Cooperator Ruffed Grouse & American Woodcock Hunting Log

During the 2021-22 ruffed grouse and American woodcock hunting seasons, 174 hunters recorded their daily hunting activities, including the number of birds flushed, the number of hours hunted, and the number of birds killed. 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 2021-22 seasons.

Results from the 2021-22 Season

During the 2021-22 season, participants reported data from roughly 1,600 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 4,300 hours afield and flushed just over 2,500 grouse and almost 1,800 woodcock. Findings from the 2021-22 season include:

Grouse Hunting

- Hunters participating in the survey averaged about 25 hours afield during the 2021-22 season. They took about 8 trips afield for the season and spent about 3 hours afield per trip (Table 1).
- Grouse log participants averaged about 15 grouse flushed per hunter for the 2021-22 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 25 hours of hunting effort to harvest one grouse. On average, one out of every 15 grouse flushes resulted in a kill (a 6.7% success rate; Table 1).
- About 75% of the effort expended by hunters occurred during the first half of the season (September - November; Table 2). In addition, about 76% of the grouse flushed and 79% of the grouse harvested occurred during this early part of the season. The flush rates were similar between the early and late portions of the season.
- More effort was expended by hunters on public lands and the number of grouse flushed was higher there (Table 3). The flush rate was also slightly higher on public 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 2021-22 season was 0.63 grouse flushed/hour, similar to 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 (1.09 grouse flushed/hour), followed by the Champlain Valley ecozone (0.71 grouse flush/hour). The rest of the ecozones were at or below the annual statewide average (Table 5, Figures 1 and 2).

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 1,150 trips and 3,211 hours afield by 148 hunters.
- Hunters participating in the survey averaged about 22 hours afield during the 2021 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 12 woodcock flushed per hunter for the 2021 season and had to spend about 2 hours hunting to flush one woodcock. In addition, hunters averaged 3 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 5 woodcock flushes resulted in a kill (a 21% success rate; Table 1).
- Hunting effort was steady throughout October, but the greatest number of birds were flushed and harvested during the third week of October (Table 6). The overall flush rate from 20 September through 30 November was 0.66 birds/hour but peaked in the third week of October (0.92 birds/hour; Table 6, Figure 6).
- There was more hunting effort and woodcock flushed and killed on public lands than on private lands, but the flush rate was higher on private lands (0.83 vs. 0.60 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 (0.88 woodcock flushed/hour vs. 0.55 woodcock flushed/hour; Table 4).
- The flush rates were highest in northern New York (St. Lawrence Valley, Champlain Valley, Adirondacks-Tug Hill ecozones), followed by the Mohawk Valley-Hudson Valley-Taconic Highlands ecozone (Table 8). The remaining ecozones were below the statewide average (0.66 woodcock flushed/hour).

Comparing 2021-22 to Previous Seasons

Ruffed Grouse

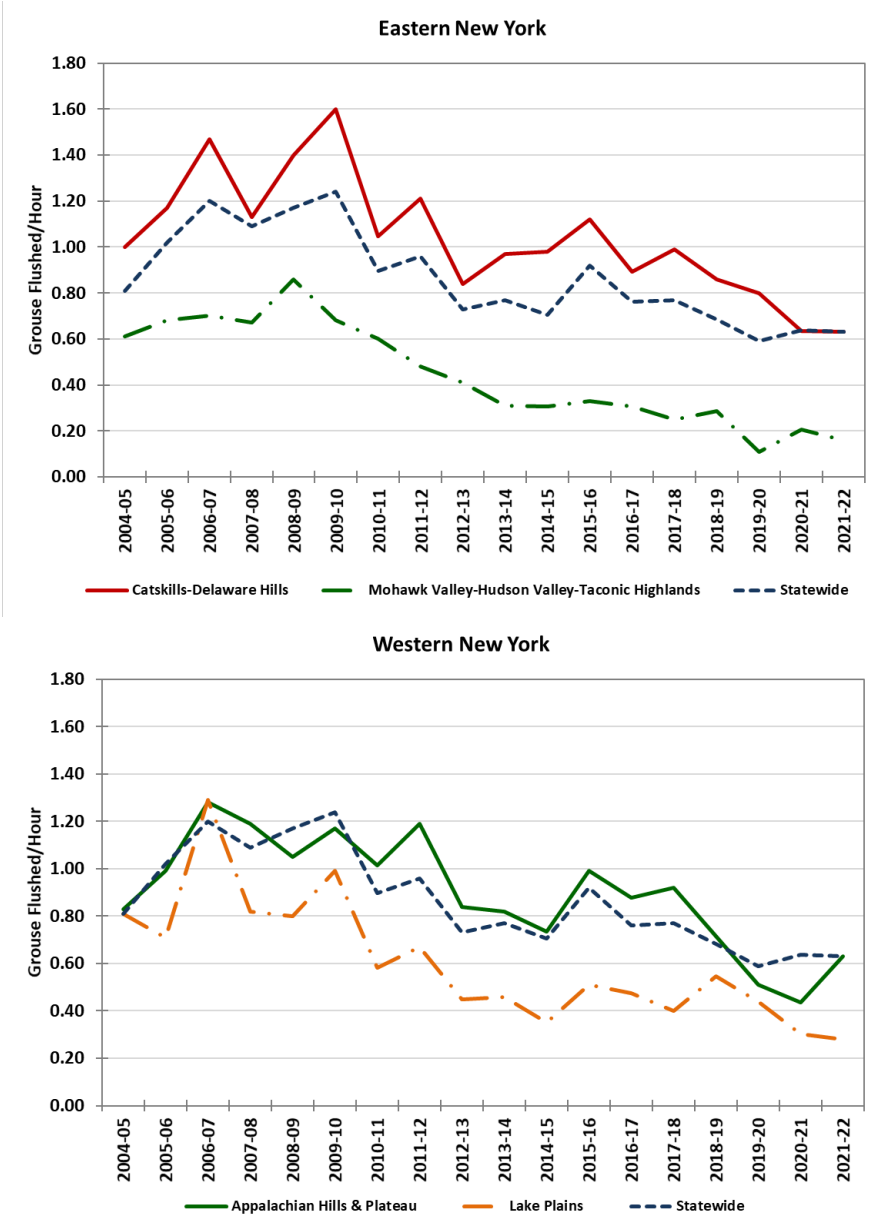
- Over the past 18 seasons, almost 1,500 hunters have participated in this survey. They have taken over 45,000 trips afield, spent over 124,000 hours pursuing grouse, flushed about 110,000 birds, and harvested 9,000 grouse. It is important to note that the number of cooperating hunters has been declining 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.
- The statewide flush rate was similar between 2020-21 and 2021-22. Also similar between years was the disparity in the flush rate between the Northern Zone (0.94 birds/hour) and the Southern Zone (0.50 birds/hour). The trend in the flush rate between these two zones has been diverging since 2017 with the Southern Zone steadily declining over that period.
- From 2004-05 through 2021-22, the average flush rate was 0.91 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. During the 2021-22 season, in the Southern Zone no grouse were flushed on 54% of trips, compared to only 30% of trips in the Northern Zone where no grouse were observed.

- 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 2021 was 0.66 birds/hour, which was higher than 2020 and higher than the long-term average (0.58 birds flushed/hour; Figure 6).
- From 2020 to 2021, the flush rate increased in every ecozone with the exception of the Champlain Valley, but even in this ecozone the flush rate was among the highest in the state (Figure 6).
- From 2010 through 2021, the flush rate varied by year, but is relatively stable over the 12-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 2021, the peak occurred the third week of October, compared to the second week of October in 2020 and first week of November in 2019. Variability in weather patterns and annual temperatures can affect the timing of migration.
- We can 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 in the spring of each year. This survey counts the number of singing males and is used as an index of abundance. From 2010 through 2021, both the SGS and the flush rate from the Grouse & Woodcock Hunting Log indicate that woodcock populations are relatively stable, but both also show that populations from 2018 through 2021 were lower than the eight years prior to that period. Lower woodcock numbers over the past four years may be the result of early spring storms in 2018 and 2019 when birds were migrating and beginning to establish breeding territories. The improved flush rate in fall 2021 may be an indication that woodcock have begun a recovery after three years of declines, but data from spring 2022 and fall 2022 will help determine whether this is the case.



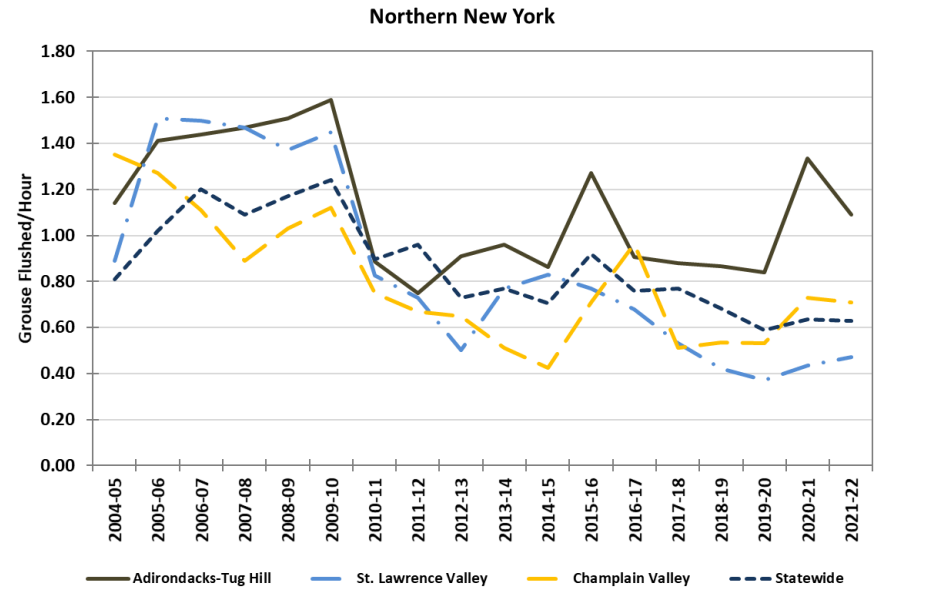


Figure 1. Ruffed grouse flush rate (grouse flushed/hour) by ecozone based on Ruffed Grouse and American Woodcock Hunting Log data for the 2004-05 through 2021-22 seasons. Ecozones are an aggregation of Wildlife Management Units. The Costal Lowlands Ecozone (New York City and Long Island) does not have a ruffed grouse hunting season.

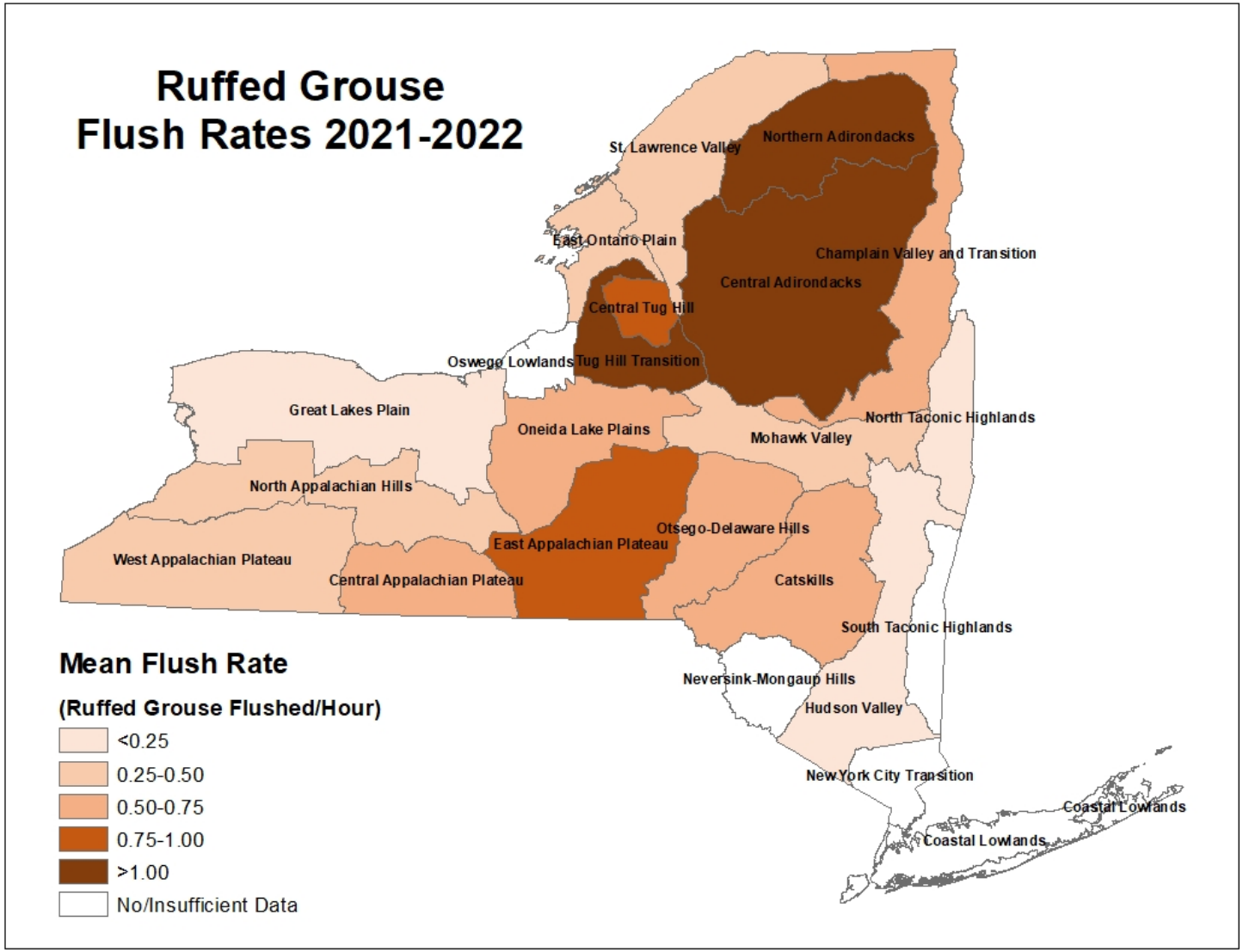


Figure 2. Ruffed Grouse flush rate (grouse flushed/hour) by Wildlife Management Unit (WMU) aggregate from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2021-22. Only aggregates with ≥20 observations/records and ≥35 hours were included in the analysis. The statewide flush rate for 2021-22 was 0.63 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.

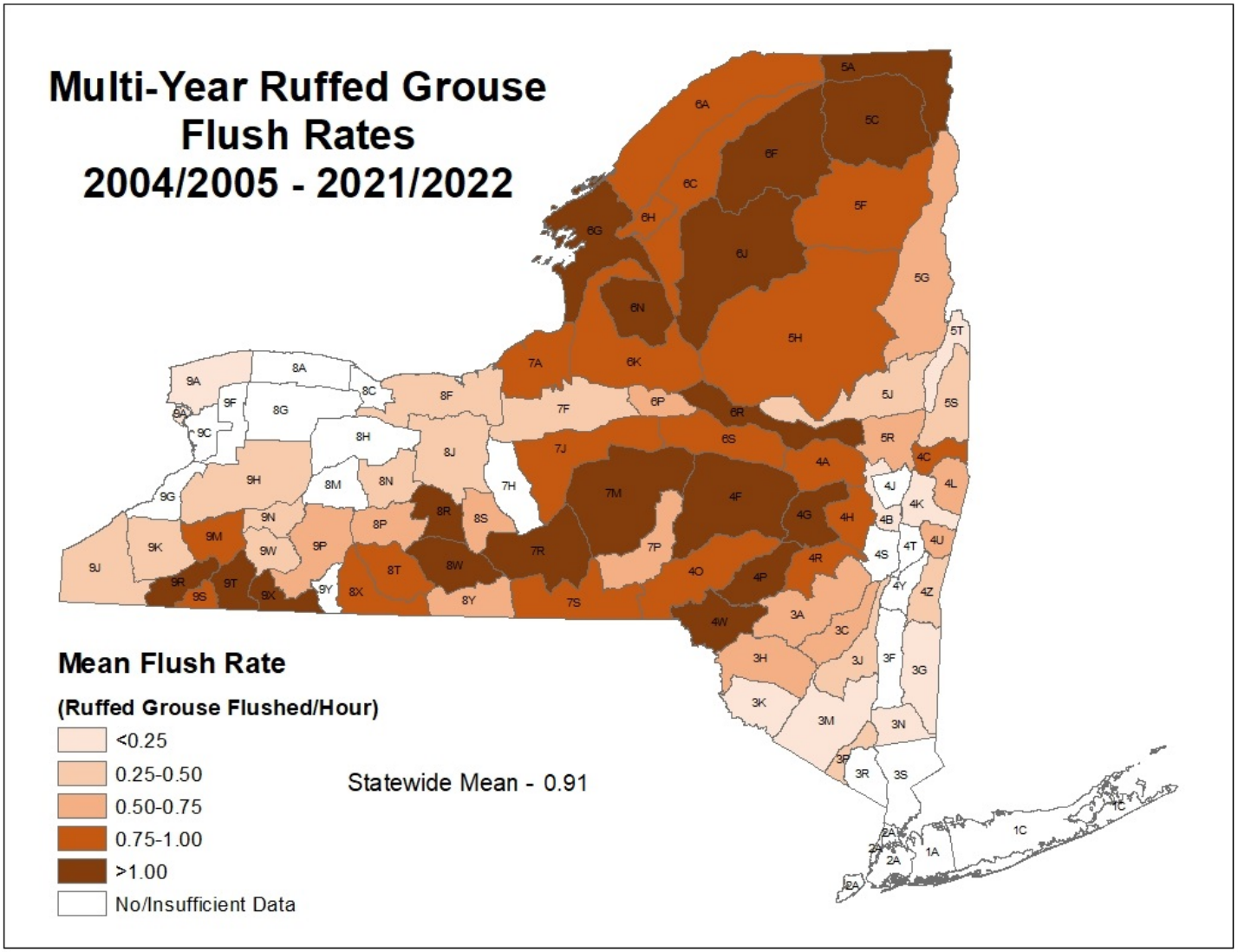


Figure 3. Ruffed Grouse flush rate (grouse flushed/hour) by Wildlife Management Unit (WMU) from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2004-05 – 2021-22. Only WMUs with ≥100 observations/records and ≥300 hours were included in the analysis. The statewide flush rate for the 18-year period was 0.91 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.

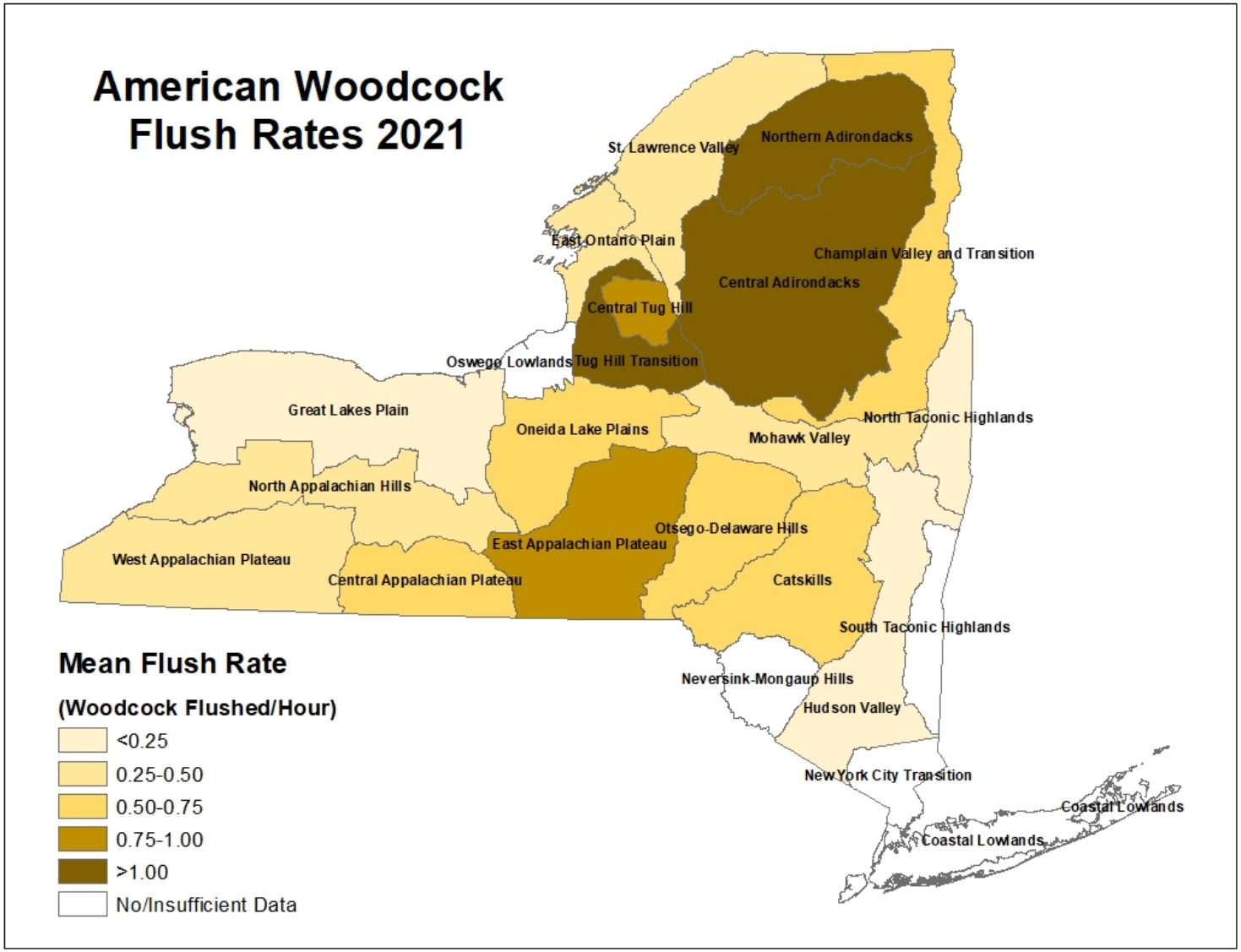


Figure 4. American woodcock flush rate (birds flushed/hour) by Wildlife Management Unit (WMU) aggregate from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2021-22. Only aggregates with ≥20 observations/records and ≥35 hours were included in the analysis. The statewide flush rate for 2021 was 0.66 woodcock flushed/hour. The Coastal Lowlands aggregate does not have a grouse hunting season, so the survey was not conducted there.

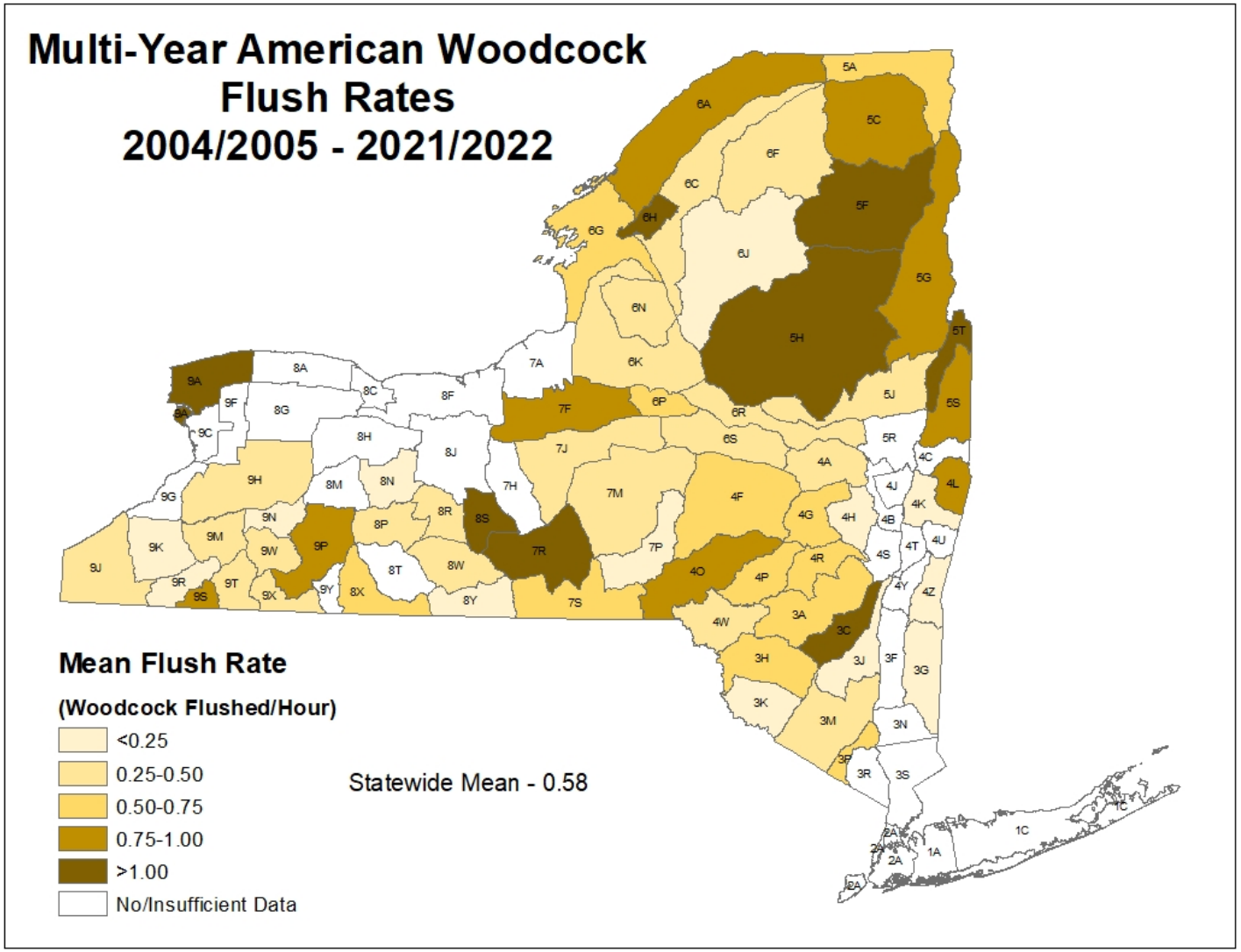


Figure 5. American woodcock flush rate (birds flushed/hour) by Wildlife Management Unit (WMU) from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2010-11 – 2021-22. Only WMUs with ≥50 observations/records and ≥150 hours were included in the analysis. The statewide flush rate for 2010-2021 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.

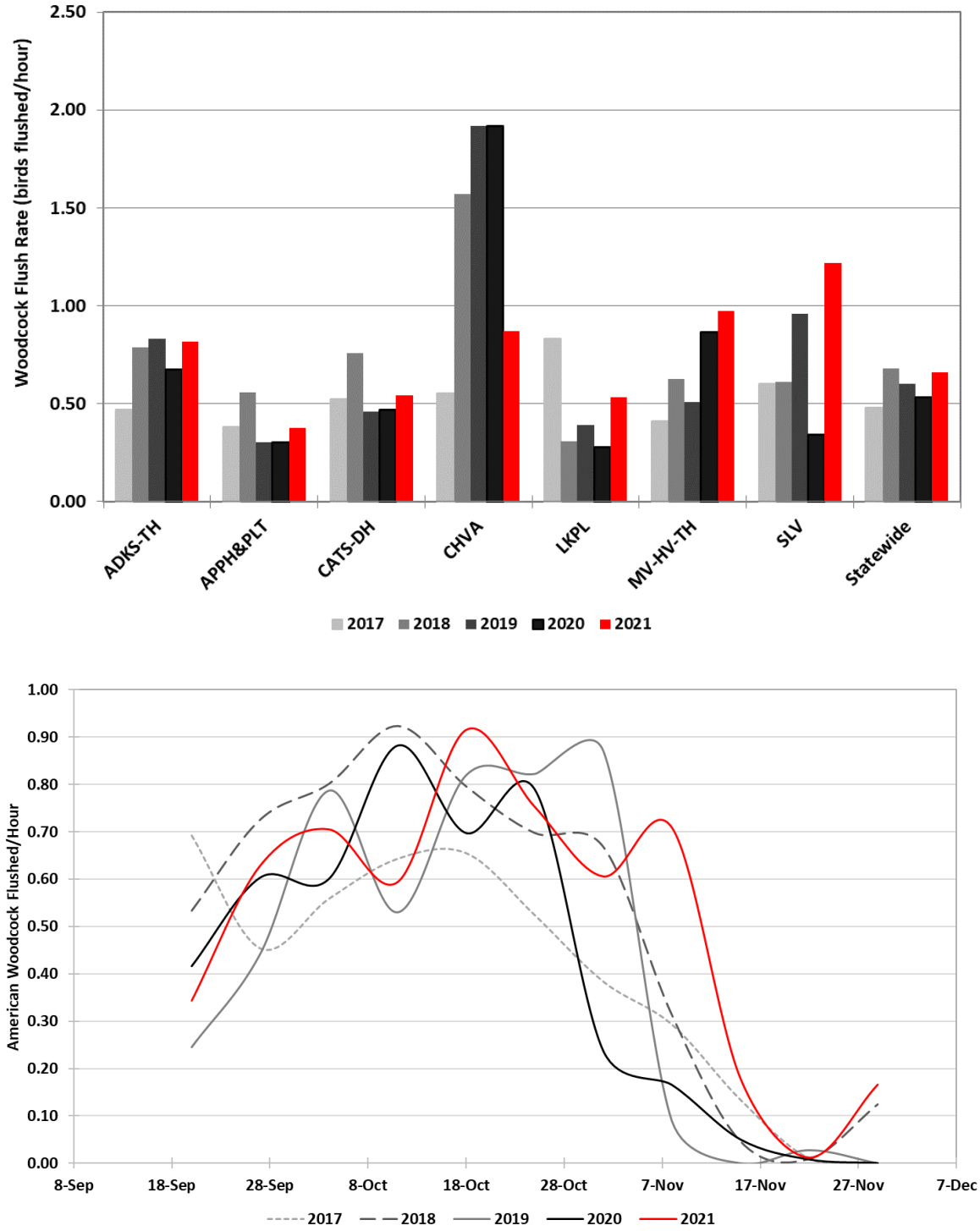


Figure 6. American woodcock flush rate (woodcock flushed/hour) by ecozone (top) and the flush rate by week (bottom) from the Cooperator Ruffed Grouse & Woodcock Hunting Log. The statewide flush rate for 2021 was 0.66 woodcock flushed/hour. Abbreviations: Champlain Valley (CHVA), Adirondacks-Tug Hill (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, 2021-22.

Summary Statistics	2018-19	2019-20	2020-21	2021-22	3-Year Avg. (18-19 - 20-21)	Fall 2018	Fall 2019	Fall 2020	Fall 2021	3-Year Avg. (2018-20)
Number of Hunters	210	200	188	174	199	188	175	169	148	177
Trips/Hunter	8.6	9.1	9.8	8.2	9.2	6.4	6.8	7.7	7.8	7.0
Hours/Trip	2.7	2.7	2.6	2.7	2.7	2.7	2.8	2.7	2.8	2.7
Hours/Hunter	23.1	24.3	25.6	24.5	24.3	17.6	18.8	20.8	21.7	19.1
Birds Flushed/Hunter	15.4	12.5	16.0	14.8	14.6	9.5	8.3	8.3	12.1	8.7
Birds Harvested/Hunter	1.0	1.1	1.2	1.0	1.1	2.1	2.1	1.6	2.5	1.9
Hours/Bird Flushed*	1.5	1.9	1.6	1.7	1.7	1.8	2.3	2.5	1.8	2.2
Hours/Bird Harvested*	22.9	22.9	20.9	24.8	22.2	8.4	8.9	13.3	8.6	10.2
% of Birds Flushed that were Harvested	6.6	8.5	7.6	6.7	7.6	21.9	25.5	18.7	20.9	22.0
Flush Rate (birds flushed/hour)**	0.68	0.59	0.64	0.63	0.64	0.68	0.60	0.53	0.66	0.60

* 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 2021 are based on 1,150 trips and 3,211 hours afield by 148 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, 2021-22.

Month	# of Trips	% of Total	# of Hours	% of Total	# Grouse Flushed	% of Total	# Grouse Harvested	% of Total	Flush Rate ± SE* (flushes/hour)
September	70	4%	194	5%	248	10%	27	16%	1.30 ± 0.16
October	754	47%	2104	49%	1,174	46%	75	44%	0.56 ± 0.03
November	326	20%	913	21%	533	21%	34	20%	0.62 ± 0.05
December	152	10%	353	8%	252	10%	17	10%	0.83 ± 0.08
January	161	10%	407	10%	246	10%	14	8%	0.65 ± 0.07
February	136	9%	294	7%	124	5%	5	3%	0.48 ± 0.06

* 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, 2021-22.

	Public Land				Private Land			
	Grouse Hunting		Woodcock Hunting		Grouse Hunting		Woodcock Hunting	
	#	%	#	%	#	%	#	%
Number of Trips	1,082	69%	805	71%	496	31%	330	29%
Number of Hours	3,059	73%	2,363	75%	1,130	27%	790	25%
# Birds Flushed	1,959	77%	1,185	66%	587	23%	597	34%
# Birds Harvested	135	80%	268	72%	34	20%	104	28%
Flush Rate ± SE* (flushes/hour)	0.66 ± 0.03		0.60 ± 0.05		0.57 ± 0.04		0.83 ± 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, 2021-22.

	Northern Zone				Southern Zone			
	Grouse Hunting		Woodcock Hunting		Grouse Hunting		Woodcock Hunting	
	#	%	#	%	#	%	#	%
Number of Trips	487	31%	397	35%	1,107	69%	748	65%
Number of Hours	1,316	31%	1,120	35%	2,941	69%	2,083	65%
# Birds Flushed	1,197	46%	841	47%	1,379	54%	944	53%
# Birds Harvested	109	63%	198	53%	63	37%	175	47%
Flush Rate ± SE* (flushes/hour)	0.94 ± 0.05		0.88 ± 0.08		0.50 ± 0.02		0.55 ± 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.

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 2021 are based on 1,150 trips and 3,211 hours afield by 148 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, 2021-22.

Ecozone / WMU Aggregate*	**Trips**		**Hours**		**Grouse Flushed**		**Grouse Killed**		**Flush Rate** (grouse flushed/hour)**	
	#	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**Mean**	**SE****
St. Lawrence Valley	**81**	**5.2%**	**241**	**5.8%**	**120**	**4.7%**	**10**	**5.9%**	**0.47**	**0.06**
East Ontario Plain	30	1.9%	84	2.0%	40	1.6%	3	1.8%	0.45	0.08
St. Lawrence Valley	51	3.2%	157	3.8%	80	3.1%	7	4.1%	0.48	0.08
Champlain Valley	**41**	**2.6%**	**103**	**2.5%**	**68**	**2.7%**	**6**	**3.5%**	**0.71**	**0.13**
Champlain Valley & Transition	41	2.6%	103	2.5%	68	2.7%	6	3.5%	0.71	0.13
Adirondacks-Tug Hill	**357**	**22.7%**	**936**	**22.4%**	**1,002**	**39.2%**	**91**	**53.5%**	**1.09**	**0.06**
Tug Hill	73	4.6%	233	5.6%	244	9.5%	34	20.0%	0.94	0.11
Tug Hill Transition	65	4.1%	173	4.1%	188	7.4%	16	9.4%	1.06	0.15
Northern Adirondacks	55	3.5%	167	4.0%	190	7.4%	7	4.1%	1.25	0.19
Central Adirondacks	164	10.4%	363	8.7%	380	14.9%	34	20.0%	1.11	0.10
Lake Plains	**152**	**9.7%**	**350**	**8.4%**	**81**	**3.2%**	**1**	**0.6%**	**0.28**	**0.05**
Oneida Lake Plains	82	5.2%	190	4.6%	81	3.2%	1	0.6%	0.51	0.08
Great Lakes Plain	69	4.4%	158	3.8%	0	0.0%	0	0.0%	0.00	0.00
Oswego Lowlands	1	0.1%	2	0.0%	0	0.0%	0	0.0%	n/a***	
Appalachian Hills & Plateau	**407**	**25.9%**	**1,048**	**25.1%**	**701**	**27.4%**	**26**	**15.3%**	**0.63**	**0.04**
East Appalachian Plateau	180	11.5%	503	12.0%	490	19.2%	18	10.6%	0.91	0.08
Central Appalachian Plateau	20	1.3%	39	0.9%	16	0.6%	1	0.6%	0.64	0.20
North Appalachian Hills	60	3.8%	139	3.3%	47	1.8%	2	1.2%	0.37	0.08
West Appalachian Hills	147	9.4%	367	8.8%	148	5.8%	5	2.9%	0.40	0.05
Catskills-Delaware Hills	**352**	**22.4%**	**991**	**23.7%**	**522**	**20.4%**	**29**	**17.1%**	**0.63**	**0.04**
Catskills	201	12.8%	579	13.9%	309	12.1%	18	10.6%	0.66	0.06
Otsego-Delaware Hills	141	9.0%	393	9.4%	204	8.0%	10	5.9%	0.59	0.07
Neversink-Mongaup Hills	10	0.6%	19	0.5%	9	0.4%	1	0.6%	n/a***	
Mohawk Valley-Hudson Valley-Taconic Highlands	**182**	**11.6%**	**506**	**12.1%**	**61**	**2.4%**	**7**	**4.1%**	**0.16**	**0.03**
Mohawk Valley	29	1.8%	78	1.9%	18	0.7%	0	0.0%	0.26	0.07
Hudson Valley	69	4.4%	207	5.0%	7	0.3%	3	1.8%	0.04	0.02
North Taconic Highlands	73	4.6%	185	4.4%	33	1.3%	4	2.4%	0.24	0.05
South Taconic Highlands	9	0.6%	31	0.7%	3	0.1%	0	0.0%	n/a***	
New York City Transition	2	0.1%	5	0.1%	0	0.0%	0	0.0%	n/a***	
Statewide Totals	**1,572**		**4,175**		**2,555**		**170**		**0.63**	**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, woodcock flushed and killed, and flush rates (woodcock flushed/hour) by week from the Cooperator Ruffed Grouse & American Woodcock Hunting Log, 2021-22.

Week of	# of Trips	% of Total	# of Hours	% of Total	# Woodcock Flushed	% of Total	# Woodcock Harvested	% of Total	Flush Rate ± SE* (flush/hour)
20 September	56	5%	158	5%	50	3%	0	0%	0.34 ± 0.07
27 September	131	11%	402	13%	198	11%	32	9%	0.63 ± 0.13
4 October	174	16%	479	16%	254	15%	55	15%	0.71 ± 0.13
11 October	148	13%	374	12%	190	11%	41	11%	0.59 ± 0.11
18 October	183	16%	527	16%	441	25%	98	26%	0.92 ± 0.11
25 October	132	11%	358	11%	245	14%	61	16%	0.75 ± 0.13
1 November	138	12%	386	12%	208	12%	46	12%	0.61 ± 0.10
8 November	125	11%	345	11%	176	10%	40	11%	0.71 ± 0.14
15 November	40	3%	108	3%	20	1%	0	0%	0.18 ± 0.11
22 November	20	2%	65	2%	2	0%	0	0%	0.01 ± 0.01
29 November	3	0%	9	0%	1	0%	0	0%	0.17 ± 0.17

* 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 2021 are based on 1,150 trips and 3,211 hours afield by 148 hunters.

Table 7. 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, 2021-22.

Ecozone / WMU Aggregate*	**Trips**		**Hours**		**Woodcock Flushed**		**Woodcock Killed**		**Flush Rate**** (woodcock flushed/hour)	
	#	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**Mean**	**SE****
St. Lawrence Valley	**66**	**5.9%**	**199**	**6.4%**	**220**	**12.5%**	**45**	**12.3%**	**1.22**	**0.24**
East Ontario Plain	25	2.2%	78	2.5%	10	0.6%	2	0.5%	0.14	0.07
St. Lawrence Valley	41	3.6%	121	3.9%	210	11.9%	43	11.7%	1.88	0.35
Champlain Valley	**30**	**2.7%**	**71**	**2.3%**	**50**	**2.8%**	**18**	**4.9%**	**0.87**	**0.24**
Champlain Valley & Transition	30	2.7%	71	2.3%	50	2.8%	18	4.9%	0.87	0.24
Adirondacks-Tug Hill	**294**	**26.1%**	**816**	**26.1%**	**554**	**31.4%**	**129**	**35.2%**	**0.82**	**0.10**
Tug Hill	65	5.8%	217	6.9%	63	3.6%	15	4.1%	0.27	0.06
Tug Hill Transition	58	5.2%	159	5.1%	36	2.0%	5	1.4%	0.38	0.12
Northern Adirondacks	49	4.4%	157	5.0%	130	7.4%	29	7.9%	0.79	0.18
Central Adirondacks	122	10.8%	283	9.1%	325	18.4%	80	21.9%	1.33	0.20
Lake Plains	**122**	**10.8%**	**272**	**8.7%**	**112**	**6.3%**	**13**	**3.6%**	**0.53**	**0.08**
Oneida Lake Plains	60	5.3%	138	4.4%	76	4.3%	12	3.3%	0.50	0.11
Great Lakes Plain	61	5.4%	132	4.2%	36	2.0%	1	0.3%	0.58	0.11
Oswego Lowlands	1	0.1%	2	0.1%	0	0.0%	0	0.0%	n/a***	
Appalachian Hills & Plateau	**253**	**22.5%**	**716**	**22.9%**	**306**	**17.3%**	**47**	**12.8%**	**0.38**	**0.05**
East Appalachian Plateau	121	10.8%	388	12.4%	198	11.2%	23	6.3%	0.45	0.07
Central Appalachian Plateau	11	1.0%	20	0.6%	2	0.1%	1	0.3%	n/a***	
North Appalachian Hills	33	2.9%	80	2.6%	33	1.9%	10	2.7%	0.41	0.11
West Appalachian Hills	88	7.8%	228	7.3%	73	4.1%	13	3.6%	0.29	0.08
Catskills-Delaware Hills	**236**	**21.0%**	**707**	**22.6%**	**269**	**15.2%**	**54**	**14.8%**	**0.54**	**0.09**
Catskills	124	11.0%	395	12.6%	129	7.3%	21	5.7%	0.46	0.09
Otsego-Delaware Hills	103	9.2%	294	9.4%	91	5.2%	18	4.9%	0.33	0.06
Neversink-Mongaup Hills	9	0.8%	18	0.6%	49	2.8%	15	4.1%	n/a***	
Mohawk Valley-Hudson Valley-Taconic Highlands	**124**	**11.0%**	**345**	**11.0%**	**255**	**14.4%**	**60**	**16.4%**	**0.97**	**0.16**
Mohawk Valley	15	1.3%	35	1.1%	9	0.5%	5	1.4%	0.26	0.13
Hudson Valley	53	4.7%	151	4.8%	30	1.7%	10	2.7%	0.20	0.05
North Taconic Highlands	48	4.3%	133	4.3%	205	11.6%	43	11.7%	2.16	0.36
South Taconic Highlands	7	0.6%	24	0.8%	10	0.6%	2	0.5%	0.29	0.19
New York City Transition	1	0.1%	2	0.1%	1	0.1%	0	0.0%	n/a***	
Statewide Totals	**1,125**		**3,126**		**1,766**		**366**		**0.66**	**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 2021 are based on 1,150 trips and 3,211 hours afield by 148 hunters.

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