

**SUBSISTENCE HUNTING PATTERNS AND  
COMPLIANCE WITH MOOSE HARVEST REPORTING  
REQUIREMENTS IN RURAL INTERIOR ALASKA**

By

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## ABSTRACT

The accounting of hunter harvests through the use of harvest tickets and other harvest reporting mechanisms is a basic tool of wildlife management. In interior and northern Alaska, harvest tickets and harvest reports have proven effective in recording the harvests of urban-based, non-Native hunters, but have had less success among predominantly Native hunters. Through key-respondent interviews with moose hunters in the interior Alaska communities of Fort Yukon, McGrath, and Nulato, this research examined some of the reasons behind non-compliance with moose harvest reporting requirements by hunters in these rural areas.

In the three study communities, the percentage of hunters obtaining required licenses and harvest tickets varied according to the availability of these items locally, the presence of resident biologists or regulating agency staff to encourage compliance, and the perceived likelihood of an encounter between hunters and enforcement personnel. Harvest tickets were widely viewed as an in-season enforcement tool rather than a post-season reporting mechanism for harvest data. While the total harvest of moose by a particular community may have been well within sustainable limits, individual bag limits imposed by the present harvest ticket system, may be exceeded by some hunters, making them unlikely to participate in accurate harvest reporting. Respondents noted that the bag limit of one moose per hunter failed to accommodate the needs of many rural hunters due to customary patterns of group hunting and shared proceeds, the practice of one hunter providing food for multiple households, and individual households whose needs commonly exceeded one moose. These were the primary reasons given for the relative failure of the harvest ticket system in two of the study communities.

These findings suggest that where accurate harvest data are needed for the sound management of resources harvested by rural subsistence hunters, alternatives to the present harvest ticket system should be considered and implemented. Transferable harvest tickets, post-season interviews with hunters, local residents or governing bodies who serve as village harvest recorders, and two Canadian harvest reporting programs are examined as potential alternatives.

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## INTRODUCTION

The idea for this research project emerged from the fall 1989 Interior Regional Council meeting. At that meeting, the topics of harvest reporting and harvest tickets were discussed. The comment was made that the present system of harvest tickets and harvest reports did not work well in some parts of Alaska and one council member suggested that there were some logical reasons why harvest reporting requirements were largely ignored by hunters in much of rural Alaska. It was suggested that the Council and the Alaska Board of Game could benefit from a closer look at specific subsistence hunting patterns that did not fit well with the concept of individual bag limits that current harvest reporting mechanisms represent.

Harvest reporting systems requiring licensed hunters to report game harvests to management agencies through the return of harvest tickets, harvest reports, or tags are well established throughout much of the United States and North America (Usher *et al.* 1985). In many areas outside of Alaska, these harvest reporting mechanisms have been in use long enough that they have become an accepted wildlife management tool and have become incorporated into the Euroamerican sport hunting ethic. For many sport hunters, a validated harvest ticket or returned harvest report represents the official confirmation of a successful hunt and it is with a certain sense of pride and accomplishment that many hunters willingly participate in harvest reporting programs.

Even in Alaska, these types of harvest reporting systems work reasonably well among urban hunters who are, for the most part, non-Natives, born outside of Alaska, and whose hunting practices have been shaped by the Euroamerican sport hunting ethic. For instance, the Alaska Department of Fish and Game (ADF&G) estimates that in any given year, 80 to 85 percent of the moose harvest in GMU 20A is accounted for by the return of harvest reports (M. McNay, pers. comm. 1990). This is an area dominated by hunters from the nearby urban community of Fairbanks. Most of these hunters obtain harvest tickets, and return rates for harvest reports are high, making it possible to achieve reasonable estimates of the overall harvest.

In contrast, these standard game harvest reporting mechanisms have a generally poor record of success in rural Alaska. By one estimate, only 15 to 20 percent of the active hunters in northwest Alaska

obtain hunting licenses (Schaeffer, Barr, and Moore 1986). In Alaska, a hunting license is required to obtain harvest tickets and tags and thus, is a necessary first step in a hunter participating in the harvest reporting process. In a comprehensive review of game regulations for northwest Alaska, the Kotzebue Fish and Game Advisory Committee estimated that the harvest ticket reporting system for the Western Arctic Caribou Herd has probably never accounted for more than 33 percent of the actual harvest (Schaeffer *et al.* 1986). Loon and Georgette (1989) found that in 1987 less than 20 percent of the brown bear harvested by local residents of GMU 23 (northwest Alaska) had been reported to the department despite a long history of harvest tag and hide-sealing requirements. Similarly, the ADF&G area biologist in Fort Yukon estimated that perhaps only 40 to 50 percent of the moose harvested by local residents in GMU 25D could be accounted for by harvest report returns in recent years (H. Golden, pers. comm. 1990). In the Fort Yukon area it appears that many moose hunters fail to obtain harvest tickets, and among those that do, return rates for harvest reports are low, making harvest tickets a poor estimate of overall harvest.

Low levels of compliance with licensing and harvest reporting requirements seems to indicate the degree to which rural residents participate in the state game regulatory system as a whole. Clearly, many residents have chosen not to participate in a system they view as somehow inappropriate or undesirable. Other residents may be prevented from participating by lack of access to licenses and harvest tickets.

### Purpose of the Study

This study was designed to gather information on hunting practices and patterns from rural subsistence hunters in interior Alaska (Fig. 1) that clarify the problems and inadequacies of the current harvest reporting system from the viewpoint of rural subsistence hunters. This research is a first step in documenting the relationship between the current harvest reporting system and the realities of subsistence hunting and sharing among rural families and communities. By beginning to understand the reasons for non-compliance with current harvest reporting requirements, progress can be made toward designing a

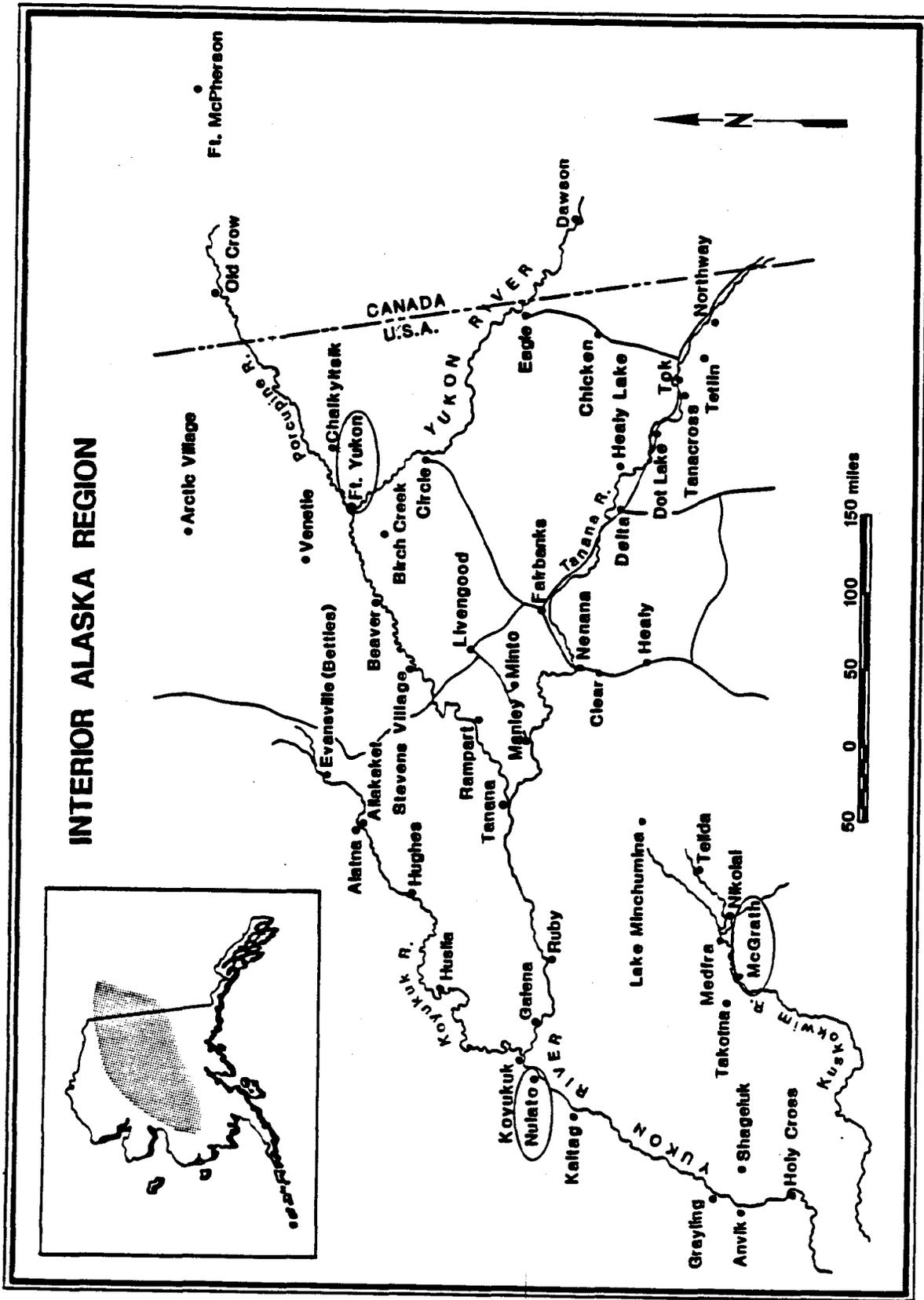


Fig. 1. Map showing Communities of Interior Alaska.

harvest reporting system that is more effective for wildlife management and more compatible with the needs of subsistence hunters.

### Methodology

Information on hunting patterns and the use of harvest tickets and reports was gathered during discussions and interviews with key respondents in Fort Yukon, McGrath, and Nulato. These communities were chosen because they represent some of the geographic diversity of rural interior Alaska. Selected characteristics of the three study communities are presented in Table 1. Key respondents were local residents and hunters who had also been involved in the fish and game regulatory system either as department employees or as fish and game advisory committee and regional council members. In many cases these individuals also recommended other local residents to interview. In addition to formal interviews, casual conversations were carried out with village residents regarding their use or non-use of harvest tickets. Area biologists in Fort Yukon and McGrath also were contacted to obtain information and opinions on the local use of harvest tickets and their overall effectiveness as a harvest reporting tool. Research questions focused on moose, as this was the most commonly hunted species across the interior for which local residents were required to have a harvest ticket. To assure that similar topics were addressed by each respondent, discussions were shaped by a 16-question interview guide (Appendix).

In addition to interviews, moose harvest report information for 1987-88 was compiled for selected interior Alaska communities and compared to estimates of moose harvests from subsistence baseline studies. These comparisons confirm previous conclusions about the mixed success of harvest tickets and mail-in reports as a harvest reporting mechanism in rural interior Alaska, as described below.

TABLE 1. SELECTED CHARACTERISTICS OF STUDY COMMUNITIES

Community	Region	1990 Population <sup>1</sup>	Percent Native <sup>1</sup>	Resident ADF&G Biologist	Average Taxable Income <sup>2</sup>
Fort Yukon	Upper Yukon River	580	85%	Yes <sup>3</sup>	\$13,571
McGrath	Upper Kuskokwim River	528	47	Yes	19,673
Nulato	Middle Yukon River	359	97	No	9,180

<sup>1</sup>Alaska Department of Labor 1991

<sup>2</sup>Alaska Department of Revenue 1988

<sup>3</sup>ADF&G area biologist no longer resident in Fort Yukon as of 1991.

## FINDINGS

### Hunter Opinions of "Wildlife Management"

In the three study communities, respondents believed that most local residents accepted the idea that big game resources such as moose needed to be "managed" and that management must include an accounting of harvest. There was a recognition that local big game populations were increasingly subject to hunting pressure from non-local hunters and environmental impacts far beyond local boundaries. For these reasons, respondents stated that game management was most appropriately undertaken by a statewide agency such as ADF&G. This differs somewhat from hunter opinions in northwest Alaska reported by Schaeffer (1986) which were generally less supportive of the concept of wildlife management by non-local agencies in their particular region.

Regarding agency expertise in the area of wildlife management, several respondents referred to the traditional values, knowledge, and hunting practices that constituted "wildlife management" by Alaska Natives prior to contact. While it was acknowledged that these practices were not always adhered to by area residents today, it was noted that traditional practices still guide many hunters. One respondent suggested that there was room for management agencies such as ADF&G to make much better use of local resource experts and expertise before initiating wildlife studies in an area or making specific management decisions. Another respondent commented that resource management was obviously necessary, but should be "considerate of our subsistence way of life." This concept of a collaborative multi-cultural management system is dealt with later in this report.

### Hunter Compliance in Obtaining Licenses and Harvest Tickets

The percentage of hunters that obtain licenses and harvest tickets appears to be variable between communities and within communities from year to year. In the three study communities, the availability of licenses and harvest tickets, language barriers, and confusion over regulations and requirements were not mentioned as major problems or as reasons for hunters not participating in the harvest reporting system. Schaeffer *et al.* (1986) documents these factors as problems in northwest Alaska Inupiat

communities. In the three study communities, respondents stated that hunters generally knew what was required of them to legally hunt and what the seasons were, especially with regard to major game species, such as moose. Some commented that they found the statewide regulation book confusing and thought it was geared toward a non-local, sport-hunting audience. Two respondents suggested that brief regional summaries of local regulations should be made available to village residents. Several respondents acknowledged that in smaller, outlying communities, access to licenses and harvest tickets and language barriers probably represent larger problems and may contribute to non-compliance by a few hunters. Smaller communities often lack reliable license vendors and residents rely, instead, on periodic visits from ADF&G staff to help explain regulation changes and issue licenses, permits, and harvest tickets.

In McGrath and Nulato, respondents independently noted that most, if not all, moose hunters went hunting with all the required paperwork to legally hunt, that is, a hunting license and harvest ticket. Several respondents implied that harvest tickets and licenses were obtained simply as insurance against the seizure of equipment should they be caught hunting without them. In Fort Yukon, for example, a respondent stated that among a hunting group of several individuals, it would be common for only one hunter, usually the boat owner, to have both the license and the required harvest ticket. These would be carried in order to protect his investment in equipment. A local license vendor in Fort Yukon stated that a record number of licenses and harvest tickets were issued in 1989 following the announcement that a new ADF&G hunter checkstation would be established nearby, implying that many Fort Yukon hunters, in previous years, did not obtain licenses and harvest tickets. This suggests that the percentage of hunters obtaining licenses and harvest tickets may be variable within communities from year to year depending on expected levels of enforcement.

In McGrath, the area biologist attributed generally good compliance with licensing and harvest ticket requirements in that community to the availability of licenses and tickets through several local vendors and to a concerted effort each fall by his office to remind hunters of the requirements. Notices posted in the community and radio announcements were successfully used to remind the hunting public to obtain licenses and harvest tickets prior to hunting and to return harvest information following the moose

hunting season. Most rural interior communities, however, do not have a resident biologist to provide these services.

### Return of Harvest Reports

While many, if not most, hunters in two of the study communities obtained licenses and harvest tickets, many rural hunters that do obtain harvest tickets fail to fill out and return their harvest report. Some hunters said they often lose their harvest reporting card, which is separate from the ticket required to be carried in the field. Others said they simply forget to send it in. One respondent said he would not mind reporting that he got a moose, but never sent in his report because he did not like the questions regarding harvest location. He felt that reporting this information would "advertise" his hunting area and invite competition.

The most common reason given for not returning harvest reports focused on the complaint that the concept of an individual bag limit imposed by the harvest ticket system was not compatible with local patterns of group hunting and sharing. While it is true that the harvest report itself does not ask "how many moose did you harvest," the bag limit of one moose is explicit in regulation. Except for recently-established regulations in the Lime Village vicinity, there are no areas in Alaska with a bag limit of more than one moose. The following comment summarizes the feelings expressed by many respondents:

"I share everything that I shoot. If I get a moose, it gets split-up with the other hunters in the boat and I give some to my sister's family too. I only keep a little meat from it. Why should I fill out the [harvest] report and say that I am done hunting when my family needs more meat?"

### Case Examples of Rural Hunting Patterns

Several respondents offered specific case examples of rural hunting patterns which illustrate how a moose taken by rural subsistence hunters may not be accounted for by harvest report returns. Three case examples are presented below.

**CASE 1.** A head-of-household in his 40s stated that he hunts to feed an extended family of 14 people in three separate households. This requires the harvest of four or five moose each

year. His hunting party consists of himself and his oldest son, age 17. They access the hunting area by boat. Both carry licenses and moose harvest tickets while hunting. The man's wife sometimes accompanies them and she also carries a license and harvest ticket, even though she does not hunt.

They hunt the legal fall season, which occurs in September, on a series of hunts lasting several days each. In a typical hunting season they might take three bull moose themselves and are given portions from other hunters that sometimes total one additional moose. All meat is distributed evenly among the three households he provides for.

There is no hunter checkstation in the vicinity of their hunting area and unless they encounter enforcement officers in the field, no harvest tickets are validated or harvest reports returned following the fall hunting season. Unvalidated harvest tickets are retained in case there is a need to participate in the legal winter season.

Following the winter season, enough time has passed that the harvest reports are frequently lost or forgotten, and thus, none are returned. This hunter recalled sending in one harvest ticket in the past several years because he shot a very large bull and wanted some information from ADF&G on how old it might be. In general, however, his harvest goes unreported.

CASE 2. A moose hunting party consisted of four individuals; a father, his two teenaged sons, and an adult male friend. Both adults carried licenses and moose harvest tickets. Neither of the teenagers carried harvest tickets, and, as they were under the age of 16, they were not required to be licensed. One bull moose was harvested during the first week of the legal fall season. The meat was divided among the group with two-thirds going to the father and his sons and one-third for the adult male friend. A small portion of the two-thirds share was also distributed to a neighbor.

Both adults required additional moose meat to meet their household needs and, thus, both retained their harvest tickets for a final hunt prior to the close of the legal season. This second hunt was unsuccessful. Both adult hunters eventually received at least one-quarter moose each from other friends or relatives. Validation of harvest tickets was never discussed by the hunters and no harvest report was returned by either adult hunter for the one moose harvested earlier in the season. The respondent was aware that this was a violation, but felt justified because neither hunter obtained the equivalent of a whole moose.

CASE 3. A hunting party was composed of five adult males, two of whom were brothers. Transportation to the hunting area was by boat. All five hunters were hunting to feed their own immediate families and required anywhere from one-half to one and one-half moose each depending on family size. The two brothers also planned to provide meat for their mother, who had helped purchase gasoline for the hunt.

Of the five hunters, two were licensed and one of those (the boat owner) had a harvest ticket. The group harvested one bull moose during the first half of the legal fall season and the meat was divided evenly among all five hunters. The respondent did not remember who actually shot the moose, noting that the possession of a license or a harvest ticket made no difference to the hunters as to who could shoot a moose.

The two licensed hunters made a second hunt during the last week of the legal season and harvested another bull. This moose was divided between three households; those of the two hunters, and the household of a friend that helped by providing gasoline for the hunt. In addition to the two moose harvested by members of this group, all of the five original hunters received some additional moose meat from friends and relatives. The one hunter that possessed a harvest ticket returned his harvest report following the close of the legal season, but as the individual bag limit per ticket holder was one moose, he reported only one of the two moose harvested by the party.

The above case studies point to several inter-related problems encountered by rural hunters that may result in harvest reports not being returned. First, it is common practice for a group of hunters to share all proceeds equally and, thus, there is a need to participate in a series of hunts during the season in order to meet their own household needs. Since all hunters in the group have a need to hunt again either as a group or individually, none are willing to validate their harvest ticket or return their harvest report. Second, there is a problem when one hunter provides for a large, extended family consisting of several households. While his own household may only require one moose, he is obligated to provide for other households that, for a variety of reasons, are unable to hunt for themselves. Finally, for many rural households that are heavily reliant on wild foods, the bag limit of one moose may simply not meet household needs. In these cases, especially where only one household member is a hunter, a single harvest ticket is likely to be re-used until household needs are met and if the harvest report is returned at all, it will reflect only a portion of the actual harvest.

#### Examination of Data From Moose Harvest Report Returns

Data from moose harvest report returns for regulatory year 1987-88 were compiled for nine interior Alaska communities and compared to estimates of moose harvests from subsistence baseline studies (Table 2). Table 2 shows that the reported harvest using the harvest-report-by-mail system is substantially lower than harvest estimates based on field work and community visits. For instance, in Fort Yukon, harvest report returns indicated a harvest of 32 moose, while the estimated moose harvest from household surveys was 150 moose. In Tetlin, zero moose were reported, when 11 moose were taken. In some communities, harvest report information can be expanded to obtain closer estimates of harvest. This can be accomplished by calculating the percentages of those reporting that they "did not hunt," "hunted without success," and "hunted successfully," from harvest report returns and applying these rates to the number of harvest reports not returned. This method assumes that hunting success for hunters who did not return harvest reports is the same as for those who did. Using this method, expanded estimates match subsistence baseline harvest estimates reasonably well in three communities--

TABLE 2. COMPARISON OF MOOSE HARVEST ESTIMATES IN SELECTED RURAL INTERIOR ALASKA COMMUNITIES BASED ON 1987-88 HARVEST REPORT RETURNS AND SUBSISTENCE BASELINE STUDIES

Community	Tickets Issued <sup>a</sup>	Reports Returned Number (%) <sup>a</sup>	Did Not Hunt <sup>a</sup>	Hunted No Success <sup>a</sup>	Reported Harvest <sup>a</sup>	Expanded Harvest Est. (1987-88)	Subsistence Baseline Harvest Est. <sup>b</sup>
Fort Yukon	139	77 (55.4)	17	28	32	57	150 (1987)
Galena	234	115 (49.1)	18	29	68	138	121 (1985)
Hughes	24	5 (20.8)	2	0	3	14	38 (1982)
Huslia	38	17 (44.7)	2	0	15	33	86 (1983)
McGrath	207	133 (64.3)	26	50	57	80	75 (1984)
Nulato	58	21 (36.2)	0	10	11	30	80 (1990)
Tanacross	27	4 (14.8)	1	3	0	0	13 (1987)
Tanana	94	42 (44.7)	8	17	17	38	57 (1987)
Tetlin	15	1 (6.7)	0	1	0	0	11 (1987)
Tok	412	218 (52.9)	53	117	48	91	82 (1987)

<sup>a</sup>Data from ADF&G Division of Wildlife Conservation, Game Harvest Statistics, 1987-88.

<sup>b</sup>Data from ADF&G Division of Subsistence, Community Profile Database.

Galena, McGrath, and Tok. In the remaining communities, harvest reports appear to result in a significant underestimate of the moose harvest compared to subsistence baseline study data.

#### Alternatives to the Present System of Harvest Tickets and Reports

Respondents were asked to suggest alternatives to the present system of harvest tickets and reports for collecting harvest data. Alternate methods which were recommended included post-season interviews with hunters, village-based harvest monitors, hunter checkstations located in communities, transferable harvest tickets that could be validated by any hunter regardless of who they were issued to, and harvest tickets which would allow the harvest of more than one moose per hunter. Most suggestions involved ways of eliminating or increasing individual bag limits, or providing ways for hunters to report their harvest anonymously.

Within Alaska and the northwest arctic regions of Canada are several working examples of alternative harvest reporting methodologies. Some of these are outlined below. While not all of these may be applicable on a statewide basis in Alaska, in specific cases, these alternative methods may provide more accurate harvest information for rural areas than the return of harvest reports by mail.

#### Post-Season Random Household Surveys

Retrospective recall surveys based on a complete census or a random sample of community households can be an effective means of obtaining accurate harvest information (Usher *et al.* 1985). Since 1978 this methodology has been successfully used by the ADF&G Division of Subsistence to collect baseline socioeconomic and harvest data in more than 150 community studies statewide. These studies rely upon a high degree of cooperation from local governing bodies in each study community which are given the opportunity to review and approve the research design prior to initiating the study. Assuring the anonymity of individual respondents, and the aggregation of household data to the community level for reporting purposes are additional elements critical to the success of this methodology.

Detailed socioeconomic surveys which cover household demographics, income, employment, land use mapping, and harvest information for numerous resources, are time- and labor-intensive, requiring months of field research and data analysis. This methodology can be streamlined, however, by focusing only on harvest data for key species. For example, the ADF&G Division of Commercial Fisheries has adopted a post-season household survey methodology to collect subsistence salmon harvest information from communities along the Yukon and Kuskokwim rivers. Using a brief questionnaire that asks only about salmon harvest, thousands of salmon fishing households are surveyed each year in dozens of communities by a crew of fieldworkers during the weeks and months immediately following the salmon fishing season. Despite the use of other harvest-reporting mechanisms such as harvest calendars and post-season mail-out cards, the household survey methodology has proved to be the most effective means of collecting accurate and timely subsistence salmon harvest data (Walker *et al.* 1989). This example points to the potential utility of other routinized, single-resource surveys in providing harvest information from rural subsistence users.

#### Local Residents as Harvest Recorders

Local residents and village councils have been successfully used in several instances to facilitate harvest reporting. During a special hunt of the Kilbuck Caribou Herd in spring 1990, hunters were asked to report their harvest to the Kwethluk IRA Council. Harvest data were then forwarded by the Council to ADF&G personnel in Bethel. The use of local councils or other governing bodies to collect harvest data from hunters and pass on community harvest totals to management agencies may have additional possibilities in other areas.

Lime Village provides another example of harvest monitoring by local residents. In early 1989, the Board of Game eliminated individual bag limits for moose and caribou for residents of Lime Village and instituted an area harvest quota. This was done with the stipulation that ADF&G devise a way to obtain accurate community-level moose and caribou harvest information from Lime Village, something the existing system of harvest tickets and reports had been unable to do. In June 1989, ADF&G Division

of Subsistence and Wildlife Conservation staff met with Lime Village residents and agreed upon a harvest calendar system of harvest reporting whereby the date, location, and sex of moose and caribou harvests would be anonymously reported on a monthly basis to a local resident designated as the harvest recorder. The monthly harvest calendar was then collected by ADF&G personnel from the recorder. The anonymity of the reporting process facilitated compliance and reports from hunters who reported day and month of the harvest, harvest location, sex of animal taken, and number harvested. In its first year, this system succeeded in providing detailed harvest information requested by the Board of Game and needed by ADF&G for management purposes.

#### The Inuvialuit Harvest Study

In Canada's Northwest Territories a unique program has been instituted to collect harvest information from Eskimo (Inuvialuit) hunters in the communities of Akalvik, Holman, Inuvik, Paulatuk, Sachs Harbor, and Tuktoyaktuk. Local residents in each community have been hired and trained as field workers to collect harvest data on a monthly basis from the more than 600 area hunters, trappers, and fishers. Using a concise one-page form, harvest quantities of birds, fish, and mammals are recorded by species along with age and sex information and mapped harvest location data. Inuvialuit hunters are not bound by individual bag limits or, for the most part, restricted by hunting seasons. Community harvest quotas exist for some species and allocation of the quota is decided upon within the community. After three years of data collection, project leaders report excellent compliance with the program which has resulted in extensive and detailed harvest information.

In examining this program and its potential applicability for use in rural Alaska, it is important to understand the legal context upon which it was built. In 1984, the Inuvialuit land claims were settled. This agreement contained two important provisions which bear upon game management in northwestern Canada. First, the Inuvialuit have exclusive hunting rights on lands surrounding each community. Second, wildlife management in these areas is managed jointly through equal representation on a management board composed of Inuvialuit, Northwest Territories Government, and federal government

representatives. Community participation in management decisions is provided for through input from Hunter/Trapper Committees (HTCs) in each community. In addition, representatives from each HTC form the Inuvialuit Game Council, a regional governing body with significant authority over matters pertaining to fish and game resources, their management, and enforcement of game regulations.

Project organizers point out that comanagement is perhaps the key element in the success of this harvest study program. As comanagers, the Inuvialuit themselves recognize the importance of good harvest data to sound wildlife management. While the Inuvialuit are now legally required to participate in the harvest reporting process, they do so willingly and with a real voice in how those data will be used and how fish and wildlife resources are managed.

#### The Yukon Indian Harvest Survey

A harvest reporting program, with some similarities to the Inuvialuit Harvest Study, operates in the Yukon Territory. The Yukon Indian Harvest Survey is administered by the Fish and Wildlife branch of the Yukon Department of Renewable Resources and collects harvest data from Indian households in the communities of Dawson, Old Crow, Pelly Crossing, Ross River, Teslin, and Watson Lake. This program employs local residents to conduct brief surveys of hunter's households twice a year, recording their harvest of seven big game species (moose, caribou, black bear, grizzly bear, wolf, sheep, and goat). Harvest locations are also mapped.

This program functions through voluntary participation rather than legal mandate as is the case for the Inuvialuit. Seven Indian bands are represented among the population of the six study communities. Representatives of all seven bands were consulted regarding participation in the study. Two declined to participate. Currently, there is no system of cooperative management of wildlife between the bands, the Yukon Territorial Government, and the federal government. Project leaders report a certain level of suspicion among hunters regarding the government's use of and motives for collecting the harvest data, particularly since land claim settlements are pending. The study is in its

third year and local community fieldworkers report high levels of household contact and cooperation from hunters among bands that agreed to participate.

### Transferable Harvest Tickets

Transferable harvest tickets were suggested by some respondents as an acceptable alternative to the present harvest reporting system. Transferable harvest tickets would allow anyone with a hunting license to obtain a harvest ticket and then transfer or assign the use of that ticket to another hunter. Using transferable moose harvest tickets, for example, an elderly individual, or nonhunter in need of moose meat, could obtain a harvest ticket and then transfer that ticket to another hunter for actual harvesting. Hunters could then legally harvest as many moose as they had valid harvest tickets for. Transferable harvest tickets represent a relatively simple modification of the existing harvest reporting system, but would effectively remove the individual bag limit, one of the major objections rural hunters reportedly have to the current system, and substitute a system that more closely parallels and accommodates the actual hunting patterns of many communities and individuals in rural interior Alaska. Elements of the current system that would be retained include requirements for harvest ticket holders and hunters to be licensed, for hunters to carry appropriate paperwork with them in the field, and to report harvest by mailing in harvest reports. While the concept would seem to offer a relatively simple solution to at least some of the harvest reporting problems in some areas, there are currently no working examples of transferable harvest tickets being used in Alaska.

### SUMMARY AND CONCLUSIONS

Research findings presented above point to common problems in compliance with the harvest reporting requirements of the harvest ticket system in certain communities of interior Alaska. Moose harvested by rural subsistence hunters are frequently unaccounted for because 1) some hunters harvest moose without ever obtaining a harvest ticket, 2) hunters that do obtain harvest tickets frequently fail to

return the harvest report, and 3) returned harvest reports often account for only a portion of the actual harvest. Reasons for generally low levels of compliance with the harvest ticket system have to do with rural subsistence hunting patterns that, for a variety of reasons, are not accommodated by this system.

Respondents in the three interior study communities felt that most residents in their area generally supported the concept of wildlife management for big game species and recognized the need for accurate harvest information. Harvest tickets and reports, however, were viewed primarily as an enforcement tool rather than as a means of providing wildlife managers with information that would contribute to the sound management of local game populations. Thus, harvest tickets, when obtained at all, were not generally obtained with the intent of reporting harvest, but rather to comply with legal requirements should an enforcement officer be encountered while hunting. Unless prompted to validate the harvest ticket by an encounter with enforcement personnel, a hunter may refrain from validating a harvest ticket through the course of several successful group or individual hunts.

Validation of the harvest ticket and return of the harvest report implies that a hunter has taken the bag limit and has completed hunting for that species for the year. The concept of "one hunter, one harvest ticket, one moose" fails to accommodate the realities of subsistence hunting in rural Alaska. In many rural interior communities moose meat represents an important portion of the diet of most households. Despite the almost universal demand for moose meat, there are a limited number of individuals who have the equipment, expertise, and time necessary to hunt moose. Thus, it is from a relatively small group of hunters and long-established patterns of sharing that the community need for moose meat is met. This conforms to the "superhousehold" phenomenon found to be common in many Alaska communities where specialization occurs among households and a majority of a community's wild food supply is supplied by a minority of households (Wolfe 1987). Data from a 1987 subsistence study in Fort Yukon illustrate patterns of sharing and the superhousehold phenomenon. In 1987, 55 percent of all Fort Yukon households harvested moose, but nearly all households (98.9 percent) reported using moose meat (Sumida and Andersen 1990). Among the 116 Fort Yukon households harvesting moose in 1987, nearly one-third (29 percent) harvested two or more moose. One household reported harvesting seven moose. The harvest of multiple moose by a single household was not strictly a function of larger

household size. The household harvesting seven moose, for example, had a household size of only three individuals. This "superhousehold" was providing moose meat for a large extended family residing in numerous households.

Given these patterns of hunting it is perhaps understandable why the concepts of harvest tickets and individual, one-moose bag limits have not been adopted by many rural hunters. To the sport hunter, the idea of allowing a single hunter to take three or four moose over the course of a 30-day hunting season might seem to invite overharvest and waste. To the subsistence hunter, however, it is traditionally the most practical means of meeting the needs of many people. In their view, it makes perfect sense to have those that are best equipped or most experienced at moose hunting provide the community with moose meat. Hunters point out that while the allowable bag limit may be exceeded by an individual hunter, the overall community harvest levels usually fall well within sustainable levels, and that the impact on the resource is the same whether the three moose needed to feed an extended family of 12 people are taken by one hunter or three.

Harvest estimates shown in Table 2 indicate that harvest tickets and reports work better in some communities than others. Among the three study communities, McGrath provides an example of a rural community where the harvest ticket and report system seems to function reasonably well compared to the other study communities of Fort Yukon and Nulato. Several features of the McGrath population and economy can help explain why McGrath hunters can more readily adopt the individual-based model imposed by harvest tickets. First, McGrath has a sizable non-Native population (53 percent in 1990, Table 1) to whom the concepts of one-moose-per-hunter bag limits and harvest reporting are more familiar and culturally compatible. Second, hunting patterns for McGrath residents, including Alaska Natives, may be more individualized than in other rural interior communities where a series of group hunts and shared proceeds is the more common practice. This may be due, in part, to cultural differences between McGrath's population and other villages that affect sharing practices and kinship obligations. Household income may also play a role. The average taxable income in McGrath for 1985 of \$19,673 (Alaska Department of Revenue 1988), was more than \$6,000 higher than the average taxable income for Fort Yukon (\$13,571) and more than twice that of Nulato (\$9,180) for the same year (Table 1). Higher

incomes may make it possible for more hunters to obtain hunting equipment, such as boats and motors, and, therefore, to finance individual, rather than group, hunts. A more individualized hunting pattern with less emphasis on sharing is confirmed by the following case example from McGrath:

A Native hunter, described by others as one of the more "traditional" hunters in McGrath stated that he needed one and one-half moose to feed his family of four. He hunted each year with a friend who also needed one and one-half moose. Their strategy was to obtain licenses and harvest tickets for all members of both families in order to increase the available pool of hunters and harvest tickets. The adult male hunters validated their own tickets upon taking the first two moose. Then, depending on who was available to participate in another hunt, they brought other family members along on hunts for a third moose, validating a third harvest ticket when the harvest took place. Harvest reports on all three moose were returned. There was little or no sharing of meat beyond the immediate families of the two hunters.

Moose harvest tickets and reports appear to achieve reasonable estimates of moose harvest in a few relatively large interior communities which function as regional centers, have a significant non-Native population, and have resident ADF&G area biologists and/or enforcement personnel. Moose harvest tickets appear to work less well in communities that are relatively small and where traditional Native hunting practices of group hunting and sharing represent the dominant hunting pattern.

Clearly, there may be ways to increase participation in the current harvest reporting system. For example, the number of people obtaining harvest tickets could be increased through an increased enforcement presence including a larger network of moose hunter checkstations. Return rates of harvest reports might also be increased somewhat by increasing educational efforts in rural communities to explain the department's need for and use of harvest information, and through a more intensive mail-out campaign of post-season reminder letters to harvest ticket holders. However, because basic concepts underlying the harvest ticket system, such as "one hunter, one moose," clash with customary hunting practices and family needs, it is doubtful that a majority of rural Alaskan hunters would adopt the current system despite measures to improve participation. Furthermore, due to the fact that reported harvest does not necessarily reflect actual harvest when individual bag limits are imposed, it is questionable whether simply increasing the number of hunters returning harvest reports would represent a significant improvement toward reflecting the actual harvest.

To be most effective, harvest reporting systems should acknowledge and accommodate customary hunting patterns as long as they are compatible with sound wildlife management. The present system of harvest tickets and reports applied to rural Alaska fails to provide meaningful and accurate harvest information because it is based on a one-moose-per-hunter bag limit which is incompatible with on-going subsistence practices involving group hunting and shared proceeds. Where accurate harvest data are critical to sound management of the resource, alternative methods of harvest data collection should be sought, such as post-season surveys. As an alternative to initiating entirely new programs for harvest reporting in rural areas, it may be possible to significantly improve the existing system of harvest tickets and reports by modifying it to include increased moose bag limits or transferable harvest tickets.

Cooperation is perhaps the key element that is common to all of the alternatives described above. Wildlife agencies operating in the Canadian North have adopted as a matter of policy a "cooperative approach" to subsistence harvest data collection where harvesters themselves play an active and positive role (Usher *et al.*, 1985). Alternative harvest reporting systems for rural areas should attempt to incorporate 1) significant levels of cooperation between users and management agencies, and 2) accommodation of customary and traditional hunting practices to the extent these do not conflict with sound resource management.

The recording of subsistence harvests is a specialized form of fish and wildlife statistics (Usher *et al.*, 1985). Standard harvest reporting mechanisms using harvest tickets, which have been shown to work well among urban hunters, meet with mixed success among rural subsistence hunters. In rural interior Alaska, moose harvest tickets and mail-in reports appear to work reasonably well in a relatively few large regional centers with a significant non-Native population, increased employment opportunities, greater household incomes, and resident agency personnel to oversee and enforce regulations. In the smaller, more traditional communities that make up the majority of interior Alaska, the system of harvest tickets and reports generally fails to provide an adequate accounting of subsistence harvests of big game. The major findings of this study lead to the following conclusions:

- 1) rural subsistence hunters in the three study communities generally agree with the concept that big game populations need to be managed and that sound management should include an accurate accounting of harvest;
- 2) among rural subsistence hunters in the three study communities, harvest tickets are commonly viewed as an in-season enforcement tool rather than a post-season reporting mechanism for harvest data;
- 3) because of low return-rates for harvest reports and harvest report returns that reflect only a portion of actual harvest, the current harvest ticket system does not provide an accurate accounting of big game harvests by rural subsistence hunters in two of the study communities;
- 4) the individual bag limit of one moose per hunter imposed by the current harvest ticket system does not accommodate the needs of many rural hunters due customary patterns of group hunting and shared proceeds, individual hunters providing for several households, and individual household needs which commonly exceed one moose (the primary reasons given for the failure of the harvest ticket system in two of the study communities);
- 5) alternative harvest reporting programs in Alaska and Canada that have been developed in a cooperative spirit with rural communities suggest that where individual bag limits are removed or designed to accommodate customary hunting patterns, rural subsistence hunters are better able to actively participate in harvest reporting programs; and
- 6) post-season household surveys have the potential for being an effective means for collecting more accurate harvest data in many rural interior communities.

Because of Alaska's large size and the dispersed nature of subsistence harvests, both geographically and temporally, the use of enforcement to induce compliance with existing harvest reporting requirements would be costly, impractical, and ineffective. Where accurate harvest data are needed for the sound management of resources harvested by rural subsistence hunters, cooperative alternatives to the current harvest ticket system of harvest reporting should be considered and implemented.

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## APPENDIX

### COMPLIANCE WITH HARVEST REPORTING: INFORMAL INTERVIEW GUIDE

1. "The System" we are asking people to "buy into" with the use of licenses and harvest tickets assumes that people accept several basic concepts:
  - That wildlife populations need to be managed
  - That management requires some accounting of harvest over time (annually?)Do you think people in this community generally understand and agree with these concepts?
  
2. Do you see a need for the department to provide more education on what wildlife management is and why it is needed?
  
3. To obtain harvest tickets, tags, etc., hunters age 16 and over must first purchase a hunting license. In your estimation, what percentage of local hunters obtain licenses?
  
4. Can you think of specific reasons why some hunters don't obtain licenses?  
(no vendor, cost, Native right to hunt, one licenses per household or hunting party)
  
5. Is there local enforcement of licenses requirements? (Are hunters checked?)
  
6. Do most hunters buy licenses at the beginning of each calendar year or do they hunt without them for a good portion of the year and buy them prior to major fall hunting activities? In other words, are people more likely to participate in "the system" for some species than for others? (Ask about compliance with local winter permit moose hunts, if any)
  
7. The harvest ticket system is based upon the concept of individual bag limits. Do you think this concept is generally accepted or is this part of the reason for limited participation in the system?
  
8. What kind of bag limit, if any, would be more widely accepted?
  
9. Some hunters buy licenses and obtain required tickets or tags but do not return the harvest report. Do you have any thoughts on why this might be?
  
10. What do you think are the primary reasons many people don't comply with harvest reporting requirements?
  
11. Do you think that confusion over requirements and game regulations is part of the reason many don't comply with harvest reporting requirements. (regs. too complex, differences between calendar and regulatory year, required paperwork, language barriers, etc.)

12. From your own experience, can you give examples of how current harvest reporting requirements do not fit with local hunting patterns. For example, can you describe how or why a moose or caribou taken locally might not be accounted for under the present system of harvest reporting requirements?
13. Do you have any ideas or suggestions for a harvest reporting system that might be more compatible with local hunting patterns and provide better harvest information?
14. Can you comment on local perceptions of what makes someone a "sport hunter" vs a "subsistence hunter"?
15. Are there residents of this community you would consider to be sport hunters? If so, how are their hunting activities different from subsistence hunters?.
16. Should sport and subsistence hunters be regulated differently?

THANK YOU FOR YOUR TIME