Cooperator Ruffed Grouse & American Woodcock Hunting Log

During the 2020-21 ruffed grouse and American woodcock hunting seasons, 188 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 2020-21 seasons.

Results from the 2020-21 Season

During the 2020-21 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 about 4,800 hours afield and flushed just over 3,000 grouse (about 0.64 flushes/hour) and 1,400 woodcock (about 0.53 flushes/hour). Findings from the 2020-21 season include:

Grouse Hunting

- Hunters participating in the survey averaged about 26 hours afield during the 2020-21 season. They took about 10 trips afield for the season and spent about 3 hours afield per trip (Table 1).
- Grouse log participants averaged about 16 grouse flushed per hunter for the 2020-21 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 21 hours of hunting effort to harvest one grouse. On average, one out of every 13 grouse flushes resulted in a kill (a 7.6% success rate; Table 1).
- About 73% of the effort expended by hunters occurred during the first half of the season (September - November; Table 2). In addition, about 82% of the grouse flushed and 85% of the grouse harvested occurred during this early part of the season. In addition, the flush rate was higher during the early portion of the season (0.70 grouse flushed/hour in Sept.-Nov vs. 0.48 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 (almost 70% of the total), but the flush rate was higher in the northern zone (Table 4).
- Overall, the flush rate for the 2020-21 season was 0.64 grouse flushed/hour, an improvement from the previous season but still among the lowest observed since this survey began (Figure 1). The flush rate was highest in the Adirondacks-Tug Hill ecozone

(1.13 grouse flushed/hour), followed by the Champlain Valley and Catskills-Delaware Hills ecozones (0.73 and 0.63 grouse flush/hour, respectively). 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 (0.77 grouse flushed/hour) than hunters that did not use a dog (0.41 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 1,305 trips and 3,511 hours afield by 169 hunters.
- Hunters participating in the survey averaged about 21 hours afield during the 2020 woodcock season. They took about 8 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 2020 season and had to spend about 2 ½ hours hunting to flush one woodcock. In addition, hunters averaged 2 birds harvested for the season and had to invest about 13 hours of hunting effort to harvest one woodcock. On average, one out of every 5 woodcock flushes resulted in a kill (a 19% success rate; Table 1).
- There was a peak in hunting effort during the first week of October, which is also when the greatest number of birds were harvested, but the number of birds flushed and the flush rate both peaked during the second week of October (0.88 birds flushed/hour; Table 7). The overall flush rate from 20 September through 30 November was 0.53 birds/hour, slightly below fall 2019.
- There was more hunting effort and woodcock flushed and killed on public land than on private land, and the flush rate on public lands was slightly higher than on private lands (0.55 vs. 0.49 birds flushed/hour; Table 3).
- There was more hunting effort and birds flushed and harvested in the southern zone than in the northern zone, but the flush rate was higher in the northern zone (0.69 woodcock flushed/hour vs. 0.42 woodcock flushed/hour; Table 4).
- The flush rate was highest in the Champlain Valley ecozone (1.92 woodcock flushed/hour), followed by the Adirondacks-Tug Hill and Mohawk Valley-Hudson Valley-Taconic Highlands ecozones (0.87 and 0.67 woodcock flushed/hour, respectively; Table 8). The remaining ecozones were below the statewide average (0.53 woodcock flushed/hour for 2020).
- 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 (0.74 birds flushed/hour) than hunters that did not use a dog (0.13 birds flushed/hour).

Comparing 2020-21 to Previous Seasons

Ruffed Grouse

- Over the past 17 seasons, almost 1,500 hunters have participated in this survey. They have taken almost 44,000 trips afield, spent about 120,000 hours pursuing grouse, flushed about 108,000 birds, and harvested almost 8,900 grouse. It is important to note that the number of cooperating hunters has been declining in recent years. Retaining current survey participants and recruiting new participants will be important to maintain reliability of the survey results and our ability to accurately track changes in grouse abundance.
- Despite having fewer participating hunters in 2020 than in previous years, on average individual hunters expended more effort (trips and hours per hunter) in 2020 than in prior seasons (Table 1).
- The statewide flush rate increased from 2019-20 to 2020-21, but this is attributable to increases observed in the Northern Zone as the flush rate in all ecoregions within the Southern Zone declined between seasons.
- Over the 17-year period the average flush rate was 0.93 birds/hour, but the flush rate has been declining over this period, particularly in the Southern Zone. This is also illustrated by the steady increase in the proportion of trips where no grouse were observed. In the Southern Zone during the 2020-21 season, no grouse were flushed on 57% of trips (compared to only 35% in the Northern Zone), the highest percentage of trips with no grouse observed since the survey began.
- The declines in grouse numbers are 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), but the decline is more pronounced in some parts of the state than others. In addition, in regions of the Southern Zone such as the Catskills-Delaware Hills that have a relatively large amount of suitable habitat compared to other regions, grouse populations have continued to decline and have not shown signs of recovery.
- While DEC and other partners have increased the amount of habitat management work across the state to benefit grouse and other species that depend on young forests, there are other factors such as susceptibility to West Nile Virus (WNV) that need to be considered when identifying where habitat management efforts will have the greatest return on investment. Improving habitat in or close to regions with high quality habitat and that have environmental features that minimize risks from WNV have a better chance at improving grouse populations than habitat management in regions devoid of high quality habitat or that have high risk factors for WNV. This more strategic approach to habitat management is needed to stop the decline in grouse numbers.

American Woodcock

- The statewide flush rate in 2020 was 0.53 birds/hour, which was below 2019 and below the long-term average (0.58 birds flushed/hour; Figure 6). The 2020 season was the second straight year where the woodcock flush rate declined (0.68 birds/hour in 2018; 0.60 birds/hour in 2019).
- From 2019 to 2020, the statewide woodcock flush rate declined 12% from 0.60 to 0.53 birds flushed/hour, but this was variable across the state. The Mohawk Valley-Hudson Valley-Taconic Highlands ecozone saw a significant increase in the flush rate between years (0.51 to 0.87 birds/hour), while the Champlain Valley, Catskills-Delaware Hills, and Appalachian Hills and Plateau ecozones were very similar in 2019 and 2020. The greatest declines

between 2019 and 202 were observed in northern New York and the Lake Plains of western New York.

- From 2010 through 2020, the flush rate varies by year, but is relatively stable over the 11-year period. The peak of migration has occurred in the last half of October over 70% of the time; however, over the last five seasons it has been more variable (Figure 6). In 2020, the peak occurred the second week of October, compared to the first week of November the previous year. Variability in weather patterns and annual temperatures can affect the timing of migration.
- Normally, we would be able to compare the results from this survey with the results of the "Singing-ground Survey" (SGS) coordinated by the U.S. Fish and Wildlife Service and conducted by DEC staff. Unfortunately, due to COVID-19, the SGS was not conducted in 2020. Based on previous years, the SGS indicates that woodcock populations in New York have been stable over the past 15 years.

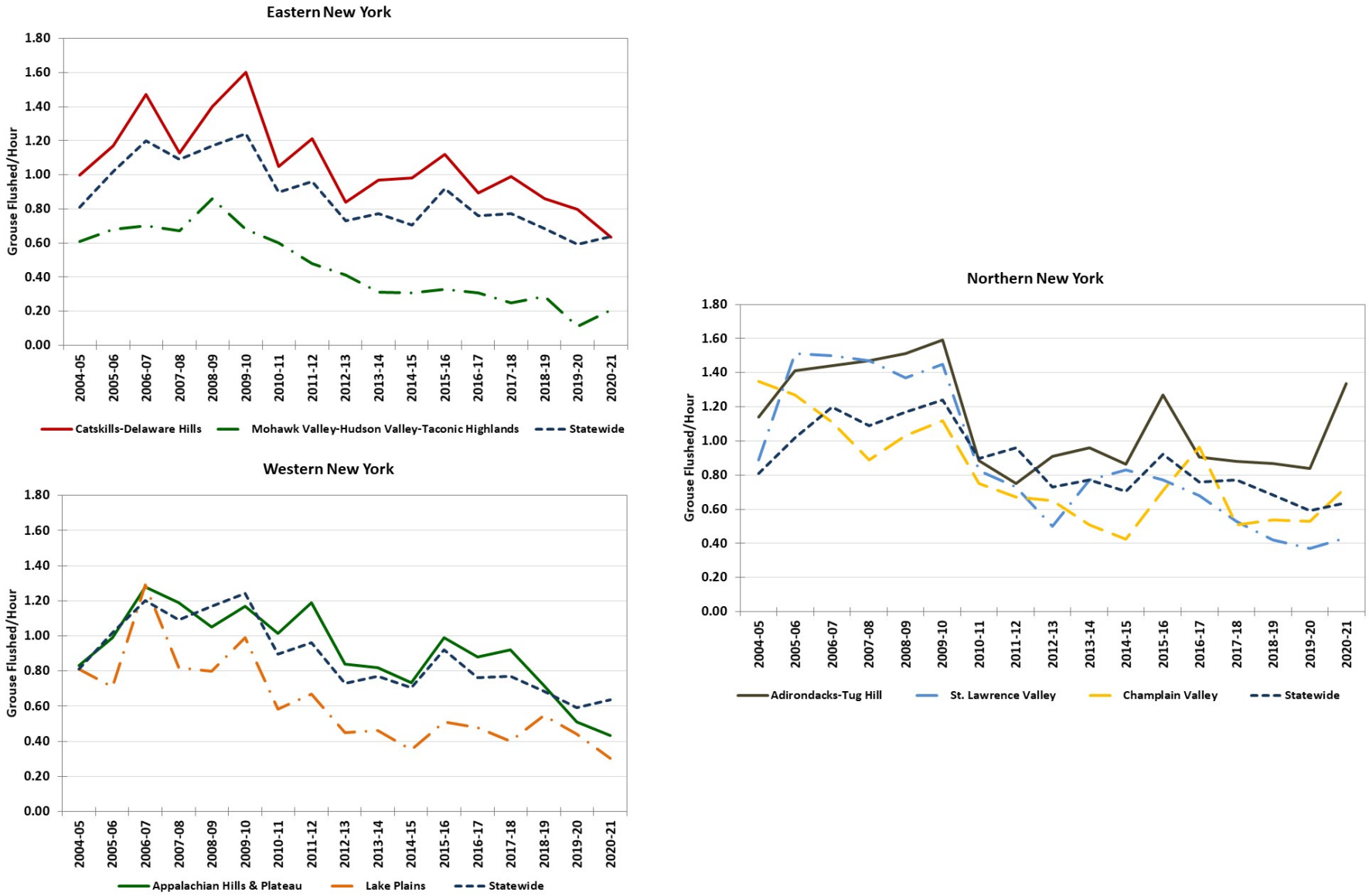

Figure 1. Ruffed grouse flush rate (grouse flushed/hour) by ecozone based on Ruffed Grouse and American Woodcock Hunting Log data for the 2004-05 through 2020-21 seasons. Ecozones are an aggregation of Wildlife Management Units. The Costal Lowlands Ecozone (New York City and Long Island) does not have a ruffed grouse hunting season.

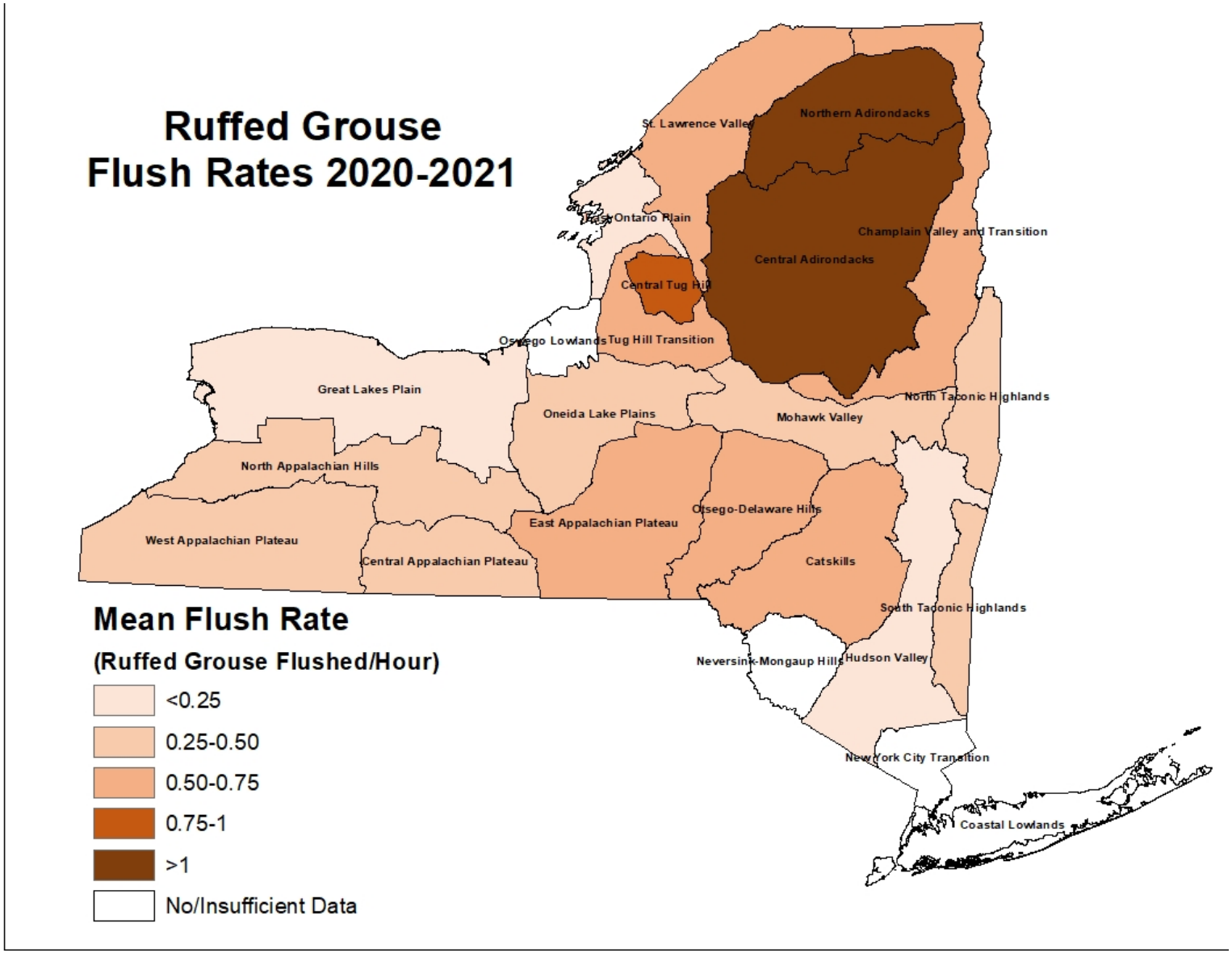

Figure 2. Ruffed Grouse flush rate (grouse flushed/hour) by Wildlife Management Unit (WMU) aggregate from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2020-21. Only aggregates with ≥20 observations/records and ≥35 hours were included in the analysis. The statewide flush rate for 2020-21 was 0.64 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.

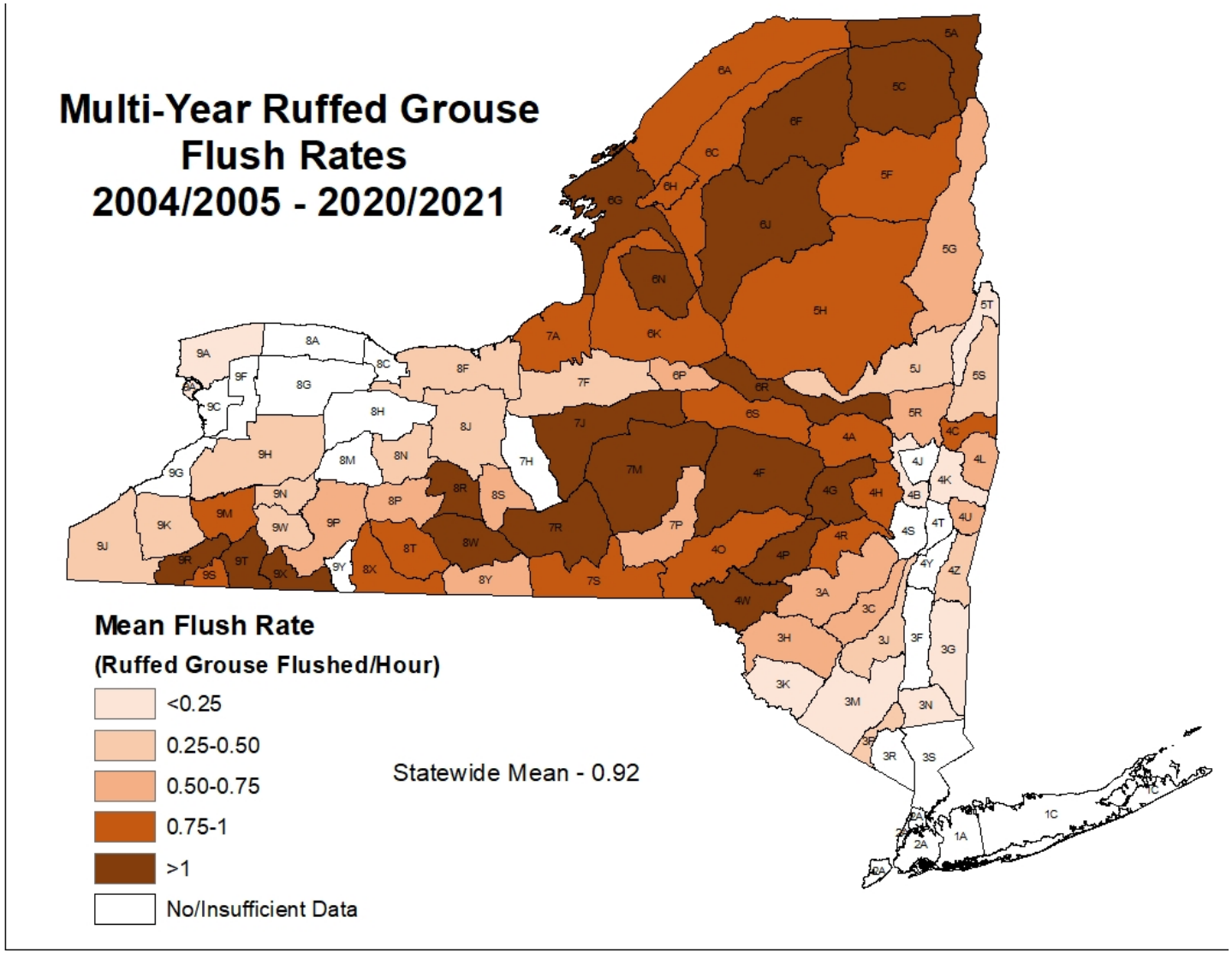

Figure 3. Ruffed Grouse flush rate (grouse flushed/hour) by Wildlife Management Unit (WMU) from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2004-05 – 2020-21. Only WMUs with ≥100 observations/records and ≥300 hours were included in the analysis. The statewide flush rate for the 17-year period was 0.92 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.

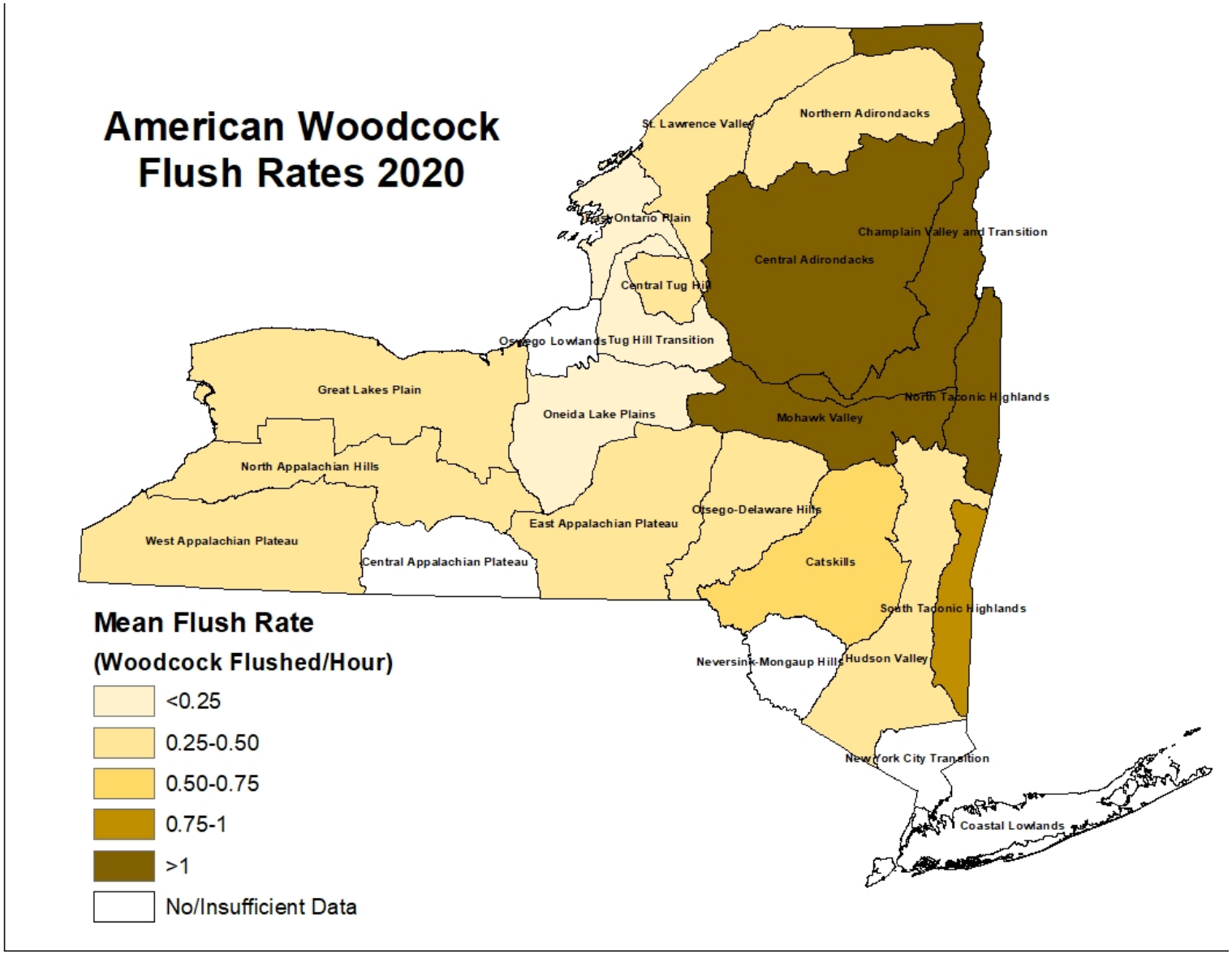

Figure 4. American woodcock flush rate (birds flushed/hour) by Wildlife Management Unit (WMU) aggregate from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2020-21. Only aggregates with ≥20 observations/records and ≥35 hours were included in the analysis. The statewide flush rate for 2019 was 0.53 woodcock flushed/hour. The Coastal Lowlands aggregate does not have a grouse hunting season, so the survey was not conducted there.

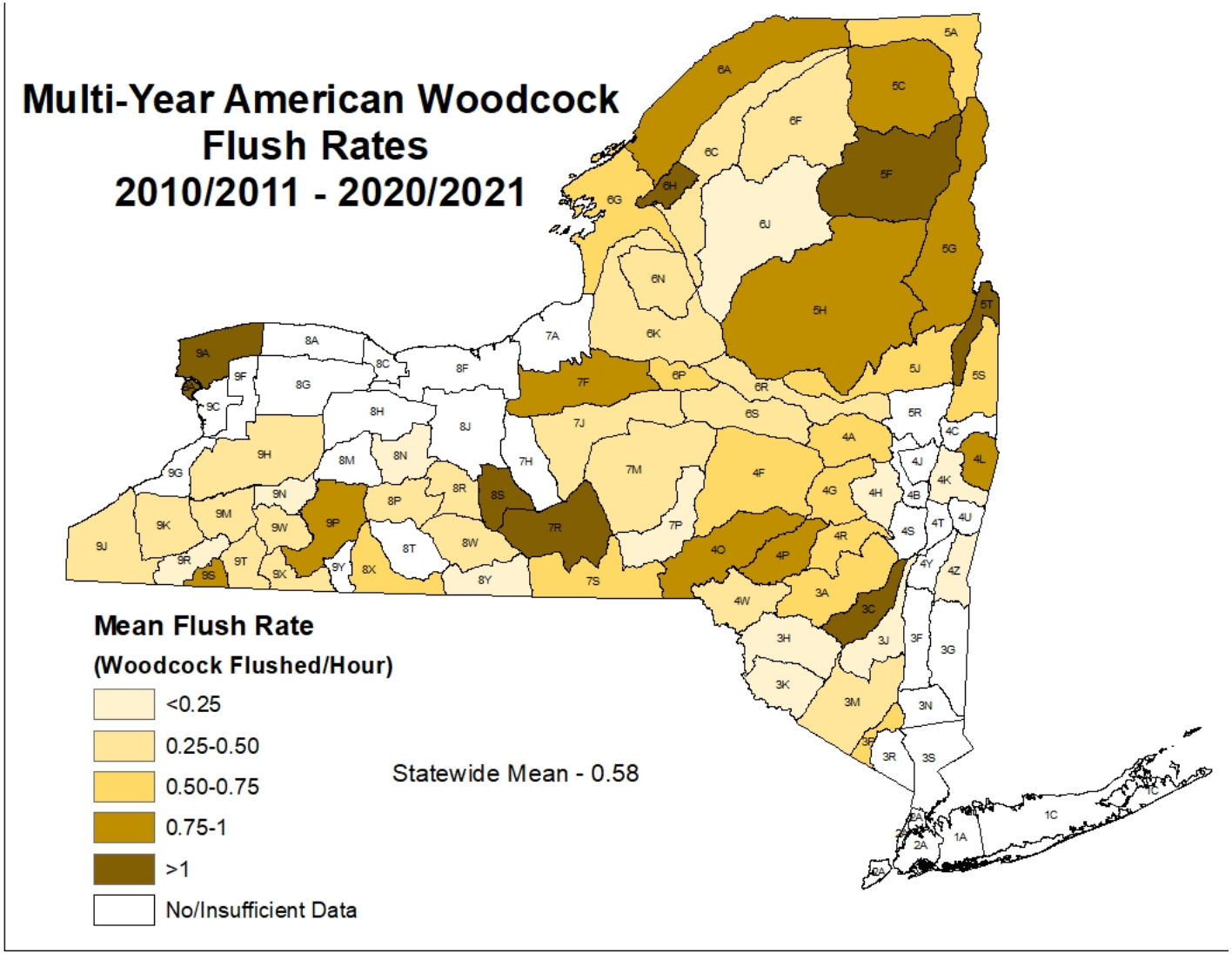

Figure 5. American woodcock flush rate (birds flushed/hour) by Wildlife Management Unit (WMU) from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2010-11 – 2020-21. Only WMUs with ≥50 observations/records and ≥150 hours were included in the analysis. The statewide flush rate for 2010-20 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.

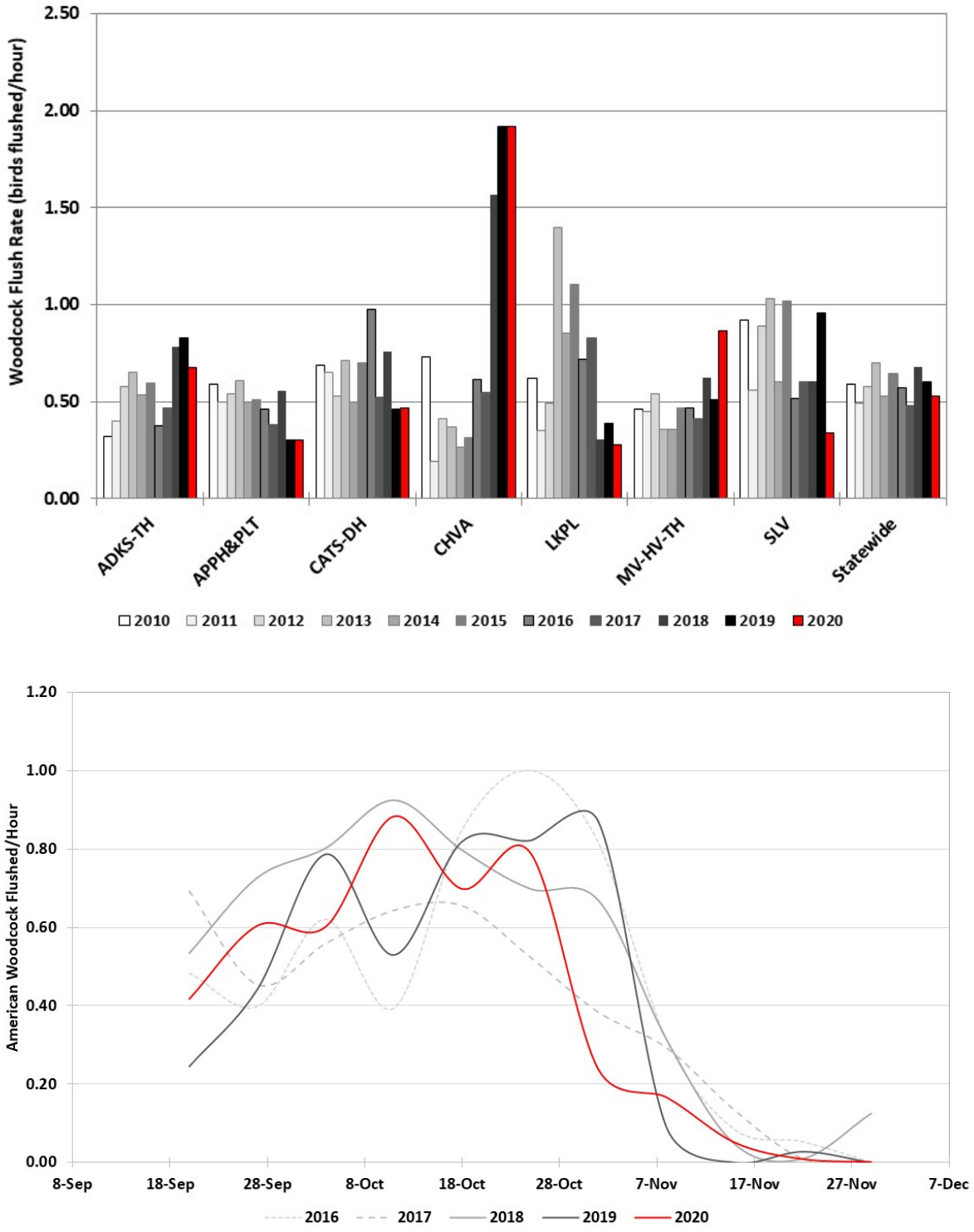

Figure 6. American woodcock flush rate (woodcock flushed/hour) by ecozone (top) and the flush rate by week (bottom) from the Cooperator Ruffed Grouse & Woodcock Hunting Log. The statewide flush rate for 2020 was 0.53 woodcock flushed/hour. Abbreviations: Champlain Valley (CHVA), Adirondacks-Tug Hill (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, 2020-21.

Summary Statistics	Grouse Hunting					Woodcock Hunting				
	2017-18	2018-19	2019-20	2020-21	3-Year Avg. (17-18 - 19-20)	Fall 2017	Fall 2018	Fall 2019	Fall 2020	3-Year Avg. (2017-19)
Number of Hunters	212	210	200	188	207	191	188	175	169	185
Trips/Hunter	9.2	8.6	9.1	9.8	9.0	7.1	6.4	6.8	7.7	6.8
Hours/Trip	2.7	2.7	2.7	2.6	2.7	2.8	2.7	2.8	2.7	2.8
Hours/Hunter	25.2	23.1	24.3	25.6	24.2	19.7	17.6	18.8	20.8	18.7
Birds Flushed/Hunter	18.7	15.4	12.5	16.0	15.5	8.4	9.5	8.3	8.3	8.8
Birds Harvested/Hunter	1.3	1.0	1.1	1.2	1.1	1.9	2.1	2.1	1.6	2.0
Hours/Bird Flushed*	1.4	1.5	1.9	1.6	1.6	2.3	1.8	2.3	2.5	2.1
Hours/Bird Harvested*	19.3	22.9	22.9	20.9	21.7	10.3	8.4	8.9	13.3	9.2
% of Birds Flushed that were Harvested	7.0	6.6	8.5	7.6	7.4	22.7	21.9	25.5	18.7	23.4
Flush Rate (birds flushed/hour)**	0.77	0.68	0.59	0.64	0.68	0.48	0.68	0.60	0.53	0.59

* 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 2020 are based on 1,305 trips and 3,511 hours afield by 169 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, 2020-21.

Month	# of Trips	% of Total	# of Hours	% of Total	# Grouse Flushed	% of Total	# Grouse Harvested	% of Total	Flush Rate ± SE* (flushes/hour)
September	100	5%	295	6%	441	15%	33	14%	1.40 ± 0.16
October	806	44%	2,128	44%	1,453	48%	114	50%	0.66 ± 0.03
November	394	22%	1,075	22%	585	19%	48	21%	0.60 ± 0.05
December	153	8%	409	9%	226	8%	17	7%	0.63 ± 0.08
January	260	14%	599	13%	239	8%	11	5%	0.50 ± 0.05
February	122	7%	298	6%	64	2%	7	3%	0.25 ± 0.05

* 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, 2020-21.

	Public Land				Private Land			
	Grouse Hunting		Woodcock Hunting		Grouse Hunting		Woodcock Hunting	
	#	%	#	%	#	%	#	%
Number of Trips	1,055	58%	796	62%	760	42%	494	38%
Number of Hours	2,866	60%	2,180	63%	1,883	40%	1,284	37%
# Birds Flushed	1,690	57%	916	66%	1,276	43%	481	34%
# Birds Harvested	132	58%	170	66%	94	42%	87	34%
Flush Rate ± SE* (flushes/hour)	0.59 ± 0.03		0.55 ± 0.05		0.69 ± 0.04		0.49± 0.05	

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, 2020-21.

	Northern Zone				Southern Zone			
	Grouse Hunting		Woodcock Hunting		Grouse Hunting		Woodcock Hunting	
	#	%	#	%	#	%	#	%
Number of Trips	600	33%	491	38%	1,235	67%	814	62%
Number of Hours	1,634	34%	1,377	39%	3,170	66%	2,134	61%
# Birds Flushed	1,638	54%	665	47%	1,370	46%	744	53%
# Birds Harvested	148	64%	121	46%	82	36%	142	54%
Flush Rate ± SE* (flushes/hour)	1.03 ± 0.06		0.69 ± 0.08		0.44 ± 0.02		0.42 ± 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 2020 are based on 1,305 trips and 3,511 hours afield by 169 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, 2020-21.

Ecozone / WMU Aggregate*	**Trips**		**Hours**		**Grouse Flushed**		**Grouse Killed**		**Flush Rate** (grouse flushed/hour)**	
	#	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**Mean**	**SE****
St. Lawrence Valley	**80**	**4.4%**	**184**	**3.8%**	**85**	**2.8%**	**7**	**3.0%**	**0.43**	**0.03**
East Ontario Plain	30	1.6%	69	1.4%	14	0.6%	2	1.0%	0.13	0.07
St. Lawrence Valley	50	2.7%	115	2.4%	71	2.8%	5	2.4%	0.62	0.08
Champlain Valley	**32**	**1.7%**	**79**	**1.6%**	**37**	**1.2%**	**2**	**0.9%**	**0.73**	**0.17**
Champlain Valley & Transition	32	1.7%	79	1.6%	37	1.5%	2	1.0%	0.73	0.17
Adirondacks-Tug Hill	**486**	**26.5%**	**1,368**	**28.5%**	**1,505**	**50.0%**	**139**	**60.4%**	**1.13**	**0.06**
Tug Hill	79	4.3%	248	5.1%	253	10.1%	21	10.0%	0.88	0.11
Tug Hill Transition	84	4.6%	292	6.0%	174	7.0%	14	6.7%	0.51	0.10
Northern Adirondacks	116	6.3%	335	6.9%	542	21.7%	38	18.1%	1.62	0.15
Central Adirondacks	207	11.3%	493	10.2%	536	21.4%	66	31.4%	1.21	0.11
Lake Plains	**126**	**6.9%**	**282**	**5.9%**	**89**	**3.0%**	**8**	**3.5%**	**0.30**	**0.08**
Oneida Lake Plains	65	3.5%	161	3.3%	58	2.3%	7	3.3%	0.36	0.07
Great Lakes Plain	59	3.2%	118	2.4%	20	0.8%	1	0.5%	0.08	0.08
Oswego Lowlands	2	0.1%	3	0.1%	11	0.4%	0	0.0%	n/a***	
Appalachian Hills & Plateau	**534**	**29.1%**	**1,356**	**28.2%**	**630**	**20.9%**	**31**	**13.5%**	**0.43**	**0.03**
East Appalachian Plateau	199	10.8%	536	11.1%	366	14.6%	15	7.1%	0.63	0.06
Central Appalachian Plateau	15	0.8%	39	0.8%	13	0.5%	1	0.5%	0.27	0.11
North Appalachian Hills	108	5.9%	267	5.5%	78	3.1%	10	4.8%	0.25	0.05
West Appalachian Hills	212	11.6%	514	10.6%	173	6.9%	5	2.4%	0.36	0.04
Catskills-Delaware Hills	**397**	**21.6%**	**1,018**	**21.2%**	**588**	**19.5%**	**38**	**16.5%**	**0.63**	**0.04**
Catskills	197	10.7%	575	11.9%	328	13.1%	19	9.0%	0.65	0.06
Otsego-Delaware Hills	186	10.1%	415	8.6%	236	9.4%	19	9.0%	0.58	0.06
Neversink-Mongaup Hills	14	0.8%	28	0.6%	24	1.0%	0	0.0%	n/a***	
Mohawk Valley-Hudson Valley-Taconic Highlands	**180**	**9.8%**	**517**	**10.8%**	**74**	**2.5%**	**5**	**2.2%**	**0.21**	**0.04**
Mohawk Valley	21	1.1%	57	1.2%	18	0.7%	1	0.5%	0.42	0.15
Hudson Valley	93	5.1%	275	5.7%	6	0.2%	0	0.0%	0.02	0.01
North Taconic Highlands	48	2.6%	114	2.4%	46	1.8%	4	1.9%	0.47	0.09
South Taconic Highlands	16	0.9%	67	1.4%	4	0.2%	0	0.0%	0.25	0.17
New York City Transition	2	0.1%	4	0.1%	0	0.0%	0	0.0%	n/a***	
Statewide Totals	**1,835**		**4,804**		**3,008**		**230**		**0.64**	**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, 2020-21.

	Hunted *WITH* a Dog				Hunted *WITHOUT* a Dog			
	Grouse Hunting		Woodcock Hunting		Grouse Hunting		Woodcock Hunting	
	#	%	#	%	#	%	#	%
Number of Trips	1,140	63%	829	64%	680	37%	469	36%
Number of Hours	2,765	58%	2,088	60%	2,006	42%	1,409	40%
# Birds Flushed	2,156	72%	1,206	86%	842	28%	189	14%
# Birds Harvested	179	78%	225	87%	51	22%	33	13%
Flush Rate ± SE (flushes/hour)	0.77 ± 0.03		0.74 ± 0.06		0.41 ± 0.03		0.13 ± 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 2020 are based on 1,305 trips and 3,511 hours afield by 169 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, 2020-21.

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	75	6%	234	7%	114	8%	0	0%	0.42 ± 0.08
27 September	147	11%	429	12%	201	14%	31	12%	0.60 ± 0.13
4 October	190	15%	505	15%	233	18%	55	21%	0.60 ± 0.08
11 October	183	14%	450	13%	298	21%	51	19%	0.88 ± 0.15
18 October	175	13%	456	13%	239	17%	46	17%	0.70 ± 0.11
25 October	136	10%	349	10%	188	13%	48	18%	0.79 ± 0.14
1 November	142	11%	360	10%	76	5%	16	6%	0.24 ± 0.06
8 November	136	10%	367	10%	50	4%	16	6%	0.17 ± 0.05
15 November	77	6%	229	7%	9	1%	0	0%	0.05 ± 0.02
22 November	33	3%	102	3%	1	0%	0	0%	0.01 ± 0.01
29 November	11	1%	30	1%	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 2020 are based on 1,305 trips and 3,511 hours afield by 169 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, 2020-21.

Ecozone / WMU Aggregate*	**Trips**		**Hours**		**Woodcock Flushed**		**Woodcock Killed**		**Flush Rate**** (woodcock flushed/hour)	
	#	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**Mean**	**SE****
St. Lawrence Valley	**62**	**4.8%**	**136**	**3.9%**	**64**	**4.5%**	**6**	**2.3%**	**0.34**	**0.08**
East Ontario Plain	24	2.0%	51	1.5%	11	0.8%	0	0.0%	0.15	0.06
St. Lawrence Valley	38	3.2%	85	2.4%	53	3.8%	6	2.3%	0.46	0.12
Champlain Valley	**25**	**1.9%**	**63**	**1.8%**	**61**	**4.3%**	**12**	**4.6%**	**1.92**	**0.62**
Champlain Valley & Transition	25	2.1%	63	1.8%	61	4.3%	12	4.6%	1.92	0.62
Adirondacks-Tug Hill	**403**	**31.0%**	**1,176**	**33.6%**	**539**	**38.3%**	**103**	**39.2%**	**0.67**	**0.09**
Tug Hill	74	6.3%	237	6.8%	106	7.5%	16	6.1%	0.49	0.08
Tug Hill Transition	73	6.2%	253	7.2%	51	3.6%	5	1.9%	0.15	0.06
Northern Adirondacks	101	8.6%	294	8.4%	116	8.2%	12	4.6%	0.49	0.09
Central Adirondacks	155	13.2%	392	11.2%	266	18.9%	70	26.6%	1.13	0.21
Lake Plains	**107**	**8.2%**	**244**	**7.0%**	**57**	**4.0%**	**13**	**4.9%**	**0.28**	**0.06**
Oneida Lake Plains	51	4.3%	135	3.9%	33	2.3%	10	3.8%	0.23	0.08
Great Lakes Plain	55	4.7%	107	3.1%	23	1.6%	3	1.1%	0.32	0.09
Oswego Lowlands	1	0.1%	2	0.1%	1	0.1%	0	0.0%	n/a***	
Appalachian Hills & Plateau	**338**	**26.0%**	**874**	**25.0%**	**255**	**18.1%**	**36**	**13.7%**	**0.30**	**0.04**
East Appalachian Plateau	167	14.2%	461	13.2%	135	9.6%	16	6.1%	0.29	0.05
Central Appalachian Plateau	7	0.6%	19	0.5%	4	0.3%	0	0.0%	n/a***	
North Appalachian Hills	58	4.9%	144	4.1%	56	4.0%	11	4.2%	0.44	0.14
West Appalachian Hills	106	9.0%	250	7.1%	60	4.3%	9	3.4%	0.25	0.07
Catskills-Delaware Hills	**261**	**20.1%**	**706**	**20.2%**	**255**	**18.1%**	**61**	**23.2%**	**0.47**	**0.05**
Catskills	125	10.6%	395	11.3%	144	10.2%	39	14.8%	0.50	0.08
Otsego-Delaware Hills	128	10.9%	294	8.4%	97	6.9%	22	8.4%	0.41	0.08
Neversink-Mongaup Hills	8	0.7%	17	0.5%	14	1.0%	0	0.0%	n/a***	
Mohawk Valley-Hudson Valley-Taconic Highlands	**104**	**8.0%**	**299**	**8.5%**	**178**	**12.6%**	**32**	**12.2%**	**0.87**	**0.17**
Mohawk Valley	16	1.4%	39	1.1%	38	2.7%	5	1.9%	1.01	0.52
Hudson Valley	52	4.4%	145	4.1%	49	3.5%	13	4.9%	0.38	0.09
North Taconic Highlands	21	1.8%	54	1.5%	71	5.0%	8	3.0%	1.84	0.51
South Taconic Highlands	14	1.2%	59	1.7%	11	0.8%	6	2.3%	0.79	0.59
New York City Transition	1	0.1%	2	0.1%	9	0.6%	0	0.0%	n/a***	
Statewide Totals	**1,300**		**3,498**		**1,409**		**263**		**0.53**	**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 2020 are based on 1,305 trips and 3,511 hours afield by 169 hunters.

The information provided in this report was supported by Federal Aid in Wildlife Restoration Grant W-173-G.