CO-MANAGEMENT OF MOOSE IN THE GWICH'IN SETTLEMENT AREA, NORTHWEST TERRITORIES

Jason P. Marshal

Gwich'in Renewable Resource Board, P. O. Box 2240, Inuvik, NT, Canada X0E 0T0

ABSTRACT: The Gwich'in of the Northwest Territories play an important role in the management of moose (*Alces alces*): they have a settled land claim that requires their involvement in wildlife management, they provide valuable traditional knowledge to biologists about moose in an area for which there is little background scientific information, and of the moose harvested, subsistence makes up a majority. A co-management board was established to ensure cooperation between Gwich'in and government agencies in the research and management of renewable resources. Through co-management, there is improved exchange of traditional and scientific knowledge between Gwich'in and agency biologists, there is an increased sense of responsibility for management among Gwich'in, and Gwich'in are more willing to participate in future management activities. Since co-management began in this area, biologists and Gwich'in have designed and conducted moose surveys, harvest assessment of Gwich'in hunters, inventory of moose habitat, and documentation of traditional knowledge about moose.

Key words: aboriginal, *Alces alces*, co-management, Gwich'in, harvest, moose, Northwest Territories, traditional knowledge

RÉSUMÉ: Les Gwich'in des Territoires du Nord-Ouest jouent un rôle important dans la gestion de l'orignal (*Alces alces*). Une entente territoriale leur demande de s'impliquer dans la gestion de la faune. Ils fournissent ainsi des connaissances traditionnelles sur l'orignal dans une region où peu d'informations scientifiques ont été recueillies et où la chasse de subsistance des Gwich'in est la principale source de récolte d'orignaux sur ce territoire. Un conseil de co-gestion a été établi afin d'assurer la coopération entre les Gwich'in et le gouvernement dans la recherche et la gestion des ressources renouvelables. Cette partenariat de gestion a permis de développer un échange de connaissances traditionnelles et scientifiques entre les Gwich'in et les biologistes des différents gouvernements. On observe une augmentation du sens des responsabilités pour la gestion de la resource chez les Gwich'in et ceux-ci sont plus intéressés à participer à de futures actions de gestion. Depuis que la partenariat de gestion existe dans la region, les biologistes et les Gwich'in ont conçu et mené des inventaires de population d'orignaux, une étude sur les récoltes indigènes ainsi que des entrevues répertoriant les connaissances traditionnelles des Gwich'in sur cette espèce.

Mots-clés: *Alces alces*, autochtone, chasse, co-gestion, connaissance traditionnelle, Gwich'in, orignal, Territoires du Nord-Ouest

ALCES VOL. 35: 151-158 (1999)

Co-management has become increasingly common in Northern Canada with the settlement of aboriginal land claims. A part of many of these settled claims is the creation of public co-management boards to manage wildlife in the claim area. The Gwich'in Renewable Resource Board (GRRB) is such a board that operates in the Gwich'in Settlement Area (GSA) of the western Northwest Territories (Fig. 1).

Moose research and management in the GSA occur through co-management. This process is a means by which wildlife users and management agencies cooperate in the research and management of wildlife. It involves an agreement between govern-

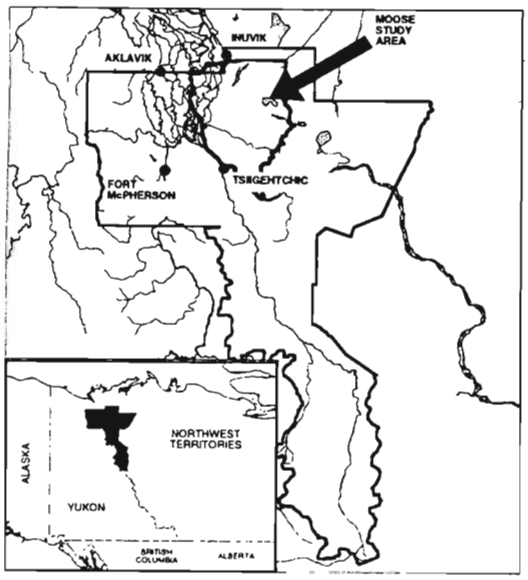

Fig. 1. Gwich'in Settlement Area showing Inuvik-Tsiigehtchic moose study area surveyed in November 1996.

ment and user groups that specifies the rights and obligations of wildlife users, the rules indicating actions that government departments, land claims organizations, and the wildlife users themselves should follow under various circumstances, and a collective decision-making process for government agencies and wildlife users (Osherenko 1988).

This paper provides an overview of co-management in general, the system that operates in the GSA, and examples of how co-management has worked in the management of moose.

PRINCIPLES OF CO-MANAGEMENT

In the past, the centralized western approach to wildlife management has not been effective where aboriginal subsistence harvest occurs (Usher 1986). Co-management attempts to decentralize management by making it community-based (Gardener and Roseland 1989). This involves aboriginal hunters in research and management that affects the wildlife they use and their subsistence lifestyles. Co-management is most likely to succeed when the aboriginal hunters and wildlife managers work together in all aspects of wildlife management (Pinkerton 1989). This cooperation includes raising concerns about wildlife populations, discussing the design of studies, communicating the results of studies, and discussing their management implications. Involvement also means including the subsistence hunters in management decisions.

Communication is essential to ensuring full involvement of all parties. This is often difficult because aboriginal hunters and university-trained biologists often speak different languages when talking about wildlife (Bielawski 1992). The solution requires education for both groups. Wildlife managers must be able to communicate in non-technical language. They must understand aboriginal cultural and social values and address these values in management projects (such as when capturing and handling animals or using radio-collars). They should be willing to include the knowledge of local hunters when planning wildlife projects. There should also be training and education opportunities to allow aboriginal people to become more proficient in wildlife management as a field of study.

At the same time, aboriginal people need to become involved in wildlife projects. They should raise concerns and provide their opinions about wildlife issues. They must be willing to share their knowledge about the land and resources, and to teach wildlife managers about their culture and how they view wildlife. In addition, education and training in renewable resources management is important for aboriginal people, for it greatly improves their understanding of methods and reasons behind wildlife management.

Having wildlife managers with an un-

derstanding of aboriginal culture and values, and aboriginal hunters with an understanding of science-based wildlife management, greatly facilitates communication between these groups. Communication and the involvement of local communities and aboriginal hunters are the basis for wildlife management in the GSA.

CO-MANAGEMENT IN THE GSA

Before the Gwich'in land claim was settled, wildlife management was the sole responsibility of the government. All management plans, actions, initiatives, and decisions were made by centralized authorities, with minimal involvement from the affected wildlife harvesters. Although the government still has ultimate jurisdiction and responsibility for wildlife, decisions are now made jointly, and they must consult and seek the approval of the wildlife users. Whereas, before land claim settlement, government played the role of sole manager and decision maker, it now participates as an equal partner with the Gwich'in. As part of the land claim settled by the Gwich'in, the GRRB was established as the primary instrument of wildlife management in the GSA (DIAND 1992). It is through this board that government agencies cooperate with Gwich'in to manage wildlife.

The GRRB is responsible for wildlife management at a regional level. This board consists of 7 members (Fig. 2). There is 1 representative from each of the main government agencies involved in renewable resources management: the federal Department of Environment (DOE), the federal Department of Fisheries and Oceans (DFO), and the Northwest Territories Department of Resources, Wildlife and Economic Development (DRWED). To balance these 3 government representatives, there are 3 Gwich'in representatives chosen by the Gwich'in Tribal Council to represent all Gwich'in in the GSA. There is also a chairperson, who can be Gwich'in or non-Gwich'in, but must be a resident of the GSA.

The GRRB addresses concerns raised by people in the communities of the GSA and government agencies. It has the power

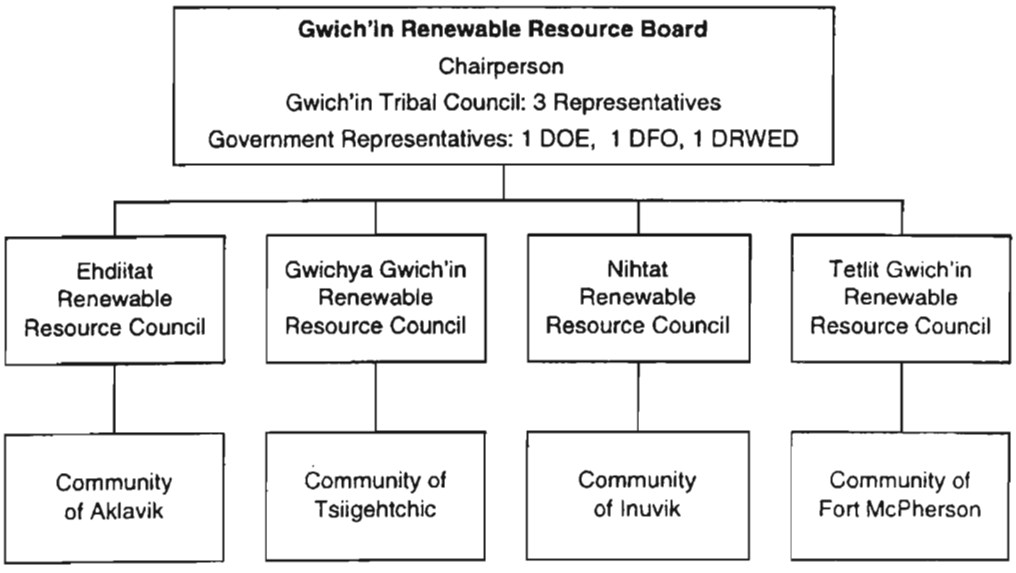

Fig. 2. Summary of the co-management system in the Gwich'in Settlement Area (DOE = Department of Environment, Canada; DFO = Department of Fisheries and Oceans, Canada; DRWED = Department of Resources, Wildlife and Economic Development, Northwest Territories).

to establish policies and propose wildlife harvest regulations, approve management plans for wildlife, and approve designation of endangered species and conservation areas (DIAND 1992). Once the GRRB has made a decision concerning a wildlife issue, that decision goes to the minister of the appropriate government department (DOE, DFO, or DRWED) for consideration. If that department has been included in the GRRB decision-making process (through its representative), the minister usually agrees with the decision, and it becomes official with the appropriate management actions or regulations. The minister could overturn the decision, for example if non-Gwich'in in the GSA have not been considered in a proposed wildlife regulation change. However, if the wildlife users and government agencies have been fully involved in the decision-making process, the minister should support the decision. Otherwise, the minister and the wildlife agency risks loosing the participation and cooperation of the wildlife users, making effective wildlife management more difficult.

Wildlife agencies work with Gwich'in hunters themselves through the Renewable Resource Councils (RRCs) in each of the 4 communities in the GSA. Each RRC has 7 members who are elected to represent the views of their community. They raise wildlife concerns in the community and recommend studies they would like. The RRCs consult with biologists about research projects, methods, study areas, facilities, and logistics. They recommend people to assist with projects who have an interest in wildlife management, know the study area, or are willing to provide a field camp or equipment. The RRCs inform their communities about the results of projects and the meaning of the results. They are also instrumental in educating the communities about management decisions and plans, and eliciting feedback.

The GRRB also has independent research capability to carry out projects that do not duplicate those conducted by government agencies. As part of the Gwich'in land claim, the Government of Canada provided implementation funds, some of which were allocated to a wildlife studies fund used by the GRRB and government agencies for research and management. The GRRB has support staff to coordinate research with government agencies and cooperate in projects with government biologists. Board research projects are usually in collaboration with government agencies.

MOOSE RESEARCH IN THE GSA

In 1996, the GRRB and DRWED began a project to study moose populations in a high-use area of the GSA (Fig. 1). The project was motivated by concerns raised by the RRCs in Inuvik and Tsiigehtchic that moose populations were decreasing. The goal was to determine moose density, distribution, and changes in moose population size.

Until 1996, moose research in the GSA had been sporadic. Moose population surveys occurred in 1980 and 1986 (Bracket *et al.* 1985, Stenhouse and Kutney 1988), however, none of the areas had been resurveyed to establish population trends. Furthermore, there were many areas in the GSA for which no moose population data were available, but where moose were regularly harvested. The 1980 and 1986 surveys suggested population densities were low (Table 1). Therefore, accurately estimating moose abundance for the GSA would probably be difficult.

Members of the RRCs and biologists from GRRB and DRWED determined a study area in which to estimate moose abundance. Local Gwich'in hunters and RRCs also identified high- and low-density areas for moose. Gwich'in observers recommended by the RRCs assisted with the

Table 1. Studies involving moose in the Inuvik-Tsiigehtchic region of the Gwich'in Settlement Area.

Date	Survey type	Number of moose	Moose/km²	Reference
Feb 1980	Strip Transect	149[1]	0.01	Brackett *et al.* 1985
Nov 1986	Stratified Random Block	173[1]	0.04	Stenhouse and Kutney 1988
Nov 1996	Stratified Random Block	107[1]	0.02	Chetkiewicz *et al.* 1998
Nov 1997	Composition	86[2]	0.09	Marshal 1998
Mar 1998	Composition	50[2]	0.04	Marshal 1998

[1]Estimated number of moose.

[2]Observed number of moose. No estimate was calculated.

survey. Following the survey, the GRRB presented results to the RRCs in non-technical language and discussed their interpretation. The GRRB produced plain-language posters for the RRCs to distribute in the communities. Interviews were conducted in Gwich'in and English on the local community radio station to discuss the project.

Since 1996 there have been additional surveys. One which occurred in March 1998 provides a good example of how cooperation with wildlife users can benefit wildlife studies. The objective of the survey was to determine the late-winter proportion of calves in the population to use as an index of population recruitment and trend. Because proportion estimates are highly variable when calculated from low sample sizes, the goal was to observe $\geq$ 70 animals (Larsen and Ward 1990). Based on the previous studies, a sample this large was unlikely.

Having little idea of the late-winter characteristics of the moose population, the GRRB considered two options: (1) conduct a low-intensity survey of a large area of interest; or (2) conduct more intensive surveys of areas identified by Gwich'in as having relatively high densities of moose.

The GRRB chose option (2) and consulted RRCs and hunters who use the area. The hunters identified important late-winter moose areas, which included areas outside the 1996 survey. They indicated that many of the 1996 areas were only occupied by moose during early winter. The survey crew counted 50 moose with the modified survey area (Marshal 1998). They did not reach their goal of 70 moose, but they did observe approximately twice the expected number (23 moose) based on the area they surveyed and the density estimate from 1996. In addition to observing a larger than expected number of moose, the survey cost less. A survey using local input cost approximately $5,000. Option (1) above would have cost $10,000.

ADDITIONAL INFORMATION AVAILABLE IN A CO-MANAGEMENT SYSTEM

Gwich'in Harvest Study

The Gwich'in land claim requires that the GRRB conduct a harvest study to estimate the number of animals harvested in the GSA by Gwich'in. The harvest study began in August 1995 and continues until 2000. At times, overharvest and population decrease of a particular wildlife species might be-

come evident. Under such circumstances, the GRRB would have the power to institute a quota for that species. The number of harvestable animals would be based on biological information provided by DRWED and GRRB biologists. The Gwich'in harvest data would then be used to determine how much of the quota is reserved for subsistence harvest, and Gwich'in Tribal Council would review that decision. Any of the quota that remains could be used for sport hunting.

Gwich'in harvest data are collected by Gwich'in interviewers who speak to the hunters in each household of each community to collect information on harvested wildlife. This includes species, number, location, date, and for some species such as moose, sex and age (McDonald 1998). Interviewers are hired to work in the communities where they live. They know all of the hunters, and get better cooperation than biologists. Because of the importance of this in establishing the harvest allocation for Gwich'in, hunters tend to cooperate and help secure what Gwich'in need for subsistence.

These are perhaps the best harvest data that the GRRB has available. Response rates for 1995 and 1996 averaged 94% (McDonald 1998), providing reasonably accurate Gwich'in harvest numbers. Unfortunately, there is no easy method for evaluating the accuracy of what hunters report. As with any study, there are tradeoffs between the quality of data and the amount of money spent. Harvest data will never be completely accurate, but for the purposes of wildlife management, the accuracy is sufficient.

Data for non-Gwich'in harvest have been collected since 1982 by means of a voluntary mail-in Resident Hunter Questionnaire. It has had territory-wide return rates of 72-91% (Graf 1992). When considering methods for the Gwich'in harvest study, the GRRB rejected mail-in questionnaires because they did not expect many returns. Some Gwich'in hunters cannot speak English or read, therefore, the only method of gathering reliable data from as many hunters as possible was via personal interviews. The aim of both harvest studies is to determine the total moose harvested in the area, and both have difficulties due to inaccurate reporting. Because both studies collect information on date, location, and characteristics of harvest, the GRRB believes these data are comparable.

Gwich'in Environmental Knowledge Project

An important aspect of co-management is the use of traditional knowledge in the management of wildlife. It recognizes that people who regularly use wildlife have knowledge about the resource because of their experiences and oral traditions. Encouraging people to share this information increases their involvement in wildlife management and improves the overall pool of knowledge about the resource. The GRRB has been gathering information from Gwich'in Elders about traditional uses of wildlife, which it makes available to resource management agencies to assist in wildlife studies. The GRRB collects traditional knowledge by interviewing Elders and researching archives.

The GRRB has recently published a book on traditional knowledge (Gwich'in Elders 1997) that contains information on about 20 fish and wildlife species. One of these species is moose. Most of the information is about the natural history and is qualitative rather than quantitative. It also includes some of the methods of hunting and the traditional uses of moose.

The GRRB is also working on a database of traditional knowledge based on interviews of Gwich'in Elders that began in the late 1970's. Most of this information is

derived from Elders' stories about their lives on the land before they were affected by western cultures. This information describes locations or ranges of wildlife populations in the past, temporal changes in wildlife populations, areas where species were harvested, and historical uses of wildlife. Place names have been linked to coordinates in a geographic information system to facilitate use by biologists.

Ownership of traditional knowledge is an important issue to the GRRB. In the past, Elders have been reluctant to provide traditional knowledge because the information was not used for purposes that benefited them or other Gwich'in. Recently, however, Elders have become more willing to share their knowledge because the information is used to assist with management of resources on which they rely for their subsistence lifestyles. The GRRB makes it clear that the Elders retain intellectual ownership over the information, and may dictate how the information is used. This is the case for the information gathered for the Gwich'in traditional knowledge book (Gwich'in Elders 1997) and for any information collected for other traditional knowledge or wildlife management projects. Elders have been willing to share their knowledge because it is being used in the GSA.

PROBLEMS WITH CO-MANAGEMENT

Co-management is new to the GSA. It will take time for the GRRB, the wildlife management agencies, and the wildlife users to learn what their roles are in this system, and how to best cooperate to identify and reach goals in wildlife management. There has been difficulty in communication between wildlife users and biologists because of technical language that community members find difficult to understand. Biologists new to co-management need to learn how to involve community members in the design of projects and how to include them at all steps of management. A biologist new to co-management might perceive community involvement to be only informing the communities about projects that have already been planned or designed, without including community members in all aspects of wildlife management.

The Gwich'in are also new to co-management. Co-management involves some education on their part to learn the basics of wildlife management, and to be able to inform and get input from others in the communities. Because government has been the sole player in wildlife management for so many years, many Gwich'in have become apathetic about wildlife management; they have lost the sense of ownership over the wildlife that they harvest. As the Gwich'in have recently settled their land claim, they are beginning to learn that their claim gives them the right to contribute to management of wildlife resources. They are learning the importance of their input and the power they have to affect management and policy decisions, but this learning will take some time. Also, because the Gwich'in are new to co-management and the field of wildlife biology, there are few Gwich'in who have the education to work as wildlife biologists or managers.

CONCLUSION

This is an exciting time for moose research and management in the GSA. When compared to areas where studies have occurred for several years, moose research in the GSA is only beginning. We are learning about low-density moose populations at the northern edge of the range. Also, Gwich'in are contributing to resources management through subsistence harvest and traditional knowledge studies. Moose research and management in the GSA has benefitted from the participation of the Gwich'in communities. Through their cooperation,

Gwich'in have benefited from the improved management of resources on which they rely for their subsistence lifestyles.

ACKNOWLEDGEMENTS

The contents of this paper were based on valuable discussion with Peter Clarkson, Catherine Filion, Hillarie Greening, Ian McDonald, John Nagy, and Patrice Simon. I greatly appreciate comments by Jim Dau and an anonymous reviewer. Marie-Anick Elie translated the abstract into French.

REFERENCES

BIELAWSKI, E. 1992. Inuit indigenous knowledge and science in the arctic. Northern Perspectives 20:5-8.

BRACKETT, D., W. SPENCER, G. BAIRD, J. A. SNOWSHOE, E. KRUTKO, L. MALES, and P. LATOUR. 1985. Moose surveys in the Mackenzie River delta, valley and tributaries, 1980. NWT Wildl. Serv. File Report 48. 15 pp.

CHETKIEWICZ, C.-L. B., D. VILLENEUVE, M. BRANIGAN, J. NAGY, and J. P. MARSHAL. 1998. Population composition and abundance of moose in the Inuvik-Tsiigehtchic region. Gwich'in Renewable Resour. Board, Report 98-04, Inuvik. 22 pp.

(DIAND) DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT. 1992. Gwich'in Comprehensive land claim agreement. Vol. 1. Government of Canada, Ottawa, ON. 122 pp.

GARDENER, J. and M. ROSELAND. 1989. Acting locally: community strategies for equitable sustainable development. Alternatives 16:36-48.

GRAF, R. P. 1992. Status and management of moose in the Northwest Territories, Canada. Alces Suppl. 1:22-28.

GWICH'IN ELDERS. 1997. Gwich'in words about the land. Gwich'in Renewable Resour. Board, Inuvik, NT. 212 pp.

LARSEN, D. G. and R. M. P. WARD. 1990. Summary of Yukon moose population trend survey results 1988 and 1989. Yukon Fish and Wildl. Branch, Progress Report ST-90-4. 45 pp.

MARSHAL, J. P. 1998. Trend survey of moose in the Inuvik-Tsiigehtchic region, Northwest Territories, November 1997 and March 1998. Gwich'in Renewable Resour. Board, Report 98-05, Inuvik. 15 pp.

MCDONALD, I. 1998. Gwich'in harvest study data report: August 1995 to December 1996. Gwich'in Renewable Resour. Board, Report 98-01, Inuvik. 33 pp.

OSHERENKO, G. 1988. Sharing power with native users: co-management regimes for native wildlife. Can. Arctic Resour. Committee, Ottawa, ON. 58 pp.

PINKERTON, E. 1989. Introduction: attaining better fisheries management through co-management - prospects, problems and propositions. Pages 3-36 *in* E. Pinkerton (ed.) Cooperative management of local fisheries: new directions for improved management and community development. Univ. British Columbia Press, Vancouver, BC.

STENHOUSE, G. and L. KUTNEY. 1988. Abundance and composition of moose in the Rengleng River area, NWT, November 1986. Unpubl. Gov't of the NWT File Report 26 pp.

USHER, P. 1986. The devolution of wildlife management and the prospects for wildlife conservation in the Northwest Territories. Can. Arctic Resour. Committee, Ottawa, ON. 139 pp.