	661	27%	119	8%
# Birds Harvested	173	83%	369	92%	36	17%	30	8%
Flush Rate ± SE (flushes/hour)	0.73 ± 0.03		0.89 ± 0.07		0.37 ± 0.03		0.12 ± 0.02	

* SE = standard error; Data analysis included logs with some missing data. Overall flush rates are calculated as an average flush rate for all days hunted, not a simple division of the total number of birds flushed by the total number of hours hunted.

NOTE: Analyses for woodcock data were restricted to 20 September through 30 November. This represents the period in which resident and migrating woodcock were in New York and accounted for 99% of all the woodcock observations during the survey. Results for 2019 are based on 1,182 trips and 3,296 hours afield by 175 hunters.

Table 7. Hunting effort, woodcock flushed and killed, and flush rates (woodcock flushed/hour) by week from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2019-20.

Week of	# of Trips	% of Total	# of Hours	% of Total	# Woodcock Flushed	% of Total	# Woodcock Harvested	% of Total	Flush Rate ± SE* (flushes/hour)
20 September	47	4%	135	4%	32	2%	0	0%	0.25 ± 0.06
27 September	106	9%	275	8%	81	6%	21	6%	0.44 ± 0.11
4 October	206	18%	537	17%	317	22%	77	21%	0.79 ± 0.14
11 October	150	13%	427	13%	192	13%	43	12%	0.53 ± 0.09
18 October	192	16%	530	16%	387	27%	107	29%	0.82 ± 0.10
25 October	152	13%	415	13%	233	16%	63	17%	0.82 ± 0.12
1 November	129	11%	367	11%	192	13%	53	14%	0.87 ± 0.20
8 November	92	8%	267	8%	22	2%	7	2%	0.09 ± 0.03
15 November	52	4%	183	6%	0	0%	0	0%	0.00 ± 0.00
22 November	36	3%	88	3%	1	0%	0	0%	0.03 ± 0.03
29 November	20	2%	72	2%	0	0%	0	0%	0.00 ± 0.00

* Overall flush rates are calculated as an average flush rate for all days hunted, not a simple division of the total number of woodcock flushed by the total number of hours hunted; Data analysis included logs with some missing data; SE = Standard Error

NOTE: Analyses for woodcock data were restricted to 20 September through 30 November. This represents the period in which resident and migrating woodcock were in New York and accounted for 99% of all the woodcock observations during the survey. Results for 2019 are based on 1,182 trips and 3,296 hours afield by 175 hunters.

Table 8. Number of hours hunted, number of woodcock flushed and killed, and flush rates (woodcock flushed/hour) from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2019-20.

Ecozone / WMU Aggregate*	**Trips**		**Hours**		**Woodcock Flushed**		**Woodcock Killed**		**Flush Rate** (woodcock flushed/hour)**	
	#	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**Mean**	**SE****
St. Lawrence Valley	**91**	**7.7%**	**257**	**7.8%**	**274**	**18.8%**	**63**	**17.0%**	**0.96**	**0.15**
East Ontario Plain	25	2.1%	65	2.0%	11	0.8%	1	0.3%	0.17	0.09
St. Lawrence Valley	66	5.6%	192	5.9%	263	18.1%	62	16.7%	1.25	0.19
Champlain Valley	**39**	**3.3%**	**80**	**2.4%**	**116**	**8.0%**	**26**	**7.0%**	**1.92**	**0.60**
Champlain Valley & Transition	39	3.3%	80	2.4%	116	8.0%	26	7.0%	1.92	0.60
Adirondacks-Tug Hill	**287**	**24.4%**	**880**	**26.8%**	**414**	**28.4%**	**101**	**27.2%**	**0.83**	**0.12**
Tug Hill	59	5.0%	228	7.0%	41	2.8%	11	3.0%	0.16	0.04
Tug Hill Transition	32	2.7%	86	2.6%	17	1.2%	6	1.6%	0.22	0.06
Northern Adirondacks	53	4.5%	226	6.9%	83	5.7%	29	7.8%	0.57	0.17
Central Adirondacks	143	12.1%	340	10.4%	273	18.7%	55	14.8%	1.34	0.22
Lake Plains	**82**	**7.0%**	**264**	**8.0%**	**84**	**5.8%**	**29**	**7.8%**	**0.39**	**0.09**
Oneida Lake Plains	62	5.3%	160	4.9%	80	5.5%	26	7.0%	0.47	0.12
Great Lakes Plain	19	1.6%	103	3.1%	4	0.3%	3	0.8%	0.18	0.12
Oswego Lowlands	1	0.1%	1	0.0%	0	0.0%	0	0.0%	n/a***	
Appalachian Hills & Plateau	**290**	**24.6%**	**769**	**23.4%**	**206**	**14.1%**	**52**	**14.0%**	**0.30**	**0.05**
East Appalachian Plateau	120	10.2%	333	10.2%	83	5.7%	26	7.0%	0.22	0.06
Central Appalachian Plateau	8	0.7%	19	0.6%	0	0.0%	0	0.0%	n/a***	
North Appalachian Hills	57	4.8%	148	4.5%	47	3.2%	14	3.8%	0.34	0.10
West Appalachian Hills	105	8.9%	269	8.2%	76	5.2%	12	3.2%	0.40	0.10
Catskills-Delaware Hills	**268**	**22.8%**	**734**	**22.4%**	**244**	**16.7%**	**49**	**13.2%**	**0.46**	**0.06**
Catskills	167	14.2%	489	14.9%	110	7.5%	28	7.5%	0.40	0.08
Otsego-Delaware Hills	96	8.2%	234	7.1%	134	9.2%	21	5.7%	0.59	0.10
Neversink-Mongaup Hills	5	0.4%	11	0.3%	0	0.0%	0	0.0%	n/a***	
Mohawk Valley-Hudson Valley-Taconic Highlands	**120**	**10.2%**	**296**	**9.0%**	**119**	**8.2%**	**51**	**13.7%**	**0.51**	**0.09**
Mohawk Valley	6	0.5%	11	0.3%	2	0.1%	0	0.0%	n/a***	
Hudson Valley	66	5.6%	155	4.7%	31	2.1%	11	3.0%	0.21	0.05
North Taconic Highlands	30	2.5%	73	2.2%	81	5.6%	39	10.5%	1.49	0.27
South Taconic Highlands	18	1.5%	57	1.7%	5	0.3%	1	0.3%	0.07	0.07
New York City Transition	0	0.0%	0	0.0%	0	0.0%	0	0.0%	n/a***	
Statewide Totals	**1,177**		**3,280**		**1,457**		**371**		**0.60**	**0.04**

*WMU Aggregates are groupings of Wildlife Management Units. Ecozones are groupings of WMU Aggregates. The Coastal Lowlands Aggregate (New York City and Long Island) does not have a ruffed grouse season, thus is not listed.

** Overall flush rates are calculated as an average flush rate for all days hunted, not a simple division of the total number of woodcock flushed by the total number of hours hunted; Data analysis included logs with some missing data. SE = Standard Error

***There was an insufficient sample size in these WMU Aggregates. A minimum of 20 trips or 35 hours is needed for analysis. Data from this aggregate contributed to the ecozone and statewide totals.

NOTE: Analyses for woodcock data were restricted to 20 September through 30 November. This represents the period in which resident and migrating woodcock were in New York and accounted for 99% of all the woodcock observations during the survey. Results for 2019 are based on 1,182 trips and 3,296 hours afield by 175 hunters.

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