

WOODCOCK STATUS REPORT 1974

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UNITED STATES DEPARTMENT OF THE INTERIOR Fish and Wildlife Service

WOODCOCK STATUS REPORT, 1974

Joseph W. Artmann Office of Migratory Bird Management



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ABSTRACT

The estimated continental woodcock harvest exceeded 1.5 million birds during the 1973-74 hunting season. Wing-collection data for 1973-74 indicated that productivity increased during the previous spring by 15% rangewide, 9% in the Atlantic Region, and 21% in the Central Region. Daily and seasonal hunting success was also greater by 8.7% and 10.0%, respectively. The 1974 breeding population index increased 6.5% rangewide, 2.4% in the Atlantic Region, and 10.0% in the Central Region. Indices from 1964-74 suggested a declining breeding population in the Atlantic Region and an essentially stable population in the Central Region. Recoveries of 2,950 banded woodcock indicate the existence of two relatively distinct populations. More than 94% of the recoveries were made in the Region of banding.

INTRODUCTION

During the past decade, the American woodcock has become an increasingly popular game bird over much of its range. The species still ranks well below waterfowl in terms of harvest, but the ratio of woodcock to waterfowl harvested has narrowed to 1:3, or less, in several northern States. Thus, the species has advanced from a "specialty" game bird highly regarded by a few hunters to a broader based recreational resource actively pursued by many sportsmen. Owen (1975) estimated that woodcock provide between 2.5 and 3.0 million man-days of hunting recreation annually.

Because no suitable sampling framework is available in the United States for conducting a randomized woodcock harvest survey, the magnitude of the harvest has been estimated from data derived primarily from the waterfowl hunter questionnaire of the U.S. Fish and Wildlife Service (Clark 1972). The estimated 1.4 million woodcock harvested during the 1973-74 hunting season represent an increase of approximately 70% from the average of the 1964-65 and 1965-66 seasons (Table 1). This is a crude estimate, but it provides some insight into the utilization of the resource. Although over half the harvest occurs in the northern zone (Fig. 1), mid-, and southern zone harvests appear to be increasing.

In Canada, all migratory game bird hunters are required to obtain Federal permits. Thus, in recent years woodcock harvests there have been measured more precisely than in the United States. The 1967-73 Canadian woodcock harvests have averaged about 105,000 annually. Canadian harvest sampling procedures were changed in 1972, and the resulting harvest estimates are generally lower but they are believed to be more accurate. In 1973, 109,000 woodcock were harvested (Dobell 1974). Combining the Canadian and U.S. harvest estimates indicated the continental woodcock harvest exceeded 1.5 million birds in 1973. Relatively little woodcock research has been accomplished and much needs to be learned of the species' potential for meeting further recreational demands.

Two annual surveys presently provide the basis for establishing woodcock hunting regulations in the United States: (1) a wing-collection survey provides data on relative reproductive success during the previous breeding season, hunting success, changes in size and distribution of the harvest by participating hunters; and (2) a singing-ground survey provides an index to the breeding population.

Data collection and analysis have steadily improved in both surveys. Although imperfect, these two surveys produce the best rangewide information currently available for managing woodcock. This report presents data from the 1973-74 wing-collection survey, the 1974 singing-ground survey, and additional information accumulated since publication of the 1973 Status Report (Clark 1974).



Fig. 1. Reference areas of U.S. woodcock surveys. Area to the right of the dotted line is principal woodcock range.

WING-COLLECTION SURVEY

The primary objective of the wing-collection survey is to determine woodcock reproductive success the previous spring as reflected by the age and sex composition of the harvest sample. The survey also produces information on changes in the temporal distribution of the harvest and daily and seasonal hunter success. Response by hunters to the wing-collection survey has been excellent since its inception in 1959, varying from 8,786 wings that year to 23,112 for the 1973-74 season and averaging about 15,000 annually.

Procedures

Procedures for collecting, processing, and analyzing survey data were described by Clark (1970, 1973). Survey participants are assembled from a variety of sources, including those hunters who cooperated in the survey the previous year, respondents who indicated on the U.S. Fish and Wildlife Service's waterfowl questionnaire and State harvest surveys that they hunted woodcock, and requests by individuals that they or their friends be included in the survey. Clark (1970) discussed biases associated with assembling a survey sample from these sources, but speculated that major changes in productivity and harvest rates could be detected. When only data from comparable hunters are used, presumably some of this bias is reduced.

Because the number of wings received from each State may not be proportional to the woodcock harvest of that State, data used to compute overall productivity and harvest index trends must be weighted. No one has devised a completely satisfactory weighting method because of the lack of a uniform sampling framework. Current weighting procedures are based upon a combination of data from the Service's waterfowl questionnaire survey, duck stamp sales, and State license sales (Clark 1970). Wing totals vary between different tables in this report because incomplete information necessitated exclusion of a few wings from some tabulations. A linear regression model was used to determine long-term trends.

Results

Although 1% fewer hunters were contacted in the 1973-74 woodcock wingcollection survey, 8% more responded. They contributed 23,112 wings, which is 21% more than in 1972-73. Distribution of hunter contacts by States and contact codes revealed that the response rate was better in northern States than in southern States and averaged 29% overall (Table 2). To improve the distribution of the wing sample, more hunters in midlatitude and southern States have been contacted in recent years (Table 3). Generally adequate samples are available from northern States.

A State-by-State comparison of the number of cooperators, envelopes returned, and wings received for the past two hunting seasons is shown in Table 4. Data on average number of wings per envelope and number of envelopes received during 1973-74 are not strictly comparable because data from previous years did not include envelopes in which no wings were submitted. These envelopes represented hunts during which no woodcock were bagged. Hence the decrease in the number of wings per envelope may have been partially caused by procedural methods.

Age and sex data from 1963-64 through 1973-74 wing collections show about an equal proportion of adults (48.4%) and immatures (51.6%) in the harvest (Table 5). The immatures were almost equally divided between males and females (50.7% vs. 49.3%), while among adults there was a greater proportion of females (59.9%) than males (40.1%). The latter difference was statistically significant (P<0.01, t = 3.99). It is not known if this difference is real or caused by the method of data collection. If differential hunting mortality is occurring, then it could affect age ratios in the harvest sample. Data for woodcock banded in Maine indicate that survival rates for adult males and females, and immature females were similar while those for immature males were significantly lower (Krohn et al. 1974). Hence, immature male mortality apparently occurs between the time the harvest is sampled and males are banded as adults. Further study is needed to determine where and when mortality occurs. Does it occur on the wintering or breeding areas or during migration? Is it a result of weather conditions, predation, or other factors?

Productivity Index

Because woodcock can be aged and sexed by wing plumage characters (Martin 1964), the ratio of immatures per adult female in the wing survey provides a measure of reproductive success during the preceding breeding season (Table 6). Considerable variation in age ratios occurs among different harvest areas (States or Provinces) and between years for the same harvest areas. These variations are probably caused by differences in hunting season dates, weather conditions, hunting restrictions, and possibly a combination of differential migration and hunting vulnerability.

Some variation has been eliminated by computing the weighted productivity index with only data from hunters who participated in the survey for 2 consecutive years. Before the 1970-71 season, annual changes in age ratios were small when range-wide data were weighted and combined (Fig. 2). Large fluctuations occurred in 1970-71 (25% increase) and in 1971-72 (26% decrease). The cause of these unusual fluctuations has not been determined but adverse weather shortly after hatching may be a factor (Clark 1974). The 1973-74 index showed a 15% increase over 1972-73 (Table 7). However, the linear regression model does not show any significant long-term trend in productivity (r = -.46).

Separating rangewide productivity data into regional components also failed to show statistically significant long-term trends (Fig. 3). The weighted productivity ratio for the Atlantic Region increased 9% over 1972-73 while that for the Central Region increased 21%. In the Atlantic Region, the ratio has varied widely, especially since the 1969-70 season. Before 1972-73,









the ratio of immatures per adult female was generally higher in the Atlantic Region. Fluctuations in the Central Region have been less extreme, with a general decline from 1963-64 to 1966-67 and an increase thereafter.

Hunter Success Index

Based on data from comparable hunters, daily and seasonal hunting success, as indicated by average number of wings per envelope and per cooperator, increased by 8.7% and 10.0%, respectively (Table 8). Daily and seasonal success for the past 11 years are plotted on Fig. 4. The curves appear similar but a linear regression analysis indicated a significant decline (r = 0.72, P<0.01) in daily hunting success but not for seasonal hunting success. Common data were used to calculate both success indices; consequently the results should be viewed cautiously.

Daily hunting success is also indicated by the daily bag size distribution. Daily bag size data for the 1973-74 season and the average daily bag size from 1969 through 1974 are presented in Table 9. The 1973-74 season was more successful because a larger percentage of hunters attained the daily bag limit than in previous years. Conversely, fewer bags contained only one woodcock.

Regional Analysis of Wing-Collection Data

Sex and Age Ratios

An investigation of factors affecting productivity and hunter success was initiated in 1970. Since differential migration by sex and age groups in conjunction with the timing of hunting seasons would materially influence the productivity index, the first step was to analyze regional sex and age ratios by time periods.

Wing-collection data were divided into 10-day segments for regional comparisons. These segments were subsequently grouped into three major periods so that approximately 50% of the wings were in the middle period and 25% each in the first and last periods. If seasonal trends in sex or age ratios occurred, this broad separation between the early and late seasons should make them more apparent. Because weather probably influences the timing of migration and the availability of woodcock, yearly weather variations make the interpretation of the results difficult. Data for the 1969-70 through 1973-74 seasons are summarized for the Atlantic and Central Regions (Tables 10 and 11). Differences have been noted, but the results are not yet conclusive.

Chronology of Harvest

With a season length of 65 days States can generally select a season encompassing the period of greatest woodcock abundance. A few States, however, continue to set woodcock hunting seasons with resident game species in mind. This reduces woodcock hunting opportunity because the period of greatest woodcock abundance may be missed in many years.



collection survey data from comparable hunters (Base Year - 1969-70).

Distributions of the 1971-72 through 1973-74 harvests by 10-day periods are shown for the Atlantic and Central Regions (Tables 12 and 13). Because no adjustment was made for periods encompassing less than 10 hunting days, these data only approximate migrational chronology. Such periods may occur at the beginning or end of the hunting season, but heavier hunting pressure on opening day or first weekend may partially compensate for the shortened period. However, the typical concentration of hunting effort and harvest in the beginning of the season probably is not as great for woodcock as for other species.

Wing-collection data from 1970 through 1973 were also summarized by 7-day periods beginning with the opening date in each State (Tables 14 and 15). The shorter period provides better information on the chronology of harvests but makes regional pooling of data more difficult because it accentuates State-to-State variations in opening dates. In contrast, it eliminates variation associated with 10-day periods, where the first period may contain from 1 to 10 days and one or two weekends. The effect of weekend hunting varies depending if Sunday hunting is permitted.

The combined data suggest that some States could benefit from earlier or later seasons than those selected in recent years. Although results may be biased by inadequate sample sizes in some States, a high percentage of the total harvest in the first 2 weeks suggests that an earlier season might be desirable. In contrast, concentration of the harvest toward the end of the season suggests that a later season may be appropriate. States having small survey samples may profit by examining data from States in the same general latitude.

SINGING-GROUND SURVEY

Procedures

The singing-ground survey, which involves counts of singing males heard along predetermined routes, is interpreted as an index to the size of the postmigrational breeding population. Between 1964 and 1970, the survey has gradually changed from routes located in average or better quality woodcock habitat to routes randomly distributed throughout the major breeding range (Clark 1970). Since 1970, the breeding population index has been based solely on random routes which provide better statistical reliability.

The 1974 index was derived from data collected on 908 routes comparable with those sampled the previous year (Table 16). This number of comparable routes is 13% greater than in 1973. In computing the index, data from each State were weighted according to its proportion of the total land area (inland water area excluded) in the region or in the range of the species (Table 17). Routes on which no breeding males were heard at any of the 10 stops for 2 consecutive years under comparable circumstances are placed in the "Constant 0" group. They are included in the number of comparable routes but are not field-checked annually. At 5-year intervals they are rechecked to determine if wood-cock are present.

Because the group of routes paired with comparable routes the preceding year is not necessarily the same group paired with comparable routes the subsequent year, it is illogical to depict numbers of singing birds heard per route. Conversion to random routes, which averaged fewer birds than management routes, also precludes portraying the average number of birds per route. In order to compare the results, the data were adjusted by the percentage change between years with 1970 as base year (Clark 1973). A linear regression model was used to determine trends.

Results

In 1974, the number of woodcock heard per comparable route increased by 6.5% range-wide, 2.4% in the Atlantic Region and 10.0% in the Central Region (Table 16). A summary of weighted regional and range-wide changes for the past 10 years follows:

	Percentage	change from previous ye	ear
Year	Atlantic Region	Central Region	Rangewide
1965	-0.4	-11.1	-6.5
1966	+2.4	-0.5	+1.7
1967	+1.5	-3.5	0
1968	-8.4	-4.5	-6.9
1969	+4.2	+12.1	+8.8
1970	0	+3.1	+2.1
1971	-9.8	-7.3	-8.4
1972	+1.6	+3.7	+2.7
1973	-6.3	-2.8	-4.3
1974	+2.4	+10.0	+6.5

Range-wide data are plotted in Fig. 5, but no long-term trend is apparent. However, differences appear if range-wide data are separated into regional components (Fig. 6). Overall, the Atlantic Region breeding population index (BPI) declined from 1964 to 1974. The linear regression model indicates an annual rate of decline of 2% per year (r = -0.85, P<0.01). In contrast, the Central Region's BPI declined before 1969 and since then has fluctuated around the mean. The regression analysis indicated an overall increasing BPI at an annual rate of about 0.5% per year; however, the increase was not statistically significant (r = 0.28).



Average Number of Woodcock per Comparable Route When Annual Percent Change is Applied to Base Year



BANDING ACTIVITIES

Greater banding effort at the northern edges of main breeding areas would provide data for a better understanding of the origins of wintering and migrant populations as well as the timing of migrations. Population origin and migration data are needed to evaluate the influence of weather on reproduction and other factors of vital importance to woodcock management. Banding in southern areas would help to identify local populations, their migrational characteristics, and the impact of late hunting seasons. During 1973, 5,470 woodcock were banded, 2,947 in the Atlantic Region and 2,523 in the Central Region. Expansion of banding effort during 1961-73 is reflected in Table 18. The increase, particularly evident in preseason banding, is illustrated in Fig. 7.

Comparisons of recovery data for 2,950 banded woodcock show two relatively distinct woodcock populations (Table 19). More than 96% of the recoveries for woodcock banded in the Atlantic Region occurred in that Region. Similarly, almost 91% of the Central Region's recoveries occurred there. Most interregional recoveries were from birds banded near regional borders. The lack of substantial interchange between regions indicates that management by regional units is biologically sound.

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APPENDIX

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Table 1.--Woodcock harvest data from Waterfowl Hunter Mail Survey.

harvest by #1 hunters % Increaseb	50.1 46.4	84.6 59.8		127.1	67.4	81.6	57.6	96.6	81.1	69.3
Woodcock waterfo Number ^a	211,094 41,015	129,695 381,804	200,059	104,357	30,461	334,877 	411 , 153	145,372	160,156	716,682
1 hunters ed woodcock 系 Increase ^b	23.2	75.8 41.9	 80.08 	118.3	49.3	90.0	4.7.7 h	104.6	0.69	63.4
Waterfow who hunte Number ^a	51,178 16,206	22,612 89,996		35,383	6,645	97,272	106,422	51,589	29,257	
unters in ting States % Increase ^D	21.5 48.4	4,2.8 29.1		57.5	19.2	53.0	34.1	52.2	37.6	40.1
Waterfowl hu woodcock hum Number ^a	371,596 236,685	351,721 917,494		180,046	83,819	442,566	550,297	416,732	435 , 540	
REFERENCE AREA	North Central Mid-Central	South Central REGION TOTAL		Mid-Atlantic	South Atlantic	REGION TOTAL	Northern Zone	Mid-Zone	Southern Zone	U.S. TOTAL IN WOODCOCK RANGE

^a Average of two latest seasons for which data are available (1972-73 and 1973-74). ^b Increase from average of 1964-65 and 1965-66 seasons.

State of		Packe	ts ma	iled	by		Total	No. of	Percentage
residence	1	con 2	tact 4	code 7	8	9	$contacted^b$	cooperators	of Contacts responding
Ala.	12	51			4	72	136	16	11
Ark.	7	32					39	24	10
Conn.	132	228	24		9		388	133	33
Del.	11	29			10		49	10	20
D.C.	1	1					2	0	0
Fla.	11	49	l		3	23	85	11	13
Ga.	27	52	1	1	13	158	242	34	14
Ill.	28	142	3		l	22	190	27	14
Ind.	31	102	l			59	191	22	12
Iowa	1	45	1				47	9	19
Kans.		22					22	1	5
Ky.	4	17				12	32	6	18
La.	45	253	7		15	293	604	62	10
Maine	162	21	4	16	55	337	588	239	41
Md.	32	88	3	2		106	231	29	13
Mass.	188	169	7		17		376	168	45
Mich.	157	111	13			503	774	197	25
Minn.	64	119	7		l		187	70	37
Miss.	20	91	1		10	79	190	21	11
Mo.	8	32	1	1		83	120	13	11
N.H.	62	160	7	1		37	259	71	27
N.J.	151	124	10	19	44	167	504	217	43
N.Y.	175	233	18		26		448	206	46
N.C.	32	70	7		3		108	31	29
Ohio	95	156	5			2	254	73	29
Okla.	4	17				5	25	2	8
Pa.	133	376	5				507	158	31
R.I.	20	32	2	11	12	125	186	45	24
S.C.	27	57	1		6	16	105	25	24
Tenn.	8	39	1	3		85	129	14	11
Tex.	8	29			3	3	43	8	18
Vt.	51	101	4			8	163	71	44
Va.	20	67	14			3	104	42	40
W. Va.	20	25	4			113	151	20	13
Wis.	131	46	16		139	349	667	271	41
TOTAL	1,878	3,186	162	54	371	2,660	8,146	2,326	29

Table 2. Distribution of contacts and response rate in 1973-74 woodcock wingcollection survey (including Code 4 contacts added during season).

^aCode 1 - Previous year's Code 1, 2, 4, 7, and 8 hunters who submitted wings.

Code 2 - Waterfowl mail survey hunters who reported hunting woodcock.

Code 4 - Requested participation or proposed by fellow hunter.

Code 7 - Appeared on both Code 1 and Code 9 lists.

Code 8 - Previous year's Code 9 hunters who submitted wings.

Code 9 - From list provided by State, primarily from State kill survey.

^bExcluding packets not deliverable.

					6-Year
REFERENCE AREA	1968-69	1970-71	1972-73	1973-74	percent change
North Central	1,894	1,757	1,061	1,628	-14
Mid-Central	542	721	795	985	+82
South Central	286	454	939	1,037	+263
REGION TOTAL	2,722	2,932	2,795	3,650	+34
North Atlantic	2,836	2,304	2,982	2,408	-15
Mid-Atlantic	1,424	1,764	1,872	1,548	+9
South Atlantic	264	447	616	540	+105
REGION TOTAL	4,524	4,515	5,470	4,496	-1
Northern Zone	4,730	4,061	4,043	4,036	-15
Mid-Zone	1,966	2,485	2,667	2,533	+29
Southern Zone	550	901	1,555	1,577	+187
U.S. TOTAL	7,246	7,447	8,265	8,146	+12

Table 3.	Changes	in	regional	distribution	of	hunter	contacts,	1968-69	to
				1973-74					

4. Data from woodcock wing-collection surveys: 1972-73 and 1973-74 hunting seasons. Mean values Table

JLALE UL							D		1011	. + 9 V L L	110	
	coopei	rators	envel	lopes	Wiı	ıgs	pe	r enveld	ope	per	coopera	tor
residence	72-73	73-74 ^a	72-73	73-74 ^a	72-73	73-74 ^a	71-72	72-73	73-74 ^a	71-72	72-73	73-74 ^a
Ala.	16	16	42	67	59	76	1.2	1.4	1.6	m	4	5
Ark.	7	4	15	22	20	34	1.7	1.3	1.5	Ś	ć	6
Conn.	135	133	395	479	731	872	2.1	1.9	1.8	7	S	7
Del.	16	10	18	24	20	21	2.1	1.1	6.	Ъ	Ļ	2
Fla.	11	11	26	26	49	40	1.1	1.9	1.5	ŝ	4	4
Ga.	39	34	82	101	147	234	1.8	1.8	2.3	ŝ	4	7
111.	23	27	72	59	150	108	2.2	2.1	1.8	9	7	4
Ind.	27	22	79	80	176	100	2.0	2.2	1.3	9	7	5
Iowa	I	6	e	23	ŝ	39	2.0	1.0	1.7	18	ς	4
kans.	0	Т	0	1	0	0	0	0	0	0	0	0
ζγ.	4	9	10	16	11	27		1.1	1.7	ł	ŝ	Ś
.a.	59	62	270	216	714	445	2.2	2.6	2.1	ø	12	7
faine	216	239	1,189	1,465	3,177	3,799	2.7	2.7	2.6	14	15	16
·Íd .	27	29	83	126	214	291	2.2	2.6	2.3	9	8	10
lass.	190	168	748	887	1,696	1,774	2.5	2.3	2.0	11	6	11
ſich.	152	197	740	993	1,790	2,260	2.3	2.4	2.3	10	12	11
dinn.	63	70	264	366	642	914	2.5	2.4	2.5	10	10	13
fiss.	30	21	101	83	176	126	1.3	1.7	1.5	2	9	9
·10.	6	13	18	20	45	31	2.1	2.5	1.6	4	ц	2
ч.н.	58	71	200	345	409	583	2.2	2.0	1.7	8	7	8
4.J.	195	217	630	1,066	1,296	2,126	2.6	2.1	2.0	12	7	10
Ν.Υ.	194	206	816	1,063	1,790	2,217	2.4	2.2	2.1	10	6	11
4.C.	35	31	93	89	197	144	1.7	2.1	1.6	9	9	S
oinc	78	73	238	275	560	559	2.3	2.4	2.0	2	7	8
Jkla.	2	2	2	2	4	2	1.2	2.0	1.0	2	2	٦
pa.	121	158	459	565	1,035	1,109	2.3	2.3	2.0	2	∞	7
R.I.	40	45	139	223	336	441	2.4	2.4	2.0	∞	8	10
s.c.	32	25	86	73	141	141	1.8	1.6	1.9	9	4	9
Tenn.	10	14	14	26	17	38	1.6	1.2	1.5	4	2	č
Tex.	10	ø	22	25	34	59	2.4	1.5	2.4	S	Υ	7
/t.	47	71	270	492	626	1,010	2.6	2.3	2.1	16	13	14
Va.	20	42	55	126	104	202	1.6	1.9	1.6	З	Ś	S
И. Va.	19	20	80	102	187	236	2.5	2.3	2.3	10	10	12
Vis.	250	271	950	1,232	2,198	2,611	2.3	2.3	2.1	6	6	10
Other		1	 	160	224	443	1	1	2.8		-	1
TOTAL	2,136	2,326	8,209	10,746	18,978	23,112	2.4b	2.3b	2.1b	9.4b	8, 8b	9.7b

^bUnweighted mean excludes information from the special study areas and unknown contact codes.

Hunting		ADULT			IMMATURE		
season	Male	Female	M/F	Male	Female	M/F	Total
1963 - 64	2,410	3,636	.6628	3,419	3,292	1.0385	12,757
1964-65	1,965	3,030	.6485	2,785	2,650	1.0509	10,430
1965-66	2,386	3,469	.6878	2,762	2,719	1.0158	11,336
1966-67	2,550	3,633	.7018	3,338	3,094	1.0788	12,615
1967-68	3,203	4,425	.7238	3,828	3,591	1.0659	15,047
1968-69	3,418	5,024	.6803	4,667	4,429	1.0591	17,538
1969-70	3,552	4,964	.7155	4,443	4,272	1.0400	17,231
1970-71	2,961	4,644	.6375	5,069	5,023	1.0091	17,697
1971-72	3,607	5,678	.6352	4,636	4,803	0.9652	18,724
1972 - 73	3,617	5,639	.6414	4,780	4,400	1.0863	18,436
1973 - 74	4,135	6,397	.6464	5,787	6,049	0.9566	22,368
Total	33,804	50,539		45,514	44,322		174,179
x	3,073	4,595	.6687	4,138	4,029	1.0270	
% of overall harvest	19.4	29.0		26.1	25.4		

Table 5. Summary of woodcock wing survey age and sex data from 1963-64 through 1973-74.ª

^a Unweighted data from all harvest areas (excluding wings which could not be aged or sexed).

	3
	100
	LEAST
	AT
	ΒY
AREAS.	REPRESENTED
STUDY	AREAS
SPECIAL	HARVEST
FROM	FROM
WINGS	CATA
^a Exclucing	D UNWE I GHI ED

NGS.

STATE CR			AGE A	ND SEX C	ATEGCRIE	S		TOTAL	
PREVINCE		ADULT			I MMA FUR		CNKNUWN	MINGS	IMMATURES PER
CF HARVEST	VALL	FEMALL	NMONNO	MALE	FEMALE	UNKNOWN	AGE	RECEIVEDa	ADULT FEMALED
AL 4.	24	22	+	22	8	2	ł	76	
A.K	¢	11	1	0,1	7	-	-	34	
CC NN.	126	163	9	270	180	\$	12	703	2 • 80
DEL.		2	8	7	G	!	1	14	
FL A.	ć	8	1	15	14	-	1	40	1
GA.	59	67	ł	53	43	1	2	224	l . 43
ILL.	ŝ	8	t t	9	89	1 I	8	25	ł
•	τ Υ	13	1	15	12	1	1	48	
ICNA	4	2	-	ŝ	4	-	1	13	-
K≺.	Ś	6	1	7	5	8	1	27	
LA.	63	111	1	133	143	2	2	454	2.50
MAINE	879	1,436	23	1,046	1,000	18	33	4,435	1 • 4 4
MU.	36	63		63	48	2	1	213	1.79
~^ SS •	181	305	2	3-5	311	2	9	1,112	2 - 33
MICH.	402	624	7	658	867	14	40	2,612	2.47
•NVIW	106	181	5	237	237	!	9	772	2.62
wISS.	31	40	1	30	38	1	2	142	1.73
MC.	ς Γ	7	1	9	11	1	1	27	
• d. • Z	3 8	44	8	62	53	1	1	198	2 • 64
∧. +.	195	261	2	219	257	4	3	941	1.84
- P - N	280	417	5	423	450	16	4 C	1,631	2.13
×	519	748	8	620	695	6	23	2,622	1.77
₽• C•	18	32	г 1	39	31	2	4	126	2.25
CHIC	60	105		1.3	111	ľ	1	385	2 • C ⁵
OK LA.	1	ł	1	1	2	;	1	2	
PA.	235	355	6	267	285	7	16	1,171	1.57
QUEBEC	4	4	1	9	4	1	1	18	
R. I.	22	48		48	57	ŗ	4	180	2.21
S. C.	46	40	1	36	35	1	5	164	1.80
TENN.	17	9	1	8	2	!	3	3.B	
TEXAS	11	18	ł	16	14	1	1	59	
VT .	193	292	11	265	242	5	36	1,044	1.75
۰ ۵ .	27	60	1	47	42	1	1	178	1.50
W. VA.	€ 4 0	51	, 1	62	66			257	3.18
AL 0.	488	842	11	680	729	10	13	2,173	1.69
ICIAL	4.135	6,357	63	5.787	6.049	104	253	22.818	1 87

NGS	1
FROM WI	SURVEYS
TERMINED	1973-74
S DE	AND
RATI05	972-73
AGE	L H
BΥ	801
TED	N
INDICA	CIPATED
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νιτγ	D P A
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PRODU	RATORS
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OF TOTAL KIL JARK- -0217 ALA. -0217 ARK- -0217 ARK- -0217 CDNN- -0217 FLA. -02132 MILL. -10332 MICH. -01399 MICH. -01399 MICH. -0139 MICH. -0294 MO. -0294 MICH	ACTOR)	MINGS RE 1972-73 25 475 6 12 58 21 21 21	ECEIVED						
ALA. ARA. DEL. DEL. DEL. DEL. DEL. DO217 DEL. DO217 DEL. DO217 DEL. DO232 MAINE b MICH. MICH. D MICH. D MICH. D 0342 0342 0342 0342 0342 0342 0342 0342 0342 0342 0342 0342 0342 0139		475 475 12 21 21 21	1973-74	1972-73	FEMALES 1973-74	1972-73	TURES 1973-74	ADULT F 1972-73	EMALEa 1973-74
ARK. DEL. DEL. 		475 475 12 21 21	19			14	6	1	
CDNN. b CEL. CEL. CA. CA. CA. CA. CA. CA. CA. CA		475 6 12 58 21	28	8	1	Ċ,	12		1
DEL. FLA. 6.A. FLA. FLA. FLA. FLA. FLA. FLA. FLA. F		6 12 58 21	600	123	135	276	349	2.24	2.59
FLA. GA. ILL. INU. KX. MAINE b MAINE b MO. MASS. MO. MO. MO. MO. MO. MO. MO. MO		12 58 21	13	1	1	4	11	ł	1
GA. ILL. IND. KY. KY. MAINE b MO. MO. MICH. MO. MICH. MO. MICH. MO. MICH. MO. MO. MO. MO. MO. MO. MO. MO		58 21	29		1	8	24	1	1
ILL. IND. KY. KA. b MAINE b MO. MO. MICH. b MICH. b MICH. b MISS. MO. MO. N. N. N. N. N. N. N. N. N. N. N. N. N.		21	72	-	-	31	30	1	1
IND. KY. LA. b MAINE b MASS. b MOSS. b MICH. b MISS. MISS. MISS. MO. N. H. b N. C294 N. C328 MISS. MO. MO. MO. MO. MO. MO. MO. MO. MO. MO		(I	19	•	1 1	10	10	1	ł
KY. LA. b MAINE b MO. MO. MO. MICH. b MICH. b MICH. b MISS. MISS. MO. N. H. b N. H. b N. H. b N. H. b N. J. b N. H. b N. J. b N. CO342 0039 0139		43	33	1	2	25	16	!	1
LA. ^b .0732 MAINE ^b .1033 MD0342 MASS. ^b .103342 MICH. ^b .1898 MINN. ^b .1898 MISS		7	6	*		4	ι Γ	1	1
MAINED 1033 MD. 10342 MASS. ^b .0342 MICH. ^b .1898 MINN. ^b .0139 MISS0139		463	308	81	70	320	197	3.95	2.81
MD. MASS. ^b MICH. ^b MINN. ^b MINN. ^b MISS. MISS. MSS. MO. MO. MO. MO. MO. MO. MO. MO. MO. MO		3,267	3,572	644	1,160	1,555	1,668	1.65	1.44
MASS. ^b MICH. ^b MINN. ^b MINN. ^b MISS. MD. MO. N. M. M. M. M. M. M. M. M. M. M. M. M. M.		95	187	22	55	50	101	2.27	1.84
MICH. ^b MINN. ^b MISS. MISS. MD. MD. M. M. M. M. M. M. M. M. M. M. M. M. M.		705	895	234	254	314	492	1.34	1.94
MINN. ^b .0139 MISS. MD. MD. N.H. ^b .0294 N.J. ^b .0412 N.Y. ^b .1226 N.C. OHIO ^b .0508 PA. ^b .2003		1,811	2,079	571	497	855	1,238	1.50	2.49
MISS. MD. N.B. N.H.b N.J.b N.Y.b M.C. OHIG D. 0508 PA.b .2003		450	699	139	159	223	407	1.60	2.56
MD. N.B. N.H.b N.J.b N.Y.b O.1226 N.C. O.1200 N.C. N.C. N.C. N.C. N.C. N.C. N.C. N.		139	124	42	36	69	60	1.64	1.67
N.B. N.H.b N.J.b N.Y.b N.C. OHID PA.b 2003		17	14	1	1	5	8	1	1
N.H. ^b .0294 N.J. ^b .0412 N.Y. ^b .0412 N.C1226 N.C		144	152	46	28	75	93	1.63	3.32
N.J. ^D .0412 N.Y. ^b .1226 N.C		592	649	228	175	235	318	t • 03	1.82
N.Y. ^b .1226 N.C0508 OHID ^b .0508 PA. ^b .2003		687	1,253	150	335	428	671	2 • 85	2.00
N.C. 0H10 ^b 2003 PA. ^b 2003		1,713	2,184	572	620	194	1,098	1.39	1.77
0HI0 ^b • 0508 PA• ^b • 2003		117	16	28	25	67	55	2.39	2.20
PA. ^b .2003		298	205	101	57	126	120	1.25	2.11
		872	646	276	291	411	455	1.49	1.56
K.I.		61	154	13	40	44	91	3.38	2.78
S.C.		104	105	34	24	54	48	1.59	2.00
TE NN.		Ś	80	1 t	1	2	2	ł	-
TEXAS		15	52	•	9	٣	26	-	8
VT. ^b .0368		660	800	218	202	266	401	1.22	1.99
VA.		62	73	8	1	43	45	1	1
W• VĄ•		141	187	29	40	73	111	2.52	2.78
WIS. D .0822	a surr ja su digur labar san a Vi)n.abaa.	2,083	2,401	657	735	1,028	1,221	1.56	1.66
TOTAL AND WEIGHTED AGE	RATIOb	15,169	17,939	4,575	5,043	7,415	9,390	1.71	1.97
CHANGE IN WEIGHTED AGE	RATIO							an daalah en saad in s	15.20

	CUUPEI	KAILKS NHU P	AKIICIPAI	ED IN BC	ТН 1972-7	3 AND 19	73-74 WI	NG-COLLE(CTION SUR	VEYS.
STATE CF	WEIGHT	NUMBER WHO	NUMBER	GF	NUMBE	R 0F	AVG. NC	. WINGS	AVG. NO.	WINGS
RESIDENCE	FACTCR	CCCPERATED	ENVELC	PES	NIM	6S	PER EN	VELOPE	PER COOP	ERATCR ^a
		OCTI LEANS	61-7161	F1 - C 1 6 T	C1-216T	41 -C1 AT	C1 _ 7 1 K T	+1-0161	1712-13	1913-14
ALA.		7	19	17	25	19	1.3	1.1	1	ł
ARK. L		2	5	17	5	28	1.0	1.6	;	
CCNN. D	.0217	11	239	242	451	548	1.9	2.3	6.4	7.7
DEL.		4	5	6	5	12	1.0	1.3	1	1
FLA.		£	7	17	12	29	1.7	1.7	ł	1
GA.		11	29	34	58	67	2•0	2.0	5.3	6.1
1 L L .		4	11	б	21	19	1.9	2.1	1	1
INC.		9	19	2C	43	31	2.3	1.6	1	+
Т.		2	1	Ś	7	6	1.0	1.8	1	1
	.0732	25	162	119	433	304	2.7	2.6	17.3	12.2
MAINE	1 033	147	1006	1043	2763	3045	2.7	2.9	16.8	20.7
MD.		12	41	60	06	169	2.2	2.8	7.5	14.1
MASS.	• 0342	87	337	388	628	951	1.9	2.1	7.2	9.1
MICH. 0	.1898	115	647	702	1595	1845	2.5	2.6	13.9	16.0
MINN. D	•0139	38	197	242	441	655	2.2	2.7	11.6	17.2
MISS.		14	67	62	116	117	1.7	1.9	8.3	8.4
י בי צ		4	2	5	17	14	2.4	2.8		L P
N N	.0294	31	136	159	274	301	2-0	1.9	B . B	9.7
۵.۲ ۲۰	.0412	114	357	478	664	1123	1.9	2 - 3	5.8	6-6
N. Y. U	.1226	136	660	159	1400	1826	2.1	2.4	10.3	13.4
		16	14	54	117	15	2.1	1.8	7.3	6.1
UHIC U	.0508		127	100	292	190	2.3	1.9	9.4	6.1
РА. U	. 2003	83	328	326	754	8C2	2.3	2.5	9.1	9.7
K.I.		13	41	11	72	148	1.8	1 9	5.5	11.4
S•C•		13	55	46	92	15	1.7	2.0	7.1	7.5
TENN.		-	m	n	ŝ	m	1.0	1.0	1	:
TEXAS		9	æ	19	15	52	1.9	2.7	1	
• • • •	.0368	34	241	285	575	702	2.4	2 • 5	16.9	20.6
VA.		11	30	9 9	61	68	2.0	2.1	5 •5	6.2
H. VA.		10	47	63	109	166	2.3	2.6	10.9	16.6
MIS. D	.0822	172	789	869	1894	2175	2.4	2.5	11.0	12.6
TUTAL AND AVERAGED	WEIGHTE	:C 1 233	6 4 0 V	376 7	13 033	53/31	, ,		c -	r T
		(7747	1004	60740	13, U22	104401	د.>	د •۶	12.0	13.2
^a CCVPUTEI ^b hEIGHTEI	D CNLY F D AVERAG	CR STATES RE	PRESENTE	C BY AT I PRODUCTS	LEAST 10 1 DF STATE	AVERAGE	HE COOP	ERATEC 80 LIED BY 1	TH YEARS	GHT ING
FACTCRS	USING C	CNLY STATES A	EPRESENT	EC BY AT	LEAST 15	HUNTERS	WHO COC	PERATEO E	BOTH YEAR	S.

9.--DISTRIBUTION OF DAILY BAG SIZES IN WOODCOCK WING COLLECTION BY HARVEST AREAS, 1973-74 AND

TABLE

1969	- 70 THKU I	913-14	SEASUN	•								
						BAG S	1 Z E					TUTAL
HARVEST AREA	YEAR	- ov	%o	• 01	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	•ON	. %	"ON	0%	- ON	۰ <i>%</i>	SUCCESSFUL HUNTS
				l					0	FC 1	7 2 1	707 0
NO. CENTRAL	1913-74	816 746	30.1 42.1	10t 10t	21.9	282 282	15.7	144	7.8	232	12.2	1,798
								-	۲ ۲	36	0	570
MIC-CENTRAL	1973-74 1969-74	147 142	53 . 8 51.3	53 61	19.4 22.3	28 36	13.2	13	•••	5 7	1 6 • 5 8 • 5	276
SH, CENTRAL	1973-74	169	46.8	84	23.3	43	11-9	29	8 • C	36	0.01	361
	1969-74	148	48.1	64	20.4	43	13.9	19	6.3	33	11.1	307
CENTRAL	1473-74	1.192	39 . 0	671	21.9	435	14.2	264	8.6	498	16.3	3,060
TUTAL	1969-74	1,036	43.8	520	21.8	361	15.2	176	7.3	289	11.8	2,382
ND. ATLANIIC	1973-74	1,617	36.3	968	21.7	683	15.3	105	11.2	069	15.5	4,459
	1909-74	1,440	39.4	114	23.7	592	16.1	343	8.4	460	11.8	3,711
MIP-ALLANTIC	1973-74	599	41.1	313	21.5	2 0 3	13.9	133	9.1	210	14-4	1,458
	1969-74	619	45.3	51z	22.8	184	13.3	110	7.5	168	11.1	1,394
CO ATLANTIC	72-2201	127	51.9	67	18.6	28	17.6	20	7.6	30	11.4	264
	L.969-74	134	58.3	47	20.5	24	9.8	12	5.6	13	5.7	230
A TI ANITIC	1073-76	2,353	1 92	ויברו	5.10	914	14 1	654	1.1.6	930	15.0	6.181
TOTAL	1969-74	2,193	41.7	1,232	23.4	800	15.1	469	6.3	640	11.4	5,334
U.S. TUFAL	1973-74	3.545	38.4	2.001	21.7	1.349	14.6	918	6°6	1,428	15.5	9,241
-	1969-74	3,228	42.4	1,751	22.9	1,162	15.1	645	8 • C	929	11.5	7,715

KĒGION	PERICD	HUNTING SEASON	SAMPLE SIZE ^a	PERCENT UF SEASON SAMPLE	AUULT FEMALES/ 100 MALES	IMMATURE FEMALES/ 100 MALES	IMMATURES/ 160 ADULT FEMALES	IMM FEM/ 100 Adult Females
ACRIH ATLANTIC	I (TO 10/10)	1973-74 1969-74	2,644 2,168	24°4 23°8	155 162	114	161 151	86 78
	(10/11-31)	1973-74 1969-74	6,345 6,611	58.5 60.9	164 150	96 96	161 168	81 83
	III (AFTER 10/31)	1973-74 1969-74	1,854 1,404	17.1 15.3	126 106	79 85	216 49	96 115
MIC-ATLANFIC	I (TO 10/20)	1973-74 1969-74	685 672	20.6 21.7	136 161	101 118	187 177	96 96
	11 (15/21 - 11/20)	1973-74 1969-74	2,068 2,500	62.2 64.1	162 135	117 104	177 197	95 100
	III (AFTER 11/20)	1973-74 1969-74	570 445	17.2 14.2	144 112	06 06	238 156	113 62
SCUTH ATLANFIC	I (TU 12/10)	1973-74 1969-74	128 78	24.J 18.9	117 126	62 91	180 49	69 115
	II (12/11 - 1/10)	1973-74 1969-74	238 236	44•6 48•5	144 111	96	161 10	76 88
	III (AFTER 1/10)	1973-74 1969-74	168 144	31.5 32.6	89 137	113 77	208 21	110 95

ATLANTIC REGION SUMMARY OF SEX AND AGE RATIOS IN WONDFOCK WING FOLLENTIN BY PERIODS TARIF 10.

^BEXCLURING ADULT UNKNOWNS AND UNKNOWN SEX AND AGE.

TABLE 11. SUM	MARY CF SEX AND AG	RATIOS IN W	сорсоск м	ING COLLECT	ICN BY PERI	CDS - CENI	RAL REGION	
REGICN	PER100	HUNTING SEASON	SAMPLE SIZE ⁶	PERCENT OF SEASON SAMPLE	ADULT FEMALES/ 100 MALES	IMMATURE FEMALES/ 100 MALES	IMMATURES/ 100 ADULT FEMALES	IMM FEM/ 100 ADULT FEMALES
NCRTH CENTRAL	1 (10 9/30)	1973-74 1965-74	1,769 1,162	29.6 26.0	172 155	112 99	264 20ú	140 100
	11 (10/1-20)	1973-74 1969-74	2,839 2,608	47•6 49•9	166 184	117 110	197 164	106 86
	III (AFTER 13/20)	1973-74 1965-74	1,359 1,088	22.8 24.1	159 172	119	161 141	88 71
MIC+CENTRAL	[110 10/10]	1973-74 1969-74	128 158	23•6 28•6	281 179	235 139	149 159	104 89
	11/11 - 11/01) 11)) 1973-74 1969-74	313 357	57.6 53.4	143 145	66 66	221 183	110 87
	III (AFTER 11/10)	1973-74 1969-74	102	18•8 18•0	66 96	50 69	204 192	68 77
SOUTH CENTHAL	I (TG 12/10)	1973-74 1965-74	50	6.6 10.3	100	189 129	217 22	142 118
	11 (12/11 - 1/10	1973-74 1969-74	373 458	49.4 57.2	139 141	88 98	229 77	108 136
	III (AFTER 1/10)	1973-74 1969-74	332 238	44°0 32.5	164 156	107 11ô	200 14	103 111

^BEXCLUDING ADULT UNKNOWNS AND UNKNOWN SEX AND AGE.

ц	vest ods	7&8		EH	の、い ゴ	1-	\0 a) 	0, (n) H H	E-1 E -1 E-1	യഗയ	EI	3 7	nvon
Regic	of har d peri	5&6	ωH	16	5 8 10 10	96	8 8 4 8 7 8 8	t 01 M	5 m 10 10	ったい	98 36 38	K- (1 O		36 17 21
lantic	nta£e ombine	3&4	19 19	53	14 31	1	0 0 0 0 0 0 0	191	26 36	64 64	55 35 55 55 55 55 55 55 55 55 55 55 55 5	0 8 5 5 9 2	37 28 38	51 14 51 10
a At	Perce in c	1&2	35 81	00	05	8	н о с С О С	2 CI 1	т-1 БЪ	0 0 0 0 0 0	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	7075 100	5555 645	500 500 Г
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r 10-	ingle			m	m 	0	н I Н П		н н н		400	리티이		
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ving c less t	ge of	m	27	37	6-0	ł	11 30 11 80	34	17 22	100 100 100	15 8 15 8	5 5 M 5 M M	32 30 35 30	54 54 56
- 74 v	entag	0	24 35	24	29	2	v o v m	- 0 -	16 20	25 25 25	л - т Г	0 61 7 7 7	583 33 583 34	15 15 15
1973 (Perc	Ч	401 41	9	12	1			ţЧ	мчα	0 0 F	н 1 1	368 379 379 379	11 11
72 through	Sample	Size	581 609	759	л 26 Г 7	14	4 7 2 t Г	137	143 224	3,750 3,717 4,423	210 117 213	709 898 1,105	850 879 938	1,799 897 1,591
on of 1971-	Opening	Date	10-16 10-21	10-20	11-19 9-30	70-17	11-20 11-11 01-11	71-20	11-20 11-20	9-24 9-25 9-24	10-5 10-5	10-10 10-10 10-10	101 101 101	10-2 10-14 10-13
Distributi	Yee	тсат	1971-72 1972-73	1973-74	1971-72 1972-73	1973-74	1971-72 1972-73 1073-75	1971-72	1972 -7 3 1973 - 74	1971-72 1972-73 1973-74	1971-72 1972-73 1973-74	1971-72 1972-73 1973-74	1971-72 1972-73 1973-74	1971-72 1972-73 1973-74
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a Ten-day	. periods ex	cept months	having 31	or 28	days	ा ा	t begi	ning	and	end (of hunti	ng sea	son.		

Atlantic Region. Distribution of 1971-72 through 1973-74 wing collections by 10-day periods^a Table 12.

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Distribut	Year	1971-72 1972-73 1973-74	1971-72 1972-73 1973-74	1971-72 1972-73 1973-74	1971-72 1972-73 1973-74	1971-72 1972-73 1973-74	1971-72 1972-73 1973-74	1971-72 1972-73 1973-74	1971-72 1972-73 1973-74
Table 13.	State	Ala.	Ark.	III.	Ind.	Ky.	La.	Mich.	. Minn.

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8 12 29 ¹⁶ 4 10 9 10 19 24 4 13 8 10 19 24 20 18 13 8 10 19 24 20 18 11 13 8 10 19 21 22 33 20 18 13 14 14 14 14 14 14 20 23 20 23 33 20 36 37 14 14 14 14 14 20 23 20 13 21 14 26 14 14 14 20 23 20 13 14 20 23 20 23 20 23 20 23 20 23 20 23 20 23 20 23 20 23 20 23 20 23 20 23 20 23 20 23 20 23 20 23 20 23 <		M FF	10-1 10-1 9-17 9-17 9-17 11-20 11-20 11-20 11-20
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8 18 23 28 17 5		2,728	9-15 2,728

^a Ten-day periods except months having 31 or 28 days or at beginning and end of hunting season.

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Table 1⁴. Distribution of 1970-71 through 1973-7⁴ wing collections by 7-day periods^a - Atlantic Region.

- Atlantic Regioncont	
e l μ . Distribution of 1970-71 through 1973-7 $^{\mu}$ wing collections by 7-day periods ^a	(T = less than 1.)
Table	

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^a First period begins on season opening date; l0th period 2 days or less. ^b Excluding special 8-day season in September.

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Table 1	- c	State	Ala.				Ark.			ILL.			Ind.			Ky.				Ĺa.		40 : M	• IID T M			Minn.	

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5. Distrit		Year	1970-71	1971-72	1972-73	1973-7 ⁴	1970-71	1971-72	1972-73	1973-7 ⁴	1970-71	1971-72	1972-73 1973-74	1970-71	1971-72	1972-73	1973-74	1970-71	1971-72	1072-73		1970-72 1971-72	1972-73	1973-74	1970-71	1971-72	1972-73 1973-74
Table 15		State	Miss.				MO				Ohio			Okla.				Tenn.			ļ	Tex.			Wis.		

^a First period begins on season opening date; loth period 2 days or less.

<u></u>				Woodcock	heard per
	Number of	routes conducted	Comparable	compara	ble route
State or Province	1973	1974	routes ^b	1973	1974
ATLANTIC REGION					
Connecticut	9	10	9	2.11	2.22
Delaware	1	2	3	0.66	0.66
Maine	50	47	46	3.83	3.72
Maryland	15	16	9	0.33	0.22
Massachusetts	16	15	17	2.41	2.17
New Brunswick	58	45	41	4.90	5.41
New Hampshire	14	14	13	3.46	4.85
New Jersey	12	12	16	2.63	2.13
New York	57	60	73	2.42	2.48
Nova Scotia	41	30	35	2.14	2.66
Pennsylvania	40	38	67	1.21	0.87
Prince Edward Island	9	8	9	2.67	3.00
Quebec	26	16	16	2.44	2.88
Rhode Island	2	2	4	1.25	0.75
Vermont	20	21	14	2.14	2.29
Virginia	31	25	70	0.31	0.47
West Virginia	20	22	47	0.87	0.70
REGIONAL TOTAL &					
WEIGHTED AVG. ^C	421	383	489	2.49	2.55
REGIONAL INDEX CHANGE	<u></u>				+2.41%
CENTRAL REGION					
Illinois	17	16	26	0.19	0.15
Indiana	22	23	45	0.33	0.29
Michigan	119	90	94	3.79	4.39
Minnesota	43	38	51	1.41	1.69
Ohio	45	47	73	0.89	0.78
Ontario	49	43	29	6.38	6.97
Wisconsin	68	65	101	2.06	2.10
REGIONAL TOTAL &					
WEIGHTED AVG.C	363	284	419	3.00	3.30
REGIONAL INDEX CHANGE	5				+10.00%
RANGEWIDE TOTAL &					
WEIGHTED AVG.C	784	667	908	2.75	2.93
RANGEWIDE INDEX CHANC	GE				+6.55%

Table 16. Woodcock breeding population indices as indicated by singing-ground surveys in 1973 and 1974 (random routes only)^a

^aSurvey forms received after deadline for this report will be included in a later update.

^bIncludes routes carried as constant zero routes.

^CWeighted averages are sums of products of woodcock heard per comparable route and the corresponding State or Province percentage of the total land area sampled. States or Provinces excluded where one comparable route represents more than 2,000 square miles or where the 2-year average is less than 0.5 birds per route.

	Land area ^b	Comparable	Sg.mi.per	Weightin	g factor
Survey area ^a	(Sq. mi.)	routes	comp. rt.	Regional	Rangewide
ATLANTIC REGION					
Connecticut	4,870	9	541	.0202	.0099
Delaware	1,982	3	661	.0083	.0041
Maine	30,933	46	658	.1289	.0633
Massachusetts	7,833	17	461	.0327	.0160
New Brunswick	27,835	41	679	.1160	.0570
New Hampshire	9,033	13	695	.0377	.0185
New Jersev	7,532	16	471	.0314	.0155
New York	47,869	73	656	.1995	.0982
Nova Scotia	20,402	35	583	.0850	.0418
Pennsylvania	45,025	67	672	.1877	.0923
Prince Edward Island	2,184	9	243	.0091	.0044
Rhode Island	1,049	4	262	.0044	.0021
Vermont	9,274	14	662	.0386	.0190
West Virginia	24,084	47	512	.1003	.0493
REGIONAL TOTAL	239,905	394	609	•9998	
CENTRAL REGION			Col	0007	2265
Michigan	50,010	94	604	.2291	.1105
Minnesota	46,503	51	912	.10/5	.0953
Uhio	41,018	(3	562	.1053	.0040
Untario"	49,220	29	1,697	.1984	.1000
Wisconsin	54,464	101	539	.2196	• 1 1 1
REGIONAL TOTAL	248,023	348	713	1.0000	
RANGEWIDE TOTAL	487,928	742	658		.9997

Table 17. Computation of woodcock singing-ground survey weighting factors.

^aExcluding States and Provinces where each comparable route represents more than 2,000 square miles or where fewer than 0.5 birds are heard per route.

^bLand area only (inland water excluded) as listed in 1970 Commercial Atlas and Marketing Guide - Rand-McNally & Co.

^CExcluding sections of Minnesota and Ontario outside of survey area.

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12-YR TOTAL		88	7	9	9,234	233	715	1,097	15	2,630	3,134	5	43	191		11	38	01		15	202 0	20,206		60	33	178	12	9,170	4,198	673	377	76	5	269	6	ы	4,422	19,492	39,698
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1971		23			1,244	0	166	263	Ч	452	762		Ч	54				4	~)	202	3,189		Г	0	η,		329	472	63	68	16		19			599	1,623	4,812
1970		22			866	4	ЗI	191		556	479	-1	└-	69		Ч	9		_	I C	100	2,527		Г		69	m	521	397	58	132	12		6	Ч		473	1,676	4,203
1969		CU	4	4	828	CJ	4	261		345	485			38			6		ł	5	0,0	2,239		CJ	4	76		472	403	TTT	146	m)	26		Ч	185	1,429	3,668
1968		Ч			732	Ś			5	645	14	m	Ч	36			t			(r	וע ני	1,968		C1	m	1		1.076	868	79	-	Ч		19	m		281	2,332	ł,300
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1966					177 1	13	œ			13	19			σ	Г		9	-	ł		LUC	843			0		er.	1,230	365	i.		9		14			27	1,647	2,490
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1961		Ч		Ч	457	12	ſ	17		75	20		34	6							Я	584		C		5		2.549	79	4		8		20	Ч		31	2,700	3,284
1963					515	22	Ч			13	15			51			C		ł		¢	628			CU	Ч	~	292	124	с Ц	•	9	Ч	10	Ч		19	472	1,100
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file through November l_{\star} , 197 $^{l_{\star}}$ (excluding previously banded birds retrapped and released in same 10-minute block recoverv woodcock band



As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through ontdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.





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