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Aussi disponible en français

No. 108, March 1980

Fisheries and Environment Canada 0022722F S
 Pêches et Environnement Canada
 CANADA. WILDLIFE SERVICE.. PROGRESS REPORT
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Why do some purchasers of Migratory Game Bird Hunting Permits not hunt?

by Fern L. Filion¹

Abstract

In the winter of 1978, 73.3% of a sample of 2357 current and previous-year purchasers of the Canada Migratory Game Bird Hunting Permit in New Brunswick responded to a special mail questionnaire asking them why they did not actively hunt migratory game birds during the 1977-78 season. The study revealed sociological and opportunity-cost reasons to be more important than constraints imposed by age, health or attitudes. Reasons differed by zone of permit purchase, involvement in other consumptive wildlife activities and age. The fact that about 40% of the persons sampled do not hunt migratory game birds in a given year affects the accuracy and cost of the annual harvest survey. Two suggestions regarding the method of sampling are offered to reduce the impact of inactive hunters on harvest estimates.

Introduction

At the request of the Fish and Wildlife Branch, New Brunswick Department of Natural Resources, CWS undertook a special survey in that province in 1977-78. As a result, this study explores the reasons why some persons purchase a \$3.50 Migratory Game Bird Hunting Permit (MGBHP) and then do not hunt, and why others do not renew their permits from one year to the next. Waterfowl managers are concerned about this topic for several reasons. Apart from a natural curiosity, they need to know the answers because a high rate of hunter inactivity may have appreciable effects on the methodology, accuracy and costs of the annual harvest and species composition surveys. If this inactivity is high, a much larger and costlier sample may be required for reliable estimates relating to hunter activity and success. A better understanding of the motives for hunter inactivity may shed light on possible solutions to the problem.

The extent of the problem is illustrated in Table 1. It shows that 20 to 25% of the persons responding to the National Harvest Survey (NHS) from 1972 to 1977 reported not purchasing a Canada MGBHP during the season studied; 37 to 40% of the respondents indicated

Table 1
 Estimated proportions of migratory game bird permittees and hunters in Canada and New Brunswick from 1972 to 1977 based on harvest survey returns*

Year	Area	Harvest survey responses	Permit purchasers	Proportion respondents buying permits	Active hunters	Proportion respondents hunting	Proportion permittees hunting
1977	Canada	22 896	17 833	0.779	14 119	0.617	0.792
	New Brunswick	1 784	1 361	0.763	1 014	0.568	0.745
1976	Canada	20 397	15 729	0.771	12 805	0.628	0.814
	New Brunswick	1 591	1 203	0.756	927	0.583	0.770
1975	Canada	20 648	15 872	0.769	12 980	0.629	0.818
	New Brunswick	1 237	949	0.767	694	0.561	0.731
1974	Canada	15 594	11 747	0.753	9 611	0.616	0.818
	New Brunswick	1 098	779	0.709	597	0.544	0.766
1973	Canada	13 461	10 761	0.799	8 472	0.629	0.787
	New Brunswick	947	753	0.795	547	0.578	0.726
1972	Canada	15 400	11 796	0.766	9 199	0.597	0.780
	New Brunswick	1 105	867	0.785	643	0.582	0.742
1971†	Canada	15 740	10 603	0.674	8 599	0.546	0.811
	New Brunswick	1 075	687	0.639	574	0.534	0.836

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*Sources: Cooch *et al.* (1978), Cooch (1976), Cooch and Raible (1975), Cooch *et al.* (1974, 1973, 1972).

†Data for 1971 are not directly comparable to other years, as explained in text.

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that they did not hunt migratory game birds; and 18 to 22% of the responding permittees reported not hunting them. These figures are lower than those prior to 1972, as the earlier survey design sampled exclusively from a permit file which was one year out of date, and did not include intermittent hunters purchasing a permit during the survey period. Although the data for New Brunswick show a pattern similar to the national data, the inactivity was generally higher during 1972-77.

This paper describes the methods and results of the study, discusses the findings and suggests possible solutions to the problem.

Methods

Questionnaire design

The study was conducted through a special mail questionnaire relating to the 1977-78 hunting season for migratory game birds. It asked eight questions on a form that is reproduced in Appendix 1, which also includes some response data.

Study procedures

No special sampling procedures were required; the questionnaires were sent to 2357 of the 3600 persons selected for the NHS in New Brunswick. These included 1591 non-respondents to the NHS and 766 respondents who said that they had not bought a 1977 MGBHP or had not hunted during the 1977-78 season. The questionnaires were administered between 31 March and 31 May 1978 in accordance with procedures recommended by Filion (1978). Completed questionnaires were manually edited, coded and stored on magnetic tape. Analyses were done using version 7 of the Statistical Package for the Social Sciences (Nie *et al.* 1975).

Table 2
Percentage distribution of harvest sample, special and harvest survey returns by sampling strata

Group	Sampling strata*				Base (no.)
	A (%)	B (%)	D (%)	E (%)	
Harvest sample	17.9	19.5	59.8	2.8	3600
Special survey returns (inactive respondents)	15.7	28.3	55.7	0.3	1013
Harvest survey returns (active respondents)	20.9	11.3	64.7	3.1	946

*A. Canadian residents selected from the current permit file who did not purchase a permit in the previous year; B. Canadian residents selected from the previous year's file who bought a permit a year previously but not in the year prior to that; D. Canadian residents selected from the previous year's file who bought a permit in the preceding 2 years; E. Non-residents selected from the current permit file.

Results

Response rates

Of the 2357 questionnaires mailed, 1728 were returned; a response rate of 73.3%. This is a relatively high return for questionnaires sent only to known inactive hunters and non-respondents in the harvest survey.

Rate of activity

Of the respondents to the special survey, 41.3% hunted waterfowl. As expected, activity here was somewhat lower than the rate of 56.8% observed for New Brunswick in the 1977 NHS (Table 1). The analysis that follows is based primarily on the 1015 respondents who reported not hunting migratory game birds during the 1977-78 season.

Inactive respondents

Characteristics

Several characteristics of inactive respondents were derived from the questionnaire (Appendix 1) and the MGBHP system file. Less than half (42%) bought the hunting permit in 1977 (Question 1a), whereas a majority (72.5%) did so in 1976 (Q1b). While none hunted migratory game birds in 1977 (Q2a), about half hunted other game (Q2b) or sport fished (Q2c).

The sample in the harvest survey is stratified according to previous hunting experience and year of permit purchase. Table 2 compares the distribution of the New Brunswick harvest and special survey returns by sampling strata. Inactivity is seen to be higher for the samples selected from the previous year's permit file (B, D) than for those chosen from the current file (A, E). Sample B clearly shows the highest level of inactivity.

Several cross-tabulations were prepared to detect differences between inactive 1977 permittees and non-

permittees. The results are summarized in Table 3. The most significant findings relate to age, sample selection criteria, zone of permit purchase and response wave. Inactive permittees were more likely than non-permittees to respond to the first mailing wave, belong to the 50-plus age group, originate from zone 2 and hunt game other than waterfowl, but were less likely to belong to sample B.

Motives

Question 4 in Appendix 1 lists possible reasons for migratory game bird hunting inactivity. Respondents were invited to report one or more reasons (Q4a) and then to single out the most important ones (Q4b). Once ranked, reasons given to either question were essentially the same (Spearman rank correlation coefficient between Q4a and b is 0.95). Employment obligations and the scarcity of birds were reported most often. Responses to Q4a are summarized in Table 4.

To simplify the analysis, reasons were clustered into four categories:

- (1) *physiological*—age or health;
- (2) *sociological*—no one to go hunting with; family or friends disapprove of hunting; obligations related to employment; family or other social obligations;
- (3) *opportunity cost*—no place to hunt nearby; saw few or no birds; hunting areas are crowded; costs too much;
- (4) *attitudinal*—hunting is too dangerous; bought permit to help conservation; dislike killing birds.

Although the relative importance of the categories varied slightly, depending on whether Q4a or Q4b was used, sociological and opportunity-cost reasons were

always reported most frequently. Based on Q4a, the following order emerged: opportunity cost (81.4%), sociological (72.4%), attitudinal (21.1%) and physiological (9.0%). Q4b yielded these results: sociological (46.0%), opportunity cost (39.9%), attitudinal (9.3%) and physiological (4.9%).

No important differences were found between inactive hunters who purchased a 1977 MGBHP and those who did not. The categorized reasons in Q4b cross-tabulated with permittees' status (Q1a) revealed no significant differences—overall chi-square test for differences among respondents: $\chi^2 = 3.15$, 3 df, $\alpha = 0.37$. However, cross-tabulations of each non-categorized reason did reveal four significant differences. The cross-tabulations summary in Appendix 2 indicates that inactive 1977 permit purchasers (21.1%) were more likely to be conservation oriented than non-permittees (1.9%). Non-permittees, on the other hand, were more likely to be inactive because of crowding (20.2%), high costs (13.6%) or dislike of killing (9.6%).

When I cross-tabulated the categorized reasons with the remaining variables to detect possible interactions (Table 5), only four of the seven variables tested showed any association with reasons for hunter inactivity. Sociological reasons predominated in Zone 1, but opportunity-cost reasons in Zone 2. Those who neither hunted other game nor fished during 1977 tended to emphasize physiological and attitudinal reasons more than their active counterparts did. While younger (under 20) inactive hunters were most frequently typified by attitudinal reasons, older (over 40) ones emphasized physiological reasons.

Table 3
Summary of significant differences between inactive permittees and non-permittees for selected variables

Variable*	Differences	Significance†		
		χ^2	df	α
Response wave	More permittees (73%) responded to first wave than non-permittees (66%)	5.77	1	0.02
Zone‡ of permit purchase	More permittees (49%) originated in zone 2 than non-permittees (40%)	6.83	1	0.01
Hunt other game (Q2b)	More permittees (58%) than non-permittees (53%) hunted game other than waterfowl	2.83	1	0.09
Sampling strata	Fewer permittees (15%) originated among 1976 non-renewals (B) than non-permittees (38%)	129.75	3	<0.001
Age	Fewer permittees (75%) originated from under-50 age groups than non-permittees (86%)	25.27	6	<0.001

*Cross-tabulations with remaining variables (Q1b and Q2c) did not reveal significant differences below the level $\alpha = 0.05$.

†Overall chi-square test for differences among respondents.

‡Zone 2 consists of Victoria, Madawaska, Restigouche, Gloucester, Northumberland and Carleton counties and contained 38% of the New Brunswick population as of 1 June 1976 (Statistics Canada 1977). Zone 1 consists of the remaining territory and is the more populated zone.

Table 4
Reasons given for not hunting migratory game birds in decreasing importance based on Q4a (source: Appendix 2)*

Rank	Reason	Range (%)
1	Obligations related to employment	>40
2	Saw few or no birds	30-40
3	No place to hunt nearby	10-20
4	Hunting areas crowded	
5	Family or other social obligations	
6	No one to hunt with	
7	Costs too much	
8	Bought permit to help conservation	<10
9	Reasons of age or health	
10	Dislike killing birds	
11	Other reasons	
12	Hunting too dangerous	
13	Family or friends disapprove	

*Spearman rank correlation coefficient between Q4a and Q4b is 0.95.

Summary and implications

The characteristics and motivations of inactive respondents in the special New Brunswick harvest survey shed light on possible solutions to some of the methodological difficulties they create for managers of migratory game birds.

Table 5
Summary of significant differences observed in cross-tabulating reasons for inactivity against selected variables*

Variable†	Reasons for MGB hunting inactivity				Significance‡		
	Physiological	Sociological	Opportunity cost	Attitudinal	χ^2	df	α
Zone 1	0	+	-	0	7.6	3	0.06
2	0	-	+	0			
Hunt other game (Q2b)	-	+	+	-	33.4	3	0.00
yes	+	-	-	+			
Sport fish (Q2c)	-	0	+	-	14.3	3	0.00
yes	+	0	-	+			
age <20	0	0	0	+	22.6	12	0.03
20-39	-	0	0	-			
>40	+	0	0	0			

*"+" indicates that an above average proportion of respondents reporting a given reason were characterized by a particular variable. "0" and "-" indicate average and below average respectively.

†Cross-tabulations with remaining variables (response wave Q1a, Q1b) did not show significant differences below the level $\alpha = 0.30$.

‡Overall chi-square test for differences among respondents.

Results from the NHS for Canada indicate that although 75-80% of the respondents buy a hunting permit during the current year, only 60-63% hunt. Activity is slightly lower (54-59%) in New Brunswick, where less than half (42%) of the inactive respondents bought a MGBHP in 1977-78. About half of these hunted game other than waterfowl or sport-fished that season. Of the 13 possible reasons for hunter inactivity, obligations related to employment and the scarcity of game birds were reported most frequently. Also, sociological and opportunity-cost motives were considerably more important than the attitudinal or physiological ones (see categories listed under "Motives").

When the inactive population was split into current-year permittees and non-permittees, the study revealed small but significant differences. Permittees responded earlier, were older, originated more often from the least populated area (zone 2) and hunted game other than waterfowl more frequently than non-permittees. The data also suggest that permittees are more inclined to report buying a permit just to help migratory bird conservation than non-permittees are, but are less likely to report crowding, costs or dislike of killing as reasons for not hunting.

Further cross-tabulations revealed a tendency for sociological motives to prevail in the most populated area (zone 1) and among those hunting other game, but opportunity-cost reasons in zone 2 and among those hunting game other than waterfowl and sport-fishing. Attitudinal motives were given more frequently by the youngest respondents and those not hunting game other than waterfowl or sport-fishing, while age or health reasons were invoked most often by those over 40.

The fact that a relatively large proportion of persons questioned in the NHS had not bought a hunting permit, and that only about 60% of the respondents had actively hunted migratory game birds has some effect on the statistical precision and cost of the surveys. High inactivity calls for larger samples and costlier studies to obtain statistics of a given precision on hunter activity and success.

These findings can be used to reduce the current level of inactivity in the survey samples in at least two complementary ways.

(1) As inactivity is known to be highest among those selected from the previous year's permit file (sample B), where inactive respondents outnumbered hunters by almost 3 to 1 in New Brunswick, we should consider reducing or eliminating this part of the sample. With the exception of the Species Composition Survey, a sample design based exclusively on the current year's MGBHP file would resolve a major part of the inactivity problem. However, before this solution is implemented, its effect on the accuracy of harvest estimates and its impact on the procedures and administration of the Species Composition Survey must be considered. For example, gains in accuracy due to a higher activity rate in the sample may be offset by a reduction in reliability of estimates, as sample B accounts for many of the birds harvested. Sampling solely from the current year's permit file would reduce the waste of questionnaires and simplify estimation procedures, but would also increase the burden on staff administering the questionnaires by reducing the time available for survey operations, as none of the sample could be drawn until well into the hunting season. For example, many of the hunting permits sold at post offices do not reach CWS headquarters until late October and November, leaving little time for a manual mailing during late November and early December.

However, these limitations could be offset by the use of a computer-addressed "self-mailer" questionnaire which is currently being tested.

(2) Reducing or eliminating sampling from the previous year's permit file will not completely resolve the problem of inactivity in the surveys, since invariably some current-year permittees will not hunt migratory game birds. The study suggests that it should be possible to predict which permit buyers will not hunt. For example, persons in certain occupations are more likely to abstain from hunting because of work-related obligations than others. Similarly, knowing that a person has seen very few migratory game birds, intends to hunt other game or has nowhere to hunt near his residence may help in predicting inactivity. This is obviously a more difficult solution to realize than the first, and needs further research before its adoption. If it was successful, some of these questions could be asked at the time the permit is purchased, for later use during sampling. Alternatively, these questions could be asked in a simple postcard questionnaire administered to the sample selected for the Species Composition Survey from the previous year's permit file. Postcard survey results could then be used to delete the predicted inactive hunters so as to minimize costs due to wasted wing envelopes.

Acknowledgements

I acknowledge the support and useful comments of F. G. Cooch during the design and analysis of the study. I also thank B. Nagpal for data processing services and S. Wendt, R. Baroni, L. Teevens and S. Quinn for assistance during the survey. G. E. J. Smith and H. Boyd provided useful comments on an earlier draft. The topic was suggested by the Fish and Wildlife Branch of the New Brunswick Department of Natural Resources.

Appendix 1

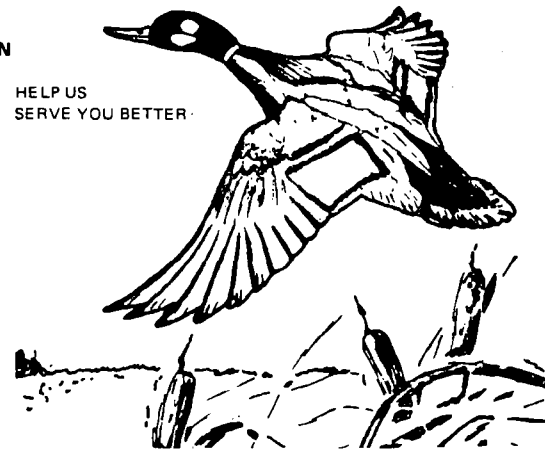
Questionnaire with statistical summary based on inactive respondents* in 1977-78.

CONFIDENTIAL

SURVEY OF NON HUNTERS OF MIGRATORY GAME BIRDS IN NEW BRUNSWICK DURING 1977-78 SEASON

CANADIAN WILDLIFE SERVICE

HELP US SERVE YOU BETTER



Purpose: We need to get a better understanding of the people who may have purchased a Canada Migratory Game Bird Hunting Permit in New Brunswick but did not hunt Migratory Game Birds. Your answers to the following questions will help us do this. All replies are strictly confidential.

Instructions: Please answer the short questionnaire by placing a simple check mark (✓) in the small boxes.

		%		Total
1. (a) Did you get a Canada Migratory Game Bird Hunting Permit in 1977? (check one)	Yes	42.0	No 58.0	1 013
(b) Did you get a Canada Migratory Game Bird Hunting Permit in 1976?	Yes	72.4	No 27.6	965
2. (a) In the 1977-78 season did you hunt Migratory Game Birds?	Yes	0.0	No 100.0	1 013
(b) In the 1977-78 season did you hunt other game?	Yes	54.9	No 45.1	983
(c) In the 1977-78 season did you do any sport fishing?	Yes	49.5	No 50.5	979
3. Do you remember receiving a questionnaire on Migratory Game Bird hunting (other than this one) from the Canadian Wildlife Service during the 1977-78 season?	Yes	56.4	No 43.6	966

Note: Please answer question 4 below only if you did not buy a Migratory Game Bird Hunting Permit or did not hunt Migratory Game Birds in 1977-78

4. (a) If you did not buy a Permit or did not hunt Migratory Game Birds in 1977-78 would you please tell us why? (you may check several reasons)

	%			%	
	4a	4b		4a	4b
- Reasons of age or health	9.0	4.9	- Saw few or no birds	32.4	21.1
- No one to go hunting with	13.2	5.4	- Hunting areas are crowded	17.8	6.7
- Family or friends disapprove of hunting	2.2	0.3	- Costs too much	11.5	4.6
- Obligations related to employment	43.2	33.4	- Hunting is too dangerous	3.6	2.1
- Family or other social obligations	13.8	6.9	- Bought a permit just to help migratory bird conservation	9.6	1.5
- No place to hunt nearby	19.7	7.5	- I dislike killing birds	7.9	5.7
- Other			(specify)	5.9	0.0

(b) In 4 (a) above, please underline the one most important reason for not buying a Permit or not hunting Migratory Game Birds in 1977-78.

Thank you very much for your cooperation. Please return the questionnaire today using the special postage paid envelope.

*The total number of replies to this questionnaire was 1728, but the data presented here are based on 1015 returns, the total number of inactive hunters. 389 persons responded to Q4b.

Appendix 2
Summary of 13 individual cross-tabulations of motives for not hunting migrating game birds (Q4a) with permittee status (Q1a)

Bought 1977 permit*	Distribution (%) of reasons for not hunting												
	Age health	Alone	People disappr.	Employ. obligat.	Family obligat.	No place	Few birds	Crowding†	Costly†	Dangerous	Conser-vation†	Dislike killing†	Other
Yes (425)	10.1	13.3	1.3	43.2	12.0	20.0	32.5	14.1	8.3	2.7	21.1	5.3	4.0
No (588)	8.3	13.1	2.8	43.2	15.0	19.5	32.4	20.2	13.6	4.2	1.9	9.6	7.1
Total (1013)	9.0	13.2	2.2	43.2	13.8	19.7	32.4	17.8	11.5	3.6	9.6	7.9	5.9

*Data in brackets indicate the total number of respondents and are the basis of the row percentage distribution.
† Yates corrected chi-square test for significant differences between respondents: X^2 , df. 1, $p < 0.05$.

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