

OPINIONS OF ONTARIO MOOSE HUNTERS ON CHANGES TO THE SELECTIVE HARVEST SYSTEM

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ABSTRACT: In response to hunter concerns with the selective harvest system for moose management in Ontario, the Ontario Ministry of Natural Resources undertook a review of the program. This review incorporated the views of regional advisory committees drawn from the public and special interest groups, to develop five recommendations regarding: 1) party hunting; 2) sportsman's cards; 3) group applications; 4) the preference pool system; and 5) mandatory hunter education. This paper describes a provincial survey conducted to determine the degree of hunter support for these recommendations. Survey participants supported all the recommendations, and indicated that their concerns with the selective harvest system were adequately addressed. For some recommendations, there were differences in the level of support from northern vs southern Ontario, and/or from mailed questionnaires vs those distributed at district offices. The results of the survey were used to support suggested amendments to the selective harvest system.

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The management of natural resources often has a social component as well as a biological component. In this paper, one role of social science in the management of moose (*Alces alces*) in Ontario is described and its applicability discussed. The purpose of this paper is to provide an example of the social component of moose management, and to report the views of Ontario hunters on recommended changes to the selective harvest system.

In 1983, the Ontario Ministry of Natural Resources (OMNR) introduced a selective harvest system for moose management in the province. The objectives of this system were to double the size of the moose population by the year 2000, to increase hunting opportunities, and to provide economic returns to Ontario. Under the selective harvest system any hunter in possession of a moose hunting license may hunt calves, but only hunters with an adult validation tag may hunt an adult bull or cow, whichever their tag specifies. People who wish to hunt adult moose must apply for a validation tag permitting them to hunt in one of the province's wildlife management units.

An integral part of the selective harvest system is the preference pool allocation sys-

tem in which validation tag applications are placed in one of two pools. Applications from people who applied for, but did not receive, a validation tag the previous year are placed in the preferred pool. Applications from people who either did receive a tag the previous year, or who did not apply for a tag the previous year are placed in the second pool. Tags are allocated first to those in the preferred pool and then, if tags are still available, to those in the second pool. Within each pool, tags are randomly allocated using a computerized draw. Depending on the number of tag applications and the moose quota in a wildlife management unit the draw will lead to one of three results:

1. A portion of the applicants in the preferred pool will receive validation tags and none of the second pool applicants will;
2. All of the applicants in the preferred pool will receive validation tags and a portion of the second pool applicants will; or
3. All applicants in both pools will receive tags.

Therefore, to increase the moose population, the selective harvest system shifts hunting pressure from adult moose to calves.

In a series of surveys conducted in northern Ontario, the response of hunters to these new regulations was examined (Rollins, 1987; Rollins and Romano, 1989). The rationale for these surveys was that knowledge of hunter satisfaction and hunter compliance with the new regulations was needed to assess whether hunter needs were being met, and whether the resource was being adequately protected. The major finding of these studies was that hunter satisfaction varied greatly, and that the major causes for this variation were hunter knowledge of the biological principles underlying the selective harvest system and the beliefs they held about the system. More knowledgeable hunters and hunters holding positive beliefs were more supportive of the system. Positive beliefs included: will increase moose numbers; will make the hunt safer; will make hunters more skilful; and will stimulate the local economy. Negative beliefs included: the system is too restrictive, too complicated; makes it too difficult to shoot a moose; and makes the hunt less enjoyable.

While there was support for the new system among resident hunters, there was also a significant amount of dissatisfaction, particularly related to the enjoyment of the moose hunt (OMNR, 1987). In addition to the surveys discussed above, this dissatisfaction was relayed to the OMNR through conversations between OMNR field and office staff and hunters, and written correspondence from hunters. In an effort to respond to this dissatisfaction and to improve the success of the moose management program in Ontario, the OMNR initiated a program review in January, 1987. The review began with the formation of an OMNR Working Group. The mandate of the Working Group was to identify specific problem areas and present feasible options (OMNR, 1987). The Working Group sought assistance from eight Regional Advisory Committees each composed of 10-18 interested members of the public and representatives of special interest groups from

different areas of the province. The regional committees were formed specifically for the task of helping the Working Group and functioned as partners with the Working Group in preparing a package of recommended improvements to the selective harvest system. Proposed improvements were evaluated on the bases of fairness to hunters, practicality (in terms of administration), cost, and biological implications. Using these criteria many proposals were rejected over the course of a series of meetings between the Working Group and the regional committees; however, the following improvements were recommended for implementation:

1. Introduce party hunting for adult moose. In such a system, any member of a party would be permitted to kill an adult moose for which another party member has a validation tag. This would make adult moose hunting opportunities available to more hunters and reduce the concern over accidentally killing the wrong moose.
2. Introduce a sportsman's card. The card would be used to purchase licences, complete draw tag applications, and could be used in other Ministry programs. This would make the application process simpler.
3. Implement a system of group applications. Under such a system, validation tags would be better distributed among groups. This would help solve the problem of one hunting group or camp getting several tags while others receive none.
4. Maintain the two level preference pool system. Hunters who did not receive a tag the previous year are given preference in the present year's draw over hunters who did receive a tag the previous year or who did not apply.
5. Implement a mandatory hunter education program for first-time moose hunters. This would be an effective way to communicate hunting ethics and skills to novices.

Within the OMNR a desire existed to ensure that the recommendations were acceptable to members of the public interested in moose hunting. Previous efforts at soliciting feedback from Ontario's hunters on aspects of moose management have used public open houses. OMNR staff have found this technique to be very labour intensive, costly, and statistically unrepresentative of hunter concerns. For these reasons, the OMNR decided to solicit the opinions of hunters using a survey distributed through the mail and through OMNR district offices as the final phase of the review process.

The intent of the survey was to provide a mechanism for determining if the recommendations put forth by the Working Group and regional committees were acceptable to the members of Ontario's public interested in moose hunting. The survey was not intended to solicit new ideas about improving the hunt, to allow comment on all possible mechanisms for improving the hunt, or to present an opportunity for the public to critique the selective harvest system.

The survey had two explicit objectives:

1. to provide a statistical accounting of the opinions of the province's public interested in moose hunting on the recommendations regarding the selective harvest system; and
2. to provide an opportunity for a broad range of those interested in moose hunting to have input into the refinement of the selective harvest system.

METHODS

The Questionnaire

The questionnaire (Appendix 1) was designed using the principles for questionnaire construction outlined by Finsterbusch (1983). The survey solicited participants' opinions regarding the five recommendations outlined above. A sixth question asked participants whether the five recommendations encompassed their concerns regarding the selective harvest system. For each ques-

tion, participants were asked to select one choice from a numerical scale ranging from 1 to 5. A choice of 1, "disagree strongly", indicated that the respondent was strongly opposed to the recommendation as stated in the questionnaire, and a choice of 5, "agree strongly", indicated strong support for the recommendation. A brief (one sentence or phrase) explanation of the rationale for the proposed improvement was included with each question. The questionnaire (Appendix 1) and the accompanying brochure (Appendix 2) were designed in a consultative manner involving biologists familiar with the selective harvest system and the OMNR review of the system, an experienced social researcher, and a public communications expert. The brochure presented a simple explanation of the selective harvest system, the rationale for the moose program review, and presented the recommendations contained in the questionnaire. An accompanying letter (sent with the mailed questionnaire) urged recipients to respond, stressing that their input was important, explained how they were chosen to be a survey recipient, and assured them anonymity. Questionnaires were distributed both through the mail and at 55 Ministry offices throughout the province.

Mail Survey

For the mail survey the names of 2,500 Ontario residents were selected at random from a list of the 80,286 adult-validation-tag applicants in 1987. These people received the questionnaire with a postage-paid return envelope, an explanatory letter, the brochure and covering letter. Using a variation of the repeated mailing technique of Dillman (1978), the same 2,500 hunters were sent a second copy of the questionnaire approximately two weeks later, with a notice reminding them to complete and return it if they had not already done so. This survey, based on a random sample, was intended to meet the first objective of the project: to provide a statistical accounting of the opinions of the prov-

ince's residents interested in moose hunting.

The decision to survey 2,500 tag applicants (as opposed to a greater or lesser number) by mail was made by assessing logistical constraints and statistical considerations. Using the technique outlined by Cochran (1963) for calculating sample size requirements for surveys whose results are expressed in proportions, 400 responses will be sufficient to reflect the true population proportions at $\alpha = 0.05$, with a 95% confidence level for all proportions. (It is more difficult to accurately reflect population proportions as they approach 0.5. Four hundred responses will meet the precision and confidence levels outlined above of a population proportion = 0.5 and therefore will meet these levels for all other proportions too.) Our uncertainty about response rates the survey would obtain combined with the desire to subdivide the survey (into northern and southern Ontario), and our precision guidelines contributed to the decision to mail 2,500 questionnaires.

Labels attached to each of the mailed surveys identified where the recipient lived and distinguished between the first and second mailing. The label also contained a unique code number for each recipient. In instances where a recipient responded to both the first and second mailing, the second response was eliminated from the survey analysis. Names of respondents were not used in any way.

District Survey

Each of 55 OMNR district and regional offices were sent copies of the questionnaire, explanatory material and return envelopes (not postage-paid) to dispense to other members of the public interested in moose hunting. News releases advertised the survey through local and provincial media. The point of mailing of the survey was determined by the postmark on the return envelope. The district survey was intended to meet the second objective of the project, to provide an

opportunity for those interested in moose hunting, but not selected in the random mail survey, to have input into the refinement of the selective harvest system.

Analysis

Survey results were analyzed on a desktop computer using SYSTAT (Wilkinson, 1986) statistical analysis package. Chi-square tests were used to test for differences in response patterns between different survey groups.

In Ontario, many resource management issues are perceived differently by residents in the northern and southern parts of the province, (Northern Ontario is generally defined as that area which lies north of Sudbury and Sault Ste. Marie.) We performed chi-square tests on the survey data to see if this trend applied to moose management issues. We also performed a series of chi-square tests to test for differences between the mail survey and the district survey. These tests were done because, although we were certain that the mail survey was based on a random sample of validation tag applicants, we were uncertain about what segment of the population responded to the district survey.

RESULTS

A total of 2,841 completed questionnaires were returned. Of the 2,500 questionnaires mailed out, 1,926 (77%) responses were returned. The remaining questionnaires were picked up at district offices. A detailed account of survey response is given in Table 1.

There was agreement to all recommendations presented on the questionnaire. The most positive response (combined results of mail and district, northern and southern questionnaires) was to question 1 regarding party hunting (mean response = 4.47), followed by sportsman's card (3.95), hunter education (3.93), adequate addressing of concerns (3.79), preference pool (3.77), and group applications (3.65). For all questions (except

Table 1. Number of questionnaires returned by location and survey group.

	Northern Ontario	Southern Ontario	Unknown Location	Total
First Mailing	606	783	2 ^a	1391
Second Mailing	243	292	0	535
Total Mail Responses	849	1075	2	1926
District Responses	363	445	107 ^b	915
Total	1212	1520	109	2841

^a return address obliterated by respondent

^b postmark unreadable

question 6 regarding adequate addressing of concerns) choice 5 (agree strongly) was the most frequently selected. Detailed survey results are presented in Table 2 and in Fig. 1.

There were virtually no differences in questionnaire responses between the first and second mailings (only for question 2, regarding the sportsman's card, was there a statistically significant difference in northern Ontario). For further analyses all mailed surveys (within each geographic unit) were lumped into one "Mail" group.

There were consistent statistical differences between the responses from northern and southern Ontario for both the mail and district surveys (Table 2). Only for question 2 (the sportsman's card) was there no significant difference. For all questions except number 5 (hunter education) northern participants responded less positively than southern participants.

For three questions (#1 party hunting, #2 sportsman's card, and #3 group application), survey participants who were mailed questionnaires responded differently from those who obtained questionnaires at OMNR field

offices (Table 2). For all three questions, mail respondents replied less favourably than did district respondents.

The response to the question of whether the proposals contained in the survey adequately addressed the respondents' concerns was generally positive. In total, 72% of the respondents selected choice 4 or 5 (agree and agree strongly) and only 14% selected choice 1 or 2 (disagree strongly and disagree).

Table 2. Mean response to survey questions by location^a and questionnaire distribution method^b

Question	Response ^c	
	Mail	District
Q1. Party Hunting	North	4.30 ↔ 4.37
	South	4.51 ↔ 4.74
	Total = 4.47	
Q2. Sportsman's Card	North	3.83 ↔ 4.04
	South	3.92 ↔ 4.14
	Total = 3.95	
Q3. Group Applications	North	3.16 ↔ 3.50
	South	3.87 ↔ 4.16
	Total = 3.65	
Q4. Preference Pool	North	3.68 ↔ 3.52
	South	3.90 ↔ 3.89
	Total = 3.77	
Q5. Hunter Education	North	4.10 ↔ 4.15
	South	3.83 ↔ 3.67
	Total = 3.93	
Q6. Overall Satisfaction	North	3.74 ↔ 3.65
	South	3.86 ↔ 3.90
	Total = 3.79	

^aLocation was classified as either northern or southern Ontario.

^bQuestionnaires were distributed through the mail or at OMNR district offices.

^cThe arrow symbol indicates a significantly different response between the two survey groups using chi-square tests at $P = 0.05$.

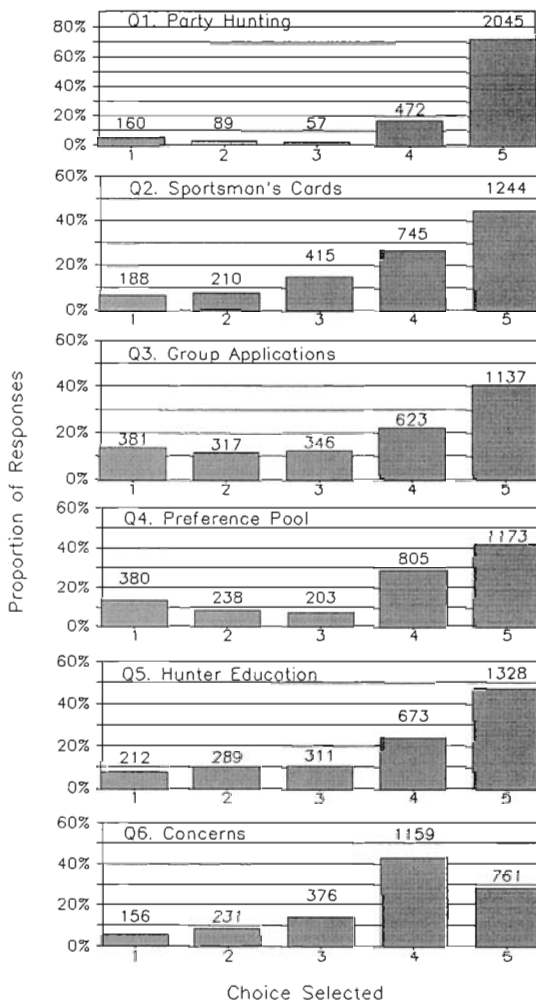


Fig. 1. Summary of all responses to questions 1 - 6. The number atop each column indicates the number of times the choice was selected.

DISCUSSION

Previous efforts at soliciting feedback from Ontario's hunters on aspects of moose management have used public open houses. OMNR staff have found this technique to be very labour intensive, costly and statistically unrepresentative of hunter concerns. In contrast, the interaction between the Working Group and Regional Advisory Committees

that preceded the survey proved to be an efficient mechanism for the formulation of recommendations. It also facilitated reducing a set of wide ranging options to a set of five key recommendations which needed further moose hunter input. This approach has been described as transactive planning (Ashore *et al.* 1986). "The transactive approach...is very decentralized and emphasizes grass-roots involvement of people who may be affected by planning decisions" (p 424).

The survey described here was an attempt to provide a effective alternative to public open houses by which to gauge opinions on recommended changes. The survey was not intended to solicit new ideas about improving the selective harvest nor to provide a mechanism for researching opinions on the selective harvest system.

Survey questions were phrased in a positive manner to avoid confusing respondents. Introducing a negative into a question (i.e. "an action should not be taken" as compared to "an action should be taken") requires respondents to take an additional mental step and is more likely to lead to errors of interpretation (Finsterbusch, 1983). Survey recipients were asked to provide their answers on a closed scale (as opposed to an open scale) to facilitate analysis. Although open-ended questions can provide insights that might not emerge from closed-ended questions, they are more difficult to interpret and analyze because various respondents might answer a question in very different ways (Finsterbusch, 1983). To allow survey recipients to express "open-ended" views, a comments section was included on the questionnaire; however, analysis of the comments has not yet been carried out.

Survey questions included only a brief (one phrase or sentence) explanation of the rationale for the recommended improvement. More information (on the pros and cons of the recommended improvements) was not given for several reasons. We desired to keep the survey simple and not overburden respon-

dents with information. Moose hunters are, in general, very interested and well informed about moose management and are familiar with most moose management issues.

The technique of employing multiple mailings to ensure high survey response is emphasized by Dillman (1978). High survey response, as obtained in this study, reduces the relevance of concerns related to non-response bias. In addition, the opinions of respondents tend to be more extreme than do those of non-respondents (Filion, 1980). This suggests that the survey has captured the opinions of hunters who feel strongly about the selective harvest system in both a negative and positive manner. As those strong opinions would be the primary impetus for either adopting or eliminating the changes outlined in the questionnaire, we are satisfied that non-response bias is not an important problem in this instance.

Hunters were generally supportive of the proposed modifications to the selective harvest system. This is perhaps not a surprising result considering the evolution of the questionnaire. The recommended changes put forth in the questionnaire were the products of an intensive screening and reviewing exercise completed by the Working Group and the regional committees. The members of the regional committees were representatives of the larger hunting community, and as such, their opinions about the utility of changes to the selective harvest system were likely similar to those of the larger hunting community. The opinions of the committee representatives were not contained in the survey results themselves, however, but were reflected in the survey makeup.

A number of statistically significant differences in opinion were evident between hunters residing in northern Ontario compared to those from southern Ontario. Northerners were less supportive of the proposals dealing with party hunting, group applications, and preference pooling, but more supportive of mandatory hunter education.

These differences, although significant in a statistical sense, are not important in influencing the general conclusions drawn from the survey. The trends in the two areas were the same (i.e. considerably more support for, than opposition to, the recommended changes). These results may suggest that hunters in northern Ontario feel some resistance to changes that they may perceive as being imposed upon them from southern Ontario (in particular, from Toronto, the capital city). Similar resentment of "southern interference" is present in other resource use issues.

In some instances, the responses from participants who were mailed questionnaires differed statistically from those who received questionnaires at OMNR offices. In those instances, the results of the mailed survey more truly reflect the opinions of the province's moose hunters as those participants were selected at random. We are uncertain what segment of the population is represented in the District survey. It may be, that because additional effort was necessary to get the questionnaires at the district offices (i.e. the respondents had to travel to the offices to obtain a questionnaire), that they represent an enthusiastic portion, not a random portion of the population. In spite of those statistical differences, the similarity in overall trend (i.e. more support for, than opposition to, the recommended changes) is obvious.

Since 72% of all respondents agreed or strongly agreed that their concerns were met by the survey recommendations, the OMNR felt that this review process was an efficient and productive method to affect program refinements involving moose hunter participation.

The process described in this paper is leading to the resolution of many concerns expressed by moose hunters about the Ontario selective harvest system. The following steps have been, or will be, implemented as a result of the survey:

1. Party hunting for adult moose was intro-

duced in the fall 1988 moose hunt.

2. The first step towards mandatory moose hunter education has been taken with the development of an extensive moose hunter education manual to be published in 1990.
3. The development of a group application system for the adult validation tag draw will be implemented in 1990.

The overall success in developing consensus with hunters has contributed the OMNR to commit to a higher level of communication with the public than has occurred in the past.

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Appendix 1. The questionnaire as it was distributed to survey participants

INSTRUCTIONS: The following questions relate to your opinions regarding various aspects of the selective harvest system for moose management in Ontario. Indicate to what extent you agree with each of the following statements by circling the number that best describes your opinion.

EXAMPLE

Disagree Strongly	Disagree	Neither/ Not Sure	Agree	Agree Strongly
1	2	3	4	5

The loon is a beautiful bird.

The response to this question indicated the respondent strongly agrees with the statement that the loon is a beautiful bird.

YOUR OPINIONS

Disagree Strongly	Disagree	Neither/ Not Sure	Agree	Agree Strongly
1	2	3	4	5

1. Party hunting of adult moose should be introduced (whereby hunters can assist each other in shooting an adult moose, as long as they do not shoot more animals than tags available in the party).

1	2	3	4	5
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2. A sportman's card should be developed to simplify licence issuing and reduce the number of errors associated with illegible or incomplete draw applications.

1	2	3	4	5
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3. To more evenly distribute tags between groups, a group application system should be developed (whereby a group of hunters submit their applications together).

1	2	3	4	5
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4. The preference pool system should be maintained as it currently exists. (In the system of preference pooling, hunters who did not receive a tag last year are given preference in the draw over hunters who did not apply last year or hunters who received a tag.)

1	2	3	4	5
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5. A hunter education program should be mandatory for first time moose hunters.

1	2	3	4	5
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6. These proposals adequately address my concerns regarding the moose selective harvest system.

Comments:

Appendix 2. The brochure distributed to survey participants

